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Passionate investment in contemporary art,
in the name of artistic value or value speculation?

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Foreword

In 2019, I visited the exhibition “Asia Now” in Paris, it is an exhibition aiming to discover and to present talented and creative new or young Asian artists, art works chosen and exhibited here represents recognition or at least positive expectation of future value from professional and academic views. I took it simply as a window to see Asian artists who break the cultural borders and are appreciated by the western world, but when I entered the exhibition, I started to realize it’s more like an art fair. Independent artists, dependent artists and their agents, galleries gathered together and passionately introduced art works to potential buyers. There was one interesting thing, an agent asked her artist: “there is a gentleman who want to buy some of your art works, he likes them a lot, but he understands nothing about your thoughts in your works. Like so do you mind selling them?” The artist replied: “Of course not! It doesn't really matter.”

It’s my first time to closely see that art investors purchasing art works without deeper knowledge or understandings but following popularity, agents selling art works without providing complete information, artists weighing monetary value more than artistic aesthetics in the market. “Asia Now” can show more or less about contemporary art business, a popular business with rich but confusing investors, profits optimizing agents and reputation chasing artists. I started to doubt that is art market centered around the art. Or it is art centered around the market.

Doubts about hot contemporary art market rise as news related to it appear often these years. This work aims to give an insight of investment in contemporary art, to aware the market situation, the value of contemporary art, the price mechanism, and the interaction among market participants. By analyzing these connecting affairs, it is possible to see how the market works and what are the hidden problems.

Contextes

Foreword	3
1 Introduction	7
1.1 Research Background	7
1.2 Research Context	8
1.3 Research Framework	13
1.4 Research Methods	14
2 Literature Review of Investment in Contemporary Art	15
2.1 Booming Market: Going Popular before Getting Understandable	15
2.2 Abstract Expression: Try to Understand before Try to Invest	19
2.3 Value Discovery: Personal Interests before Public Aesthetics	19
3 Insight of Abstract: Value of Art Works Based on Hedonic Pricing Model	23
3.1 Model Inspiration: Combination of Value Contribution from Independent Factors	23
3.2 Comparative Applications in Artwork Pricing	25
4 Back to Reality: Value Factors of Contemporary Art Considered by Market Participants	27
4.1 View of Suppliers, How Artists Estimate the Value of Their Works?	27
4.2 View of Market Makers, How Agents Evaluate the Value of Art Works?	28
4.3 View of Demanders, How Investors Expect the Value of Art Works?	29
4.4 Dynamic Interaction between Market Participants Affects Independence of Value Factors	32
5 Criticism: Apparent Model Limitations Rarely Matches Complex Contemporary Art Market	39
5.1 Inevitable Multicollinearity: Dependent Factors Both in Art and Market	39
5.2 Asymmetric Information: Inefficient Data Transmission Caused by Low Transparency	39
5.3 Measurement Invalidity: Simplified Model Misses Various Aspects of Contemporary Art	40
Conclusion	42
Postscript	43
Acknowledgement	46
Bibliography	47

List of Figure and Table

Figure 1 Individual with Artistic Aesthetic	9
Figure 2 Individual Self-doubt due to Contemporary Art	9
Figure 3 Potential Reason due to Public Confusion of Contemporary Art	10
Figure 4 Potential Result When the Public and the Professional Do Not Understand Contemporary Art	10
Figure 5 Potential Decisions of Market Participants due to Hot Contemporary Art Market	11
Figure 6 Different Contemporary Art Market Situations by Chasing Monetary Value or Artistic Value	11
Figure 7 Interaction among Subjects of Research Framework	13
Table 1 Value and Volume of Transactions in the Global Art Market	15
Table 2 Value Market Share of Country in Global Art Market in 2019	16
Figure 8 Share of Having Purchased Goods	16
Figure 9 Price Range for Purchasing Art Works and Art Objects	16
Figure 10 “My Life Is Pointless”	17
Figure 11 Motivation to Purchase Art Works	17
Table 3 Often Chosen Sales Channel in the Art Market	18
Table 4 Potential Net Wealth Tax for Art Works	30
Table 5 Potential Corporate Tax of Companies for Art Works	30
Table 6 Potential Income Tax for Art Works	31
Table 7 Potential Gift and Estate Tax for Art Works	31
Table 8 Potential Capital Gains Tax for Art Works	32
Table 9 Contemporary Art Market in Relevant Wealthier Regions	32
Table 10 Contemporary Art Market in Relevant Poorer Regions	33
Figure 12 Simplified Interactions among Price Factors and Market Participants	35
Figure 13 Contemporary Art Work Inspired by Ocean Pollution	36

Figure 14 Contemporary Art Work Inspired by AI Applied in Dating Apps	36
Figure 15 Packaged Pont Neuf in 1960s	43
Figure 16 Construction Site of Packaging Pont Neuf	44
Figure 17 Massive Amounts of Visitors for Packaged Pont Neuf	44

1 Introduction

This chapter introduces the whole research ideas based on introduction in details, including the research background, research contexts, research methods and research framework.

1.1 Research Background

Contemporary art is indeed popular now, even facing criticism and sarcasm. The interesting thing is its popularity and controversy are existed and recognized both for professionals and common people. This art style and its business draw more and more attention, the significance to study them goes without saying.

Keeping a belief that the real is rational and the rational is real, this work recognizes the monetary value of contemporary art showing its artistic value, but points out the evaluated monetary value of contemporary art work may not be accurate if corresponding with an incomplete recognition of its artistic value due to knowledge or era limitations, which is proved from historical experience that certain art works, artists or even art style could be criticized and suppressed at that time, but were recognized and pursued after.

To have a deeper insight on the investment in contemporary art, especially the reasonableness between pricing mechanism and the value exploration in contemporary art pieces, this work uses four research methods: transdisciplinarity research, qualitative research, literature research and descriptive research to discuss the relevant topics of contemporary art and its investment, this work divides into five chapters:

Chapter one introduces the whole research ideas based on introduction in details. This chapter includes the research background, research contexts, research methods and research framework. The contexts part points out the tight connections between art and reality, explains the active interaction between art evolution and social development, presents the booming art market, then lists doubts and concerns related to contemporary art investment market, which directly or indirectly influence the pricing process.

Chapter two reviews literatures, which starts from presenting the booming contemporary art market by referring to the art industrial research reports, and then develops some opinions on contemporary art of art history researches, finally states main findings about monetary value in the market of contemporary art work. The order of this arrangement means to show how the reality goes on that contemporary art business gets popular before contemporary art really gets understandable to investors or even professionals. It is important to introduce contemporary art here, with the understandings of its artistic value, then this work concludes some findings about its monetary value exploration.

Chapter three focuses on the model to define value of art works, which is abstract and ideal method. This chapter firstly introduces the widely used hedonic model in pricing art works, then analyses and compares some works mentioned in literature review in details, such as the consideration of chosen factors, database, target market, time period, etc. Through this chapter it is able to see the overall researching process and

achievements.

Chapter four backs to the reality since current researches based on hedonic model in artwork pricing may have key potential issues that directly or indirectly cause the inaccurate or incomplete value evaluation of contemporary art works. To find these hidden issues, it is necessary to discuss how three market forces, as supplier the artist, as market maker the institution such as gallery or auctioneer and as individual investor, consider about the factors to affect final value of contemporary art works, then to discuss how their interactions affect considerations and even decisions of each other, which results in the changes of art creation and pricing.

Chapter five is about personal critical thinking of value evaluation of contemporary artwork based on hedonic pricing model. From literature review to reality check, certainly there will be unmatching between ideality and reality, this chapter admits and accepts it, and more aims to point out the limitations or shortages during model application.

Overall speaking, this work is a theoretical work related to contemporary art investment. By analyzing the market situation, research achievement and value evaluation process, this work picture the developed contemporary art market with developing pricing mechanism with exact possible shortages, which may be helpful for other researchers to improve the value modelization.

1.2 Research Context

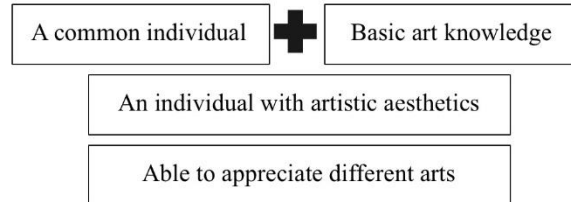
Based on research background introduced as above, this work selects contemporary art among different art styles as research subject since firstly it is the current popular and developing art style which actively interacts and reflects events and thoughts in our time; secondly it has the most controversial understanding, recognition and acceptance but also hottest market reaction among not only common people but also professionals.

People having basic understandings of art have abilities to recognize the artistic and monetary value of art works, but they have doubts of values in contemporary art, and surprisingly some professionals don't understand artistic value of contemporary art neither, but they do see its massive monetary value in the market. An artwork lacking artistic value should also be valueless, but the reality is contemporary art is popular and makes considerable gains, so the problem doesn't from contemporary art style itself.

Here this work sets a series of familiar scenes as below to reveal hidden issues to affect its value and value recognition, which will be further discussed after. These scenes are observed and experienced by the author in the life.

“You have interests in art, so you often visit art museums. You may not a specialist in art, but you know more of less about styles, backgrounds and features of art.”

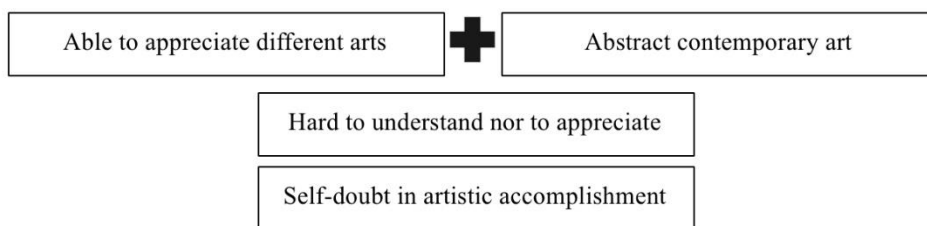
Figure 1 Individual with Artistic Aesthetic



The scene abstracted as figure 1 is applicable for many people that they like art and know basic knowledge and information of art, they can be considered as having artistic aesthetics, so their judgement of artistic value is reasonable as they are able to appreciate different arts.

“Among all kinds of art, contemporary art often embarrasses you. You visit an exhibition of contemporary art in a renowned museum. You just glance at most of them and feel nothing special, meaningful nor beautiful. You have no idea how these things can be exhibited in such a good museum, but the taste of museum represents a high standard of fine arts, so it is your shortage if not appreciating them. You try to understand by reading handbook, but abstract presentations let you confuse and doubt your artistic aesthetic more. That impressing, comfortable, obsessing feeling from other older art styles fades...”

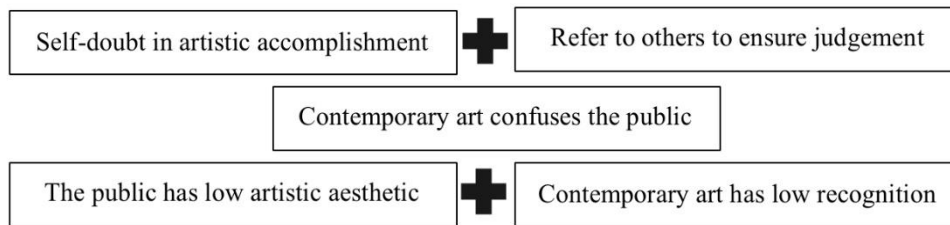
Figure 2 Individual Self-doubt due to Contemporary Art



In the scene abstracted as figure 2, people who can appreciate different art styles have problems to understand contemporary art as it's often abstract to express the thoughts of artists, without exquisite techniques and materials like other art styles it's still possible to be highly recognized and presented in famous museums. People prefer to recognize art works presented in museum as it represents the academic recognition of art, so when people can't understand contemporary art works in the exhibition then they will doubt their abilities to understand art.

“...you peep visitors around you, they are whispering, snickering, or even ridiculing these art works as nobody takes the exhibition seriously. They just post pictures of themselves with art works behind to show their tastes or to mock art works...”

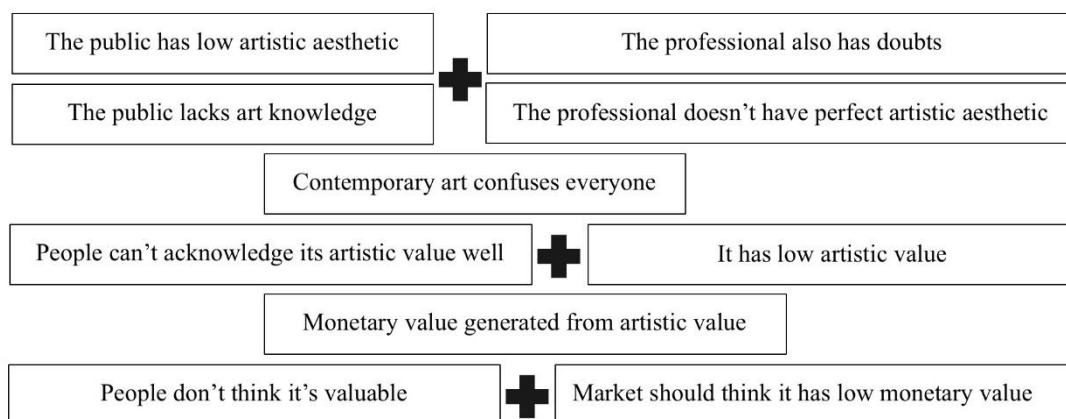
Figure 3 Potential Reason due to Public Confusion of Contemporary Art



In figure 3, when people have doubts, they refer to others to ensure the source of problem is really from themselves or from the art works. It's widely founded that many people cannot understand contemporary art, so when people refer to each other, they are easily to locate the problem on the contemporary art as the referee holds same opinion, the following conclusion due to this is the public has low recognition of contemporary art. But there is another possibility that the public has low artistic aesthetic so they cannot realize the value of contemporary art like the professional does.

“...after exhibition you consult your friends who have art education backgrounds or work in art business so that they can expand your thoughts about contemporary art. They can talk about its development and some stories of master pieces, but they admit even themselves may not totally understand, appreciate, recognize and value entire contemporary art works...”

Figure 4 Potential Result When the Public and the Professional Do Not Understand Contemporary Art

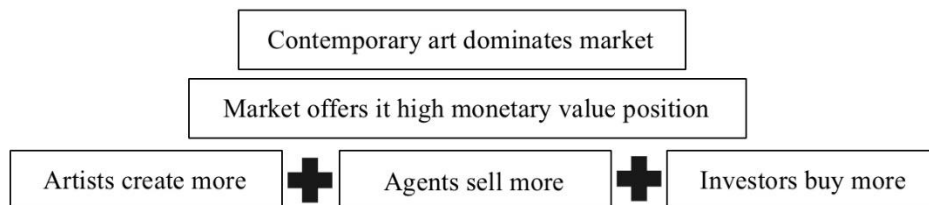


As figure 4 illustrates, if the fact is the public has low artistic aesthetics, but the professional has high one, then the contemporary art shouldn't have controversy in the art industry as the professionals reach consensus. But professionals doubt contemporary art too, so with or without enough art knowledge does not equal perfectly less or more artistic aesthetics. As everyone doubts contemporary art, so everyone has problem in understanding, or it really doesn't have high artistic value. Artwork price is evaluated mainly by quantifying the features of artistic value, so if the contemporary art is artistic valueless, it should also be monetary

valueless, which is opposite of the real market performance.

“...but you know contemporary art and its business are popular. It is a dominating art style for now, many artists continuously create new works. Its business often has new records of bidding price, investors are crazy to buy it, professionals are active to discuss about it...”

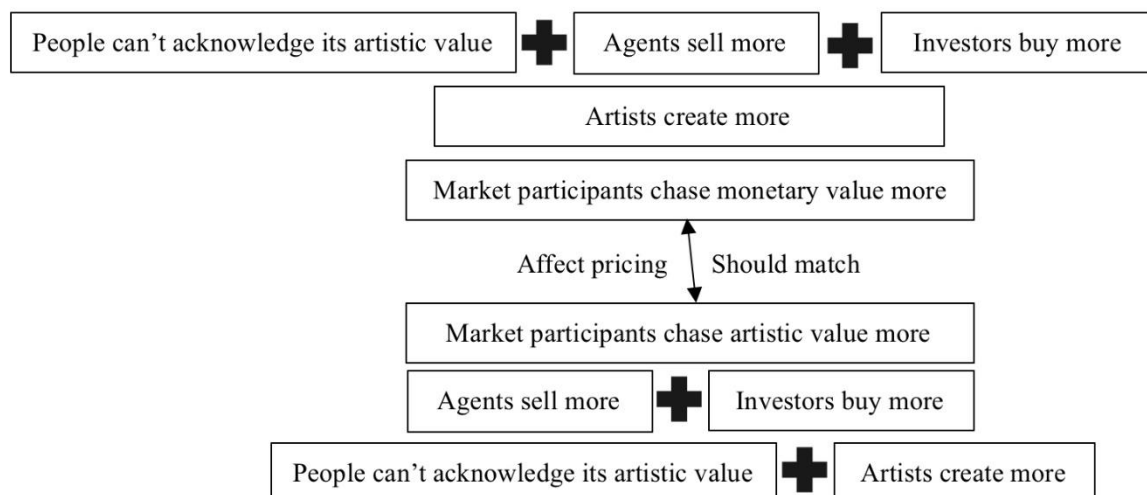
Figure 5 Potential Decisions of Market Participants due to Hot Contemporary Art Market



Currently contemporary art is dominating art style in the art market as it's more productive and amount limitless than other older styles. Art market trades contemporary art works actively and often appears record breaking prices. It may guide all the industry focusing on the contemporary art business together, artists create more at first, then agents can sell more and investors buy more as in figure 5 shows.

“...seems its market goes viral regardless of its overall understandings to people. You wonder do market makers know contemporary art works totally? Do investors really appreciate contemporary art works they bought? Do artists choose to create these works for artistic pursuit or monetary need? You have so many questions, if the answers are all ‘yes’, then it’s the public needs to improve their artistic aesthetics, if the answers are all ‘no’, then it’s the market participants need to rethink and to correct the unusualness, but if the answers mix ‘yes’ and ‘no’, there are more things waiting to be discussed...”

Figure 6 Different Contemporary Art Market Situation by Chasing Monetary Value or Artistic Value



Booming contemporary art market has two possibilities as figure 6 shows, from one side agents may use their advantage knowledge, information and position to promote sales of contemporary art, the booming

market encourages artists to create more contemporary art works, as long as the business goes well, then the artistic value of the contemporary art matters less, to this point the passionate investment in contemporary art is value speculation in fact; from another side artists leading the art development, even people cannot understand contemporary art for now, but as long as artists create more to educate the public, then the recognition of contemporary art will get progress, like so agents can see the value of it and would like to sell more, investors will buy more as they have positive expectation in appreciation of it for long term, so to this point, passionate investment in contemporary art is real investment. Two possibilities both exist in the market, no matter market participants chase value speculation or value investment, their considerations and actions all affect the process of value evaluation. The ideal pricing mechanism should be monetary value matching artistic value of contemporary art.

Certainly, the matching degree between monetary value and artistic value of art works is highly associated with the subjective recognition and objective need of people, which can be seen through the river of history, as art always plays an important role in improving awareness of people about cultural contributions and social aesthetics, this process often highlights the popular or dominating art style in the certain term. Although popularity of different art styles may differ among classes due to limitations of recognition, with gradually adjusting comments from people, it is able to picture an overall value framework of art pieces. The value here consists of two parts, artistic value and monetary value. Artistic value is the first well known feature coming out of everyone's mind when mentioning the value of art, and the common understanding in monetary value of art works is awakened after people receiving one after another news related to the active art market. Remark that here emphasizes 'common understanding', which refers to the public realization, the reason to clarify this is because purchasing art work has been usual consumption to rich classes for centuries crossing dynasties, Monetary value of art work has been properly shown as an appreciation of family asset on the basis of the accumulation of time. For the nobility, art market exists as long as art itself, and for common people, art and its market seem to lower their thresholds as following social advancement and art evolution. New riches rising with national or regional development, they purchase art works as the nobility did to improve decorative tastes and to declare wealthy, but compared with experienced nobility, they may not have good knowledge to define the value of art well within short term, and they may also lack of patience and intention to reserve art works for quite long terms among generations, from this point art works can be traded frequently to have better liquidity, art works start to have financial function.

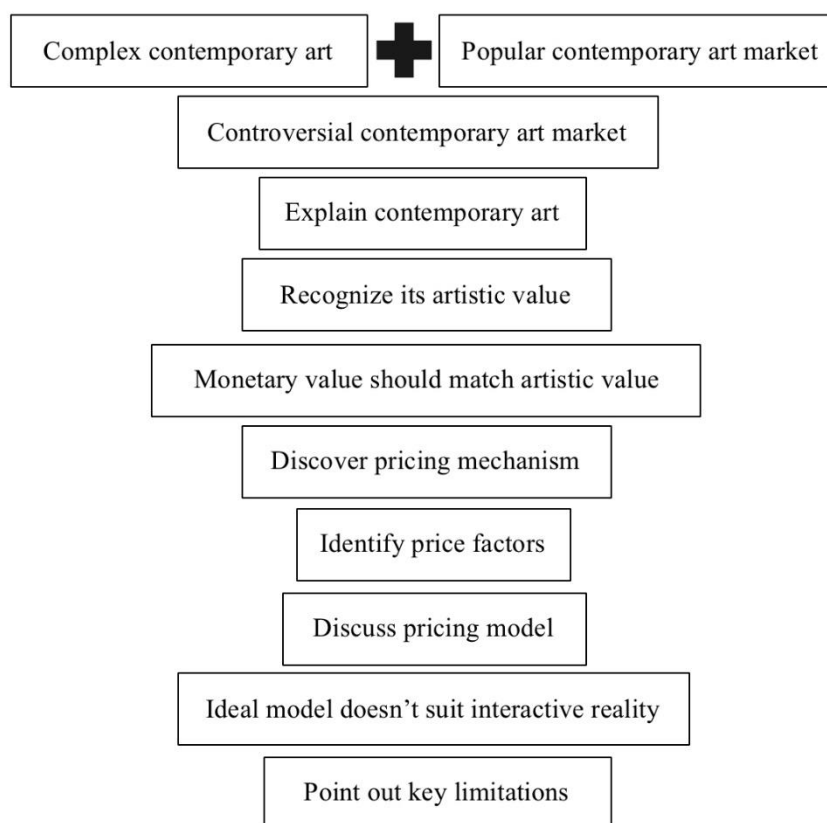
Art develops till now existed as the contemporary art which generates more styles than before, elegance and casualness are both accepted; the amount of artists increase rapidly with less strict backgrounds regulations than old times, everyone can participate in art creation, artists not only exist in top institutions but also appear on the street; materials, methods and techniques used in artistic creation are expanded with more possibilities, non-painting materials and computer technologies are widely considered than before, which allows various forms to exist like conceptual art and installation art. Meanwhile doubts and concerns related to various topics coming along with the thriving development of contemporary art and its market rise. It is widely discussed that massive amount of people do not understand artistic value and monetary value of contemporary art work well since it is too vanguardian and abstract, but institutions and rich people are buying or selling those art works passionately which discretely breaks the records of bidding prices. Do they really understand deeper than others or they just jump inside the market to gaze chance at first, and think over to discover truth after?

Artistic value is subjective depending on different aesthetic preferences of people, monetary value is objective as indifferent price set to everyone in the market. Applying an overall price framework on a specific art style is difficult, doing so on so controversial contemporary art with various forms is even harder. Many researchers have already noticed these confusing but interesting phenomenon, they try to understand, to explain, to question, or to prove the reasonableness and suitability of monetary value of contemporary art works through perspective on the different subjects such as art history, cultural economics, finance, etc. Their inspiring findings do expand the blind spot of people, but also remain issues or bring new problems waiting to be discussed.

Art has inborn and indelible contradictions that it is ideal and realistic, subjective and objective, chasing freedom but surrounded by reality, this is the origin of further controversy in its matching degree of artistic value and monetary value. To this point, understanding contemporary art is crucial to evaluate the monetary value of its art works traceably.

1.3 Research Framework

Figure 7 Interaction among Subjects of Research Framework



Based on the overall analysis, this work can construct a framework as above figure 7 to show the main interactions among discussed subjects. Considering this framework is a fast way to understand the idea of this work, it may not list all analyzed possibilities. Remark that all of them have impact on other factors, directly or indirectly, obviously or invisibly since mechanisms applying on art creation and art work prices

are very complex. As the framework indicates, by stating the complex contemporary art and its popular business, a controversial contemporary art market is presented in front of people. A booming market should gradually recognize even promote its products, so if meanwhile people don't understand it, it's more due to lack of art education. A meaningless art work is also valueless in the market, a good art work is also desirable in the market, so this work explains the development of contemporary art to enhance the understanding of people who may underestimate artistic value of contemporary art. Considering the monetary value of an art work should be consistent with its artistic value, this work discovers the pricing mechanism of art works by identifying price factors, discussing pricing model and comparing the model applications. There are many inspiring findings from current researches of contemporary art work pricing, but ideal model doesn't suit complex reality with highly interactive market participants and price factors, therefore this work points out some key limitations of current pricing model design and researches.

1.4 Research Methods

This work uses four common research methods: transdisciplinarity research, qualitative research, literature research and descriptive research.

Transdisciplinarity research is the leading method through this work, which enables to realize the artistic value of contemporary art by seeing through the art history, economic model and financial investment together.

By qualitative research this work clarifies several frequently used and easily confusing concepts such as modern art and contemporary art, artistic value and aesthetic value based on findings of others with a bit expansion. Note that considering this work tries to use economic theory to explain phenomena in art market, therefore for those concepts having different definitions among art and economics, this work all applies economic definitions.

Through literature research this work presents the rising awareness of monetary value in the contemporary art market in national and global levels; sorts out the developing pathways of contemporary art that implies its artistic value and reasonable existence, which are frequently questioned by the public; locates value factors which are hardly to be standardized quantified and sufficiently matched pricing models due to unique and subjective features of art pieces; analyzes the adaptability and applicability of hedonic pricing model in art work pricing. This method is mainly used to direct the analysis after.

With descriptive research this work gives more intuitively clear descriptions in tables of art market development, contemporary artwork popularity, etc. by quoting data from professional institutions.

2 Literature Review of Investment in Contemporary Art

This chapter reviews literatures, which starts from presenting the booming contemporary art market by referring to the art industrial research reports, and then develops some opinions on contemporary art of art history researches, finally states main findings about monetary value in the market of contemporary art work. The order of this arrangement means to show how the reality goes on that contemporary art business gets popular before contemporary art really gets understandable to investors or even professionals. It is important to introduce contemporary art here, with the understandings of its artistic value, then this work concludes some findings about its monetary value exploration.

2.1 Booming Market: Going Popular before Getting Understandable

Not a lot of people know how art market really is, but almost everyone knows it is a thriving business, especially for rich class. Art market is really a hot market attracting millions of dollars every year, global sales of art reached over 64.1 billion in 2019, although it has a 5% fall in sales compared with 2018, but for long term, from 2009 to 2019, art market maintains a positive sales growth at 62% and volume growth at 34% as table 1 shows.

Table 1 Value and Volume of Transactions in the Global Art Market

Year	Value (\$ millions)	Volume (millions)
2009	39,511	31.0
2010	57,025	35.1
2011	64,550	36.8
2012	56,698	35.5
2013	63,287	36.5
2014	68,237	38.8
2015	63,751	38.1
2016	56,948	36.1
2017	63,683	39.0
2018	67,653	39.8
2019	64,123	40.5
Growth 2018 - 2019	-5%	2%
Growth 2009 - 2019	62%	34%

Data Source: Arts Economics, 2020

There are many countries actively contribute to the rapid development of art market, among all of them US, UK and China take major shares in table 2.

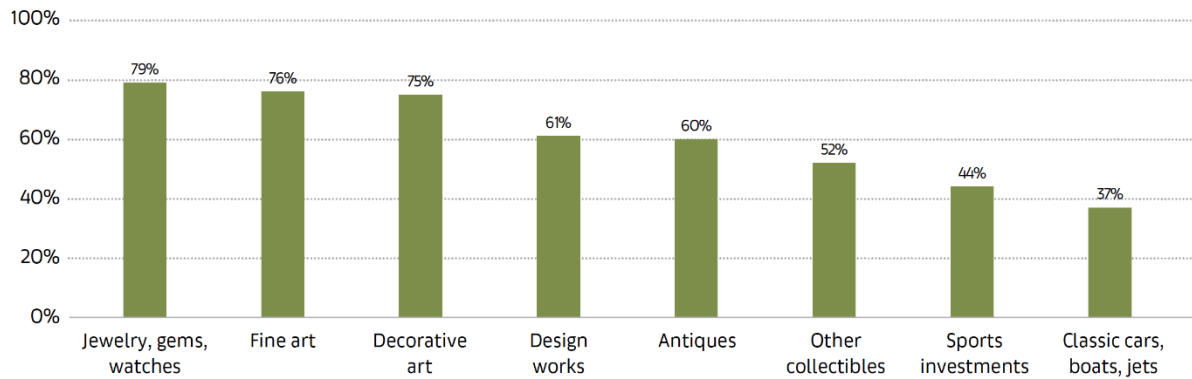
Table 2 Value Market Share of Country in Global Art Market in 2019

Country	US	UK	China	France	Switzerland	Germany	Spain	Others
Share	44%	20%	18%	7%	2%	2%	1%	7%

Data Source: Arts Economics, 2020

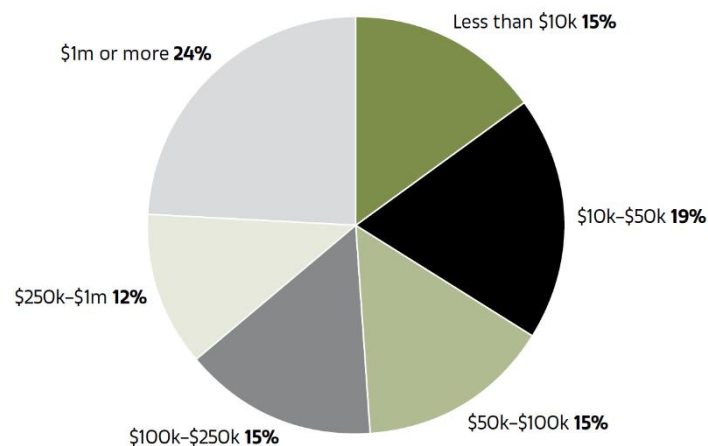
And potential customers of art works are truly rich classes as they have capital advantage to purchase art works casually. As in figure 8, when asked about having purchased goods of high net wealth millennial collectors from 2017 to 2019, there was 76% of the sample of high net wealth collectors having purchased fine art across all over the world, compared with other categories of goods they purchased, purchasing art was ranked as the second most favorable investment choice.

Figure 8 Share of Having Purchased Goods



Data Source: Arts Economics, 2020

Figure 9 Price Range for Purchasing Art Works and Art Objects



Data Source: Arts Economics, 2020

When asked about the price range of art works or objects they purchased as figure 9 shows, only 15% of responded high net wealth collectors spent less than 10,000 dollars, this is already quite a lot of money for common people, taking account for few months' salaries, but only just an art piece bought by rich class.

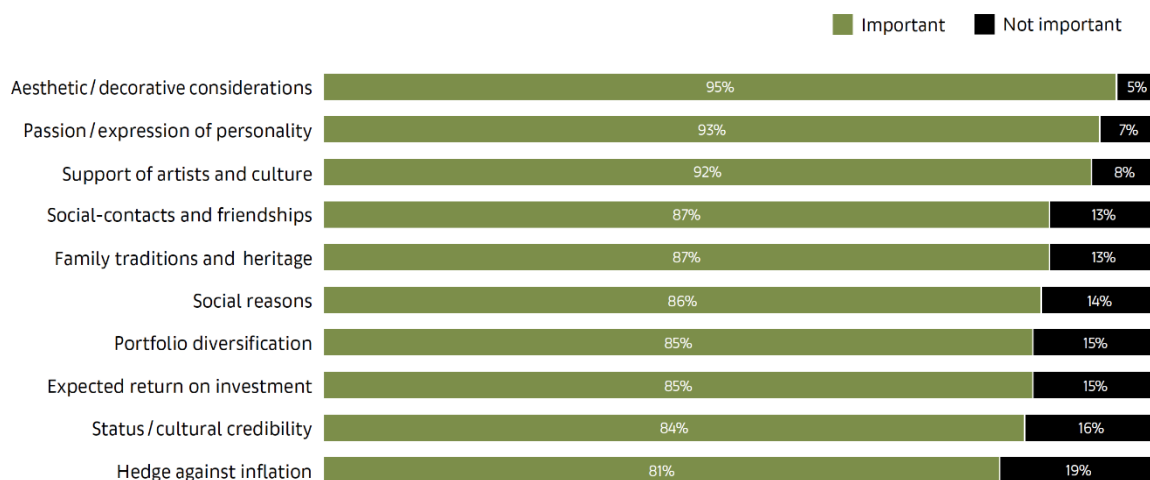
Here giving an example of an original version contemporary artwork by Joan Cornellà I recently saw in the gallery arts factory in Paris, “My life is Pointless” (figure 10) which is priced less than 10,000 dollars (9000 euros). Notice Joan Cornellà is only 39 years old, and he has been famous and popular almost 10 years, at least since he published his first book, “*Anulio*”. Being a popular, young and alive artist, the price of his original pieces will increase surely as he gets older, sells more art works and collects more reputations.

Figure 10 “My Life Is Pointless”



Source: Joan Cornellà

Figure 11 Motivation to Purchase Art Works



Data Source; Arts Economics, 2020

High net wealth collectors have similar ability to purchase art works, but the reasons why they do so vary,

from personal preferences to financial needs as figure 11 shows. No matter what motivation they have, it will guide them to search, to pick and to purchase their favorable art works. All these motivations can be grouped as for monetary value or for artistic value of an artwork. Collectors don't decide monetary value of an artwork directly, they make negotiation, and the sold price will be reference for other similar works. They don't decide artistic value of an artwork directly neither, they have preference, and the sold work will be considered as favorable and popular style of art works in the market.

Even collectors are the main purchasers in the art market, they don't make decisions independently, most of time they purchased art works based on a series of suggestions of market makers and preferences of certain artwork among these suggestions. Market makers include dealers, auctions, private collectors, art fairs, advisors that have impact on investors to choose art works and on artists to promote their works. No matter in national markets or global market, market makers all have dominating position as illustrated in table 3.

Table 3 Often Chosen Sales Channel in the Art Market

	Total	UK	US	Singapore	France	HK
Dealers	20%	18%	22%	34%	17%	15%
Auctions	19%	20%	16%	11%	23%	27%
Private collectors	14%	15%	16%	9%	12%	11%
Art fairs	14%	7%	8%	13%	19%	21%
Artist studios	12%	14%	13%	13%	9%	9%
Online	9%	12%	10%	11%	9%	6%
Advisor	7%	7%	6%	9%	5%	7%
Instagram	5%	7%	7%	1%	3%	5%
Other	1%	1%	1%	0	1%	0

Data Source: Arts Economics, 2020

When investors choose to consult market makers, they put trust on market makers since they should have enough knowledge, understandings, and better artistic aesthetics to differentiate fine arts from all art works. But the reality will disappoint investors, market makers don't understand more than common people and it has lasted for years, even they actively hold exhibitions to show contemporary art works, the reason to do so is because it's profitable. Greenfeld (1989) interviewed some potential investors in exhibitions about art works they want to see or even to purchase, many spectators have very specific conditions, they want an art work with technical knowledge plus spirit, plus education, preferably academic and with understandable intention of the artist, but the market is occupied by contemporary art as it's art for now. They do not really like contemporary art that much since it's difficult to understand, it's often undefined and very abstract and it's hard to use any criteria to evaluate it. They question its meaning and its value totally, but they will still buy it since contemporary art is already a large part of art market, it is profitable within short term as it's art for now. So even they do not really like it and understand nothing, they enter contemporary art business.

This work admits that contemporary art is abstruse, with strong era characteristics, but looking back to the

art history, contemporary art is not the only art style being questioned and judged. As time advances people have different views of unfavourable art styles in the older time and often give positive feedback on them, taking them as breaking the era limitation and leading a new style. Contemporary art might be one of them, it's hard to tell its future value when we standing on our side with strong era marks, its future value is uncertain, but as the market is heading to its investment, then market participants should try to understand it and consider it has artistic value, or the monetary value of contemporary art shouldn't exist at all, which is against real market situation.

2.2 Abstract Expression: Try to Understand before Try to Invest

How art arrives contemporary art and how we think about it requires a historical research of art development. Hodin (1951) clarifies that the definition of art changes as time forwards, people cannot clearly define art at their time due to time limitations. Art riches its meaning for centuries, in fourteenth century, a glass maker is an artist, but nowadays people may prefer to think so. Completely historical definition of art is a skill to craft something artistic or useful, a product with artistic functions, a division of society and culture. Contemporary art is a replaceable word of modern art but limited in narrower or stricter time, may only apply to generation after 1950 because modern art still focuses on painting or sculpture, but contemporary art develops more forms like lumia, film, etc. Stallabrass (2006) points out that art seems to have enough freedom beyond the politic and economy, but in fact it tightly reflects the financial capital power, from the past till now, material wealthy states also have active even dominant cultural power to provide enough space for art creation. Contemporary art is affected deeply by political multipolarity, economic globalization and cultural diversity. Redhead (2008) presents that contemporary art leads an art revolution to involve any object, any detail or fragment without distinction of the material world, the artistic expression based on them are free and equal, which perfectly match the concept of true democracy that everyone should have freedom and equality without any distinction in the world. Contemporary art uses everything available from the reality but abstract the idea or concept from it to express the artistic thoughts, lookalike is not such important.

Their researches verify some key opinions from dialectical materialism that social existence determines the social consciousness, and social consciousness counteract the social existence, which exactly implies the relationship between contemporary art and reality. Contemporary art is developing as the world develops, we are limited by what we can see now to understand it, and we can hardly predict where it will go in the future and how we will think about it after. It is true that contemporary art is too front guard for many people now, but back to old time, Leonardo da Vinci was not appreciated enough, Vincent Van Gogh got famous after he died. How to define and to understand contemporary art is a very controversial topic, but no matter how researchers argue about it, it has become the most productive art style for now. Massive artists continue to make new art works, institutions and investors chase to buy them.

2.3 Value Discovery: Personal Interests before Public Aesthetics

If people buy contemporary artwork passionately but even can't understand it well, dose that mean artistic value is not the most important measure in the art market? What they think when they buy art works? Will the market adjust to please them? Goetzmann (1993) argues that art market doesn't have such high return as the data show, the data is normally from sold art works which are already accepted by market and investors,

but only occupies very small share in all art works, the realized return may mislead investors that it can be representative of the market, but art investment can be considered as an alternative investment for risk adverse investors. Lum (2019) reviews his interactions with artists and points out the artistic value is available as long as the artist creates art works without dependent limitations of location, topics and styles. The problem is investment or market value of these art works are determined by the market as a social, economic, and political network of forces. Artists cannot be recognized by the market exists non-identified status and will affect following creation, but identified and recognized artists will also be affected by the market power. Value of art works traps in a dilemma. Lopes (2011) discusses different theories about relationships between artistic value as aesthetic value of art works which are often mentioned as key feature of well-known art works. He points out even for academics, defining artist value is very hard. If extending the relationship of this value with market value it is evidently difficult to understand. Korteweg, Kräussl and Verwijmeren (2016) show that gains and losses are not linear correlated with selling probability, any highly possible to be overrepresented corresponding to the time. They point out that art investment can be optimized when targeting top sold artists or certain styles. Horowitz (2011) discovers that many art investment institutions are not interested in art itself but in its sustainable returns to their investors as an alternative investment. The interesting thing is the Monetary value of art is realized later than it is widely practiced, which mainly thanks to the auction system maturing the supply of artists and the demand of the nobility for centuries, this process flourishes the whole entrepreneurial art business, with the processing art economics and changeable international market, investors gradually discover that art is a comparatively stable asset. The overall understanding level of contemporary art, or even art is not consistent with the rapid development of art market at all, institutions as agency who should equip with experience art knowledges and skilled investment abilities do not exercise their responsibility well as imagined. In the contrary, they may play the role to lead, affect, or even twist the art creation and art market since they have enough power and influences in the industry. What features investors pay for art works? Are these features hard to be measured as artistic value?

As the contemporary art business gets popular, how to predict the value of contemporary art works gets more important. Before to construct the pricing model, we must consider what kind of important or hidden factors will affect the art creation and therefore art values. Broudy (1964) analyzes the aesthetic education and social background determines the acceptance level and the value of contemporary art, then discovers political force or preferences of political leader impact on the recognition and the value of artist and his/her works, especially in less democratic country. Economic power also affects a lot in the past as art works are more for elite group before. With technology developing, entertainment media starts to become a main platform to affect aesthetic choices of the public, artists can get popular by managing it well. Santagata (1995) concerns about the institutional anomalies in the contemporary art market, he points out as institutions design rules, organizations as players, the market in fact is under their control, artist do not have enough information and power to negotiate about property rights with them. Zorloni (2005) discusses the pricing process of art works nowadays, which more depends on the preferences of the elite such as dealers, collectors and critics, unlike old time that is influenced more by the academic researchers. Various factors can have determining effects on value evaluation of art works such as the artist's brand, technical features of art works, degree of international competition, level of development of the cultural infrastructure and power of the dealer. Singer (2016) argues that art market has grown deformed, it creates a bubble that seems artists are expressing their thoughts about many unbalanced relationships in this world, which rises attentions and prices of their art works, but in fact it is more like they please capitals to create luxury but useless works, which do not help

the world develops better, neither shows true value of art works and brings huge ethical issue. Altahuler (2005) worries about the difficulty of conserving contemporary art affects its value and meaning, which in fact is not an issue for traditional art works. He points out the value of art should be conserved both in physical and conceptual forms, which are usually determining factors of value of art works. The factors work on art works values are more than we normally think, and external factors even play more important role than internal factors, which may let us understand why it is so difficult to price art works accurately. It is not difficult to observe external factors of art work prices, many researchers work on this topic covering different subjects, the difficulty part is after we acknowledge them, how we evaluate the impact of them on the prices of art works? External factors are not independently associated with art works, they may directly affect artists to make corresponding topic or style art works, which seems to be possible priced by models.

Different researchers hold various opinions on exact factors in artwork pricing process, but many of them agree to use hedonic pricing model as the pricing evaluating tool. The conclusions differ as they apply different data, time and factors. Renneboog and Houtte (2002) use auction prices of visual arts from 1970 to 1997 all over the world, they point out that painting techniques play key role in pricing: oil painting is preferred that watercolor painting. Bigger size works yield more profits but also have size limitation. International well-known auction houses easily have high auction price works. After compared with stock market, they point out that high transaction fees reduce the profits of art works during repeating selling. Worthington and Higgs (2006) use data from art works of fifty famous modern and contemporary artists sold from 1973 to 2003 to construct hedonic pricing model, which includes factors like artist's personal information (name, age and living status), the details of sold works (year, auction house, size and amount). They find out that returns on these works are related to the stock market developing trend, and art works sold by Sotheby's or Christies can have higher prices. Rengers and Velthuis (2002) use gallery prices data in Netherlands to explore the determinants of contemporary art work prices on work details (size and material), artist information (age, sex, place of residence and institutional recognition) and the gallery information (location, institutional affiliation and age). They find out that size and materials of art works, age and place of residence of artist are strong predictors of art works prices, prices variances among galleries largely explained as the features of their representative artists. Beggs and Graddy (2009) chose painting date, length, width, medium and artist as hedonic features, they discover that size, painting data and signature differ price of a painting significantly. Furthermore, they find out anchoring effect appears as their predict prices occur but without bias between presale estimates and final prices. Renneboog and Spaenjers (2013) investigates the price factors by applying an extensive hedonic regression model with over one million data, the results show that return of art works is lower than those sold at auction house, and both luxury consumption demand and art market sentiment affect art work prices.

Noted that even researchers use various features to apply to hedonic model, but many features are similar such as artist's basic personal information (age, place of residence), art works' profile (size, material). Hedonic pricing model can explain to how much extent internal factors affect price of art works, but as this paper illustrates previously, art works are widely affected by external factors such as political environment, economic conditions, etc. Furthermore, the data chose in the empirical researches are often from gallery or auction house, as indicated that they have the power to select preferring artists and to affect market, so these data more or less represent the preference from the powerful market participants, and as implied before, artists and their works hardly keep independent and freedom without affected by the capital, market trend for sure will influence artists' following creation, as similar art works published, it gets harder to strictly

define the true value of them, and they may benefit from the existence of well-known similar works with good pricing history.

3 Insight of Abstract: Value of Art Works Based on Hedonic Pricing Model

This chapter focuses on the hedonic model to define value of art works, this model is widely used in different goods and services as it has high acceptance of database. This chapter is based on the view of researcher who abstract complicated art pricing issue to practical way by quantifying the features.

3.1 Model Inspiration: Combination of Value Contribution from Independent Factors

The idea of hedonic pricing model is to use the value of a substitute good or service to evaluate the implicit price of a non-market good or service, which provides a mechanism to measure the value of new good in the market based on contribution level of characteristics of the good. Rosen (1974) points out characteristics embodied in differentiated products have tight connections, when goods can be considered as tied packages of characteristics, then observed market prices can be comparable on these characteristics.

Hedonic pricing model has wide range of usages, pricing artwork is one of them. Artwork can be considered as a composite good which consists of a bundle of characteristics that are relevant to affect people's decisions to buy it or not. For example, artwork prices can be used to provide a value of particular reputable attributes. Investors may be willing to pay a premium for an artwork from a well-known artist, while they may wish to have a discount on an artwork which is from a fresh artist. Reputation of the artist surely is just one of various determining characteristics in artwork pricing process, others that affect it would include the materials, sizes, styles, historic price records of other art works from same artist, trading place, etc.

The purpose of a hedonic pricing model is to determine how much each characteristic contributes to the marginal value of the artwork. Besides to analyze the relationship among characteristics that make up the composite good and decide its price, the model sometimes can also try to capture the individual preferences in order to reveal how they drive people to make decisions. This attempt is very difficult to be correct and accurate since it requires to define and to quantify the individual preferences that may include many personal factors, which results less research works go this way.

Many researches in art investment applying hedonic pricing model also weigh more on characteristics, which is a perspective based on overall market without concerning more about intentions, motivations or preferences of investment this behavior itself. In fact, by observing and analyzing data from art investments, it is possible to discover the preferences from the market that which size of art painting sold well, which artist is popular, which material is preferred, etc. The hedonic empirical study based on characteristics is to use the results to explain the relations among variables, it may not explain art market very well when exclusive psychological factors, which are very important factors in art market since appreciating art work is very subjective and the appreciation of its value is not strictly following models but is more relying on expectations and preferences from investors or agencies.

Triplett (2004) points out a hedonic function is a relation between prices of varieties, or models of heterogeneous goods or services including the quantified characteristics:

$$P = h(c)$$

Where P is a vector with n elements of prices, and (c) is a k x n matrix of characteristics, meaning there are n different products with k characteristics, which is based on hedonic hypothesis that heterogeneous goods are aggregations of features, and economic behavior relates to the features and goods or services. This implies that a transaction is connected with a bundle of features, so the price of a good can be explained by prices and quantities of characteristics of a good. Haan, Jan and Diewert (2013) points out the basic hedonic model assumes that the price p of property n in period t is a function of a fixed number as K, characteristics measured by their corresponding quantities Z_{nk} . From time 0 to time T, we have:

$$p_n^t = f(z_{n1}^t, \dots, z_{nK}^t, \varepsilon_n^t)$$

To estimate the marginal contributions of the chosen characteristics, the above equation has to be specified as parametric model. They provide two commonly used hedonic parametric model, a fully linear model:

$$p_n^t = \beta_0^t + \sum_{k=1}^K \beta_k^t z_{nk}^t + \varepsilon_n^t$$

And a logarithmic linear model:

$$\ln p_n^t = \beta_0^t + \sum_{k=1}^K \beta_k^t z_{nk}^t + \varepsilon_n^t$$

Where β_0 and β_k are the intercept term and the characteristic parameters to be estimated. β_k is allowed to change over time as when market conditions change, the contribution of characteristic can change too. Therefore, the above models can be applied for short term, that β_k is constant over time. To improve this a constrained model is introduced as below:

$$\ln p_n^t = \beta_0 + \sum_{k=1}^K \beta_k z_{nk}^t + \varepsilon_n^t$$

Where β_0 is converted into a constant quality index for long term usage.

With assumption that having data on selling prices and characteristics for the samples $S(n)$ of properties sold in periods t with size $N(n)$, where $n = 0, 1, \dots, T$, $t = 0, 1, \dots, T$, and matching zero mean and constant variance conditions, then the fully linear model and logarithmic linear model can be estimated by ordinary least

squares regression on the sample data of every time period individually. The constrained logarithmic linear model can be estimated through time crossing data, the estimating equation of this is referred as time dummy variable hedonic model as below:

$$\ln p_n^t = \beta_0 + \sum_{\tau=1}^T \delta^\tau D_n^\tau + \sum_{k=1}^K \beta_k z_{nk}^t + \varepsilon_n^t$$

3.2 Comparative Applications in Artwork Pricing

Chanel, Gérard-Varet and Ginsburgh (1996) points out many researches focusing on comparison of returns between art works and other assets without constructing a suitable price index for art market. They use hedonic model to construct such an index since it allows all data from single or repeating sales. They pick impressionist and modern paintings market as research object as they think it's relatively homogeneous market matching model assumption, but their data includes all artists born since 1830 and having art works sold on auctions from 1855 to 1970, around 46 painters and 1900 price data. In their data set they don't specify the times of an artwork sold since it may not be indicated always or translated into different languages causing identifying difficulty. They propose three possible estimators of price indexes, as geometric mean estimator, geometric repeat-sales estimator, and the hedonic estimator. For hedonic estimator they mention that via it, interactions between time and characteristics can be allowed, as if the prices of certain characteristics are considered as changeable over time, then new variables should be involved. By comparing these constructed estimators, they suggest that price indexes of painting should apply all available data, which means hedonic model is a suitable way to evaluate artwork prices. But they also note that hedonic model may lack of efficiency as data are not continuously updated like other financial product markets.

Renneboog and Houtte (2002) uses hedonic model in order to compare returns of art works and returns of stock market. They choose Belgian paintings as firstly Belgium is famous of its front garde art works all over the world, secondly within this period there were many art works were produced, so the data set can reach a good quality. They collect 71 painters with 10,598 sales data from database ArtQuest, collecting data include features as auction prices, physical features of paintings (e.g., technique, medium, size and signature) from 1970 to 1997. They use hedonic model since repeating sales of artwork don't occur often due to high transaction costs and time consuming process and it provides better explanation than simple indices. By applying hedonic model, they discuss price effects caused by different features. They discover that when setting an art price, technique or medium matters more: oil paintings provide higher prices and returns than water color paintings or painted studies; with signature can have substantial appreciation then without it as signature proves origin; larger size of painting does bring higher prices but with limit as too big painting is hard to be exhibited or stored both in museum or private place and famous auction house often occurs high price than common auction house as buyers have more beliefs in it. No matter how many potential advantages art works can bring, when taking purchasing art as alternative investment and compared it with stock market, as traditional investment, art market preforms less good than stock market as it's less liquid but higher cost.

Spaenjers (2010) uses 1,088,709 transactions data of paintings and works on paper of auctions in 13 countries

(Australia, Austria, Belgium, Canada, Denmark, France, Germany, Italy, Netherlands, Sweden, Switzerland, U.K and U.S) from 1957 to 2007. The database is constructed from his previous work with Renneboog (2009), it includes auction data of 10,211 artists from different authoritative art history resources. The chosen data have already been classified in features with details such as price exclusive transaction costs, artwork information (e.g., size, medium and the sale information (e.g., location, date)). As the art market has obvious geographical and style differences, his data also appear substantial differences among countries and art styles, which matches his intention, to study the effects of art market segmentation on the international returns. He uses GDP growth rates and equity returns as they are accessible for long term, and other researcher have proved these two factors have impact on art prices. His data includes repeating transactions of the same artwork; therefore he applies hedonic regression to use all available sales information. He discovers that annualized real U.S. dollar returns from 1970 to 2007 range from -0.9% (Belgium) to 4.6% (U.K). The investment performance of art works is comparable to that of stock market. The international art market is highly connected with economic growth, so when economic falls, the art market sales fall too despite artwork is set price locally, but renowned artists are exceptional, their works are always desirable.

4 Back to Reality: Value Factors of Contemporary Art Considered by Market

Participants

Previous chapter is based on view of researchers who have to simplify the reality in order to measure the characteristics of art works. But in reality, artists, agents and investors think potential price affecting factors at first, even some of them may apply model by professional way, but the final prices will vary from model results as reality has more features than the model does. Jumping out of the academic research and back to reality is helpful to see a bigger picture of how real price of art works should be considered.

4.1 View of Suppliers, How Artists Estimate the Value of Their Works?

Artists may not follow the market to make art, but they have to follow it to make the price. Pricing process to artist is similar like pricing any other products to producers in market. It is always about figuring out where to sell, what to sell, how to price, why price so and when price changes. ArtBusiness (unknown year) provides four key steps to help artists price their work: to define personal market, to define personal art type, to determine similar artists as reference and to compare prices of similar works.

As there are no identical leaves in the world, but some leaves can be traced back to the same tree to reach similarities, artists and their works work in the same way to find the connections with others, noted as art criteria, which will be direct pricing reference. The art criteria is a collection full of information from different art works, then locates each art work in matching position based on different features such as sizes, materials, styles, areas, artists, etc. Every feature will gather enough information from various art works and generate corresponding price, a final price of artwork estimated by the artist should be a combination of prices from all features. The basic artwork pricing steps will be as following:

- Choose proper geographic market. Location of art market does make differences in acceptance, evaluation and purchasing power. Bringing an abstract and political satire artwork to Russia will have different result than doing so in Europe. This step is to optimize the exposure and appreciation of the artwork, a suitable market will give artists more chance to be favored.
- Discover characteristics. Artistic characteristics include the theme, physical characteristics, categories, etc., which are used to identify every possibly valuable part of the artwork. Contemporary art does not have a single or clear objective like many other art styles, it means to be free spirited therefore it generates diversity in materials, forms, subjects and time periods, etc. Using them to define exactly a contemporary artwork might be confusing due to mixture of characteristics time to time. A good way is to define the artwork by its themes that represent the souls of artists and express their opinions or concepts. There are countless themes of contemporary art as it still develops, some notable themes include politics, body, globalization, migration, technology, society, culture, time, memory, emotion, etc. After categorizing themes, then describe other characteristics will be easier and clearer.
- Refer to counterparts. When artists enter the art market, the pure uniqueness of their art works are

weakened and the similarity of them are strengthened in order to build a reference system to define and to compare the characteristics and the prices. Even every artist firmly believe his/her art spirit and art work are irreplaceable, there is no way to judge them by comparing among artists and art works, but market is a place full of goods and buyers will compare these goods therefore searching counterparts is crucial point to locate position of artists properly, to evaluate characteristics of their art works suitably and to estimate the prices of these art works reasonably. Above steps is only basics of pricing just after creation and before entering the market, when artists bring their works into the market, prices change as dynamic market updates.

4.2 View of Market Makers, How Agents Evaluate the Value of Art Works?

Art evaluation belongs to financial evaluation that estimates market value of art works. By doing so the financial considerations will be risen and aesthetic concerns will be decreased, and more be performed as cultural values. It is obvious that when art works are on sell in the market then the prices labeled here is not the same than artists expect before entering the market. There are many market makers such as auction houses, galleries, art fairs, private events and websites that can influence the prices more or less depending on their brand awareness and selling process. Different agents have different strategies to set the deal at an optimal price, for example auction is to bid price from the reserve (minimum) to the higher prices, but galleries, art fairs and private sales are to start with the highest price to the lower prices. But one special case needs to be noticed that prices of charity auction or sale cannot be used to measure art work market value since the bidders in charity target the reputation and attention of their behaviors from the public, not the art work itself, therefore charity art works selling data should be exclusive in the art market value estimation. Then the artwork price evaluation will involve and compare data from other representative market makers such as auction houses, galleries, consultants, analysts, curators and collectors since there are many debates among them that causing price biases.

For market participants like collectors putting more personal pursuits in aesthetics then they may require a good combination of aesthetic value and monetary value of the art works, or even more weight on the former one; for those who target monetary value more, then the speculation will be risen, furthermore between these two kinds of participants, the liquidity and conservation of art works will be different too. Collectors have more emotional connections with art works, art works they purchased will stay with them longer than with speculators since they care more about appreciation in the future so they will exchange it when finding opportunities, which brings more liquidity of art works in their hands, also creates more historical price records that will be included in further art evaluation. And the art works conserved for long will bring price lag or even gap for the industry from which the historical data appears more discrete than it is from the frequent exchanges, for long term using data like so will cause inaccurate analysis of the real art market situation due to incomplete information. To balance this, it is suggested to consider authenticity, quality, rarity, condition, provenance and value when evaluating and comparing artwork prices by Art Dealers Association of America.

In fact, for market makers, to evaluate the price of an artwork the potential considered factors are much more than stated above, in research analysis and evaluation process, the factors analysis method is widely used. These factors can be grouped into factors that are directly related to either the object (size, material, style,

time, condition, historical selling records, etc.), the artist (age, nationality, place of residence, style, political opinion, art school, art movement, representative agent, etc.) or the market (style, exchange place, tax rate, liquidity, popularity, etc.). Every factor should be measured in models and compared to achieve proper evaluation result, but as explained previously, large parts of data is inaccessible so seeking professional art expert is crucial to identify the value. Notice that experts are not 100% accurate too, they just have more experience, knowledge and historical data to evaluate art works, sometimes estimating price from them can have inaccuracy too.

According to research of artworlds insights in 2019, 3% to 8% possibilities to sell art works under the lowest price estimation, 38% chances to sell art works between the lowest and the highest price estimations, 5% to 10% lots can sell art works above the highest price estimation. Seeming the value estimation from market makers is good, but there is another indicator that 20% market makers fail to find a buyer, this failure can have many potential explanations such as artists produce more and faster than the elite group expands and the wealth of them increases, causing oversupply and shortage of demands, or the improper art valuation generates an inaccurate price, which is beyond the expectation of investors, or market makers do not play a good networker to find potential buyers, lacking the connection between suppliers and demanders.

4.3 View of Demanders, How Investors Expect the Value of Art Works?

The background and target of people who buy art works can vary significantly, some can be collectors with deep understanding of the art and its market, some simply want to choose an alternative investment to chase more potential profit space within a certain period, some may know nothing about art and its market, just simply have enough money to buy it as decoration, or maybe as investment. Various pursuits of buyers direct them to weigh different factors more in artwork price. Generally, they consider factors like professionals do so too, but with less knowledge and experience in art, more desires in appreciation and liquidity which brings more financial features in art purchasing.

Taking artwork as an alternative investment has been popular for a while, 'investment' also represents the expectation of the investor:

- Higher return. Many researches have proved that art investment has positive relationship with stock investment, investors who buy art works rather than stock market aim to get higher return within a similar investment period which is possible but uncertain in reality, especially now with contemporary art, their investment can change to speculation easily.
- Combination of consumption and investment. If selecting an asset among different investable assets, real estates have too many taxes every year, complex process to keep good conditions, consuming efforts to resell; jewelries and rare stones have very limited production, complex reprocess, and the value can be unbelievable high when technical conditions of them are perfect; financial derivatives can be very completed to understand and requiring certain market and market participants with professional knowledge, PE or venture capital are aiming to discover new possibilities in the businesses. Compared with these alternative investments, art investments can be taken as a perfect combination of life aesthetics and financial asset which is also the combination of consumption and investment without

further reprocess. Putting an artwork in the house can not only keep it to wait the appreciation, also can show the owner's aesthetics.

- Tax advantages. There are many reasons to explain popularity of art investment, tax advantage is one of the key factors, especially considering art investment has high capital barriers to enter which sort of turning it as a game of the elite class, so buying art works (more) rather than other assets is more derived from the financial considerations than artistic passions, and it is not a secret that art can be dealt for reasonable tax avoidance. As art can be viewed in different ways: a storage of wealth, a masterpiece to cherish, a family heritage, a part of a trust, an estate, or even a gift. The corresponding tax rules in main actively art investing countries and regions listed as below from table 4 to table 8:

Table 4 Potential Net Wealth Tax for Art Works

Country	Net Wealth Tax
Belgium	No
France	Art assets are excluded
Italy	Art assets are excluded
HK	Art assets are excluded
Russia	No
Singapore	Art assets are excluded
UK	No
US	No

Data Source: Deloitte (2019)

Table 5 Potential Corporate Tax of Companies for Art Works

Country	Corporate Tax
Belgium	33.99%, reach certain conditions can reduce graduated tax rates (\leq EUR 322,500)
France	33.33%, taxable deduction of art works from living artists over 5 years
Italy	27.5% (national), 3.9% (regional)
HK	16.5%
Russia	20%, purchasing costs of art assets is only deducted for business need, 0% (gallery, museum, etc)
Singapore	17%, taxable income: 75% (1 st SGD 10,000), 50% exempt (next SGD 290,000), 30% (\geq SGD 30,000); 1 st 3 years of exempt for startups (1 st SGD 10,000 and 50% of next SGD 200,000)
UK	20% - 21%
US	35% (national), complex states taxes

Data Source: Deloitte (2019)

Table 6 Potential Income Tax for Art Works

Country	Income Tax
Belgium	25% - 50% (\geq EUR 34,330), may add communal surtaxe
France	\leq 45%; 2 additional contributions: 15.5% (additional social security contribution, CSG and CRDS), high income contribution
Italy	Income resulting from commercial activities: 19% - 43% (national), 3.9% (regional) Income is not from commercial activities: No
HK	\leq 15%
Russia	13% (most categories, worldwide income, residents), 30% (income generated in Russia only, non-residents)
Singapore	0% - 20%, 250% tax deduction (gifts to approved museums, sculpture donation for public display)
UK	20% - 45% (\geq GBP 150,000)
US	0% - 39.6%, additional medicare hospital insurance tax of 0.9% (\geq USD 200,000, single; \geq USD 250,000, married), additional net investment income tax of 3.8% (\geq USD 200,000, single; \geq USD 250,000, married; \geq USD 125,000, separate taxpayers, married), complex states taxes

Data Source: Deloitte (2019)

Table 7 Potential Gift and Estate Tax for Art Works

Country	Gift and Estate Tax
Belgium	Gift: 3% (direct descendants), 7% (beyond the individual's immediate family) Estate: Complex rate scales vary from regions, 3% - 30% (spouses, direct descendants), 30% - 80% (others excluding charities) Inheritance: Can be reduced via manual donations of cultural property
France	Same but based on family relationship. 5% - 45% (\geq EUR 1,805,677) with a deduction of EUR 100,000, 60% (beyond the 4 th degree of family relationships)
Italy	Considering the non-taxable threshold amounts and relationships between the transferor and recipient, 0% - 8% (gift, inheritance) \leq 10% of the entire portfolio transferred (inheritance)
HK	No tax to art assets from gift or inheritance
Russia	No
Singapore	No
UK	No gift tax, but can be as capital gains tax and inheritance tax during lifetime and on death; 20% (gift to a trust during lifetime), 40% (transfers on death)
US	\leq 40% (national), annual and lifetime exclusion for individuals, complex states taxes

Data Source: Deloitte (2019)

Table 8 Potential Capital Gains Tax for Art Works

Country	Capital Gains Tax
Belgium	Not taxed on the disposal of cultural property if in the management of private assets
France	5% (individual sales \geq EUR 5,000)
Italy	Excluded from the disposal of art assets (national), 3.9% (regional)
HK	Excluded from the disposal of art assets
Russia	The disposal of art assets is taxable for individuals from income tax standpoint; 30% (non-residents), 0% (owned at least 3 years, residents)
Singapore	Not taxed unless the gains are trading in nature
UK	18% or 28% (\geq GBP 31,865), annual exemption GBP 11,000
US	\leq 39.6% (holding art works, \leq 1 year), 28% (holding art works, $>$ 1 year)

Data Source: Deloitte (2019)

4.4 Dynamic Interaction between Market Participants Affects Independence of Value Factors

The relationships among suppliers, agents and demanders in art market are centered around the capitals, from the past till now it never really changes. Contemporary art may break many rules to chase preferences and standards of the elite group and try to express more emotions and opinions on the basis of society and world, but without conflicts generated from capital powers based on politics since the mid-19th century, the deeper thinking of contemporary cannot be inspired, indirectly causing that there is no artist can have entire freedom in art creation. Themes that contemporary artists try to present are tightly connected with the environmental factors, such as development, changes, revolutions and rights, which are easily to be born and accepted in the relevant wealthier regions, so relevant wealthier regions have better significant position in contemporary art market as table 9 shows, they perform more actively in art business than poorer regions as table 10 shows.

Table 9 Contemporary Art Market in Relevant Wealthier Regions

2017 - 2018	Global	US	UK	Europe	China	South Asia
Real GDP Growth	3.3%	2.3%	1.2%	1.6%	6.3%	6.8%
Real GDP Growth Trend	Negative					Neutral
Contemporary Art Sales (US \$ million)	4367.1	2510	1170	251	112.2	92
Art Market Sales Growth	14.9%	-7.2%	51.8%	36.9%	25.3%	48.0%
Art Market Share	100%	57.5%	26.8%	5.7%	2.6%	2.1%

Data Source: World Wealth Report 2019, Deloitte

Table 10 Contemporary Art Market in Relevant Poorer Regions

2017 - 2018	Global	Russia	Middle East	Latin America	Africa	Southeast Asia
Real GDP Growth	3.3%	1.6%	0.3%	1.1%	3.6%	5.0%
Real GDP Growth Trend	Negative			Positive		Neutral
Contemporary Art Sales (US \$ million)	4367.1	41.1	26.6	74.9	48.2	41.1
Art Market Sales Growth	14.9%	-19.9%	-19.9%	4.0%	-13.4%	-16.0%
Art Market Share	100%	0.9%	0.6%	1.7%	1.1%	0.9%

Data Source: World Wealth Report 2019, Deloitte

Pricing art works is so different from marking art work; it is more about collective judgments, popular trends and overall preferences generated from a group of people such as dealers, galleries, agents, publishers, auction houses, appraisers and collectors since they have the most market forces to decide what is the market value of an art work. The value of an art work defined by them often varies than it is estimated by the artist, maybe more or less, sometimes the standards of pricing are very subjective which is quite difficult for researchers to have an accurate and integrate methods of measurement. Pricing art is also difficult, especially pricing contemporary art, which has some special characteristics such as using non painting materials (like glasses, plastics, etc.), highlighting conceptual design, etc. to increase the difficulty level in pricing process. If only considering and applying traditional ideas and methods to price contemporary artwork then the result may vary ridiculously between estimation and reality.

But at the same time, as long as art works are exchanged in the art market, then they can always be priced by certain ways despite their uniqueness. The creativity, imagination and personality of an artist need to be quantified or at least classified as a series of standards in order to suit the market. Though these standards may vary from producers as artists, agents who set market prices based on trends and investors according to their preferences and needs, it is possible to discuss how price mechanism works and interacts among them.

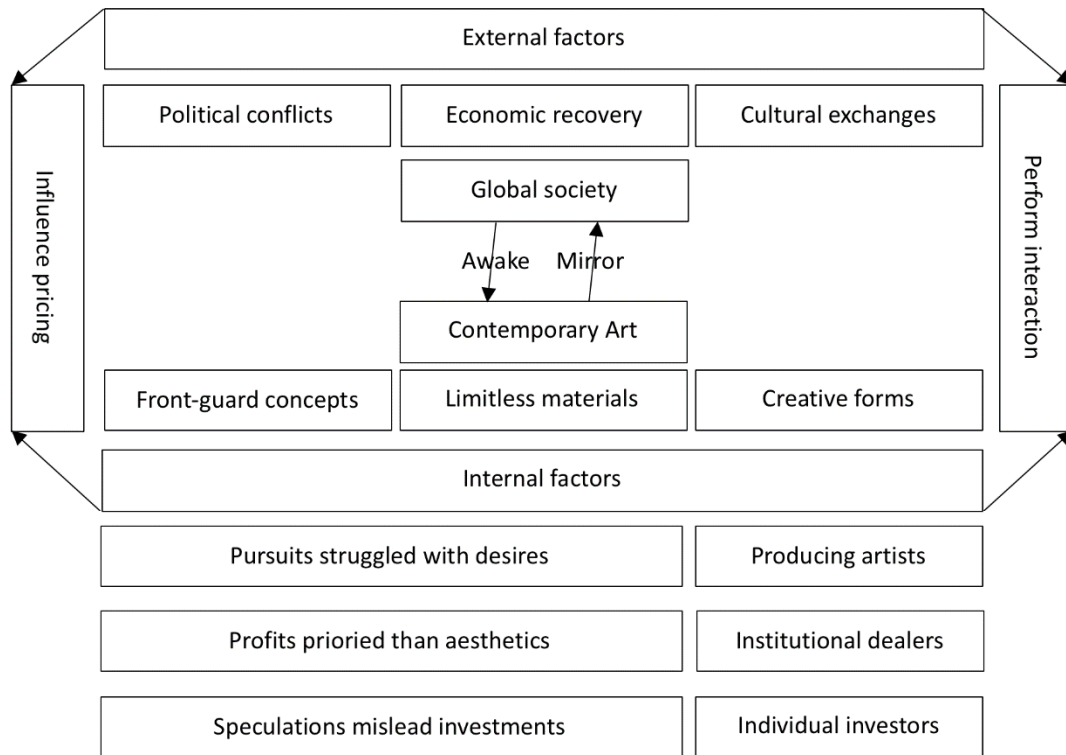
In a word, artist pays more attention on the basis of the individual level during the creation, and has own evaluation of the art work, but after the art work is done, artist has to fit it in a bigger picture of all art works in the market to price it suitably, this step is applied indifferently no matter the artist is ready to sell by personal way, through a gallery, on the internet, or at the auction house since the industry has its widely recognized and accepted price framework. At this point, artist may have to compromise with the market standards to redefine, to relocate and to re-evaluate art works. But it is often not the end of pricing process since exchanges continue at the investor level. Investors will combine their artistic aesthetics, preferences, financial conditions and future expectations to decide whether to buy an art work, as usually every art work is unique, the market lacks of transparency, preassigned prices may be adjusted again without consistency with other similar art works in the market in order to set the deal eventually. Through the whole process, there appears three prices matching the same art work, price from artist, price from market, and price from investor, these prices are changeable as the market trend and the reputation of artist may change as time forwards, the overall depreciation and appreciation can be often observed by repeating sells.

Relationships among art market participants are involved with many factors, it is difficult to separate every factor from another totally due to internal connections, these factors not only reflect the interactions among artists, agents and investors, also mirror how art market operates. The analysis of this appears as a loop form as below:

“...time forwards, economics develops, politics changes, society advances, culture spreads → new riches rise → tastes and money at least they have the second one → they want to enjoy, to show off and to persist wealth → they intimate life philosophy of old riches → they do various investments → they combine tax advantages, risks, returns and personal preferences → they invest in art works → they follow market to make safe decisions → they consume contemporary art works → their trading records add to the database of art market → market makers refer database to define art work’s value → best-selling categories of contemporary art is well-known → investors prefer to buy best-selling art works → market makers collect best-selling art works to sell → some artists get famous → they become representative and refereeing artists to certain categories → other artists intimate or learn from them → similar styles art works are produced → prices differ based on qualities and recognitions → market makers hold events to advertise artists → investors choose art works based on budget and risks → they encourage new artists to create relevant art works → more developed and famous certain styles art market → market makers easily sell relevant art works → repeatedly and actively selling provides liquidity and appreciation of art works → investors enjoy, show off and persist wealth → they invest back in certain art works with experience → market makers search matching art works → artists produce matching art works more → art industry and art market build similar aesthetics → more available art works can be grouped by features → more traceable data → investors follow market to make safe decisions → ...”

The above loop presents a complex and confusing interactions among market participants since every factor may result next factor, to sort out their infinite interaction, a simplifying figure 12 made as below, notice this graph gives a global idea of main interaction, therefore may not conclude all factors making impact on contemporary art and its price:

Figure 12 Simplified Interactions among Price Factors and Market Participants



In figure 12, all factors can be grouped as external factors or internal factors. External factors more refer to environmental factors that exist without intervention of artists, such as politics, economics, culture or maybe nature, they are macro level factors. Internal factors more refer to micro level factors which generated from contemporary artwork itself, such as concept, material, technique, form, etc. As previously introduced that contemporary art is awakened by rapidly changing global society in the nineties of the last century when political conflicts occurred often, economics started to recover corresponding with digital revolution and cultural communication got active, global society enters a highly associated era. Exhausted from the conflicts of interests and encouraged by the hopes of developments, artists start to create art works to reflect the reality and to express their minds. Relations among different subjects such as country, human, nature, society, technology, etc. inspire artists to imagine future life with technology, to rethink balance between human space and nature condition, to question about public welfare and personal interests, etc. These thoughts are very advancing, to properly present their works matching their thoughts, artists also use limitless materials, for example, to make an installation art by marine debris to judge over polluted ocean environment as figure 13:

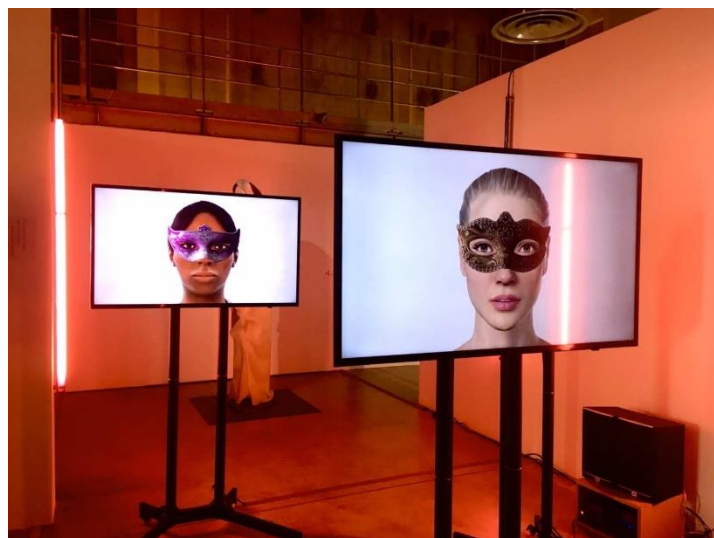
Figure 13 Contemporary Art Work Inspired by Ocean Pollution



Source : “Princesse des Villes”, Palais de Tokyo, 2019

All features of the contemporary artwork itself interacts with external factors, what contemporary art shows are from reality, but will be more artistic and subjective as art is subjective creation. The concepts involved in contemporary art will be expressed to public and bring further thinking or even changes. For example, Tinder hold an exhibition in Paris in 2019, as “the Future of Love”, it presents different contemporary art works based on current dating trend has more ways than old time, with toys, with virtual objects, with online dating, etc. The exhibition simply uses contemporary art style to show and to inspire people to think what will be the future way that we fall in love, it won't directly or immediately change people's behaviors or environmental situations, but to people who never know relevant topic it plants a seed in their mind about contemporary dating, and to people who already see this trend it strengthens their beliefs to do so.

Figure 14 Contemporary Art Work Inspired by AI Applied in Dating Apps



Source: “the Future of Love”, Tinder, 2019

One of the contemporary art work in the exhibition is above as figure 14, it shows that when people using dating app, the person who flirts with might be a fake person programmed and design by the dating app company, especially when there are less real female users than male users. This is turning to truth.

Washington Post published an article titled as *“Dating apps need women. Advertisers need diversity. AI companies offer a solution: Fake people”* earlier this year, especially discussed that artificial intelligence startups use software combined with artificial pictures, voices and conversions to help dating applications have more users and sponsors.

Contemporary art doesn't give impact on changing world directly, it's more like exporting a conceptual force to lead people to care, to think, to question, to discover, to change and to create, an indirect impact to change the world. Among all internal factors, basic features of artwork itself is even not the origin, at least they are associated with artists, so artist is an internal factor, so more basic internal factors are market participants. Their considerations and actions will shift the market, as explained individually before.

As producers, artists have their own understandings and ideas of the world and their art works, they do want to create art works with enough freedom, so called independence, if they can be famous then they have more decision power of their attempts, but if not, they have to face a dilemma that if their ideas and works are not appreciated by the market, then they live a tough life, or to please the market by creating similar popular works, the different attitudes chosen by the artist will affect anything related to their art work.

As market makers, institutional dealers equip enough knowledge and complete information related to art history and art market, they dominate the art market by having the power to select and to show artists, having the position to define and to negotiate the monetary value of art works and having the network to connect and to expand the investors. They make the rules to enter this market so they can choose the transparent degree of information to let investors and artists make optimal choices, but at the same time, information advantages can ensure they optimize their personal interests, so market makers will weigh more on their profits, and then try to satisfy investors and artists. Another side effect is that market makers can bring due to this is in order to optimize their profits, they will prefer to select and to show easy selling, best-selling or getting popular artists' works, by doing so they can make sure to make deals within shorter time, but other talented but not famous yet artists have less chance to be noticed by investors. If the contemporary art market has a deformed structure, then these market makers should be blamed at first.

A good change is recent years development of technology and economics allows all regional market participants updates from regional level to international level simply via internet. Less geographical limitations provide artists and investors more opportunities to trade by comparing comparative advantages in different areas. Artists may prefer to sell their art works online than in local events organized by auction houses or galleries when they are located in relevant poorer regions with less wealthier buyers. Investors may prefer to discover new art works online than in galleries, auction houses or other locations in order to gather information faster, save more time and reduce transaction fees. Agents have to expand their advertisement from offline to online which may face more competitive environment but also have more chances to attract buyers. This expands the trading ways but does not change the basic interactions among market participants.

As investors, they do have their preference in contemporary art regardless of their understanding level of it, they can buy any contemporary art works and consider they are fine art since artistic aesthetic is subjective. The contradiction appears when investors want to invest art works and expect value appreciation or tax avoidance, at this point they have to choose between popular and valuable art works recognized by the market, or preferring and valuable art works considered by themselves but may not be recognized as the same by the market. Creating art isn't just for people who can own it, but selling art is centered by them. To optimize value appreciation, investors will invest in art works with best market expectations and will ignore art works who may be appreciated by the market in a long and uncertain time.

Artists, market makers and investors all want to optimize their profits and maintain their artistic preferences, without capital advantages they can't guide and affect the whole market's choices, but with enough capital force they may be hard to back to original choices since their tastes will be affected. Everyone wants to gaze another one to make best deal, during this game, they may gradually forget that they wanted to target art at first, not each other.

5 Criticism: Apparent Model Limitations Rarely Matches Complex Contemporary Art Market

Hedonic pricing model has strict and ideal assumptions requiring independent factors to do further analysis, applying it with historical data seems a proper way to estimate the price of art works. However, when back to reality it is impossible to separate artists, market makers and investors due to their tight interactions, an external factor from one of them may be taken as an internal factor for another of them, which directly causes the difficulty of pricing art work when applying factor analysis. The purely independence among factors affecting art work price doesn't exist in real life, by pointing it out not only can clarify the existence of difference between labelled price and real value in order to remind all market participants that model and data can have bias results with reality, paying attention to reality is also important, but also can give reasonable doubts to other researchers about the model design, data choice, and factor selection in order to improve the further researches.

5.1 Inevitable Multicollinearity: Dependent Factors Both in Art and Market

As explained previously, characteristics discussed in model should appear independently, or it will occur multicollinearity, but reality is not simple like so. The cruel fact is many factors in art works are connected, social backgrounds and social events affecting artist's opinions that may inspire their works, during the creation process, materials, techniques even forms the artist chooses mirror not only the personal background but also the real world. Following this logic, multicollinearity is easy to occur with or without being realized, then the basic conditions to apply hedonic model are also easy to be broken, when realizing this issue, it is impossible to do the hedonic analysis, but if ignoring this and continuing the model application, the results will be inconvincible. For example, if an artist is an environmentalist, so he/she may use ecological materials to make art works and the theme of works related to environment protection, then his profile and his art work conditions are correlated; famous auction houses often only sell famous artists' works, and small galleries often only sell new art works from new or young artists. Like so exchange information is correlated to artist profile, they cannot be defined and even used as independent variables in the function. Highly correlated reality and art send art work evaluation into a dilemma.

5.2 Asymmetric Information: Inefficient Data Transmission Caused by Low Transparency

The model assumes that all participants have prior knowledge of history of art, art investment and complete information of artists and their art works, etc. But in reality, many investors do not have systematical training of history of art or art investment, they may even hardly understand and accept some art works, but they still purchase them as an alternative investment, taking them as value increasing assets, as an usual consumption, as an interior decoration, etc. To achieve better deals investors often put more trust on agents like dealers, galleries, auction houses who are educated and experienced in art business, with more information. But as market makers, agents have their business targets too, they do want to have stable relationships with investors by helping investors to buy valuable art works with future appreciation possibility, but they also want to maximize their profits through selling popular art pieces, they may mislead investors to make decisions

through information advantages. Frey and Eichenberger (1995) points out due to infrequent resale, many market makers can hold their art works for long without updating information, even they sell art works, they may not reveal it immediately in order to have better position in the market, surely causing low efficiency of data in the market.

If investors can not totally understand how exactly different characteristics impact on art work prices, and how their preferences of willingness could optimize their purchases, then firstly data from real deals will have biases, investors do not purchase art works by well performing the theory and model (since they may even not know them, just listen to their agents), secondly applying these collective data into models and theories will not reach a well matching conclusion. The last but maybe the most important thing is, preferences of investors have deeper and wider impact on art work prices than assumed, this has long historical reason and also strong capital power supports, they often do not define value of art works after they sort out all characteristics in details like presented by the model, then individually measure potential price in terms of combination of each characteristic and their backgrounds, instead they take an art work as a whole piece, considering their background to purchase one of favorable art works, then decide by comparing characteristics. When they know less about art works, they cannot estimate their value properly, price negotiation will let agent know what is the budget and knowledge constraints of investors, but cannot let investors know the exact proportional effects from different characteristics. Due to asymmetric information, there are other following issues may rise such as moral hazard.

The hidden assumption but can be observed easily when applying the model is that any changes of characteristic will immediately change the hedonic price since it's a perfect competition market so any changes will be acknowledged well and be used to adjust price. In reality, art work market has strong asymmetric information issue that changes in characteristics maybe revealed very late or even not be revealed due to kinds of reasons such as confidentiality of private deals or rare amounts of seals from small galleries. Price lag will affect the accuracy of model because the data can be collected easily and completely are often from public auctions that often auction famous or defined valuable art works, so the collected data do not reflect the real prices of the market since the beginning, then for sure will mislead further analysis.

5.3 Measurement Invalidity: Simplified Model Misses Various Aspects of Contemporary Art

The model presumes that by abstracting characteristics from a substitute art work and using data from historical selling prices it is possible to price a new art work, this assumption is ideal but not practical in reality. Art always strengths creative part, usually every art work is unique so that finding art works with same features is already hard, then according to features to pick a substitute art work in order to be a reference to price other works, this is even harder. Art world is not an industrial production world that none of art works can really be considered as proper substitute good to others, especially for a real masterpiece. Though it is common said that there is neither loneliness nor nobleness in the art creation, master pieces are very few, and one master will create and lead new trends in techniques, concepts, materials and styles, so many other artists may build their styles based on learning and imitating the master works, like so seems there are more substitute art works appear, but only gathering the lower level parts. There can be a case that an investor wanting to buy an art work as successful as Banksy, may find that most of works on sale

are not famous, and other works from Banksy are sold out, the market cannot provide enough different available art works as it should do. Also artistic achievement is defined very subjective by critics, researchers or some buyers, so a nobody may become somebody surprisingly to the public, then maybe before his works are not considered as a substitute goods to master pieces, but after his reputation rises, same works will be redefined and maybe as substitute goods to master pieces. Notice this can happen, meanwhile the pricing model and the characteristics remain same, the subject opinion changes may bring significant changes in model application. Issues stated as above rise as contemporary art goes viral, it is more and more complicated to sort it out, not even mentioning its market.

Hirschman and Holbrook (1982) points out that valid measurement is hard to achieve in behavioral research as the simulating features are mixing real and assumed aspects and maybe not accurate when design and measure them. As the model will be used to price properly art works, then the quality of the measurements chosen in the variables is very important. Independent and dependent variables have to be chosen properly, or it could result in an inaccurate coefficient relationship in the regression. Here the difficult problem comes that how to entirely identify and separate all significant variables in to independent or dependent classes. Notice that art has a very special feature that it mirrors the reality, the materials, techniques used in the art work, or even the economic and political background of the artist all will be reinterpreted in the art work by highly reflecting the thoughts of artist. So commonly used independent variables such as politics, economics, social events, etc. in art work pricing may not be possible to be seen as independent. Another tricky part is the suitability of art work conditions, different art styles have different conditions, middle age art works are valuable even just for the painting materials due to scarcity, but contemporary art develops new forms that it may adapt very common materials inside the creation process, the materials and techniques can be usual or even valueless, but the concept of it matters a lot. For example, given an installation artwork about ocean pollution, the artist creates a dead shark full of marine debris, the shark is made in plastic, marine debris are directly collected from the ocean. And the artist specially exhibits this work in overdeveloped coastal cities such as Venice on world oceans day. Like so, the model receives huge challenges by many ways and needs to be restructured by different characteristics and considerations. The materials and techniques should be weighted less, the concept needs to be quantified, which is also connected with economic and political development, so these factors cannot be taken as independent variables. After all characteristics are well classified, then at the second step of hedonic regression, whether investors would like to buy it despite appreciating it, having enough money becomes a problem since installation art takes a lot of place and the appreciation of it is hardly to predict, most importantly the concept is the key, the whole art work can be easily recreated in different occasions, buying this installation art seems not equals to buy the whole idea and creation of the work from the artist than buying classical art works. Model application can be easily stuck and go in a mysterious way to do measurements in contemporary art pricing.

Conclusion

This work discusses the complicated interactions among characteristics of art work and among market participants, by doing so the work combines art history to recognize the value of contemporary art and economic model to analyze the current research process of art work pricing.

This work discovers that:

- The reason that people don't understand and recognize value of contemporary can be knowledge shortage or era limitation. But with more knowledge does not equate surely better artistic aesthetic as art itself is subjective. Investors can be fooled by agents if they fully believe in the latter.
- Many researches related to value of artwork often weighting more on pure artistic value, as in art history field, or weighting more on monetary value and return, as in economic and financial fields. For researches related to monetary price of artwork, there are not many researches only focus on contemporary art. Their crossing style or crossing time research provides a view of prices and returns of overall art market for long term, but hardly to see if the contemporary art prices are normal. Furthermore, they ignore that contemporary art is the only art style that develops different forms more than painting and sculpture these traditional artistic expressing forms compared with other art styles, forms like installation art, conceptual art used video, lumia, non-painting materials of contemporary art are hard to be priced too as they may even don't exist physically, or exist physically but made of non-valuable materials, etc., problems like so haven't been considered and discussed frequently by researchers, as economists don't know art enough, and art historians don't understand pricing model enough.
- Different market participants consider differently when pricing art works, their considerations cover more factors than hedonic model includes. Therefore, indicated price by using hedonic model can't explain all the potential characteristics of artwork, there are many external factors such as tax avoidance advantages, transaction cost affect investors significantly but aren't in hedonic models.
- Apply hedonic model requires pre-collected data which are often from historical auction sales, these data are objective but the process to reach them is subjective as it relates to human behaviors. Many researchers don't question if the data has been affected by external or internal factors, and then applying them in the model, although hedonic model has high acceptance of dataset, but it only shows partial art market as only partial data is available among all market participants. To contemporary art, it even shows less as auction data mainly concern for physically existing art works.
- Hedonic model and art market have inborn limitations, which get more seriously when applying to art works, as art is dependent on the environmental factors, art business can't achieve high data efficiency and market participants don't have equal forces to affect the market. These limitations will affect the accuracy of model.

Postscript

After I finished this work, I visited a contemporary art exhibition of a famous artist couple: Christo and Jeanne-Claude in Centre Pompidou in Paris, which gave me further thinking of investment and pricing issues of contemporary art works, especially related to its features.

They were typical and representative contemporary art artists, they used new materials following the time, such as polypropylene. Their famous series of work was about packaging, using new materials and threads to package anything they had interests. One of their works was to package Pont Neuf in Paris in 1960s as figure 15 shows.

Figure 15 Packaged Pont Neuf in 1960s



Source: Centre Pompidou

Huge work like so surely cost massively in every aspect, they spent decades of years to finalize the details of this project, they used crowd funding towards the public to raise enough money to achieve this project, thousands of workers joined the construction as figure 16 shows, and this work attracted over three million visitors as figure 17 shows.

Figure 16 Construction Site of Packaging Pont Neuf



Source: Centre Pompidou

Figure 17 Massive Amounts of Visitors for Packaged Pont Neuf



Source: Centre Pompidou

Following hedonic pricing model and considerations of market participants, this work should be evaluated

high price as it had countless investment and efforts, massive size and influence, and made by famous artists. But the fact is that it's non-tradable as temporarily existed and related to historical site. Separating the package materials from the Pont Neuf causes meaninglessness and valuableness of the artwork. The model can give a value but doesn't work in the market as no one can afford it, the considerations of market participants can affect the artwork, but no one can own it as the materials were recycled after the exhibition.

Market can lose its control when facing contemporary art, the challenges of pricing contemporary art are more than this work addresses. If the art style has evolution, models should have evolution to fit contemporary art better, but how to do the latter is beyond my current ability.

Contemporary art develops fast, its market expands rapidly but the theories and methods to evaluate contemporary art process slowly, wishing to see more research works on related topics.

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When I joined QEM I did not expect what I can have today at that time. QEM is a difficult and selective program, I wasn't the most talented one nor most hardworking one, I even had many times to almost fail the program, but when many classmates quitted the program, I insisted to finish it regardless of what will be the ending, and finally I reached the requiring grades.

I spent one and half a year in Venice during this program, I received many helps and suggestions for life and study from professors and secretary of QEM Venice. It is very heart breaking to leave here suddenly when coronavirus swept Venice even whole Italy. I could not allocate time well to balance study and work after I moved back Paris urgently, which also affects the process of my thesis writing. The worst thing is I broke screen of my laptop during quarantine that I have to use cellphone and iPad to write entire thesis. I take it as the last obstacle for me to graduate from QEM and I sincerely thank my friend who allowed me to use his iPad.

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