From art to information system

Evaluation of Art: \( P = (a \times p)^{-1} \)

Miro Brada

This insight to art came from chess composition concentrating art in a very dense form. To identify and mathematically assess the uniqueness is the key applicable to other areas as programming, social media, energy costs, pricing of art. Maximization of uniqueness is minimization of entropy that coincides as well as goes beyond Information Theory (Shannon, 1948). Reusability of logic as a principle to minimize entropy, requires simplified architecture and abstraction. Any structures (eg. plugins) duplicating or dividing functionality increase entropy and unreliability (eg. British Airways IT system). These ideas were verified by my chess compositions, art works and information system as an author of each.co.uk, and presented at conferences in Santorini, Adelaide, Geneva, Daejon and virtually.

Imitation: thing \( A \times \) its depiction \( (A) = A^2 \)
Art is a series of 2 or more units. A cave horse is a series of (1) real, and (2) depicted horse. The realistic imitation is 1st criterion: the more real, the unique. series's unit \( A \) has value \( A^2 \). The cave horse is less real than Michelangelo's David. But the cave man had worse tools. Since invention of photo (1826) to imitate is trivial: take a pic, but do better tools lead to better art?

Options or oddity can't make art unique
The more options \( (o) \), the higher potential for art: \( A^2 \times o^2 \). Cave man, regardless of his talent, had far less options than Michelangelo. The options for art and reality equally rise, so imitation isn't unique with new options: \( U = (N \times o / A \times o)^2 = N^2 / A^2 \), \( A < N \). Uniqueness is independent of time and space. Tahiti girls (1890) seem unique in Paris (as Paris in Tahiti), but the real art is unique anywhere. Gauguin's art has value by the way he did it, not because of Tahiti.

Deviation is temporarily unique
Deviation adds option to imitation. The long neck of 1st known manneristic work, is realistic imitation just intentionally extended \((=new \text{ option } o)\). Since all can be longer: \( N \times o \), it's only temporarily unique until all options are exploited. H. Bosh deviates in proportions \( o_p \) in odd context \( o_o \): \( o_p \times o_o \). Impressionists deviate by blurring \( o_b \), Warhol in colors \( o_c \). The deviation includes imitation referring the reality, otherwise it's random (pseudo-deviation) and can't be unique, eg. abstract 'art' can be anything \( (A=N): \ U = N / N = 1 \).

Probability of Art
Uniqueness \( U \) or inverted probability (frequency) defines art: \( U = N / A = p^{-1}, \ p \in (0,1) \). Invention \( o \) enhances both art \( A \times o \) and reality \( N \times o \): \( U = N \times o / A \times o = N / A \). But 1st new option is: \( N \times o / (A+1) \), 2nd: \( N \times o / (A+2) \). So next art of the same option is more likely: less unique. The 1st impressionism \( \text{Le Déjeuner sur l'herbe} \) (1863, Manet) or \( \text{Impression, Sunrise} \) (1872, Monet), or 1st cubism: \( \text{Les Demoiselles d'Avignon} \) (1907, Picasso) are unique than next impressionism / cubism. As marginal utility in economics: 1st thing is valued more than next one.
But 1st movie *Roundhay Garden* (1888) in 1.66 seconds, isn't unique than later movies by Chaplin or Fellini.. It is because *La Dolce Vita* in 7 episodes (174 mins) has new options to differ far more than paintings among paintings. New art $a_n$ with probability $p_n$ enhances the reality $N$ to decrease other arts' probabilities by $(1-p_n)$: $\sum_{n=1}^\infty p_n = 1$,

while it increases probabilities of existing arts - if it leapfrogs their uniqueness. Eg. Sotamayor has held the record high jump 2,45 m since 1993, and his record is uniquer by time with still new jumps. But if a new jump overcomes 2,45 m, the Sotamayor's jump will become less unique (more likely). The probability of the top rank depends on the size of the set, as eg. 9th of 100 (.1) is uniquer than 1st of 10 (.1). That's why the top movie is uniquer than top painting, because movie as a set of static pics is far bigger set than set of all paintings. Likewise impressionism and cubism are on average uniquer than classic painting, as they enhance the set of paintings by extra option o. The quality determines the rank: a banal or technically bad cubism (=lower rank) isn't better than Vinci. But top cubism eg. Picasso's *Le Rêve* is uniquer than eg. Vinci's *Monna Lisa* (1503), as it's at the top within a bigger set. It doesn't mean Vinci couldn't do or invent cubism - if born later, it's a comparison of the products. Intricacy is a criterion to assess the rank of art. Eg. are Duchamp's readymades (objects isolated from their intended use) eg. *Fountain* (=toilet) uniquer than cubism? Already Bosh used 'readymade', Duchamp just isolated it in a 'test-tube'. Set of 'readymates' is huge (actually anything), but it isn't unique than other art because probability of readymate is almost random ($\approx .5$) without criteria to differentiate. That's why it is easy to do / repeat. Anyone can do "readymade" a la Ray, Warhol, Hirst, while the few can do a somersault.

### EASY (almost random) TO DO

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Fountain</em></td>
<td><em>The gift</em></td>
<td><em>Campbell's Soup</em></td>
<td><em>Shark in formaldehyde</em></td>
</tr>
</tbody>
</table>

### DIFFICULT

<table>
<thead>
<tr>
<th>M. Vazquez, 1982</th>
<th>Han Song, 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>quadruple (4x)</td>
<td>quintuple (5x)</td>
</tr>
</tbody>
</table>

M. Vazquez did the 1st 4x somersault on the flying trapeze in 1982, H. Song did the 1st 5x one in 2013. A somersault is harder / uniquer than average art, and even though the 5x somersault is uniquer than maybe 99% of art, the top art is uniquer as it is far bigger set. But what's top art? Is it *Girl with a Pearl Earring* that is more famous than H. Song's somersault? It became more famous since its promotion (2012) that is unrelated to the quality (anything promoted is more famous). So the fame isn't reliable criterion. What are other criteria? Yashenko jumped the record 235cm in 1978, by straddle. Sotamayor set it to 245cm in 1993, by flop. Deducting the jumper's height, Sotamayor (193cm) ends 5th, Austin (183cm) 1st. The highest jump isn't always, by other criteria, the uniquest. 5x somersault can be at the top of somersaults, while *Girl with a Pearl..* is high but probably not at the top of paintings with other comparable products: *Mona Lisa* (1503), *Las Meninas* (1656) .. A somersault can be: forward, backward, sideways. A high jump can be: scissors, roll, straddle, flop. For the records the 'forward' and 'flop' are the best. 'Straddle' (235cm) and 'flop' 245cm differ less than 'forward' and 'reverse' somersault. So somersaults vary a bit less than the high jumps, and paintings having numerous styles vary even more. The set of somersaults $N_s$ is smaller than set of jumps $N_j$ that is smaller than set of paintings $N_p$: $N_s < N_j < N_p$. 

<table>
<thead>
<tr>
<th>Jump minus jumper's tail</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Austin 240-183 =57</td>
</tr>
<tr>
<td>2 Matei 240-184 =56</td>
</tr>
<tr>
<td>3 Conway 239-183 =56</td>
</tr>
<tr>
<td>4 Barshim 243-189 =54</td>
</tr>
<tr>
<td>5 Sotamayor 245-193 =52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top jumps (straddle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sotamayor 1993 245</td>
</tr>
<tr>
<td>2 Barshim 2014 243</td>
</tr>
<tr>
<td>3 Bondarenko 2014 242</td>
</tr>
<tr>
<td>4 Sjöberg 1987 242</td>
</tr>
<tr>
<td>5 Paklin 1985 241</td>
</tr>
</tbody>
</table>
1) The bigger set \( N \)
- the lower probability of the top art \( p_n = \frac{1}{N} \)
- the higher variability and more possible criteria to assess the top art.

2) New art \( a_n \) with probability \( p_n \):
- decreases probabilities of all arts by \( 1 - p_n \), when: \( \sum_{n=1}^{N} p_n = 1 \)
- increases probability \( p_x \) of art \( x \) - if it is uniquer: \( p_n < p_x \Rightarrow p_x \uparrow \). Eg. When Sotomayor (1988) jumped 243, overcame Sjöberg's (1987) 242 that became less unique. When M. Barshium (2014) jumped 243, Sotomayor's 245 became uniquer, but Sjöberg's 242 less unique again.
- decreases the difference \( \Delta_{a-b} \) between arts: \( a_a \) and \( a_b \) if they are both less or more probable than \( a_n \): \( (p_a < p_n \wedge p_b < p_n) \vee (p_a > p_n \wedge p_b > p_n) \Rightarrow \Delta_{a-b} \downarrow \). Sotomayor's 245 made all previous jumps less unique, and diminished the differences among them. A difference \( \Delta/N \) becomes \( \Delta/(N+1) \). It is true for a smaller jump too: all differences among the higher jumps becomes smaller: \( \Delta/(N+1) \). Or internet covering all previous arts diminished the differences not only among paintings but also among paintings and movies or literature.

![Images of artworks and space flights](https://example.com/image)

Space flights are rarer than movies, so are they a smaller set \( N_f \) than set of movies \( N_m \)? No, as the space flight is a top collection of various industries: engineering, material, automation... \( N_f = N_e \ast N_m \ast N_a \ast \) far bigger than \( N_f \): \( N_f \ll N_m \). Is uniquer 1st space flight (1961), moon landing (1969), Falcon 1 (2007), or Chinese robot on Moon's dark side (2019)? While moon landing reached further and so could be uniquer than 1st space flight, the Falcon 1 was uniquer only by special criteria irrelevant to the result: reusability or private funding. And 'reusability' was dubious as well as funding when the US Department of Defense paid the launches. There can be many other criteria to consider eg. the Soviet Union had less people than USA, and very damaged in WW II.

**Economy and Relevance: \( A \downarrow \Rightarrow U \uparrow \)**

Any unneeded unit in chess composition should be removed. It is called economy - a principle to maximize uniqueness. Why do gymnasts point their toes, or programmers optimize codes (eg. minimize loops)? The pointed toe is just one (the uniguest) of many positions. Extra loops or duplications cost more resources and obscure the code. The economy minimizes the set of solutions \( A \downarrow \) to raise uniqueness: \( U = p^{-1} \), \( p = A/N \): \( A \downarrow \Rightarrow U \uparrow \).

The performance itself enforces the economy: a top high jump can't be uneconomical (eg. jump with wavying). Anything unneeded to perform or to express un idea is uneconomical \( A \uparrow \) decreasing uniqueness \( U \downarrow \). The quality of landing is irrelevant in the high / long jump, but matters in the ski jump. D.Vassiliev made the longest ski jump 254m to crash. So S.Kraft's 253.5m without a crash is the longest. By other criteria, the shorter jumps could be at the top. Or a ball hitting the pole can be 1/2 goal to amend the football. In Rorschach test 'oligophrenic detail' is answer describing parts of the whole (eg. hand / leg instead of body) or focusing on the inkblob's parts. Such answers are more often in mental disability less capable to recognize relevance / whole.
Eg. dress colour is mostly irrelevant to a performance. It can have a minor role in figure skating, but the difficulty or style is far more relevant. In painting the colour matters as well as shapes, lines, composition. But it matters more for impressionism / expressionism than pop-art / surrealism. Eg. colour is negligible in Escher’s illusions, while relevant in Munch’s works expressing emotions. The economical architecture can be crucial in IT. In 2007, I started working on each.co.uk server-side ASP.NET system with little re-use, repeated outages, slowness, sessions cut off. In 2012, I was let to build a system independent of server, plugins, 3rd party dependence. I reduced:

- server’s operations \(n\) for \(N\) users: \(N \times n \downarrow (n \approx 0)\)
- data \(d\) structures \(H\) sent from the server: \(H \times d \downarrow (H \approx 1)\)

I replaced the old server’s \(N\times n\) operations sending huge HTML data \(H\times d\), by single-page (SPA) in javascript (js) not to reload server’s pages and to use user’s device. The \(n\) operations aren’t intensive to slow users’ devices, but their cumulation \(N\times n\) on the server with many SQL operations caused slowness. I started using json and array to minimize and reuse data in any html. The new system ended all outages and cut off. Instead of 1.5 MBs of C# compiled dll, the server uses 5 KB simple php code easily changeable to any script: c#, py.. The closed (no new changes) php code only transfers data to / from client. Database / SQL often eats most server’s resources. The old database had tables comprising many sub-tables \((t_1, t_2, \ldots)\) multiplying operations \(n\uparrow (t_1, t_2, \ldots)\) to load data. I merged the tables to reduce \(n\downarrow\), and moved less interrelated SQL data (views, histories..) to simple files. Using js I replaced unneeded SQL eg: SQL jobs, SQL generated ids, SQL 8 bytes date - eg. SQL 17. Oct 2022 09:01:33, is 220917090133 YMMDDHHMMSS compressed to MHJ91X (M=22, J=09..). The non-SQL YMDHMS date is 2 bytes smaller and usable in any db / system eg. Client’s js processing C makes server idle: \(n_1 \approx 0\), \(n_2 \approx 0\), and easier to re-use: \(\Delta C \leq \Delta n_1 + \Delta n_2\) (\(\Delta\) - change). Before the C# dll was running many operations \(n_1\) that required specific SQL operations \(n_1\) - that’s why reducing \(n_1\) reduced \(n_2\). SQL itself is less flexible than js to duplicate some operation \(n_2\) (eg. sorting). So moving server’s operations \(n_1, n_2\) to the client C reduces the server’s operations as well as their amount. It’s the objective advantage, and so js libraries, plugins, frameworks have appeared: jQuery (2006), Angular (2010), AngularJS (2016), React (2011), Vue (2014) .. They minimize the server, but their prepared functionality is at the expense of flexibility, speed, transparency and can prevent a competition (explained later).

The economy is universally inevitable for a higher quality, to recall Occam’s razor (14 century): "entities should not be multiplied beyond necessity". It’s often implicit in art eg. a gymnast can’t do somersault with funny moves. But the relevance of criteria is less implicit. M.Powel jumped the record 895cm and crashed, while D.Vassiliev’s longest ski jump 254m isn’t the record due to his crash. A score for landing would invalidate M.Powel’s 895cm. The landing in high/long jump vary too little to be scored, except perhaps 'crash' or jumping outside - that wouldn’t help to achieve longer/higher jump. But if the ski jump isn’t scored for style and landing, the jumps would be longer but riskier.
Also ski jump has more options eg. preciseness of landing, possible to score. So the landing is irrelevant in long/high jump, while relevant in the ski jump. The relevance is implicit / functional, but can be regulatory too. C.Lewis’s 891cm wasn’t the record due to the wind over 2 meters. The wind limit is regulatory in the long jump - as well as the misstep (the jump can be measured exactly from the jump’s start, instead of the board). Or in football the goal must be (implicitly) with a foot, but: foul, offside, size of gate, game length.. are regulatory. The overall assessment $S = s \cdot r_1 \cdot r_2 \ldots$ comprises score $s$ multiplied by values $r_x \in (0,1)$ of relevant criteria. Eg. in the long jump the misstep is just yes or no: $r \in \{0,1\}$, while the style (ski jump, figure skating, art..) has more values and criteria $x$: $r_x \in (0,1)$. Which one of Van Gogh’s Sunflowers series (1887) is the best? And which one of the ballet dancers series (1870-1900)? Or which of Hokusai’s painting is the best? What’s the best philosopher or mathematician?

**WORKING**

Modern Art: $U=p^{-i}$, $i \geq 2$

Arcimboldo reused things in a thing (Librarian of books) with depictions $A^2$ powered by $2:\left(A^2\right)^2=A^4$: uniqueness unachievable by ‘classic’ deviations - still applicable: Librarian’s head can be long, blue.. Or cubism reused the same object $A^2$ from different positions at the same time to multiply it: $A^4$. Dostoyevsky (1888) writes how Jesus returns (phase 2) during the Inquisition, performs miracles to be arrested and burnt the next day. Hitchcock’s movie Vertigo (1958) or Psycho (1960) suddenly reverses its meaning (victim is culprit) as info reveals (phase 2). Dostoyevsky and Hitchcock reused the plot $A^2$ in another plot: $A^4$. Both plots remind a threat paradox in chess composition (1958): "The defence enables mate in phase 1 to disable it as a threat in phase 2".

The principle of modern art is the reusage to multiply uniqueness: $U=p^{-i}$ ($A=1/p$), with intricacy $i \geq 2$: eg. chess compositions reuse logic in 2, 3 or more phases. The reusage can enforce the form
eg. cubism simplifies reality to geometrical shapes possible to reuse. Modern art is a mental
gymnastics or figure skating reusing jumps, spins, rhythms.. A somersault or a pirouette itself is a
reusage (return to the same point): A^i, where i is number of somersaults. Top performances sum
more criteria eg. difficulty (. salchow, loop, flip, lutz, axel), style, precision, and so are uniquer than
records with 1 criterion eg. max of somersaults. Gymnastics as art of movements can be eg. ballet
(15 century), waltz (18), tango (18), flamenco (18), gymnastics (19), modern diving (19),
synchronzied swimming (19), rhythmic gymnastics (20), freestyle skiing (20).. Mental gymnastics is a
far bigger physically less limited set: painting, literature, music, movie, chess composition,
philosophy, math..

Each art reuses / copies reality. Modern art adds extra layer. Religions reuse the reality in the other
world: paradise, hell, karma.., same as Plato's dual worlds. Nietszche's (1887) "eternal return of the
same": the life repeating (re-using) itself exactly as it is forever, merges dual worlds to one to recall
Parmenides (6 BC): the reality is one. Chess composition is a shortcut to art. Alberto Mari's neo-
strategy' (1928): game in game, re-used mates in reciprocal change (AB-BA). Mansuba in Persian or
Arabic Empire, was often "study to win", similar to chess. Caliph of Baghdad Al-Mutasim Billah
composed 1st known problem (9 C): mate in 9 moves, with "hard to solve" criterion: the trickier, the
better. Neo-strategy just added phases to reuse mate, function, motif, defence.. As in art, the new
genres (deviations) have appeared eg. selfmate (13 C), helpmate (19 C), or schools as Bohemian
model mates, Slovak change of motifs.. I used to compose too, won a few prizes and invented
redefinitions of mate (eg. MAFF=mate with a free field). As I was reading (2002) art journals, I
realized compositions' definitions could define the art. They deviate from chess - as a gymnast
deviates from a run: the aim isn't a speed but a stylish pirouette / composition. The chess
composition provides several insights into art.

The chess composition provides insight A/N
is probability f, \( \frac{A}{N} \) is new option
probability \( f_i \); \( p_i \), \( p_t \) \( \in (0,1) \). So: \( U = \frac{(N \times o/A \times o)}{(p \times p_t)} \). By logarithm: \( U = \log U = -i \times \log p \times p_t \). Uniqueness increases
linearly by inverted frequency and
geometrically by intricacy. The bigger
invention, the lower its probability
(frequency). The first products of new
invention need less intricacy to be equally
unique as products with less options: eg:
simple movie can be uniquer than intricater painting

solutions's units
\( i = \{0,1,2...N\} \)

all units

1x logic
\[ \begin{align*}
1 & +1 & 2 \quad +1 & 3 \quad +1 & 4 \\
\end{align*} \]

2x logic
\[ \begin{align*}
\begin{array}{c}
\text{\textbullet} \\
\text{\textbullet} \\
\text{\textbullet} \\
\text{\textbullet} \\
\end{array}
\end{align*} \]
\text{alt: empty / full rot: +25%}

4x logic
\[ \begin{align*}
\begin{array}{c}
\begin{array}{c}
\text{\textbullet} \\
\text{\textbullet} \\
\text{\textbullet} \\
\end{array}
\end{array}
\end{align*} \]
\text{alt: empty / full rot: +25% smaller: 25% add: +0%}

Rubik's Cube, 1977
IQ series: 1x, 2x, 4x

Energy costs / economy

Eg. quad (4x) axel considered hardest of all 4x jumps L.Lacny, 1949 N.Macleod, 1950
Plushenko, 2010 Intricacy i in A¹ can exceed 2: chess compositions reuse logic in 3, 4.. phases. Picasso reuses things in different angles. Chirico, reading Shopenhauer, Nietzsche, translated unknown and solitude to painting, with simplifications reused by Dali, Ernst..

Social media: \( N^N \), decreases intricacy to transform fame

Can be the best art the most popular or chosen by election? Yes and no: many good artists were popular, other not or after dead. It also depends on opportunity and motivation. Famous painters, composers, writers, singers.. have certain quality / intricacy, but don’t need to be the best. Internet and social media radically cut costs of imitation and distribution, as anything can be copied and shared instantly. Is the best art most-viewed? How many 'likes' would get calculus if Leibniz (1684) would posted it? Social media equate all criteria except views / likes to diminish intricacy as a criterion (i≈0), so the fame requires less average intricacy to be distributed more randomly. It is a monopoly of unusual scale: summing all galleries, theatres, cinemas, TVs, radios, books etc.. to influence all including politics with a few limits eg. Western social media are restricted in Iran, China, North Korea.. Social media seemingly give an equal chance, as anybody can post without approval, unlike before artists needed approval to exhibit. But commissions or experts approving the art are more qualified (in spite of mistakes or bias) than the social media inducing a zero-sum competition for a fame (or people look for fun / info) to profit from ads based on number of views:

\[
\text{Fame } F = P \times \hat{U}, \text{ where } \hat{U} = -i \times \text{lg } f \times f_t \Rightarrow F = P \times -i \times \text{lg } f \times f_t, \text{ where } f, f_t, P \in (0,1)
\]

Substitute: \( \Delta = \text{lg } f \times f_t \Rightarrow i = -F/P*\Delta \), for: \( \Delta = -1 \), \( i = F/P \)
P is an external power, in case of social media $P = 1 \Rightarrow \mathbf{i} \equiv \mathbf{F}$, where $\sum_{x=1}^{N} F_x = 1$

Number of post (N) decreases the average fame and intracity: $\mathbf{N} \uparrow \Rightarrow \mathbf{F} \downarrow$, $\mathbf{i} \downarrow$.

A new innovation ($f_i < 1, \Delta < -1$) eg. posts via mobile, further lowers the average intracity due to 1) extra temporary uniqueness of the new option, 2) more posts (N↑). It leads to a less rational society of endless shares, chats, likes wasting human potential. Average fame decreases too: 'most liked stars' are easily replaceable to be much cheaper, increasing the profit of the social media owners. It doesn't mean social media are 'evil'; intracity (IQ) was often not an advantage before social media eg. enforced suicide of Socrates in Ancient Greece, burning G. Bruno in the Middle Ages.. But imagine Euclid or Thales would be posting how they’re working on math how it goes.. It would be just disturbing, and the 'likes' would have no relevance to the result. To develop idea requires confrontation with objective reality - not 'likes'. Social media (at the current form) de-motivate to develop intracity and diminish its significance. Probably it wouldn't affect much Euclid, but average persons are less immune against isolation and luring to likes / views, and even though Euclid would finish his ideas they could disappear due to lack of views / likes. To learn or create something is unique in itself, because it is less likely to learn / create than not to learn / create. It is not a mere zero-sum game, as anybody can learn / create something: the intricater, the uniqueness. There is a competition in creation too - e.g. Newton and Leibniz argued who defined the calculus first. But this is a different 'race' as there is a new creation (calculus), while social media zero-sum game produces only views and likes with immediate uniqueness distracting to create as the uniqueness from creating takes time. Or playing the computer games give certain uniqueness (increasing scores) that can distract to learn.

**WORKING HERE**

Social media to be art friendly would need a different ownership model. Private media (West) tend to cut output or quality to rise the price, while state media (China) can be more motivated to support art. Korea has replaced the UK in art global influence, that can result from a different model over private monopoly. Azerbaijan's capital Baku has a cafe (2021) dedicated to the Korean BTS - the most famous band since 2020, preceded by the most viewed video of Korean Psy's Gangnam Style (2012). Or since late of 1990s "New Korean Cinema" has gained international reputation. Some say it is a commercial success without artistic value imitating Western commercial bands of 90s.. It is seemingly true, but why West doesn't copy more successful Korean bands? Or why USA doesn't copy the Chinese high speed rail system, if it is so easy? Imitation reflects a quality, and Asian success is more than 'mere' imitation, as China has the fastest trains or best information technology (Huawei).. Since 2004 Indian Bollywood has bigger global audience than Hollywood and eg. comedy Three idiots (2009) isn't less intricate than Hollywood (long time since Hitchcock). Except technological lead in China (Asia), its huge population has enough buyers to sustain very different products (scale effect in economics) potentially the high art too, and the products can inspire each other (spillover effect) being another potential impetus. If 50 mln Korea have globally influenced the art, what 1.3 bln China can do?

Art, Time, Scarcity and Price: $P = (a \times t)^{-i}$

<table>
<thead>
<tr>
<th>type</th>
<th>name</th>
<th>*price</th>
<th>year</th>
</tr>
</thead>
<tbody>
<tr>
<td>painting</td>
<td>Salvador Mundi</td>
<td>100%</td>
<td>2017</td>
</tr>
<tr>
<td>movie</td>
<td>Pirates of the Caribbean</td>
<td>94%</td>
<td>2011</td>
</tr>
<tr>
<td>music</td>
<td>Thriller (M. Jackson)</td>
<td>80%</td>
<td>1982</td>
</tr>
<tr>
<td>football</td>
<td>Neymar</td>
<td>58%</td>
<td>2011</td>
</tr>
<tr>
<td>diamond</td>
<td>The Pink Star</td>
<td>16%</td>
<td>2017</td>
</tr>
<tr>
<td>car</td>
<td>Rolls Royce</td>
<td>6%</td>
<td>2017</td>
</tr>
<tr>
<td>chess comp</td>
<td>cyclic change</td>
<td>0</td>
<td>1949</td>
</tr>
<tr>
<td>math</td>
<td>calculus</td>
<td>0</td>
<td>1672</td>
</tr>
</tbody>
</table>

*price is related to 450 mln of Vinci (inflation included)

Is $450 mln for da Vinci's "Salvator Mundi" adequate? Is $379 mlns "Pirates of the Caribbean" the uniquest movie or is it "Avatar" making $2.847 blns? Why literature or philosophy isn't priced so? Why figure skaters, gymnasts get far less than tennis / football / golf players although gymnastics is intricater than tennis / football? Uniqueness of the new options vanishes by time: $U = (A \times (1 + \text{time} \times (\text{o} - 1)) / \text{N} \times \text{O}^t$, $t \in (0,1)$. Art is long-term investment (time=1), so ONLY the intracity should matter, regardless if it is pic, movie, novel...: $U = A^t / N^t$. While intricate
works of da Vinci, Picasso... are pricey, the very intricate calculus or Lačný cycle isn't. A little water in a desert is scarcer and so dearer than anything intricate (eg. space robot).. Scarcity increases: 1) exponentially by intricacy: the intricator, the scarcer 2) linearly by frequency of occurrence (gold..) or accessibility (monopoly reducing goods / service) Price is: \( P = s^i \), scarcity (s)=1/accessibility (a)\times frequency (f); f, a \in (0,1) : P = a^i x f^{-i}, \text{ applying log } : P = -i \times (\log a + \log f). \text{ Intricate unrestricted (i\geq 2, a=1) thing can be cheap, while something trivial inaccessible (i\leq 1, a\approx 0) can be expensive. Intricate idea can be indirectly pricey, if part of eg. popular software or machine, but the intricacy itself is secondary (in spite of it can be needed to increase the usability / popularity of the product). The popular means less frequent product, if f(i)=1/i, the price raises with intricacy: -i \times (\log a - \log i). \text{ The product accessed by the more users}

**WORKING HERE**

**Chess composition as an art**

Hard to solve composition:  

**Miroslav Brada**  

Pravda, 1994 (authors 1st problem)

Solution:

\[ \text{1. a6!} \]
\[ \text{1... h5} \]
\[ \text{2. d1#} \]

Mate in 2

Flight giving key

Changed mates

Neo-strategic composition:  

Solution:

\[ \text{1. e4! (A)} \]  
\[ \text{2. h5} \]
\[ \text{1... c4 (a)} \]  
\[ \text{2. h4} \]
\[ \text{3. d2 (b)} \]
\[ \text{g2!} \]
\[ \text{1... c4 (B)} \]  
\[ \text{2. e4} \]
\[ \text{1... h5} \]  
\[ \text{2. g5} \]
\[ \text{1... h6} \]

Active sacrifice

Kiss cycle

Barnes

**Miroslav Brada**  

The Problemist, 1997 1st Prize

Mate in 2

Chess composition is a shortcut to art. Alberto Mari's neo-strategy' (1928): game in game, is especially impressive coinciding with Arcimbolo's modernity. I was also a composer winning a few international prizes to invent special conditions redefining mate (eg. MAFF=mate with a free field). In 2002, I was reading art journals to realize compositions' definitions could define art. They deviate from chess - as a gymnast deviates from a runner: the aim is not to be the fastest (to win) but to jump somersaults. In Persian and Arabic Empire, they composed 'mansubas', often studies to win, similar to chess. Al-Mutasim Billah (caliph of Baghdad, 833-42) made the earliest known problem: mate in 9 moves. The criterion was "hard to solve": the harder, the better. As in painting or literature, the new genres (deviations) have appeared eg. selfmate (13 c.), helpmate (1854), or schools as Bohemian "model mates", Slovak "change of motifs". While 'hard to solve' criterion remains, neo-strategy exponentially increased intricacy by multi-layers reusing logic - mate, function, motif.. My first composition (diagram 1) had a tricky key. B. Formánek, once President of FIDE for chess composition, was sending me journals, taking me 6 months to grasp neo-strategy, an extremely aesthetic experience (other composers said same) - contrary to expectation far more impressive (unique) than hard-to-solve problems. Diagram 2 is the 2nd prize in Problemist (1997) for a cyclic change (reusage) of key and 2 mates in 2 phases. Formed by chess problems, I made first animations in 2006 in Prague. In my solo exhibition in Holland Park in London (2013), I was showing digital art entitled From Animation with eg. Naomi Campbell combining logical IQ series: decompose, sum, move in move, repetition, or 3-phases' short movie 'Discontinuity'. My art was later exhibited in Germany, Japan. Composition 'Sevilla' is most advanced, 'Modern Art' is a satire of a corruption masking as 'art' being anything even perversion: a fart in heart, so a gas mask is needed, sold for unreal price.. The market can promote the art as the rise of modern European music after WW II. In 1990s, the Western art market has been gradually (privately) monopolized to cut output / quality and rise price (profit). A real competition was replaced by ads. A qualified feedback to artists, was replaced by 'likes' from social media. Degradation demonstrates a belief that the point of art is to shock by any means or do anything 'first'. In 2014, the famous American singer invited 'artist' that vomits on canvases (='art') to vomit
on her as she was singing. It seems 'unique' but anybody can vomit or be vomited, while few can jump a pirouette. So 'vomit' or 'be vomited' is not very unique.

2 pics from Sevilla (2020)

ME (2019)

Discontinuity, The New Art Form demonstrating Foucault's philosophy in 3 phases
Miro Brada, Discontinuity, the new Artform (2013)