



ЭКОНОМИЧЕСКИЕ И СОЦИАЛЬНЫЕ ТРЕНДЫ: ЦИФРОВИЗАЦИЯ

ECONOMIC AND SOCIAL TRENDS: DIGITALIZATION

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The role of technology in the art market in the COVID-19 period

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Abstract. The art market, like many other industries, has experienced a challenging and transformative period since early 2020 as the COVID-19 pandemic has created new unforeseen needs for galleries and auction houses. Along with the challenges it presented, the crisis has also created many opportunities for restructuring and innovation in the industry as organizations have been forced to look for new ways of working because the traditional format has become unacceptable, and this has required new methods and technologies. The market, driven by external circumstances, moved online as businesses closed and events were canceled, and dealers were forced to rethink their business models to adapt to the new economic realities, which, for many, involved the deployment or significant intensification of digital strategies in to support sales and communications. Therefore, the purpose of the study is to determine the impact of innovative technologies on the world's largest auction houses. To better understand the impact of innovative technologies on the financial performance of the auction houses Christie's, Sotheby's and Phillips, econometric models were built to identify the presence or absence of a relationship between auction profits and such a qualitative factor as the format of the auctions. Based on the econometric analysis, it can be concluded that in the period 2019–2021, the importance of online auctions and, as a result, other technologies necessary to support their activities has increased. This growth is due to factors such as the forced transition to an online format due to security measures and the fight against COVID-19 and an increasing level of confidence on the part of market participants.

Keywords: art market, online auctions, NFT art, blockchain, COVID-19

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Роль технологий на арт-рынке в постпандемийный период

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Аннотация. Арт-рынок, как и многие другие отрасли, с начала 2020 г. пережил сложный период преобразований, поскольку пандемия COVID-19 создала новые непредвиденные вызовы развития галерей и аукционных домов. Наряду с вызовами кризис также создал ряд возможностей для реструктуризации и внедрения инноваций в отрасли, поскольку традиционный формат стал неприемлемым, а это потребовало новых методов и технологий. Рынок, движимый внешними обстоятельствами, переместился в онлайн: предприятия закрывались, мероприятия отменялись, и дилеры были вынуждены переосмысливать свои бизнес-модели с целью адаптации к новым экономическим реалиям, что для многих предполагало разрывы или значительную активизацию цифровых стратегий для поддержания продаж и коммуникаций. Целью исследования является определение влияния инновационных технологий на крупнейшие мировые аукционные дома. Для лучшего понимания влияния инновационных технологий на финансовые показатели аукционных домов Christie's, Sotheby's и Phillips были построены эконометрические модели, позволяющие выявить наличие или отсутствие зависимости между аукционной прибылью и таким качественным фактором, как формат проведения аукционов. На основе эконометрического анализа можно сделать вывод, что в период 2019–2021 гг. возросло значение интернет-аукционов и, как следствие, других технологий, необходимых для поддержки их деятельности. Такой рост обусловлен такими факторами, как вынужденный переход в онлайн-формат в связи с мерами безопасности и борьбы с COVID-19 и повышением уровня доверия со стороны участников рынка.

Ключевые слова: арт-рынок, онлайн-аукцион, NFT, блокчейн, COVID-19

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Introduction

Art and technology have a complex but significant history of collaboration and influence on each other. In many ways they have evolved side by side to take their place in today's digital age when they constantly intersect and embody new ideas.

With each new development in technology, art also changes. However, this does not only apply to their products. The way art is viewed, distributed, consumed, and subsequently sold is also constantly transforming. Technology has made art more accessible (Candy and Edmonds, 2002). As with countless other facets of modern life, the Internet has enabled the consumption of art in a more direct way, opening the industry to a wider and more diverse audience. Museums showcase collections online, and artists have all the tools they need at their fingertips to promote and sell their pieces — often without the hassle of having a physical exhibition.

The relationship between art and technology has led to many exciting new works and techniques. Significant innovations of the last two decades include:

- Art created by artificial intelligence (AI). While experts are trying to keep us in check and suggest that the discovery is still in its infancy, it's hard not to appreciate this outstanding innovation in the art world (Mazzone and Elgammal, 2019). By blurring the line between man and machine, AI-generated art offers us a new kind of unorthodox creativity. Some argue that computer science-generated art is not art or creativity (Hong, Curran, 2019). However, the work created by Mario Klingemann shows us that artists continue to experiment, fusing art and technology as one (Schmitt, 2018).
- Blockchain technology. It has many goals in the art world and could have an even bigger impact. In its 2014 report, The Fine Arts Expert Institute (FAEI) found that more than 50% of the artwork it examined was either fake or did not belong to the original artist. The development of blockchain can help change that and preserve the industry's all-important authenticity (Whitaker, 2019; Zeilinger, 2018).
- The Art of Blockchain. The term refers to physical works of art that are tokenized. Most accurately, these words describe digital art that can be published on a blockchain with a "hash", the equivalent of a digital identity (digital art can take the form of TIF, gif, jpeg, etc. files). Artists are also using blockchain as a medium — Kevin Abosch's IAMA Coin project and his collaboration with Ai Wei Wei called Priceless are notable examples (Choudhary, 2022). Artists can also use the blockchain to divide their work into parts, each of which can be considered independent. The Whitney Museum's Public Key/Private Key Project is also a great example of how fragmentation can create new forms of ownership (Walker, 2019). Finally, the blockchain is used by marketplaces to collect cryptocurrencies such as CryptoPunks and CryptoKitties (Nadini et al., 2021).

In the course of the study, the following methods were used: analysis, synthesis and retrospective. The scientific paradigm of the study is based on the fact that the liberalization of international economic relations and the subsequent increase in the weight and economic power of developing countries in the world economy, the strengthening of global competition and the relative weakening of the positions of developed players, the strengthening of disintegration processes, outright trampling and ignoring the rules and principles of the WTO led to the need to revise the foreign trade policies and investment policies of the developing countries.

Literature Review

The Internet allows art businesses to market themselves more effectively through online advertising, blogs, and social media (Archev and Peckham, 2014; Fourmentaux, Hennion, 2005; Ippolito, 2002). It helps to reduce costs and increase revenues through efficient use of online resources.

The Internet also greatly facilitates the ability to find talent and understand what to expect. For arts programmers, having access to high-quality media to review artists before judging them live has been a huge step forward, making it much easier to get a first impression of an artist or an artist (Jean-Paul, 2005; Goriunova, 2012).

While it is impossible to know what the Internet and digital technologies will be like in the long term, the trend towards faster delivery of more information to more targeted audiences with faster feedback from the recipient is likely to continue (Zhang et al., 2019; Kehoe, 1992; Clarke, Flaherty, 2002).

Beyond the practical, one of the prevailing positive trends is that technology is expanding — and will continue to expand — access to art. In some cases, technology is simply seen to improve marketing and communications to reach as many people as possible, but it is also worth noting its ability to expand and deepen the audience experience.

Technology is expanding access to art across geographic boundaries, which greatly improves accessibility in the arts — both financially and logistically. People who live outside urban areas will be able to see works and events that are only available in major cities in a small number of countries. It also means that arts organizations will need to rethink how they interact with their audiences (Paul, 2003; Drucker, 2013).

Methodology

For the research work, it was necessary to complete the following tasks: study the theoretical aspects of innovative activity of auction houses, identify factors of the need to introduce innovative technologies in the field of art, analyse innovative activity of auction houses Christie's, Sotheby's, Phillips; build econometric models of the dependence of the profits of auction houses on the format of the auctions held for 2019–2021. Within the research, the authors used econometric, analytical and modeling methods.

Results

Online auctions trends

To better understand the impact of innovative technologies on the profits of the auction houses Christie's, Sotheby's and Phillips, several econometric models were built to identify the presence or absence of a relationship between auction profits and such a qualitative factor as the format of the auctions.

To test these assumptions, the authors formulated a basic model

$$\text{SALERUB}_i = \beta_1 + \beta_2 * \text{FORM}_i + \beta_3 * \text{LOTS}_i + \varepsilon_i.$$

Table 1 lists the definitions of the variables used in the empirical procedure, while above, we discuss why we chose these variables.

Description of variables

Variable	Description
SALERUB	Sales volume at auctions (million rubles)
FORM	auction format (1 — if online, otherwise — 0)
LOTS	the number of lots in the auction

To assess the dynamics of the dependence of the auction profit on the format of the auctions the authors compared the estimated sales equations of auction houses Christie's, Sotheby's, and Phillips for 2019, 2020 and 2021.

$$2019: \text{SALERUB}^{\wedge} = 390,33 - 1307,56 * \text{FORM} + 35,18 \text{ LOTS};$$

$$2020: \text{SALERUB}^{\wedge} = 324,98 - 428,12 * \text{FORM} + 20,04 * \text{LOTS};$$

$$2021: \text{SALERUB}^{\wedge} = 818,75 - 1290,58 * \text{FORM} + 36,17 * \text{LOTS}.$$

It can be seen from the equations that in 2020 the dependence of the amount of auction sales has significantly decreased compared to 2019. This can be explained by the fact that due to the pandemic; most auctions were held entirely online.

Further, the dependence of the amount of auction sales has increased significantly compared to 2020 but is still lower than this indicator in 2019. Such indicators are explained by the fact that in 2021, restrictions were eased and some auctions, namely those where were presented works of art with a price above the average, were held in the traditional format. The rest of the auctions were still held online due to restrictive measures and increasing confidence in online auctions on the part of participants.

NFT art market

In 2019, there was an increase in activity in the crypto arts sector, so this rapidly developing market began to receive special attention as a segment of the blockchain economy (Franceschet et al., 2021). New art projects have been created and there is no doubt that marketplaces and virtual galleries have allowed artists to be recognized on a much larger scale (McConaghy, 2017). The greatest interest was observed in projects whose main goal is art (artists, generative art, art markets, etc.).

Crypto art refers to digital works of art, the ownership of which can be verified, just like in the case of physical art. Usually, the authenticity of physical works of art can be proven in various ways, such as by verifying the artist's signature or obtaining authentication certificates. In the case of crypto art, different methods must be used. Authentication and proof of ownership of digital files relies primarily on non-fungible tokens (NFTs), which are unique digital assets stored on a blockchain.

NFTs can represent any type of digital format such as GIF, JPEG and MP3. They are not interchangeable, but they can be bought with cryptocurrency. Once a digital work of art is uploaded to the blockchain in the form of an NFT, it will become a unique work of art as the original file can always be identified, even if copies of it are used online indefinitely (Bsteh, Vermeulen, 2021).

On February 25, 2021, Christie’s — one of the world’s leading auction houses in terms of fine art income — held an online auction of one lot — works by American artist Mike Winkelmann, known as Beeple, based on non-fungible tokens. This was the first time that a major auction house had listed NFT digital art for sale and accepted cryptocurrencies for sale.

The piece, a digital collage titled “Every Day: The First 5,000 Days”, attracted 33 potential buyers. Looking at the age of the bidders, most of them were Millennials and only three percent of the bidders were Baby Boomers. Meanwhile, 55 percent of bidders were in the Americas. On March 11, 2021, the lot sold for an astounding \$69.3 million, making it the most expensive piece of art sold online to date. It was also the third highest auction price for a work by a living artist, after Jeff Koons and David Hockney. The buyer, known only under the alias Metacovan, was a Singapore-based investor and co-founder of the Metapurse crypto fund (Lambert, 2021).

In 2020, the art segment played an important role in the NFT market. That year, the sector posted the second largest sales revenue in the NFT market. Overall, NFTs sold as artworks generated approximately \$12.9 million in 2020. Meanwhile, given the volume of sales in the non-fungible token (NFT) market, the art segment only accounted for about five percent of all units sold. Outside of the NFT market, the online contemporary art market has grown significantly in recent times. In the first half of 2020, as the coronavirus (COVID-19) pandemic forced auction houses to seek alternatives to in-person events, online auction revenue from contemporary art sales around the world skyrocketed, roughly doubling the revenue reported in 2019 (Figure 1).

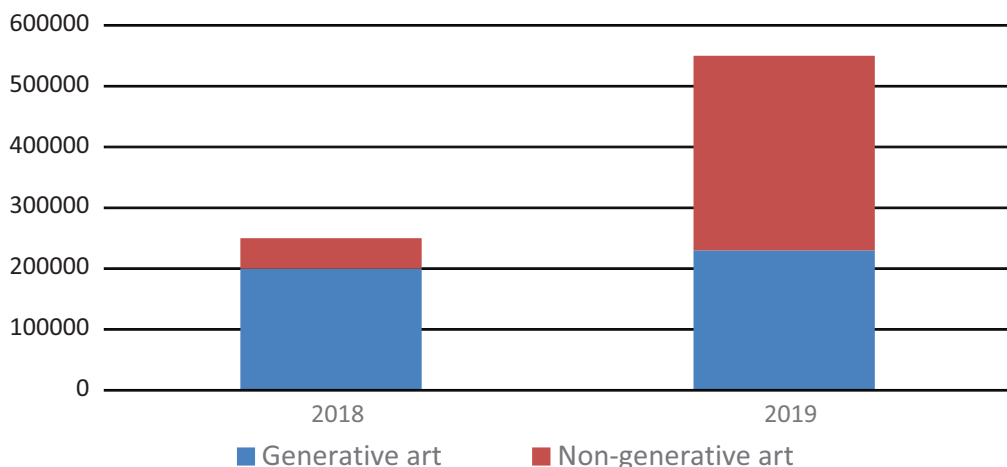


Figure 1. Global sales of generative and non-generative art in USD, million

Source: build by the authors based on: Non-fungible art report. Retrieved December 10, 2021, from <https://nonfungible.com/static/nft-art-report-2018-2019.pdf>

The works of art in the NFT market are classified into generative and non-generative. Generative art is art created by algorithms (coded by humans). The code as a result produced by the algorithm is considered a work of art. “Generative art” refers to all works of art generated by an algorithm (Boden and Edmonds, 2009; Galanter, 2003).

Non-generative art is art created entirely by humans. Whether the work is digital or physical, it was created by human hand. “Non-generative art” classifies all works of art that were created in the first place by a person, regardless of whether an algorithm was further used or not.

One interesting indicator to watch is the rise in secondary sales in the non-generative art market. In a year they grew by 537%. It’s not just the resale of art that is seeing rapid growth: 2019 saw a significant increase in the number of artists, works, volume of trades and transactions in dollars.

Figure 2 shows that the value of NFTs traded in 2021 is significantly higher compared to 2020. While the total sales value of all NFTs sold in 2020 was about \$65 million, NFT sales in the first half of 2021 were approximately \$1.26 billion.

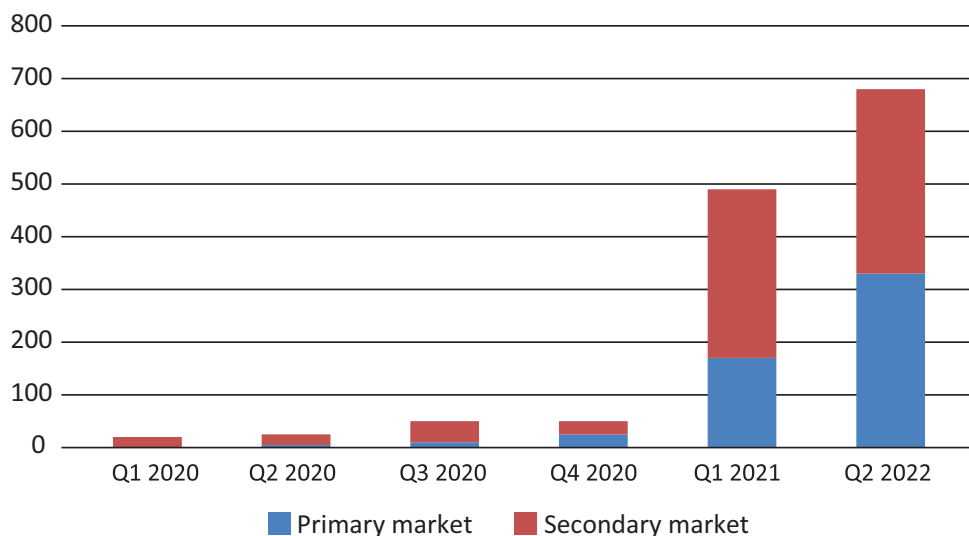


Figure 2. Total NFT sales in the arts sector worldwide for Q1 2020 — Q2 2021, by type, \$ million

Source: build by the authors based on: Art Basel & UBS. Total value of sales involving a non-fungible token (NFT) in the art sector worldwide from 1st quarter 2020 to 2nd quarter 2021, by type (in million U.S. dollars). Retrieved December 1, 2021, from <https://www.statista.com/statistics/1269499/nft-sales-value-art-sector-worldwide-by-type/>

Economic efficiency of online auctions

With the onset of the coronavirus (COVID-19) pandemic in 2020, auction houses around the world have stepped up their digital departments and online auctions as many events had to be canceled or rescheduled due to the health crisis.

Figure 3 shows that Sotheby’s online sales in 2020 increased sharply compared to the previous year and amounted to \$575 million. In 2021, this figure increased even more, reaching a record high of \$800 million. In the same year, Sotheby’s total auction sales reached \$7.3 billion, the highest of all time.

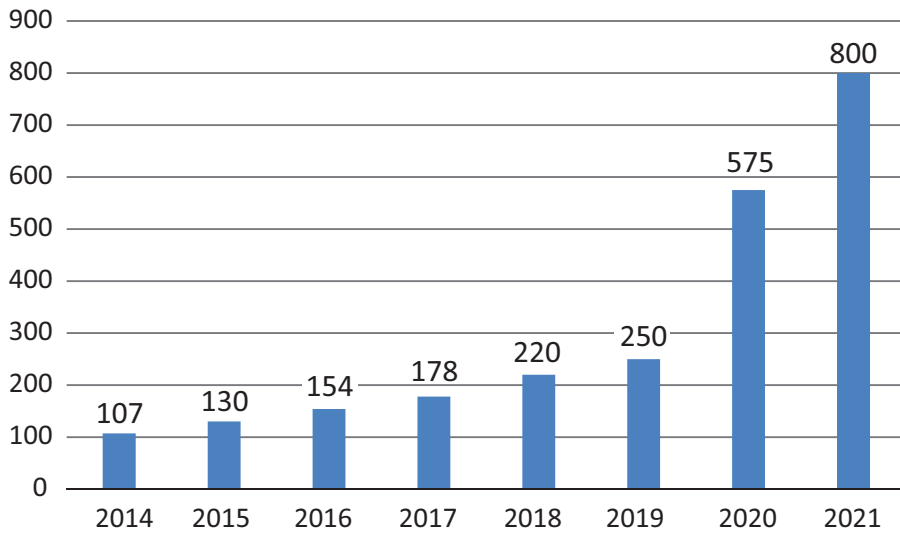


Figure 3. Sotheby's online sales 2014–2021, \$ million

Source: build by the authors based on: Sotheby's, Total online auction sales of Sotheby's worldwide from 2014 to 2021 (in million U.S. dollars). Retrieved November 1, 2021, from <https://www.statista.com/statistics/999373/sotheby-s-auction-house-online-sales/>

Auction house Christie's online sales also grew in 2020 by more than 260% year-to-year to \$311 million. That year, Christie's more expensive lot was sold during ONE, a global online auction hosted by the company in July. In 2021, Christie's online auction sales continued to grow. Sales grew by 43% reaching \$445 million. The average lot price reached \$23,400 (for example, in 2016 this figure was \$6,100). In addition, today almost half of all Christie's auctions are held online.

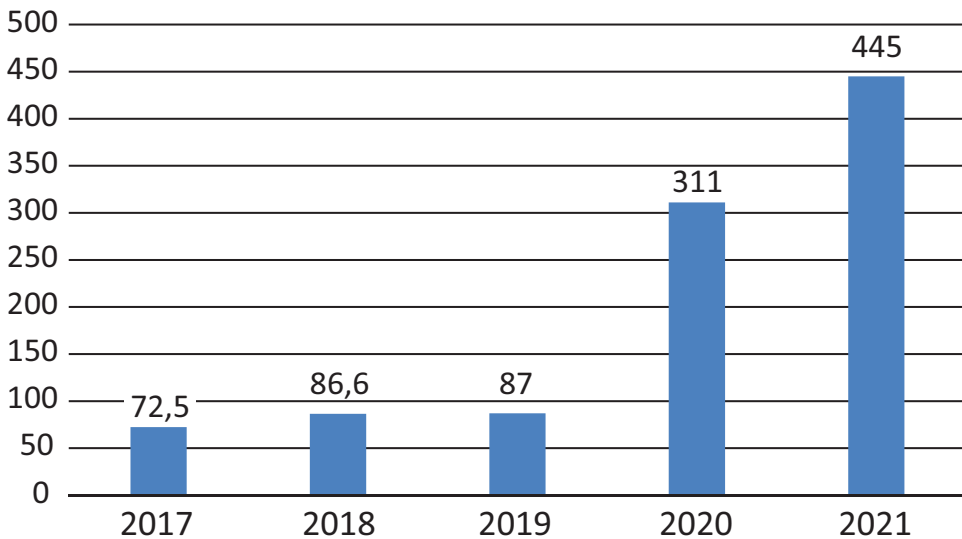


Figure 4. Christie's online sales 2017–2021, \$ million

Source: build by the authors based on: Christie's EOY 2021 Press Release. Retrieved December 12, 2021, from https://www.christies.com/presscenter/pdf/10337/Christie's%20EOY%202021%20Press%20Release_10337_1.pdf

The pandemic has also caused a major shift in the auction market, with Christie's, Sotheby's and Phillips raising \$1.1 billion in online auctions in 2020, up from \$168 million in 2019. Online auction sales of these homes increased by 70% in the first half of 2021 to \$671 million. Online-only sales in 2020 accounted for 14.2% of the total auction sales of the three homes, compared to just 1.2% in 2019.

They launched 238 online auctions in the first half of 2021, up from 216 in 2020 and 93 in 2019. A combination of more frequent events, as well as more organized and themed auctions across more collectible categories, has revitalized the auction business and helped mitigate the effects of the pandemic.

Buyers now seem to have become more confident in buying art online — a key barrier that has held back the market now in the past. Clear evidence of this is that average online auction prices have tripled in 18 months. The skyrocketing value of online sales at Christie's, Sotheby's and Phillips not only increased the number of listings, but also increased average online-only prices by 202% to \$24,921 in the first half of 2021, compared to the 2019 average of \$8,259. The traditional price cap of the online art market has been lowered during the Covid-19 pandemic, making online auctions an important sales channel for a range of collectibles.

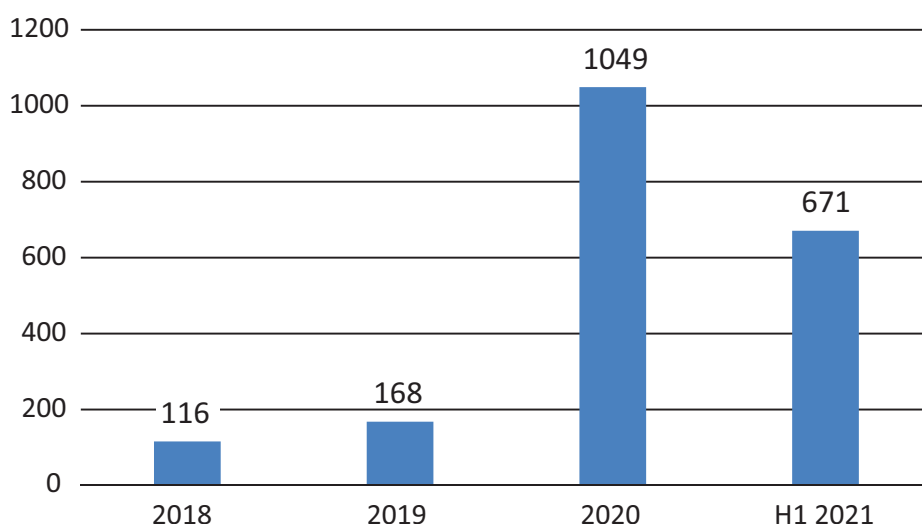


Figure 5. Global online-only auction sales of Christie's, Sotheby's, and Phillips 2018-H1 2021, \$ million

Source: build by the authors based on: Deloitte, Combined online-only auction sales of Christie's, Sotheby's, and Phillips worldwide from 2018 to 1st half 2021 (in million U.S. dollars). Retrieved December 12, 2021, from <https://www.statista.com/statistics/1274067/online-only-auction-sales-leading-auction-houses-worldwide/>

The British insurance company Hiscox conducted research and published the Hiscox Online Art Trade Report 2021, which identified the main challenges for online auctions in 2021. The results showed that the following factors are of greatest concern.

- Building consumer confidence and brand awareness: 50% of online platforms said it was their top priority. However, it is worth noting that this figure has declined (56% in 2020 and 64% in 2019), which may indicate that the pandemic

and the resulting shift to online format has strengthened consumer confidence and increased brand awareness.

- Different tax regimes for international transactions: 46% said this was a major problem, up from previous years (30% in 2020, 21% in 2019). Several platforms based in the UK and the EU cite the UK's exit from the EU as a key issue.
- Logistics: 38% said this was the main problem, down from 41% in 2020 and 50% in 2019.
- Consumer hesitancy about shopping online is on the decline, with 23% of those surveyed making it a top priority, up from 56% in 2020. This is indicative of the growing confidence of online shoppers to buy art with unseen eyes.
- Adapting to e-commerce: 23% of those surveyed said it was a big problem, up from 19% in 2020. This may be due to increased requirements for the quality of online platforms due to a large influx of buyers.

Online auctions have a large market share, with online-only sales accounting for 14.2% of the total sales of the top three auction houses in 2020, compared to 1.7% in 2019. As we enter post-crisis realities, online auction market share has declined, but they still account for 11.4% of total sales at Sotheby's, Christie's, and Phillips in the first half of 2021. With a total sales value of \$670.6 million, this is 871% more than in 2019, when the online market share was only 1.2% of all auctions.

Online buyer confidence remains strong as average prices rose by 22.4% in the first half of 2021: The rapid growth in the value of online sales was driven not only by an increase in the number of lots sold online, but also by an increase in average prices by 22.4% to \$26,192 overall in the first half of 2021. Online-only average prices peaked in March 2021 at \$44,785, up 197% from the previous year. The strong dynamics of volumes sold, selling values and average prices indicate that auction houses and buyers are more confident than ever when transacting online. However, as we return to a more normal situation, we expect the current growth rate to slow as buyers begin to return to physical and hybrid auction formats.

Conclusion

There are many opinions regarding the introduction of technology into the art market. Some believe that the Internet and social media have increased mass engagement and made art more attractive, and that they have helped diversify the art audience.

However, there are also opinions "against". For example, some believe that technology creates false expectations that all digital content should be free. Based on the econometric analysis carried out, it can be concluded that in the period 2019–2021, the importance of online auctions and, as a result, other technologies necessary to support their activities has increased. This growth is due to factors such as the forced transition to an online format due to security measures and the fight against COVID-19 and an increasing level of confidence on the part of market participants.

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