



arts

Art Markets and Digital Histories

Edited by
Claartje Rasterhoff and Sandra van Ginhoven
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Special Issue Editors

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About the Special Issue Editors

Claartje Rasterhoff works as assistant professor in Urban History and Digital Methods at the University of Amsterdam. She specializes in the relationship between cities, culture and economics, and has published and taught on art markets and cultural industries from the early modern period to the present. Her current research projects focus on the development of historical cultural datasets and digital infrastructures, as well as their application in other societal domains.

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Preface to “Art Markets and Digital Histories”

This Special Issue of *Arts* investigates the use of digital methods in the study of art markets and their histories. As historical and contemporary data is rapidly becoming more available, and digital technologies are becoming integral to research in the humanities and social sciences, we sought to bring together contributions that reflect on the different strategies that art market scholars employ to navigate and negotiate digital techniques and resources. The essays in this issue cover a wide range of topics and research questions. Taken together, the essays offer a reflection on what takes to research art markets, which includes addressing difficult topics, such as the nature of the research questions and data available to us, and the conceptual aspects of art markets, in order to define and operationalize variables and to interpret visual and statistical patterns for scholarship. In our view, this discussion is enriched when also taking into account how to use shared or interoperable ontologies and vocabularies to define concepts and relationships that facilitate the use and exchange of linked (open) data for cultural heritage and historical research.

Claartje Rasterhoff, Sandra van Ginhoven

Special Issue Editors

Art Markets and Digital Histories

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Abstract: This Special Issue of *Arts* investigates the use of digital methods in the study of art markets and their histories. Digital art history or historical research facilitated by computer-technology in general is omnipresent in academia and increasingly supported by an infrastructure of seminars, workshops, networks, journals and other platforms for sharing results, exchanging notes and developing criticism. As the wealth of historical and contemporary data is rapidly expanding and digital technologies are becoming integral to research in the humanities and social sciences, it is high time to reflect on the different strategies that art market scholars employ to navigate and negotiate digital techniques and resources.

Keywords: art markets; digital history; editorial

This Special Issue of *Arts* investigates the use of digital methods in the study of art markets and their histories. Digital art history or historical research facilitated by computer-technology in general is omnipresent in academia and increasingly supported by an infrastructure of seminars, workshops, networks, journals, and other platforms for sharing results, exchanging notes, and developing criticism.¹ As the wealth of historical and contemporary data rapidly expands and digital technologies become integral to research in the humanities and social sciences, it is high time to reflect on the different strategies that art market scholars employ to navigate and negotiate digital techniques and resources.

The history of art markets is a particularly interesting subfield for observing the use and development of digital methods in historical and contemporary areas of study. The tradition of computational scholarship in this particular line of research dates back to well before the 1980s and is inextricably linked to the subdisciplines of ‘economics of art’ and ‘cultural economics’, as well as to ‘economic art history’ and ‘social history of art’.² Recurring overarching questions include the following: when and where did art markets emerge and how did they develop across time and space, what made them develop more rapidly or successfully in particular places and periods, how are artistic changes and innovations explained by changing market conditions and tastes, and how can the (commercial) success of specific artists, styles, themes, or artistic communities be explained? Besides these shared thematic questions and interests, the history of art markets is also characterized by a specific approach, as many researchers are trained in or borrow from social sciences research methods and then adapt them to the specifics of historical art markets. Art markets (and markets for cultural goods in general) are characterized by relatively high levels of demand and quality uncertainty, and as a result, both market participants and researchers grapple with elusive concepts such as taste, value, reputation, status, novelty that do not fit easily in economic and computational models.

¹ Consider for instance the recently founded *International Journal for Digital Art History*; <http://www.dah-journal.org/>. Cf. Baca et al. (2013, 2019).

² This range is also at the core of the recently founded *The International Art Market Studies Association* (TIAMSA); <https://www.artmarketstudies.org/> and the *Journal for Art Market Studies*; <https://www.fokum-jams.org/index.php/jams>.

In addition to these more structural properties of art market research, a more recent historiographical trend makes the inquiry into the use of digital methods particularly relevant. The boundaries of art markets as defined by researchers are becoming more fluid and contested, as can be observed on at least three levels. First, the history of art markets has since long been studied through economic, social, and cultural lenses. While some scholars still opt for one or the other, many researchers now try to integrate these perspectives through the topics of, for instance, intermediaries, market mediation, and valuation processes. The second trend plays out on a spatial level. The geographical reach of historical art market studies is increasingly more global, extending its focus beyond Europe and the United States to incorporate Latin America, Asia and Oceania. At the same time, scholars have developed increasing interest in themes such as cross-border trade and networks, global vs. national vs. local, and migration and mobility patterns. Finally, the historical narratives on the development of art markets are less homogeneous and linear, as more attention is being paid to different market segments and types of markets developing at different speeds, as well as to the relations between markets for paintings and markets for other cultural products, not only such as books, prints, photos and tapestries, but also musical, film, and theatrical productions.

The extension and opening up of disciplinary boundaries have added to our understanding of art markets as complex and multidimensional socio-cultural as well as economic phenomena. In theory, digitization, digital methods and linked data provide excellent opportunities for further advancing transdisciplinary, cross-border and comparative analyses. Open access to digital resources from art museums, archives, and libraries provides the opportunity, most explicitly perhaps in the form of linked data, to examine crossovers between research domains, periods, places, and to experiment with different explanatory models. However, as we observe in our own research practices and networks, it is difficult to systematically link or compare data across disciplines and borders, and to test theoretical models across different periods and places. For this issue, we therefore sought contributions that present a historical research question relevant to art market studies and we were particularly interested in contributions that reached out to other domains (be they time, place, or societal), and that emphasized combining and using multiple sources or data types (linked or not linked). There were no limitations as to place or time, as long as the papers were explicit on their research processes with regards to data, techniques and methods. This Special Issue showcases some of the aforementioned developments, reveals current practices and challenges, and points us to possible future research opportunities.

Thematically, the essays address many aspects of art markets and propose a wide array of operationalization strategies of art market research. In trying to understand career success within artistic communities and in the creative sector more broadly speaking, Braden & Teekens propose a network approach to measure artistic status and reputation and use regression analysis to evaluate how these interact. Networks also feature in the McCabe's evaluation of Hans Rottenhammer's (ca. 1564–1625) international trajectory and the role that intermediaries played in the advancement of his career among patrons and the open markets principally in Venice, Rome, Antwerp, Augsburg and other cities. Also preoccupied with the role of institutions in artistic careers, Saint-Raymond quantitatively tests the resilience of the academic system and the French Salon and identifies the latter's lasting impact on artists' economic successes until the Great War, thus proposing that the establishment of the so-called dealer-critic system took root later than has been conceived to date. Fuchsluger provides a reflection on current economic-sociological approaches to the study of art markets and emphasizes the complex relationship between markets and museums, illustrated by the case of maiolica forgeries in the photo archive of *Verband von Museums-Beamten zur Abwehr von Fälschungen und unlauterem Geschäftsgefahren* collectively maintained by museum officials in the early twentieth century. This archive, currently undergoing digitization, illuminates understudied aspects of museums' involvement in the market and the development of in-house expertise.

In order to explain the growth and development of local and regional art markets, Oberste-Hetbleck focuses on the role of art fairs in the internationalization of the markets for modern and contemporary art. In doing so, the mapping project ART|GALLERY GIS|COLOGNE recognizes and reflects on the

role that digital platforms play in facilitating an integrated analysis of fairs and other art market phenomena. Also concerned with how art markets grow and develop, Nijboer, Brouwer & Bok compare aspects of the painting industries in sixteenth- and seventeenth-century Antwerp and Amsterdam by analysing biographical data from ECARTICO, a database and linked data web resource on painters working in the Low Countries ca. 1475 to ca. 1725. In contrast to the long-held view that Amsterdam was the successor of Antwerp as the main artistic center in the Low Countries, the authors identify higher degrees of independence between the trajectories of the two local painting industries in terms of production figures and the producers' populations. Li also analyses ECARTICO data in tandem with production trends mined from the most comprehensive dataset of Netherlandish paintings of the RKD-Netherlands Institute for Art History. She presents novel visualizations of the painting production trends in the Northern Netherlands throughout the seventeenth century, which lead to explorations of incentives and constraints underlying the development of this industry in "irrational" ways that complicate the neoclassical economic approach to art market studies. Behavioral economics, outsider markets, information asymmetries, innovation and exuberance are also topics that surface in the coupled reflections by Van Miegroet, Alexander & Leunissen and by Sidorova on the current state of contemporary art markets. The authors of both articles reflect on how online presence, digitization and technological advancements impact how art markets and research practices are conceived, and single out some challenges and opportunities for the application of analytical methods and tools to study the identified developments.

From these contributions, we can observe that the study of the commercial aspects of arts and culture is increasingly integrated by domain experts within disciplines such as art history. As a result, historical art markets can now be better understood as multilayered and complex socio-cultural structures that are not a given, but rather developing within specific social and societal contexts. The dialogue between historical and contemporary research further strengthens the critical reflection on art market sources and data and prompts discussions on what an art market is and how useful the concept is for historical research. While many of the topics covered here overlap and are central to the study of art markets, these contributions also demonstrate the specificity of place and time in art market inquiries and offer a reflection of established lines of research and availability of sources for each given topic. In other words, each period and place comes with its specific research interests, questions, and approaches, and the contents of this Special Issue in turn illuminates what is has not yet been systematically included, particularly in terms of time periods, geographic locations and artistic media.

The contributions in this Special Issue testify to the different ways in which digital collections and methods can be applied to historical research on art markets. While some articles are guided by more explicit questions and hypotheses, such as Braden & Teekens and Saint-Raymond, scholars such as Fuchsgruber and Oberste-Hetbleck take specific datasets or sources to explore questions and topics and other authors, such as Li, McCabe, and Nijboer, Brouwer & Bok can be situated in between explanatory/exploratory or question-driven/data-driven approaches. More speculative essays by Van Miegroet, Alexander & Leunissen, as well as by Sidorova, offer timely reflections on current topics and research possibilities for the study of contemporary art markets. In fact, all the contributions provide hypotheses or starting points for further research. This type of research, then, provides insight into the iterative and sometimes more speculative character of digital research practices and therefore facilitates the (re-)use of datasets and models and the testing of hypotheses and assumptions. This also stems, at least partly, from the fact that, both in academia and cultural heritage institutions, specialized research-oriented datasets and online platforms are developed and tested in order to demonstrate potential and limitations of the data by means of specific use cases. Such big(gish) institutional or academic datasets help to elucidate the functioning of art markets by providing curated datasets (such as ECARTICO) as well as practices of data and tool criticism that work for different types of projects.

Indeed, in one way or another and in varying degrees of complexity, all the contributions rely on carefully curated corpora of source data compiled from a wide array of digital repositories or platforms, secondary printed material, and primary archival documents suited for specific inquiries. It stands out

that for curating each of the corporuses, contributors overcame the challenges of constructing and linking datasets or enriching the available data with new complementary sources necessary to tackle their research questions. In all cases, the authors have been able to advance new digitization projects and take advantage of open access policies of digital resources from art museums, archives, and libraries. Fairs, galleries and auction sales catalogues, online museum collections and exhibition histories, digital provenance data and archival documents, prosopographical and image databases, art sales prices published online and art historical encyclopedias are some of the main sources brought together in these projects.

The articles thereby implicitly herald the need to formalize training in the development and the application of digital methods for the advancement of transdisciplinary, cross-border and comparative analyses by art market scholars and (art) historians. This type of research evidently requires interdisciplinary expertise, knowledge and skills that are still often self-taught or emerge from multidisciplinary research teams. In practice, it is still difficult and time-consuming to develop and identify good practices of data treatment, data modeling, and statistical analyses. When are the data good enough, how do we (re)present uncertainties and incompleteness and how do I publish the dataset, data models and statistics? How do I assess the functioning and usefulness of research tools and platforms? How do I present the research process in an article and where can I publish it? And, not unimportantly, who can review such interdisciplinary research? Translating the promise of digital methods into actual conceptual leaps in the field requires careful design of research questions, data models and methodologies. Even though historical researchers addressing these questions are being increasingly organised, these questions, many researchers, as well as authors in this special issue, are still developing their own definitions, measures and models.

In our view, digital research into art markets would benefit from a more systematic and open discussion on how to research art markets. This means engaging more explicitly with the conceptual aspects of art markets in order to define and operationalize variables and to interpret visual and statistical patterns. Here, current self-organising practices in the field of linked (open) data for heritage and historical research can perhaps serve as a source of inspiration. Linked data uses the Web to connect related data not previously linked that resides in heterogeneous and distributed datasets without superimposing a single model, but by using ontologies and vocabularies to define concepts and relationships and facilitate use and exchange. Such an approach as well as data principles (such as FAIR: Findable, Accessible, Interoperable, and Reusable³, and LOUD: Linked Open Usable Data⁴) might also be applied to research methods. This does not mean that communities of researchers have to arrive at unanimously shared definitions or data models, but rather that they have to ensure transparency about their methods in terms of definitions and data models concerning key concepts in research on art markets such as reputation, status, success, authenticity, incentives, constraints, relations, pricing, value, valuation, and value systems, intermediaries, and platforms. We hope and expect that the development of such conceptual and methodological frameworks will ensure the multiplicity of methods and ever-growing available data to more strongly impact existing research agendas and facilitate transdisciplinary, cross-border and comparative research. In the case of current art market developments, we expect that questions around digitization, online presence and methodological approaches to digital-born data and machine-generated and artificial intelligence (AI) tools will attract more scholarly attention in the future.

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³ <https://www.dtls.nl/fair-data/> (accessed 21 July 2019).

⁴ <https://linked.art/loud/index.html> (accessed 21 July 2019).

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Article

Reputation, Status Networks, and the Art Market

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Abstract: The effect of an artist's prestige on the price of artwork is a well-known, central tenant in art market research. In considering how an artist's prestige proliferates, much research examines networks, where certain artistic groupings and associations promote individual member's artistic standing (i.e., "associative status networks"). When considering the role of associative status networks, there are two models by which status may increase. First, the confirmation model suggests that actors of similar status are associated with each other. Second, the increase model suggests that a halo effect occurs, whereby an individual's status increases by association with higher-status artists. In this research, we examine the association of artists through museum exhibition to test confirmation versus increase models, ascertaining whether prestige acquisition is a selection or influence process. This research capitalizes on the retrospective digitization of exhibition catalogues, allowing for large-scale longitudinal analysis heretofore unviable for researchers. We use the exhibition history of 1148 artists from the digitized archives of three major Dutch museums (Stedelijk, Boijmans-Van Beuningen, Van Abbe) from 1930 to 1989, as well as data on artists' market performance from artprice.com and bibliographic data from the WorldCat database. We then employ network analysis to examine the 60-year interplay of associative status networks and determine how different networks predict subsequent auction performance. We find that status connections may have a point of diminishing returns by which comparison to high prestige peers increases one's own prestige to a point, after which a high-status comparison network becomes a liability.

Keywords: artistic reputation; auction price; museum exhibition; associative status networks; prestige; associative theory

1. Introduction

Art history repeatedly reveals the crucial role connections play in artistic careers. Particularly during the 20th century, artists were frequently known by their memberships within groups or stylistic movements. For lesser-known artists, connections to more prestigious names often serve as a crucial turning point for their reputations. Similarly, artistic practices are commonly inspired and grounded by tracing ideas to earlier visionaries, for example, the various artists who draw inspiration from Marcel Duchamp's conceptualist precedents or Robert Rauschenberg's innovative material combinations (see Foster 1994).

In both visual art and across artistic fields, research has shown that advantageous associations can be professional, such as membership within an artistic movement (Crane 1987; White and White 1965; for example, see pp. 6–17), mentorship between an established and novice artist (Craig and Dubois 2010), or attending a prominent academy or school (Madoff 2009); however, informal associations also prove beneficial, ranging from friendship circles and social milieus (Currid 2007; Ridgeway 1989) or admiration and attributing influence (Craig 2007; Anheier and Gerhards 1991)

to evaluative comparisons created by critics and historians (Braden 2018; Schmutz and Faupel 2010). Regardless of origin or expression, the underlying motivation for promoting association is to influence an art worker's standing, and empirical evidence corroborates the material effect associations can engender. For example, sociological research on artistic workers in both music and theater has shown the importance of connections for both greater professional opportunities and income (Dowd and Pinheiro 2013; Uzzi and Spiro 2005).

The purpose of the current research is to test the theories on how associations impact an artist's prestige. While previous research has explored the importance and influence of connections in the art world, the mechanism behind how associations work has received little empirical examination. Case studies provide anecdotal evidence and offer some theoretical explanations; however, fewer studies have sought to test association's general, long-term impact. The following research empirically examines associative theory and assesses different ways in which associations may produce long-term advantages with respect to artists' auction prices.

To uncover the structural mechanisms underlying artists' statuses and reputations, our research makes use of the growing digital repositories tracking artists' career trajectories and outcomes. As such, we follow in the footsteps of work in the digital humanities (e.g., Meirelles et al. 2014; Brosens et al. 2016; Lincoln 2016), in which larger-scale datasets are created to assess the patterns and structures underlying the history of culture. In art market research, Szabo (2012) and Van Ginhoven (2017) showed how network visualizations are particularly useful tools to expand analyses of artists' sales into longitudinal and international scope. In this article, we attempt to move forward in two ways. First, we go beyond descriptive analysis of networks by explicitly modeling the causal relationship between artists' statuses and reputations. Second, we transcend "the biased preference toward certain types of networks, such as social networks, over all other possible networks in arts, humanities, and culture" (Meirelles et al. 2014, p. 91) by explicitly theorizing about and mapping associative connections between artists created through museum exhibition.

Utilizing ideas in cognitive and development studies, we can theorize how associations may affect an artist's standing. Fundamentally, association is the foundation for memory and learning. Though associations are often built on perceived similarity between two subjects, association can also be created by simultaneous experience (Strauss 2017; Thorndike 1920). That is, when different objects, ideas, or actions are experienced at the same time, they can become associated or linked together in the mind. (Think, for instance, about the association between salt and pepper, bacon and eggs, or cookies and milk.) The more often this association occurs (i.e., "frequency"), the stronger the mental link becomes (Hamilton and Gifford 1976; Skinner 2014). Later, when a subject is encountered again, the association is easily recalled in the working memory and becomes part of what is known about both subjects. In this manner, contiguous association (Guthrie 1930, 1959) is a basis by which people acquire knowledge.

From an understanding of contiguous association, it is possible to comprehend how cultural associations can benefit status and reputation. When historical personages are repeatedly associated, such as through critical or historical assessment and grouping, these personages may become linked within cultural knowledge and the public consciousness. For example, when artists are grouped together in exhibition, the audience's concurrent experience of their work creates an explicit association between the artists themselves (for example, see Lang and Lang 1990). Group exhibition explicitly promotes the connections between artists: exhibitions titles such as "Cézanne, Gauguin, Seurat, Van Gogh" (MoMA Exh. #1, 7 November–7 December 1929) clearly create association between these artists. Note that, in such exhibitions, the use of the artist's name and reputation captures the content of the exhibition, i.e., the artist and artwork are the same. Because exhibitions invite attendees to view the presented as related and more significant when understood in tandem, such exhibitions connect artists while building their reputation through that connection. Because museums are often considered the gateway to prestigious, successful careers (Braden 2009; Fraiberger et al. 2018), exhibition association is particularly powerful, denoting critical comparability and a historical relationship.

Theoretically, then, exhibitions should be a vehicle for increasing prestige. Associative theory postulates that when an individual is more prestigious or recognized than another with whom she or he is associated, a mental heuristic may serve to extend attributes identified with the more well-known to the lesser-known individual (Kahneman 2011; Thorndike 1920). Through this heuristic, attributes such as expertise, quality, and esteem are believed to characterize both people based on their perceived association. Here, however, the mechanism by which association benefits the prestige of an individual becomes unclear. Specifically, there is little research into whether associations serve to *increase* or *confirm* prestige. The difference is subtle but important.

The “halo effect” (Thorndike 1920), whereby positive attributes extend through association, is dependent on relational connections and, therefore, is an evolving network position (Collins and Guillén 2012). If association increases prestige, then the effect should be cumulative, where each association has the potential to add to an actor’s status. Alternatively, if associations confirm an actor’s prestige, actors should be grouped by similar reputation, where, for example, artists of a similar prestige level would be routinely compared. Such repeated association serves to legitimize and strengthen reputational standing, providing a more durable personal attribute that an artist carries around as part of how she or he is known (i.e., part of one’s “reputation”, see Granovetter 2005, also, for an organizational example, see Schultz et al. 2001).

The difference under discussion here can be understood as the difference between reputation and status. While these terms are often used interchangeably, there are valuable distinctions. Reputation is the beliefs or opinions generally held about someone (Granovetter 2005), whereas status is often defined as a relative social or professional standing (Linton 1936; Berger et al. 1972). In other words, reputation is a known aspect of an individual’s identity, while status is comparative and relational. For example, think of the difference between the statement that “she is a talented emerging artist” compared with the statement that “she is the most talented artist emerging this year”. The first statement is one of reputation (“she is talented”), the second is one of status, where a hierarchy of talent is developed in relation to comparative others. The distinction matters when hierarchical heuristics come into play, such as when rewards are scarce, but value measurement is unclear (see Bourdieu 1983 for specific context in the art world, but also Kahneman 2011 for heuristic reliance). Whereas a good reputation may garner rewards in the art world, status may determine which artists receive the most or greatest accolades. This distinction is particularly salient within the art market, where the reason for sky-rocketing prices for some artists, but not others, is indefinite. Are high auction prices indicative of an individual artist’s outstanding reputation? Or are market prices affected by an association dynamic, where the high price of one artist leads to greater market demand for his or her associates? In the following section, we attempt to untangle these mechanisms by formalizing hypotheses on the temporal connection between prestige and connections to prestigious others.

We test two possible mechanisms of prestige moving through associations. Our first theory describes a flow of prestige in which associations with high prestige others increases the status of those persons associated with them. Within art exhibitions, this theory leads us to expect that exhibiting with high prestige artists increases an artist’s own prestige. Consequently, we hypothesize that if status impacts prestige, then prestigious associations add to an artist’s standing and, consequently, help explain variation in auction performance.

Alternatively, if reputation influences auction sales, then a second potential mechanism is at play in museum exhibitions, which we term the confirmation effect. Here, we hypothesize that an artist’s reputation leads to associations with equal prestige artists, and when artists are exhibited together through comparable reputations, these associations serve to recognize and confirm the artist’s level of prestige. Unlike the increasing effect of status, the confirmation effect is hypothesized to occur when an artist’s prestige is established by individual accomplishments and then supported by exhibition with prestigious others.

In both models, prestige and prestigious connections are assumed to be causally related to one another, but the causal mechanism between them differs strongly. For the increase model, i.e., when

assuming connections with high prestige others will increase one's status, high prestige connections causally must come first, and subsequently, artists gain prestige. Therefore, in an increase model, we hypothesize the following:

Hypothesis 1. *An artist's high prestige connections at timepoint 1 (t1) predict an artist's number of solo exhibitions at timepoint 2 (t2). Alternatively, in a confirmation model, the opposite occurs. If artists are exhibited together based on their reputation, we expect that, first, reputation must develop, and subsequently, artists will be increasingly exhibited with others of similar status. This leads us to our alternative hypothesis:*

Hypothesis 2. *An artist's number of solo exhibitions at t1 predicts the number of high prestige connections at t2.*

The objective of this research is not merely to ascertain which mechanism lies at the core of an artist's amassing of prestige, but to go beyond this and assess how these mechanisms in turn affect an artist's auction prices. Theoretically, both mechanisms of reputation and status associations explain an artist's auction price, with the effects potentially working in tandem to explain the large variance found in art markets. Despite the theoretical distinction between status and reputation, their effects on an artist's auction price should be similar; that is, both factors of high status and strong reputation are expected to raise an artist's price. Yet, it is important to assess which of the two has a stronger bearing on auction prices in order to decipher the mechanism underlying prestige's influence. To test the respective effects of status and reputation on an artist's market value, we formulate two additional hypotheses:

Hypothesis 3. *An artist's reputation positively affects his or her auction prices.*

Hypothesis 4. *An artist's status connections positively affect his or her auction prices.*

Note that, theoretically, status would seem to hold more weight in the art market than reputation. Again, while reputation may be thought of as an individual attribute, status is a relational variable, and if status represents a hierarchical positioning in relation to others, the higher the status is judged, the greater the comparative value to others. A position in the hierarchy of status serves to highlight and distinguish individual artists, as only one artist can occupy a specific hierarchical space. When two artists of significant reputation are compared with each other and one is judged to be of greater status, it makes sense that the higher-status artist will have greater economic value. Along these lines, having a large network of high prestige others to which an artist is compared within exhibition may actually hurt the artist's status over time. Within a large network of prestigious others, the competition is stronger and one's own prestige must vie to stand out. Consequently, status connections may have a point of diminishing returns by which comparison to high prestige others increases one's own prestige to a point, after which a high-status comparison network becomes a liability. Our last hypothesis is therefore formulated as follows:

Hypothesis 5. *The effect of an artist's reputation on an artist's auction price is mediated by the artist's status connections, in that the effect of status diminishes with the growth of reputation.*

2. Data and Methods

2.1. Population

The population used in this research are those artists who exhibited three times or more in modern art exhibitions in three Dutch museums (Boijmans-van Beuningen Rotterdam, Stedelijk Museum Amsterdam, and Van Abbe-Museum Eindhoven) between 1930 and 1989 (N = 1148). This population

was compiled using exhibition catalog data provided by the archives of each museum¹. In principle, an exhibition mentioned in the museum's list is included in our dataset, unless it is specifically indicated to not have content about modern visual arts. Therefore, exhibitions taking as their subject seventeenth-century painting or modern-day pottery were excluded. The initial lists of exhibitions in the museums are archived by the museums themselves. The three museums were selected for their importance and as broadly representative of Dutch art institutions. Our research timeframe, from 1930 to 1989, captures a period of institutionalization for art museums. As group exhibitions emerged in Dutch museums sparsely at the beginning of the 20th century, a starting point of 1930 allows for greater comparability through time among the exhibition networks. The upper boundary (1989) allows for a significant time period to be assessed (60 years of exhibition) while also allowing for a longitudinal assessment of auction prices (1990–2018).

In Figure 1, the distribution of museum exhibitions over our timeframe is presented. Historical upheavals such as World War II (WWII) had immense consequences for the course of history and the artists that populate it (as illustrated on a global level by Schich et al. 2014, p. 561). Our methodology deals with possible historical disruptions by analyzing a significant timeframe (60 years) but within decade-by-decade periods (see Section 2.3 for specifics on data collection). The length of time allows for broad examination, where historical happenings and outliers do not dominate the overall data; conversely, our decade-by-decade analysis allows for consideration of the effects of historical events and helps contextualize our findings. For example, because we capture WWII within our analysis, we also capture the possible disruptions caused by such an event in our data. The post-1945 rise in exhibitions within our Dutch museums is dramatic, with the lowest number of exhibitions taking place in the 1930s (50) and the number of exhibitions slowly increasing towards the end of the timeframe (98 in the 1980s). Although Dutch art museums were left relatively autonomous in their decision-making during World War II (Mulder 1976, pp. 226–36), financial support from municipalities and the government after 1945 allowed for a proliferation of exhibitions immediately after the war (Pots 2000, pp. 249–53). Because we capture and analyze artists' long-term exhibition history, we can assess the possible effect of exhibitions within a given decade on those of a subsequent decade. Consequently, in our analysis, we found both a marked shortfall of exhibitions during WWII (Figure 1) and an anomalous spike in the increase model over the confirmation model (Figure 2). Capturing this abnormality in the data allows us to understand how reputation and status may work in times of crisis. A potential explanation could be that when museum exhibition is a scarce resource, such as during wartime, the increase model becomes stronger, as there are more rewards to be gained in exhibiting. That is, given limited exposure opportunities, any affordance offers greater gains in status.

Our data collection captured the entire population of artists and exhibits within our three museums—a total of 6885 artists in 540 museum exhibitions. Given this large population, for both practical and theoretical reasons, we restricted our analysis to those artists who were exhibited at least three times during the study's timespan, allowing us to capture change in status and reputation over time. As such, our study population was reduced to 1148 artists. The bulk of these artists (80.0%) were living during at least the last 20 years of our timeframe. Moreover, due to our inclusion criteria being based in museum appearance, some of the artists were active long before being exhibited in a museum. Grouping artists by first exhibition appearance, rather than biological age, allowed us to examine an artist's professional career, which is often longer than an artist's lifetime (for a discussion on this, see Lang and Lang 1990, pp. 92–95). Additional analyses showed that our results were robust to the birth year of artists. Though birth year has a significant, negative effect ($\beta = -0.112$, $p < 0.000$), the strength or direction of the other reported effects were not significantly altered.

¹ These archives are available digitally at <https://bibliotheek.boijmans.nl/adlib312/default.aspx>, <http://library.stedelijk.nl/default.aspx>, and <http://212.61.168.66/abbeweb/Vubis.csp?Profile=Default>.

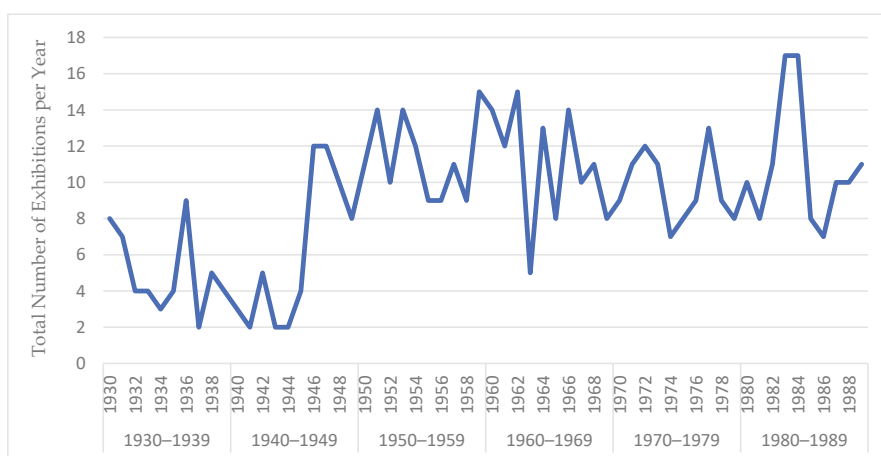


Figure 1. Number of museum exhibitions per year in three Dutch museums.

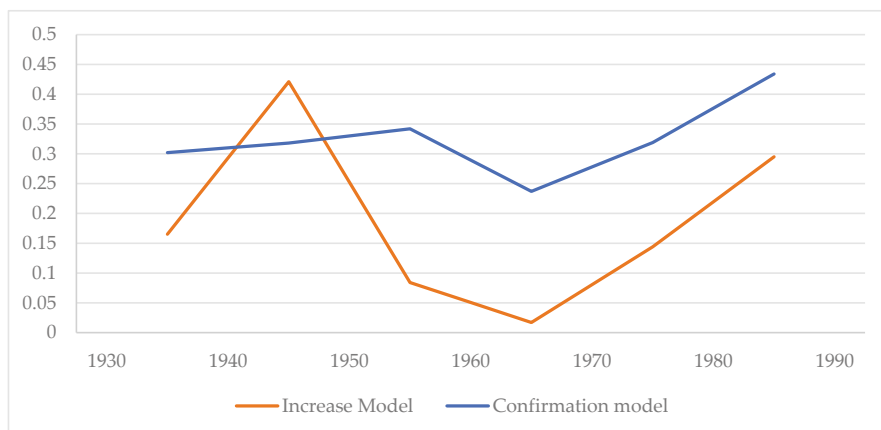


Figure 2. Pearson's r correlation coefficients between artists' reputation and status per decade.

2.2. Variables and Operationalization

2.2.1. Reputation: Solo Exhibition and Book Inclusion

In this research, we theorize that reputation is an individual variable of prestige. We have two measurements to capture reputation: solo exhibitions and book inclusion. First, we operationalize an artist's reputation as the number of solo exhibitions the artist had in our museums during our timeframe. That is, the variable includes all solo exhibitions an artist garnered from 1930 to 1989 in the three museums examined. Solo exhibition data were collected through the same museum archival websites used to gather general exhibition data (see above). For solo exhibitions, we have longitudinal data (exhibitions are timestamped), and we therefore use this data to test our confirmation and increase models. For robustness, we also collected data beyond our timeframe (from 1890 to 2018). Analyses of this data did not significantly alter our results.

For a second measure of an artist's reputation, we used the number of books that specifically deal with a given artist. To gather this data, we used WorldCat.org, a library cataloguing database, which compiles lists of books available for public circulation in libraries throughout the world. Search queries were created to include all matches that named an artist in the title, abstract, or keywords. Exhibition

catalogs were excluded, as we wanted to disentangle book inclusion from inclusion in museums, as well as avoid measuring the same operationalization (museum appearance) in both variables. To do so, we excluded from our query all terms similar to “exhibition catalog” or “tentoonstellingscatalogus”. Book inclusion data were not collected with a timestamp, which restricted us to use this variable only in the regression analysis and not in the longitudinal analysis.

2.2.2. Status: The Prestige of an Artist’s Associative Network

We theorize that status is an inherently relational concept. Because exhibitions form a symbolic connection between artists, we argue that an artist’s exhibition history can provide an exhibition network of associated artists. Ties between artists are demonstrated by joint exhibition appearance, with stronger ties being indicated by repeated joint exhibition. We argue that association with artists of high reputation will add to a given artist’s prestige, either through confirmation effects of reputation or an actual increase through connection. As we measured reputation in two ways, through solo exhibition and book inclusion, we compared status networks in parallel. For each artist in our population, we created an ego-network, including all artists with whom he or she exhibited at least once. All associated artists (“alters”) were assigned their own measure of solo exhibitions and book inclusion. Because we knew how often our focal artist was connected to his or her alters, we calculated an artist’s status network score by multiplying the strength of the connection to the alter by that alter’s reputation score and then adding the score of all the alters. We thus acquired two status networks: one of book inclusion and one of solo exhibition.

2.2.3. Auction Price

We measured an artist’s highest price at auction in euros with data retrieved from artprice.com. Because we conceive of reputation as being built over numerous exhibitions and decades, we examined auction prices subsequent to our artists’ exhibition histories (i.e., auction prices from 1990 to 2018). This allowed us to capture long-term reputational standing, rather than the ups-and-downs of analyzing a shorter timeframe, for example, a yearly analysis of exhibition to auction prices. While our exhibitions were only in the Netherlands, auction prices were not nation specific. Given the global nature of art markets for pre-World War II, post-war, and contemporary artists (MacAndrew 2008; Crane 2009; Velthuis and Curioni 2015), this long-term measurement is a more valid indication of an artist’s auction price than restricting the measurement to prices acquired at Dutch auctions alone. As often is the case in art price research (Rosen 1981), we found a distribution with a high number of low art prices and a few high-priced outliers. After log transformation, the art prices were found to be distributed normally, allowing us to use these data in regression analysis.

Table 1 provides descriptions of auction prices and independent variables for our sample of 1148 artists for which we have data. The mean score on our independent variable, i.e., the highest price achieved at auction for the work of an artist, was 2.11 million euros, with a standard deviation of 8.67 million. These values show that the distribution of rewards among artists is positively skewed, with a small number of artists demanding very high prices—a finding that is unsurprising given the superstar economy of visual arts (Rosen 1981; Menger 1999). Artists on average appear in just over 10.5 museum exhibitions, with solo exhibitions being rare, averaging 0.79. The average number of books in which an artist is included in the WorldCat database is almost 38, and here, we found a similarly skewed distribution of rewards as we did with auction price. For our two status network scores, we used the artists’ exhibition connections to calculate the status score of each artist’s network measured in both solo exhibitions and book inclusion. The average score of “network solo exhibition” was just over 901. In itself, the score is hard to interpret: it is the strength of an artist’s ties to others multiplied by his or her number of solo exhibitions. However, in comparison with other artists, each individual artist will find his- or herself on a scale, comparing him or her to all other artists. For solo exhibitions, this scale runs from 0 to 7635, with an average of 901. A similar scale was

constructed for an artist's network on the variable of book inclusion, running from 0, through the average of 6.110, to the maximum score of 77.049.

Table 1. Calculations regarding the study population of artists.

Characteristic of the Artist	N	Mean	Standard Deviation
Highest Auction Price (in Millions of Euros)	1148	2.11	8.67
Total Group Exhibitions	1148	10.53	10.54
Total Solo Exhibitions	1148	0.79	1.30
WorldCat Book Count	1148	37.87	128.58
Network Solo Exhibition	1148	901.27	1294.31
Network Book Count	1148	6110.76	8453.73

2.3. Methodology

In this paper, we used two separate strategies of analysis to test our hypotheses. To test Hypotheses 1 and 2, we used a longitudinal analysis assessing the impact of status versus reputation through time. For Hypotheses 3, 4 and 5, we employed ordinary least square (OLS) regression analyses.

The increase and confirmation models of Hypotheses 1 and 2 were tested by using our museum exhibition data during the timeframe from 1930 to 1989. We divided this timeframe into six decades and obtained information on the solo exhibitions in an additional seventh decade. This allowed us to compare six different changes in time: 1930s–1940s, 1940s–1950s, 1950s–1960s, 1960s–1970s, 1970s–1980s, and 1980s–1990s. For every artist, we calculated both individual reputation through their number of solo exhibitions during that decade and the prestige of their exhibition network. To assess which of these variables more strongly predicted the other, we calculated Pearson's *r* correlation coefficients for the variables. Model 1 tested the confirmation model and therefore assessed how an artist's solo exhibitions at timepoint 1 affect that artist's exhibition network's prestige at the subsequent timepoint 2. The analytical reverse effect was tested in Model 2, in which we assessed how the prestige of one's exhibition network at *t*₁ predicts the number of solo exhibitions an artist features in at *t*₂. This we termed the increase model, as it ascertains whether artists with high prestige connections derive benefits to their reputation over time.

Hypotheses 3, 4 and 5 were tested by using OLS regression analysis to allow for an examination of how separate factors simultaneously affected our outcome variable: auction prices. OLS was appropriate as the log transformation variable of auction price was normally distributed. Moreover, we tested for multicollinearity by using variance inflation factors in our models. When multiple independent variables correlate with each other, this potentially harms the validity of the acquired results. The variance inflation factor is a ratio that tests how severely independent variables in a model correlate with each other, with a general standard that values over 10 indicate problematic results (Field 2014, p. 325). More conservative values have also been proposed, with Menard (1995) urging researchers to be aware of scores higher than 5. The variance inflation factor (VIF) values in our models never passed 5 (the highest VIF was 3.23), indicating that there were no significant problems with multicollinearity between our independent variables. To improve the interpretability of our variables in comparison with the interaction term we introduced in Model 5, all the variables used in the regression analyses were centered around their mean (Field 2014, pp. 398–400).

3. Results

We tested our hypotheses by measuring reputation and status at different moments in time. To ascertain how they are chronologically related, we measured reputation and status for every artist in our sample at six different periods, i.e., a data point per decade from 1930 to 1990.

In Table 2, the first row is our "increase model", with the presented values being Pearson's *r* correlation coefficients between status at *t*₁ and reputation at *t*₂ per decade. Pearson's *r* theoretically ranges from −1 (a perfect negative relationship), through 0 (no relation between the variables), to 1

(a perfect positive relationship) (Privitera 2015, pp. 484–91). When a value is positive, it means that status in the previous decade had a positive relationship with reputation in the subsequent decade. In other words, through these numbers, we measured how status predates reputation connections. We found only partial evidence for our first hypothesis, as, in some decades, status was a significant predictor of later reputation, but the correlation did not always achieve significance.

Table 2. Pearson’s *r* correlation coefficients between artists’ reputation and status per decade.

	1930s (t1) to 1940s (t2)	1940s (t1) to 1950s (t2)	1950s (t1) to 1960s (t2)	1960s (t1) to 1970s (t2)	1970s (t1) to 1980s (t2)	1980s (t1) to 1990s (t2)
Status (t1) to Reputation (t2)	0.165 ***	0.421 ***	0.084	0.017	0.144 **	0.295 ***
Reputation (t1) to Status (t2)	0.302 ***	0.318 ***	0.342 ***	0.237 ***	0.319 ***	0.434 ***

*** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$ (two-tailed).

In the second row of Table 2, we provide the results for the confirmation model, where the values represent Pearson’s *r* correlation coefficients between reputation at t1 and status at t2 per decade. The values measured in these rows were analytically distinct from the previous model, as they showed how an artist’s reputation influences status over time. The positive correlation coefficients indicated that reputation affects status positively. The resulting values were positive and significant for every decade, indicating strong evidence for our second hypothesis and the corresponding confirmation model.

Figure 2 compares the two models via a line graph, demonstrating the correlation coefficients over time. This graph illustrates how the two theorized models relate to one another. What is specifically interesting here is that the blue line, representing the confirmation model, is almost consistently higher than the orange line (representing the increase model)—again, providing evidence for the confirmation model over the increase model. Nevertheless, we found a spike in the effect of status on reputation in the early 1940s (for a discussion of this spike and its connection to WWII, please see Section 2.1).

We executed stepwise OLS regression models to test Hypotheses 3, 4, and 5. In these hypotheses, we theorized about the effects of status and reputation on an artist’s auction price. All the models therefore had an artist’s highest auction value as the dependent variable. Table 3 provides the results of our regression analyses. In Model 0, we included only museum exhibition as a control variable. We added individual reputation effects in Model 1, and Model 2 shows the effects of status on auction price. In Model 3, we showed the effects of status and reputation combined, and our final analysis (Model 4) included the interaction effect of reputation on status.

Table 3. Ordinary least squares (OLS) regression results, showing effects on the highest auction price (log transformed) and reporting the standardized coefficients.

	Model 0	Model 1	Model 2	Model 3	Model 4
Reputation					
Total solo exhibitions		0.201 ***		0.037	0.038
WorldCat books		0.410 ***		0.215 ***	0.345 ***
Status					
Network solo exhibitions			−0.225 ***	−0.189 ***	−0.261 ***
Network book inclusion			0.802 ***	0.664 ***	0.793 ***
Interaction					
Book inclusion X Network book inclusion					−0.278 ***
Control variable					
Museum exhibitions	0.001	−0.087 **	−0.200 ***	−0.194 ***	−0.171 ***
Adjusted R²	0.000	0.232	0.380	0.418	0.456

*** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$ (two-tailed).

Our baseline, Model 0, did not test our hypotheses, but rather included a control variable: the total number of museum exhibitions that featured an artist. Museum exhibition was included as a control variable to assess whether it is the mere number of appearances in a museum that influences an artist's prestige rather than the connections created in the museum's exhibitions. However, in Model 0, we found that museum exhibition in itself does not significantly predict auction prices for artists, with an insignificant standardized coefficient of 0.001. In other words, museum exhibition alone is not a significant predictor of auction price.

In Model 1, we added two variables to our analysis that capture an artist's individual reputation. Specifically, Model 1 measured the "reputation effects" on auction price of having solo exhibitions in museums and being featured in art historical books. We found both our proxies of reputation to have positive and significant effects, with book inclusion being a particularly strong predictor ($\beta = 0.410$). Moreover, total number of museum exhibition (control variable) was a negative, though small, significant predictor.

Model 2 presents the effects of status on auction price. We had two indicators of an artist's status: first, the variable titled "network solo exhibitions" represented how many of an artist's co-exhibitors previously had a solo exhibition of their own, thus indicating their high level of status. Second, for "network book inclusion", a higher score indicated that an artist had a large exhibition network of co-exhibitors featured in books. Our results regarding the status effect on auction price were ambiguous but significant. Having co-exhibitors with solo exhibitions had a negative, significant effect on auction price, with a standardized coefficient of -0.225 . Artists with co-exhibitors featured in books, however, had a strong, positive, and significant effect on an artist's auction price. Our control of an artist's number of museum exhibitions continued to have a negative effect in this model.

To assess how the two concepts, reputation and status, affect auction prices simultaneously, we combined effects in Model 3. When combining variables, an artist's number of individual solo exhibitions lost predictive power with respect to auction prices (i.e., having solo exhibitions does not predict auction prices for an artist), while all other variables retained significant effects and directions, although the strength of the relationship slightly diminished. Our final model, Model 4, included an interaction term in the regression to ascertain how the effects of reputation and status might reinforce one another. It is this final model, we tested our hypotheses. Hypothesis 3, dealing with the effects of artist's reputation on auction price, was partly confirmed, as only a specific operationalization of reputation provided significant results (i.e., being featured in books). Whereas an artist's book inclusion was a very strong predictor of auction price ($\beta = 0.345$), acquiring solo museum exhibition on average did not lead to higher auction prices ($\beta = 0.038$). Our fourth hypothesis dealt with status effects, and here, as well, we found slightly conflicting results. First, book networks were, again, a particularly strong predictor ($\beta = 0.793$), but being exhibited with a strong network of co-exhibitors who previously had solo exhibitions themselves actually detracted from an artist's auction price ($\beta = -0.261$).

The interaction term hypothesized in Hypothesis 5 was found to be significant and negative. By including this interaction term, we measured whether the effect status has on book inclusion differs for artists who have differing reputation levels: does status work similarly for artists of low or higher reputation or can we discern differing effects for low and high reputation artists? The negative value of $\beta = -0.171$ found in Model 4 indicates that the strength of the effect of status on book inclusion diminishes as artists gain better reputations. To further assess how reputation and status effects interact, Figure 3 shows a scatterplot in which status effects are plotted on the x-axis and auction prices on the y-axis. Artists were divided into four different groups, ranging from low reputation (represented by blue), medium reputation (red and green), and high reputation (orange). For every category, we then drew a regression line to determine how status affects auction price for artists belonging to different reputation groups. As shown, we found particularly strong status effects for low and medium-low reputation artists, represented by steep regression lines. Conversely, while the effect was still present and positive for medium-high and high reputation artists, it was much less strong as it was for the low reputation artists, with a far more temperate increase in their regression lines.

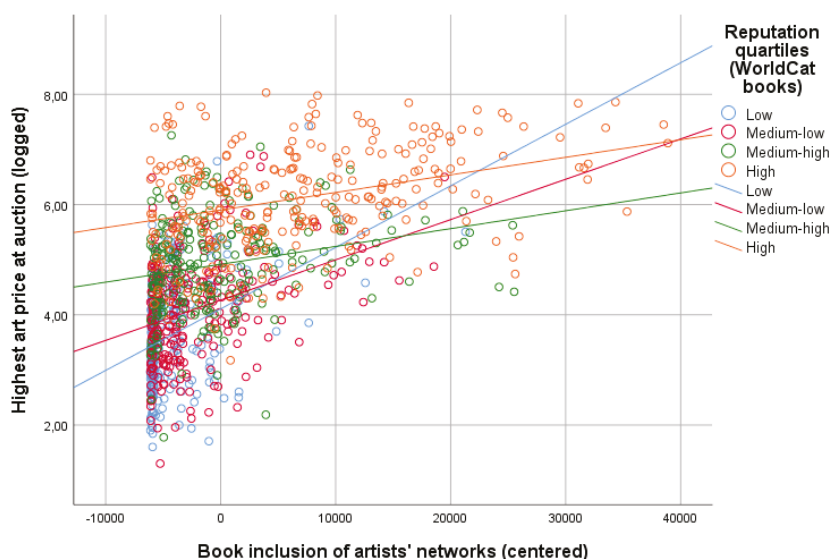


Figure 3. Scatterplot and regression lines of the effects of status (measured as network book inclusion) on auction prices (logged) for artists of differing levels of reputation.

4. Discussion and Conclusions

In this research, we theoretically differentiated reputation from status. We argued that reputation is an individual attribute based on what is known about a given artist. Alternatively, status is a judgement in which an individual is explicitly compared to others. While the concepts are interconnected, the present research demonstrates that often reputation precedes status, at least with respect to our population of artists and exhibitions. Thus, contrary to the belief that careers often depend on “breaks”, where an unestablished artist gains prestige through association, the reverse effect is stronger: such associations are usually on the basis of an established reputation. Our analysis of museum exhibitions reveals that artists are frequently grouped together based on similar reputational standing—a theoretical model we labelled the confirmation model. Artists with a high reputation subsequently obtain high-status connections in museum exhibitions. While our alternative theory, the increase model, also achieved significance, it was at a slower pace and with reduced impact. With the increase model, we found that high-status networks, where artists are exhibited with other artists of greater reputation than themselves, do increase prestige and add to a given artist’s reputation, albeit less than in the confirmation model. Overall, we found that reputation and status interact on a feedback loop, where both promote and strengthen each other’s growth; however, the artist’s individual reputation is usually the principal force driving the process.

We developed our analysis of reputation versus status further by examining their effect on long-term auction valuation. Given the evidence obtained for both the confirmation and increase models in museum exhibition, we analyzed the effects of both on the auction prices of our population of artists. The results were twofold. First, we found evidence that status connections are important regarding auction price and stronger than reputational standing. In other words, the increase model of status connections explained an artist’s auction price better than the confirmation model. Our second finding, however, shows the nuances of the primacy of status connections. For auctions, we found an interaction effect between reputation and status: status connections are important regarding auction price when artists have yet to build a strong reputation. That is, the increase model of status connections seemed to most strongly operate at the lower levels of artistic prestige, when reputations are still being built. The strength of the effect of status on auction price decreases when artists acquire a higher

reputation, but even for high-reputation artists, the effect of status remains positive. Accordingly, status associations can be understood as having diminishing returns: when artists have a lower prestige reputation, status associations are constructive to increasing prestige; however, at a certain point, an artist's reputation takes over as the main mechanism explaining auction price.

It is important to keep in mind that the threshold of inclusion in our population required an artist to already have a degree of success in the art world, having been included in museum exhibitions on at least three different occasions (see Section 2). Despite this degree of establishment, long-term artistic valuation is marked by uncertainty, where even amongst the most talented and promising artists, some achieve distinction, but most do not. This research attempted to understand some of the factors that contribute to this disparity. Within the institutional setting of museum exhibitions, associations between artists were made primarily based on prior reputation (the confirmation model), although we did find that the increase model functioned, albeit slowly. In our second analysis, we focused on the micro-level of the individual artist to assess how reputation and status affect an individual artist's auction price. Here, the importance of the slow-working "increase" model came to the fore, suggesting that different stages of an artistic career require different strategies for building prestige. Consequently, for example, our findings appear to recommend that an unestablished artist should focus on general exhibitions with prestigious others rather than solo exhibitions dedicated to his or her own work. Once a reputation is established, we found that perpetuation is likely; however, status is the means by which to (slowly) attain a higher reputation. It should be kept in mind, however, that garnering prestigious associations is itself challenging. Indeed, we found that artists were most often grouped with those of similar reputation. Nevertheless, artists who can garner high-status connections while still building their reputation are generally rewarded with greater auction prices. Once established, however, an artist should turn his or her attention towards maintaining and bolstering reputation through personal achievements rather than prestige connections.

Finally, we wish to discuss a striking finding in the empirical results that deserves some elaboration. We operationalized artistic prestige through inclusion in books and solo museum exhibition. Book inclusion served as an excellent predictor of an artist's auction price; solo exhibition, however, did not. Solo exhibition did not achieve significance as a predictor of auction price, and for status networks, being connected with other artists who had solo exhibition decreased an artist's predicted auction results. While it is difficult to pinpoint what is underlying these surprising findings, we believe an answer might be found in the difference between the forms of prestige that book inclusion and solo exhibition convey. While books denote a long-term, historical level of importance, solo exhibitions offer more short-term and contemporaneous prestige. For auction prices, association with those marked as historically important belies reputational durability and greater permanence—desirable attributes for those investing in expensive works of art.

There are several limitations to this study, raising questions deserving due attention in future research. First, the empirical context of this research comprised solely exhibitions in three museums in the Netherlands. This means that despite the wide variety of artists from different nationalities featured in our population, Dutch artists were overrepresented. The wide timeframe and the inclusion of international artists in Dutch museum exhibitions still allowed for an analysis of artists' prestige, but it should be kept in mind this was seen from a Northern-European viewpoint. Although there is no reason to doubt our conclusions based on this research's national setting (e.g., with empirical research focusing on France (White and White 1965; Queminn 2006), the United States of America (Alexander 1996; DiMaggio 1996), and Germany (Beckert and Rössel 2013) using similar singular contexts), an international comparison of artistic status and reputation would offer a deeper understanding of how national contexts and their institutions affect artistic prestige. A possible avenue for further research could inquire into the effects of artists' nationalities, museum inclusion, and reputation building. A working hypothesis based on our findings is that museums may have a more confirming role for the reputation-building of foreign artists and a more status increasing

role for domestic artists. For this, inspiration could be gathered from, for instance, the research of Janssen et al. (2008) and Ertug et al. (2016).

Additionally, our research focused on the meaning of status connections for the evaluation of artists. In this research, we treated connections made between artists in museum exhibitions as unproblematic, with any connection carrying forth some evaluative judgement. An avenue worthy of further investigation is whether there are different types of connections that institutions make (cf. Teekens 2016). For instance, one can imagine that some exhibitions contrast specific artists with one another, instead of relating them. In this paper, our argument is that status flows through such connections regardless of the precise intention. We argue that even if an artist is contrasted with a prestigious artist, the contrast still implies that one is worthy of comparison. This theoretical assumption, however, needs further empirical validation, although the significant results in this research show that repeated connections do affect artistic reputation even without differentiating their intention. In other work (Braden and Teekens, please contact authors for manuscript), we problematized this assumption by testing the importance of specific historical connections between artists within exhibitions. Differentiating connections made between artists of differing historical periods allowed for an assessment of how an artist's exhibition connections to historical predecessors and successors affect artistic reputation. We found that those artists who bridge artistic generations (i.e., exhibit with both artists who came before and after the artist's own time) tend to receive the most coverage in books. Together with the findings in this research, we believe that it is valuable to continue examining under what circumstances and in what points in an artistic career, different symbolic associative connections affect an artist's prestige.

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Article

Intermediaries and the Market: Hans Rottenhammer's Use of Networks in the Copper Painting Market

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Abstract: In Willem van Haecht's *Gallery of Cornelis van der Geest*, *The Last Judgment* by the German artist Hans Rottenhammer stands prominently in the foreground. Signed and dated 1598, it is one of many copper panel paintings Rottenhammer produced and sent north of the Alps during his decade-long sojourn in Venice. That the work was valued alongside those of Renaissance masters raises questions about Rottenhammer's artistic status and how the painting reached Antwerp. This essay examines Rottenhammer's international market as a function of his relationships with artist-friends and agents, especially those in Venice's German merchant community. By employing digital visualization tools alongside the study of archival documents, the essay attends to the intermediary connections within a social network, and their effects on the art market. It argues for Rottenhammer's use of—and negotiation with—intermediaries to establish an international career. Through digital platforms, such as ArcGIS and Palladio, the artist's patronage group is shown to have shifted geographically, from multiple countries around 1600 to Germany and Antwerp after 1606, when he relocated to Augsburg. Yet, the same trusted friends and associates he had established in Italy continued to participate in Rottenhammer's business of art.

Keywords: Hans Rottenhammer; social network; intermediaries; mediation; digital humanities; digital art history; merchants; art market; copper painting; Jan Brueghel the Elder

1. Introduction

As artist and critic Carel van Mander indicated in 1604, to succeed as an artist, one must study the works of ancients and acquire the skills and techniques of Italian masters. A period of education in Italy was essential, for, as Van Mander suggested pointedly, "In Rome one learns to draw, in Venice, to paint" (van Mander 1969, p. 75). Hans Rottenhammer (ca. 1564–1625) was one of the many Northern European artists who crossed the Alps after his apprenticeship in order to gain further education. Best known for his paintings of mythological and religious themes on copper panels, the Munich-born Rottenhammer not only acquired the styles and motifs of Italian masters but also developed a savvy mercantile education in marketing and networking as he constructed an international career from Venice through the use of his networks of artist-friends and the German merchant community. Unlike many of his contemporaries who stayed for one to two years before returning home, Rottenhammer remained in Italy for about seventeen years, from 1589 to 1606. During this period, he opened a successful workshop in Venice, gained a reputation for small-format cabinet paintings on copper panels, and married a Venetian woman named Elisabetha d' Fabris (also called Isabetta di Fabri), with whom he had five children. He would return to Germany, settling in Augsburg, but maintained the same trusted friends and associates in the network he helped to develop in Italy.

Rottenhammer's production of copper paintings occurred primarily in Rome and Venice. Yet, much of Rottenhammer's production was acquired by northern patrons and collectors. The taste for copper painting probably depended on the preciousness of the result: Because the pigments were

not absorbed into the smooth, hard metal, they remained on the surface and retained their richness, luminosity, and texture. Van Mander noted the artist's international patronage, as he described the artist's "multitude of handsome pieces on copper—some large, some small, which are distributed through many countries and can be seen with art lovers" (van Mander and Miedema 1994–1999). In other words, Rottenhammer achieved international success as a foreign artist working in one of the most competitive cultural centers in Europe during the late sixteenth and early seventeenth centuries.

Scholars have long positioned Rottenhammer's paintings on copper as objects of cultural transmission, in which the Venetian style was transposed to precious cabinet paintings for collections in Germany and Northern Europe (Peltzer 1916; Schlichtenmaier 1988; Borggreffe et al. 2007; Borggreffe et al. 2008). His *Diana and Actaeon* (Figure 1), for example, combines the figural motifs of female nudes seen in paintings by Italian masters Leonardo, Raphael, Titian, and Tintoretto with the luscious flesh tones and color harmonies of Titian and Veronese. Yet, the subject of the artist as a businessman has received little attention. While Heiner Borggreffe has discussed Rottenhammer as an agent for the Rudolfiner imperial court (Borggreffe 2007), the broader scope of Rottenhammer's entry into the circles of leading patrons and business strategies for collectors and the general market has not yet been examined to any great degree. That Rottenhammer not only acquired an education in artistic styles and practices in Italy but also developed a savvy mercantile education in marketing and networking as he constructed an international career from Venice remains significant and warrants a closer look.



Figure 1. Hans Rottenhammer, *Diana and Actaeon*, 1602. Oil on copper. Munich, Alte Pinakothek, Inv. 1588. © Bayerische Staatsgemäldesammlungen. CC BY-SA 4.0. <https://www.sammlung.pinakothek.de/de/bookmark/artwork/o5xr7XML7X>.

Art historians interested in the relation of art to economic life tend to fall back on one of two models: that of the direct relation between the artist and an individual patron, or that of the "market", understood as an open field in which objects circulate freely according to the laws of supply and demand, following the foundational studies of Francis Haskell and J. M. Montias, respectively (Haskell 1980; Montias 1982). Neither of these models is adequate to deal with the real complexity of the situation, and the example of Rottenhammer shows why: His success depended on the network of associations he developed and assiduously maintained, in some cases employing agents, as merchants commonly did and as modern artists commonly do.

Operating in the interstices between court artist and an artist for a general market, Rottenhammer represents an alternative model for understanding how an artist garnered success during the late sixteenth century. By working through multiple networks, and employing them strategically, Rottenhammer participated in what I call an *artist-agent model*. By this term, I mean an artist who negotiated with various groups, including artist-friends, merchants, and agents, and would become an art agent himself. My work provides an alternative model for how early modern artists built a career, contributing to the discussions of the inextricable relationship between art and commerce (McCabe 2019).

2. Methodology

In studying Rottenhammer's use of networks, my project brings social network analysis and intermediation perspectives together with the themes of Northern European artists working in Italy and early modern markets, the literature of which remains vast (Panofsky [1943] 2005; Dacos 1964; Jaffé 1977; Aikema and Brown 2000; Goldthwaite 1993; Fantoni et al. 2003; De Marchi and van Miegroet 2006; Spear and Sohm 2010). Rottenhammer's education in Italy helped him to develop an Italianate style meeting the taste of leading European patrons, what I refer to as a stylistic integration of the works of Italian, Flemish, and German masters or an international style (McCabe 2019). Northern European artists relied on the support of established foreign communities in Italy, especially welcome during their initial years. I suggest Rottenhammer's associations with the German merchant community in Venice and the community of Northern European artists in Rome enabled him to establish an international career from Venice. Rottenhammer's copper panel *The Last Judgment* (Figure 2), painted in the lagoon city in 1598, for example, entered the collection of Antwerp spice merchant and art lover Cornelis van der Geest, as seen in the right foreground of Willem van Haecht's 1628 painting (Figure 3) (Held 1982). That the work was valued alongside those of Renaissance masters raises questions about Rottenhammer's artistic status and how the painting reached Antwerp.

Rottenhammer's patronage network included princely rulers, cardinals, and merchants. To better understand how Rottenhammer established relationships with leading patrons, I turn to the artist's network structure to discern his key intermediaries. I reconstructed Rottenhammer's network with primary data of correspondences, contracts, testimonials, marriage records, and inventories gathered from published sources and located in archival collections in Wolfenbüttel, Bückeburg, Munich, Augsburg, Milan, and Venice, as well as inventory databases, such as the Getty Provenance Index[®] Databases. My dataset also includes Rottenhammer's paintings, drawings, and prints maintained in museums, public institutions, and private collections. I used the appendices of Harry Schlichtenmaier's 1988 dissertation as references for the works of art, supplemented with the entries of the 2008 Rottenhammer exhibition catalogue and the Brueghel Family Database, which lists collaborative paintings between Rottenhammer and Jan Brueghel the Elder and encompasses Klaus Ertz's 2008–2010 catalogue raisonné of Brueghel paintings.

To reconstruct Rottenhammer's painting market in addition to his social network and associated networks, three tables are necessary: (1) paintings; (2) the individuals associated with Rottenhammer; and (3) Rottenhammer's connections with the individuals. The first table is the dataset of paintings identifying known works according to their painting support (copper, canvas, wooden panel, fresco) and function (altarpiece, ceiling decoration), as tied to production city, patron, patron city, and collaborator, if a collaboration. This table is used to map geospatially Rottenhammer's painting market. The second table is a dataset of the individuals in Rottenhammer's network, organized by their attributes, such as *role* (intermediary, agent, patron), *capacity* (artist, prince, merchant, cardinal), and *religion* (Catholic, Protestant, Converso). I selected these categories for analysis because I wish to understand the network's composition in terms of the ratio of patrons to intermediaries and agents, and how Rottenhammer's commercial success possibly depended upon the node's position or religion. The third and final table is a relational matrix connecting the individuals discovered in the archival documents, as well as known paintings and engravings. The table of individuals (called "nodes" in

social network analysis terms) and the relational matrix (“edges”) are used together in order to produce a visualization of the network structure.

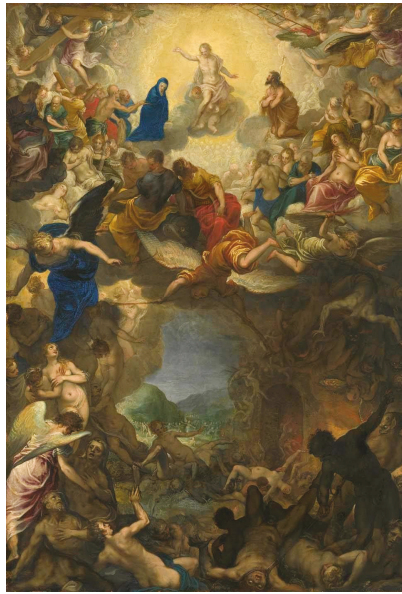


Figure 2. Hans Rottenhammer, *Last Judgment*, 1598. Munich, Alte Pinakothek, Inv. 45. © Bayerische Staatsgemäldesammlungen. CC BY-SA 4.0. <https://www.sammlung.pinakothek.de/en/bookmark/artwork/5347YR5L9e>.



Figure 3. Willem van Haecht, *Gallery of Cornelis van der Geest*, 1628. Antwerp, Rubenshuis, Inv. RH.S.171. Public domain. Rottenhammer’s *Last Judgment* at bottom right.

The first challenge is to identify the type of relationship each node maintains with another, and to recognize that multiple types of edges potentially exist between two nodes. The second challenge is to categorize the edge, managing the expanding number of types of relationships so that the visualization remains legible. To make sense of the dense thicket of Rottenhammer's network, it is necessary to zoom in for a microlevel view of the network structure. Here, one sees how Rottenhammer likely gained access to patrons, such as Cardinal Federico Borromeo, through his collaborators Paul Bril or Jan Brueghel the Elder.

Social network theories examining network structures and social capital by James Coleman and Ronald Burt help frame my approach. Coleman's discussion of social capital—not as a single entity, but rather composed of several entities with a social structure that facilitates certain actions of actors within—moves the discussion from effects on a single individual to that of the group, which aligns with the foreign community framework that Rottenhammer negotiated (Coleman 1988). Burt's theory of structural holes draws from Mark Granovetter's theory of the strength of weak ties, in which individuals with weak ties form a bridge, and these bridging ties lead to novel information (Granovetter 1973). Burt posits that an individual with a network of discrete groups could potentially be in a bridging position. With the potential to synthesize and broker the information across these gaps, or structural holes, this individual stands to gain more social capital (Burt [2005] 2007). In effect, the theories of Coleman and Burt push and pull at the dynamics of a network, moving what is gained by actions in the structure from group to individual. As will become clear in my discussion, the intermediaries in Rottenhammer's network located at bridging positions were his artist-friends, especially his collaborators, and German agents.

There are few studies in art history that employ social network analysis (SNA) methods. Koenraad Brosens's work on the tapestry industry and its networks is one which uses the lens of economic sociology from Mark Granovetter's work on the embeddedness of economic action in networks of personal relationships to measure the levels of trust between individuals in the tapestry production between 1580 and 1780 (Granovetter 1985; Brosens 2012, p. 45; Brosens et al. 2016). Brosens and his team's use of SNA demonstrates the importance of women as not only bridging nodes in marriage between interlocking networks of the tapestry industry, but also as working partners (Brosens et al. 2016).

In a similar vein, my use of SNA seeks to understand the determining factors for Rottenhammer's international success. Through the lens of Coleman and Burt, SNA allows for an overall view of Rottenhammer's social structure. Since the artist moved from Munich to Venice and the Veneto, to Rome, back to Venice, and then settled in Augsburg, it is important to understand what communities he became a part of and how his involvement in these communities enabled his rise in social and economic capital. Unlike Brosens's study of familial ties in the tapestry industry, Rottenhammer's connections to his patrons and the art market were not through family but, rather, social ties. SNA provides a means to discuss Rottenhammer's economic and social capital as tied to the structure composed of relationships with princes, cardinals, and leading merchants, where many connections between the artist and his patrons were facilitated by his intermediaries of artist-friends and agents.

The significance of intermediaries and agents can be located within recent scholarship concerning secretaries, ambassadors, and others as brokers of information (Cools et al. 2006; Keblusek and Noldus 2011; Martin 1995; Martin 2008; Meadow 2009). Operating between the prince or merchant and the intended artist or art market, these intermediaries and agents helped to obtain desirable objects for their patrons. Artists functioned in this role, too, as shown by Marika Keblusek's work on cultural and political agents, whereby artists were simultaneously cultural brokers, diplomats, and potential political spies (Keblusek 2011). In such positions, Rottenhammer and his artist-friends could traverse smoothly between various networks and perform multiple roles—artist, intermediary, art agent.

This project benefits from the use of digital tools to analyze Rottenhammer's painting market and his network. The combination of mapping the artist's paintings across Europe and visualizing his network of patrons, artist-friends, and agents opens up new ways to understand Rottenhammer's key

markets and key intermediaries. The geographic information system (GIS) platform ArcGIS, developed by Esri, indicates the international extent of Rottenhammer's patrons and the taste for his international style (Figure 4). As a static illustration, the ArcGIS map yields little information, as the platform is meant to be used interactively. For example, each location, when viewed online, lists the paintings sent to that particular location, along with the name of the patron who commissioned or acquired the work.

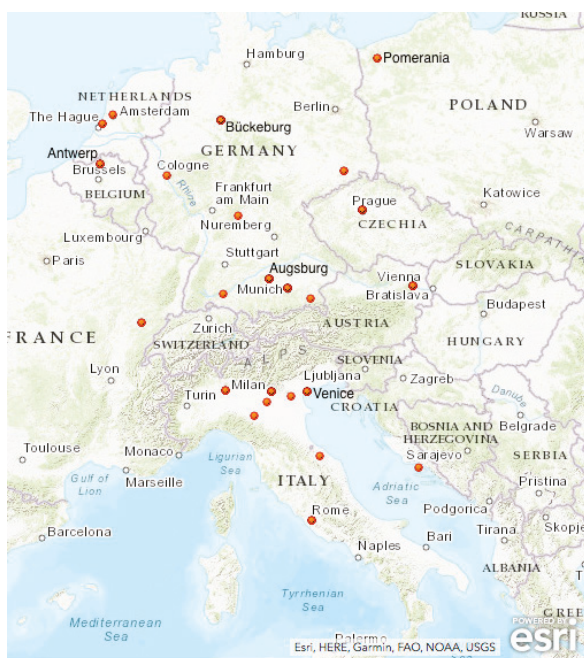


Figure 4. Rottenhammer's painting market overall, known patrons and anonymous collectors. Created by the author with ArcGIS.

A second digital platform useful for my analysis is Palladio, an open-access, open-source platform maintained by Stanford University. Unlike ArcGIS, Palladio provides information about the relative number of paintings Rottenhammer sent to patrons from the production cities of Venice and Augsburg, the two largest nodes on the graph (Figure 5). At the same time, because Palladio is not dependent on geography, paintings for unknown collectors ("UNK") are also included in the visualization. With Palladio, a key observation appears immediately: four cities—Munich, Antwerp, Bückeberg, and Vienna—remained constant in Rottenhammer's career during his Venetian period and later Augsburg years. This finding helped me formulate a hypothesis about Rottenhammer's use of networks. I suggest the artist engaged key intermediaries from his network of artist-friends that had formed during his Italian period, and these intermediaries, who had settled in places like Antwerp and Munich, facilitated his introductions to patrons, and helped him bring his paintings to market. As an international painter, Rottenhammer already enjoyed patronage support from northern princes, and worked to maintain the relations after his return to Germany.

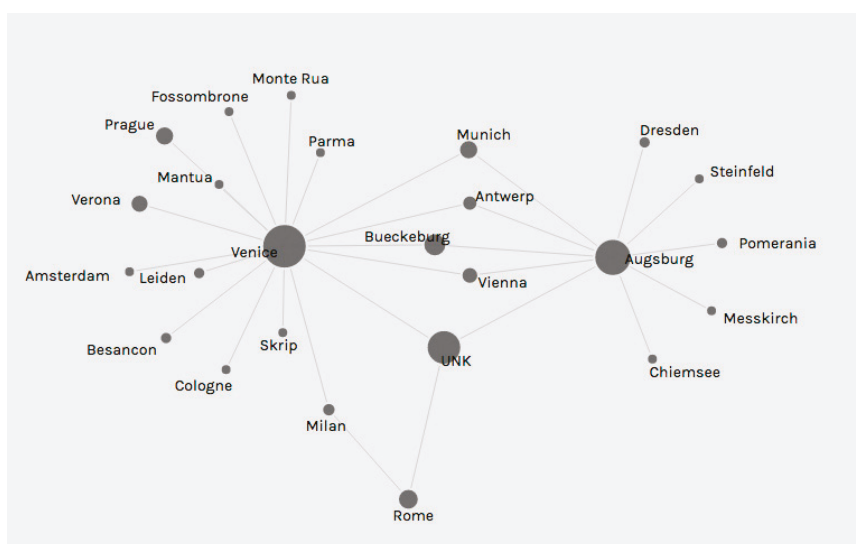


Figure 5. Rottenhammer's patrons and collectors by city, 1595 to 1625. Created by the author with Palladio.

Using the open-source digital platform Gephi for visualizing Rottenhammer's social network provides a broad and microlevel view of his network structure. Running the algorithm Force Atlas 2 in Gephi, for instance, makes apparent the formation of three to four clusters of nodes in the artist's network (Figure 6). The clusters indicate certain communities within Rottenhammer's network; for example, those around Sadeler J (Jan Sadeler I) were part of Rottenhammer's Flemish artist network in Venice, as the individuals were witnesses in Sadeler's testimonial in the lagoon city. A second community around Ott H (Hieronymus Ott), Fugger M (Marcus Fugger), and Wilhelm V is likely the German community of merchants in Venice, and the Bavarian court in Munich. Finally, the mass of nodes around Rottenhammer seems to constitute a third community; however, the visualization combined individuals from Rome, Prague, Antwerp, and Bückeburg for reasons not readily apparent. I surmise the cluster formed due to common artists and agents linking Rottenhammer to his patrons in these cities.

Through statistical analysis, we gain from Gephi the nodes with the highest betweenness centrality, which measures how often a node appears on the shortest path between two nodes. This individual or node is located at a bridge or brokering position and is a potential key intermediary who facilitated Rottenhammer's path to market. The top five bridging nodes calculated by Gephi are Rottenhammer's collaborators Jan Sadeler I and Paul Bril, patrons Wilhelm V and Marcus Fugger, and agent Hieronymus Ott. Since I constructed the network around Rottenhammer, he was guaranteed to have the highest betweenness centrality, and thus, I have put him aside, as my goal was to locate his key intermediaries.

An examination of the types of relationships maintained at the microlevel provides a better understanding of how Rottenhammer worked with his intermediaries and patrons. For example, given that Jan Sadeler was a possible key intermediary, zooming in on his network gives indication to how Rottenhammer could have gained the patronage of Pope Clement VIII (McCabe 2019).

My findings suggest SNA and its visualization tools are part of the research process. For my project, SNA provided an analytical value in helping to realize Rottenhammer's key intermediaries for commercial success. Even though I had considered artists as the only intermediaries in Rottenhammer's network, SNA computational tools revealed Rottenhammer's patrons as some of the most influential nodes in the network. Unfortunately, the individual not included in the list of influential nodes, based

on the statistical calculations, is artist, collaborator, intermediary, and possible agent Jan Brueghel the Elder, who mediated the relationship between Rottenhammer and several cardinals, and likely the Antwerp collecting market. Since my network was constructed with data around Rottenhammer, it does not account for datasets around nodes not related to Rottenhammer. For example, Brueghel's extensive network of Antwerp artists and patrons is not included in my construction, unless those artists and patrons are connected also to Rottenhammer, as we see for example with artists Paul Bril and patron Federico Borromeo. Hence, we must keep in mind the limitations of SNA in which the extent of a network remains incomplete, unless one has discrete datasets of every node in the network. As data becomes available, the dynamics of the network structure will change. Thus, SNA with its network visualization tools remains an iterative process that must work in tandem with archival documents, as well as works of art, in order to understand the context of the relationships.

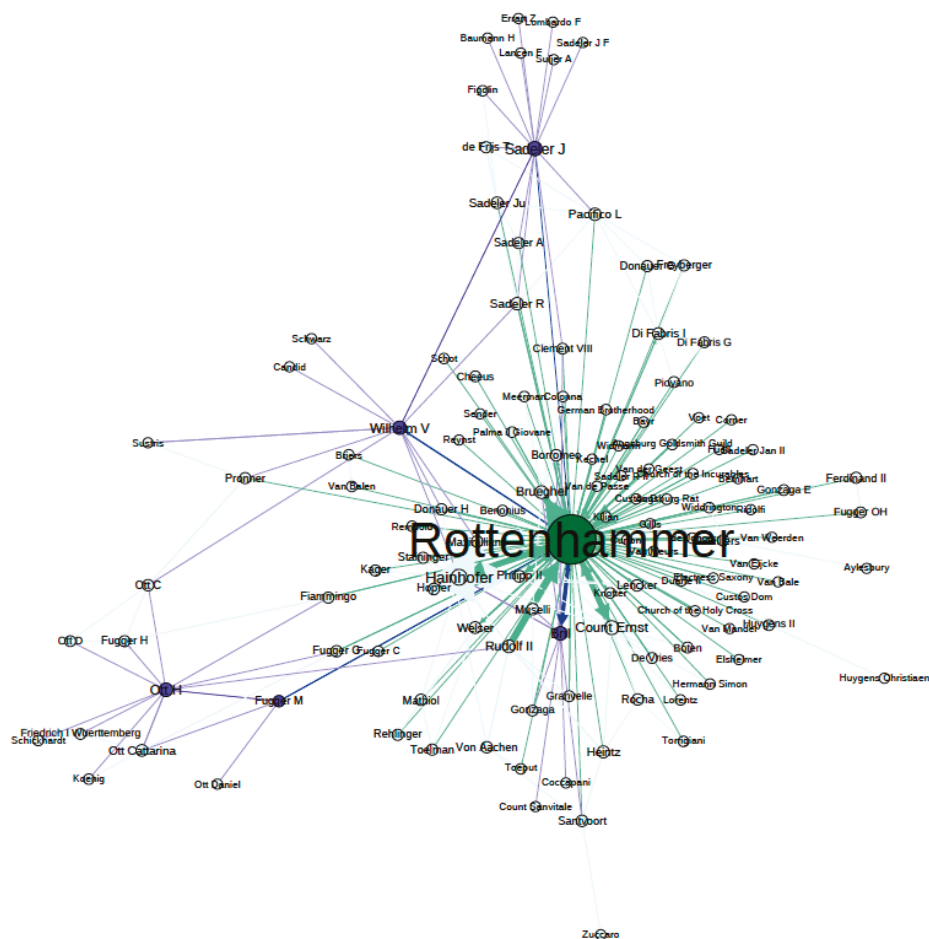


Figure 6. Rottenhammer's social network. Highest betweenness centrality indicated by nodes at brokering positions between clusters. Created by the author with Gephi.

In analyzing Rottenhammer's painting market and network with digital platforms, the project raises questions about what constitutes digital art history, how digital tools may be used to construct research arguments, and what new inquiries could emerge. Johanna Drucker addressed some of the

challenges for bridging the divide between art history and *digital* art history, i.e., “the use of analytical techniques enabled by computational technology” to produce insight in the discipline (Drucker 2013). This essay seeks to demonstrate the construction of Rottenhammer’s international market as a function of his network, namely his relationships with artist-friends and art agents, especially those in Venice’s German merchant community around the Fondaco dei Tedeschi.

My discussion is in three parts: (1) how Rottenhammer worked within the Northern European artistic community to enter the circle of leading patrons; (2) the importance of the German merchant community for Rottenhammer’s business strategy; and (3) how key intermediaries helped bring to market Rottenhammer’s name, designs, and paintings.

3. Discussion

3.1. Rottenhammer and the Northern European Artistic Community

In 1588, after his six-year apprenticeship working alongside court artists in Munich, Rottenhammer departed for Italy. A 1589 drawing of *Hope and Innocence* with the inscription “in Terfiss” places Rottenhammer in Treviso, near Venice, likely within the workshop of Flemish master Lodewijck Toeput (1550–1603) (Borggreve et al. 2008). The introduction to Toeput was likely facilitated by court artist Hans von Aachen (1552–1616) whom Rottenhammer would have met in Munich. Both are documented in the ducal city during 1587 to 1588 in connection with the *Penitent Magdalen*, an altarpiece for St. Michael’s church for which Von Aachen provided the design and which Rottenhammer’s master Hans Donauer (c. 1521–1596) painted. After spending four years in Venice and the Veneto, Rottenhammer traveled to Rome, where he entered the entourage of Flemish landscape specialist Paul Bril (1554–1626), who was known to open the doors for other Northern European artists (Ruby and Bril 1999). There, Rottenhammer also met Jan Brueghel the Elder (1568–1625).

Bril was established in the city as a leading landscape painter since the late 1580s for Sixtus V (Ruby and Bril 1999), and Brueghel, who arrived in 1592, had gained the support of a circle of cardinals, including Ascanio Colonna and Federico Borromeo (Honig 2016). Joining the community of Northern European artists in Rome was a standard activity for all artists north of the Alps. What made Rottenhammer’s association with Bril and Brueghel significant was that the three artists worked collaboratively on copper paintings (Peltzer 1916; Ertz and Nitze-Ertz 2008–2010; most recently, Honig 2016). Elizabeth Honig’s study of 16th- and 17th-century collaborative paintings demonstrated how each artist involved in a “high-level” collaboration—that is, a work produced by two or more illustrious artists—had an identifiable personal style recognized and appreciated by its beholders (Honig 1998, p. 188). In the case of Rottenhammer and the Flemish landscape specialists, the former painted glowing figures with softly mannered features, while the latter—Bril or Brueghel—executed the highly detailed and precise landscape elements. Their collaborative process comes down to us from Ridolfi, who reported that Rottenhammer in Venice made “figures in copper, sending them afterwards to Paul Bril in Rome, in order to have him paint the landscapes” (Ridolfi [1648] 1965). The collaborations proved to be building blocks for Rottenhammer’s career and international success. Since the landscape specialists were both supported by the prelate, working with Bril and Brueghel remained strategic for Rottenhammer as he gained invaluable access to leading patronage circles. Federico Borromeo was one of the earliest patrons to appreciate the distinctive qualities of paintings on copper, and collected pictures by Rottenhammer and Brueghel, and Bril. Spiritual value gained from Rottenhammer’s collaborative paintings, for example, was first discussed by Borromeo in his 1625 treatise *Musaeum* (Borromeo et al. 2010; Jones 1988; McCabe 2019).

On 10 October 1596, after his return to Antwerp, Jan Brueghel wrote to Borromeo in praise of “that German”, referring to Rottenhammer as the two artists worked closely and collaboratively even after each returned to their respective cities. Brueghel noted: “I have been everywhere in Holland and Flanders to look at painting of [our countrymen], but I really did not find anything close to that of Italy and of that German: for this reason, I implore Your Grace to hold his things in the very highest esteem”

(Crivelli 1868). The letter implies the importance of friends and intermediaries in Rottenhammer's network for establishing his career. A year later, in April 1597, Rottenhammer wrote to the cardinal in response for the latter's request to find a painter who could produce a portrait of the church fathers (BA n.d.; Jones 1988). The letter indicates that Rottenhammer indeed had established a relationship with the cardinal, likely through Brueghel's intermediation. It also signals Rottenhammer's early entry into the role of the art agent.

That artists negotiated multiple roles as artist, intermediary, art agent, or even ambassador and spy was not uncommon (Keblusek 2011). Paul Bril functioned as an agent for Borromeo and intermediary for Rottenhammer in 1601 when negotiating the latter's delivery. Bril, charged by the cardinal to send instruction to Rottenhammer in Venice for a painting, received the panel in Rome and presumably shipped it to the cardinal, who had returned to Milan by then (Jones 1988). Bril's letter to the cardinal on 28 July 1601 praises Rottenhammer's work, and also deferred to his patron's wishes:

... the small painting arrived to me in hand, which is beautiful, and is made with excellence, and the painter asked for his production forty scudi, however, Your Most Illustrious Lordship, if you desire that I send to him, how much it is in the spirit of Your Most Illustrious Lordship to spend, and from everything he will remain of service to give me notice. (BA n.d.; Bedoni 1983)

The subject matter, while unidentified in the letter, likely depicted holy figures on a copper panel, perhaps an Archangel Michael (Borggrefe et al. 2008). That Borromeo commissioned a painting from Rottenhammer suggests not only that Borromeo valued the artist's work, and wanted to add another copper panel by him into his growing cabinet collection, but also that Rottenhammer's business increased so much for copper paintings that the artist felt confident enough to request a price of 40 *scudi*. This fee was higher than the 35 *scudi* Bril asked for in 1607, according to the agent Papirio Bartoli (BA n.d.; Bedoni 1983).

Rottenhammer's access to leading patrons appeared to come directly from his collaborations with Brueghel or Bril, as several collaborative paintings were acquired by patrons who favored the two Flemish artists. A *Christ in Limbo* (1594) painted with Brueghel is in the collection of Ascanio Colonna (Honig 2016), and a *Dance of Nymphs* executed with Bril had belonged to Bril's patron, Ferdinand Gonzaga I, Duke of Mantua (Ridolfi [1648] 1965; Ruby and Bril 1999). I suggest also that Borromeo as a patron helped to introduce Rottenhammer's works indirectly to collectors. As a leading patron of art and a supporter of Rome's Accademia di San Luca, Borromeo's thoughts about art were influential, and the admiration for the work of Rottenhammer's collaborations expressed in his writings undoubtedly helped to create interest in it among other collectors. One of Rottenhammer's *Rest on the Flight into Egypt* copper panels—"a small landscape by Paolo Brill with the Madonna going to Egypt by Rothenhammer, a rare thing"—was in the collection of Count Sanvitale in Parma, as described by agent Gabriello Balestrieri in 1640 to his patron Bishop Coccapani (Bedoni 1983). My working hypothesis for Borromeo as an intermediary connects the cardinal to bishops and other prelates who also collected works by Rottenhammer. Not surprisingly, then, the network visualization indicates another important patron, Wilhelm V, as a bridging node and thus intermediary for Rottenhammer's success.

My research shows that artists worked with their patrons as artist and artist-agent, and their collaborators as intermediaries. A microlevel examination of Rottenhammer's network structure from Figure 6 should indicate the multiple types of relationships Rottenhammer maintained with Borromeo, Brueghel, and Bril. However, Gephi combined the various types of connections between two nodes into one weighted connection, thereby removing the discrete relationship types (Figure 7). While the weighted edges indicate the strength of the connection between Rottenhammer and Bril, Brueghel, or Borromeo, the different types of relationship, or the nuances of the edges, are omitted. For example, Bril's letter to Borromeo in 1601 indicates that the Flemish artist functioned as an intermediary for Rottenhammer. But since Bril and Rottenhammer were also collaborators, Gephi collapsed their multiple relationships into one, noting simply the collaborative relationship, as shown in Figure 7a.

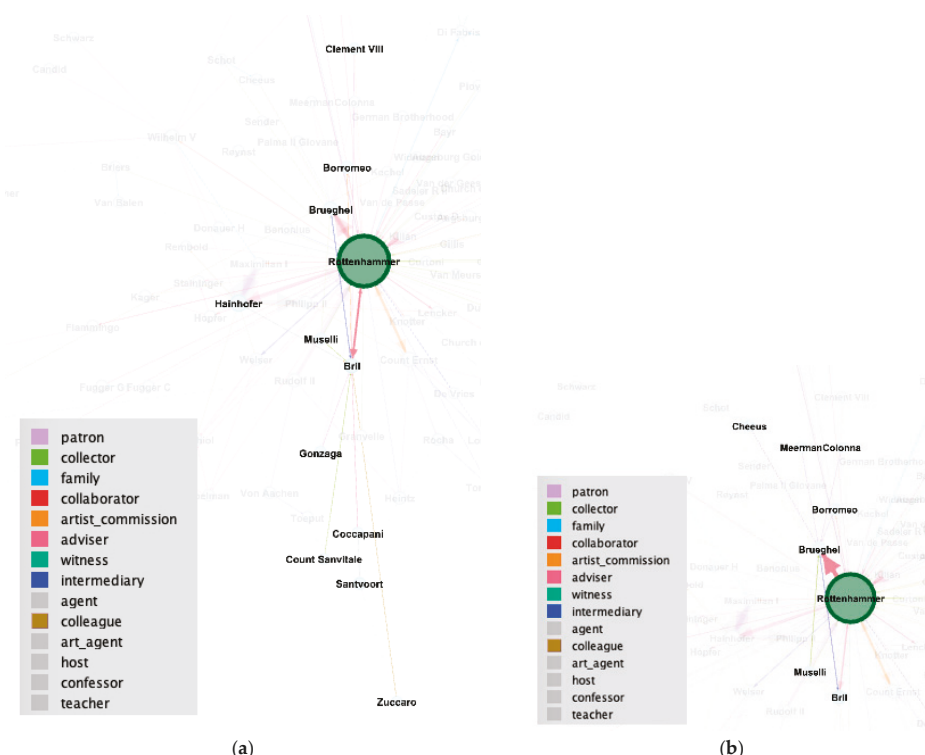


Figure 7. Microlevel view of Rottenhammer's network structure, connected to (a) Paul Bril's network, and (b) Jan Brueghel the Elder's network. Created by author with Gephi.

3.2. Rottenhammer and German Merchant Community

Established since 1228, the Fondaco dei Tedeschi operated as a customs house and temporary lodging for German merchants. Venice's German community commissioned leading artists for decoration, notably Albrecht Dürer, who painted the *Feast of the Rose Garlands* altarpiece for the German Brotherhood in Venice in 1506. In the sixteenth century, the Fondaco's walls were covered with frescoes by Giorgione, Titian, Veronese, and Tintoretto (Roeck et al. 1993).

One of the key players in Rottenhammer's career was the Ott family of agents, whose members held co-consul positions at the Fondaco from 1546 to 1606 (Simonsfeld 1887; Martin 1995, p. 535). David Ott and his sons Hieronymus and Christoph handled the affairs of the Fugger merchant firm in Venice. A clear connection existed between Rottenhammer and the Ott agents through Duke Wilhelm V of Bavaria and Hans Fugger, as the Fuggers provided enormous loans to princely rulers, including the Bavarian dukes and the Habsburg imperial family. Producers of fustian textiles, the Fuggers began amassing large stakes in mining production in the fifteenth century. By constructing credit agreements with dukes and emperors for a share of metal produced from the mines, Jakob Fugger "the Rich" (1459–1525) developed the model for the family enterprise in 1485 with a loan to the Habsburg Archduke Sigismund, which was to be repaid by silver from the Tyrolean mines. By 1523, the Fuggers formed part of the monopoly that divided the copper trade in Europe (Häberlein [2006] 2012). In 1583, David Ott arranged the sale of the Fugger mining products, delivering copper and lead from Tyrol to Venice (Backmann 1997). The Ott family negotiated for Hans Fugger not only copper, fresh fish, and fruits, but also art objects (Lill 1908; Martin 1995). Their relationship remained close, as Hieronymus

Ott recommended his wife, sons, and a brother in Augsburg to the protection of Marx Fugger in his 1602 testament (Backmann 1997).

As an apprentice at the Munich court, Rottenhammer would have been well aware that the ultramarine, red, green, and yellow ochre pigments came from Venice, as recorded by the ducal librarian Wolfgang Pronner in his ledger, the “Pronner’sches Malbuch” (Maxwell 2011). Ursula Haller’s study of Pronner’s revenues and accounts book is an invaluable source of information for use in reconstructing the artistic materials, sources, trade routes, and intermediaries for painting at court under Wilhelm V, for it demonstrates connections between the Ott agents and the Bavarian court (Haller 2005). On 22 July 1586, Pronner received pigments and “laca fina” from Venice sent via Starnberg and paid for by one “Cristoff Ott” (Haller 2005). Rottenhammer could have learned of Christoph’s name as an agent in Venice in connection with the Bavarian court before leaving for Italy. Nevertheless, given that he was likely armed with a ducal introduction, as the duke sent his artists for further training in Italy (Schlichtenmaier 1988), Rottenhammer remained in a position to seek help from the Ott agents in Venice. In this period, Hieronymus Ott was at the final stages of mediating a commission for an allegorical cycle of paintings by Paolo Fiammingo for Hans Fugger’s Kirchheim castle. On 15 February 1592, Fugger wrote to Ott in Venice, stating, “The two paintings by Paolo Fiammingo I am prepared for . . . when he has finished them. If they do not forget me, as similar artists do who have too much work” (Lill 1908, p. 144). Evidently, Fugger was none too pleased with Paolo’s repeated delays of the cycle of the Planets; and his agent would have been aware of the frustration. Given Rottenhammer’s arrival in 1591, Ott likely introduced the young artist to Paolo Fiammingo’s busy workshop (Martin 1995; McCabe 2019).

Van Mander’s remark that Rottenhammer, upon arriving in Rome, “devoted himself to painting on plates as is customary with the Netherlanders”, suggests that Netherlandish artists were known for their finely painted copper panels by 1604 (van Mander and Miedema 1994–1999, p. 442). The technique of fine painting on a small surface appealed particularly to Netherlandish painters active in Italy. The durability of the metal and ease of transport of the panels helped to make the copper painting a product available for the art market (Phoenix Art Museum 1999). However, for Rottenhammer, I argue, the significance of using copper as a support was more than simply for its painting aesthetic, or for its ease of shipping. Rather, it was the Southern German merchants’ investments in the copper metal trade and their vertical integration into the refining of the metal and monopoly of the European trade which helped to direct Rottenhammer towards this specialization (McCabe 2019). By late sixteenth century, Rottenhammer could utilize the existing infrastructure of transportation of goods shipped from the city, as mediated by the German agents Hieronymus and Christoph Ott. Sibylle Backmann’s rich archival work has highlighted the control maintained by the Ott family in the long-distance trade of luxury goods, specifically in the access to transportation. In c. 1567, when antiquarian and competing agent Jacopo Strada wanted to send multiple boxes with art objects from Venice to Munich for his patron Duke Albrecht V, David Ott blocked the transport of goods with the excuse that he found no wagoner available (Backmann 1997, p. 182).

3.3. Rottenhammer’s Painting Market and the Artist–Agent Model

Rottenhammer returned to Venice by autumn 1595 and established a successful studio in the lagoon city. He already had two assistants by then—Hans Freyberger and Georg Donauer from Munich, as documented in testimonials in September 1596 for Rottenhammer’s marriage (Hochmann 2003). The artist likely joined the Venetian painters’ guild shortly after he married. As a member of the guild, he could open a workshop in the city, as demonstrated by an entry in the 1599 Venetian magistrate records in which “Geronimo Sender tedesco” entered the studio of “Jan Rothenamer” (Sapienza 2013). From late 1595 to 1606, Rottenhammer produced not only copper paintings but also ceiling decoration and altarpieces for patrons north of the Alps, such as Emperor Rudolf II, Duke Wilhelm V, Count François Perrenot de Granvelle, Count Ernst of Holstein-Schaumburg, the Fugger family, and merchants in Venice, Antwerp, and Amsterdam.

As the richness of his patronage network demonstrates, Rottenhammer elected to remain outside the exclusive service of any one court (McCabe 2019). Unlike his contemporaries Hans von Aachen and Joseph Heintz, who worked for the Prague imperial court, Rottenhammer followed the Roman artist attitudes of controlling one’s own production. As discussed by Patrizia Cavazzini, successful artists in Rome maintained multiple avenues of revenue with different types of patrons, in lieu of being obligated to a single patron, which appeared too restrictive since one’s entire artistic production was reserved for the same person (Cavazzini 2008). Indeed, Paul Bril worked for various popes and cardinals, but he also used Flemish merchants as conduits for his painting business, as noted by Baglione (Baglione 1642; Cavazzini 2008, p. 146). Rottenhammer used similar marketing strategies, as he emulated Bril in this fashion, taking advantage of comparable opportunities in Venice with the use of his artist-friends as intermediaries and the German agents around the Fondaco dei Tedeschi. Rottenhammer’s marketing strategies included products for an anonymous general market, akin to Bril and Brueghel. (Cavazzini 2008; Honig 2016).

3.3.1. Rottenhammer’s Unknown Collectors (The Anonymous Market)

Based on correspondences, reports, ledgers, and the paintings themselves, from about 1595 until his death in 1625, Rottenhammer produced copper paintings, altarpieces, ceiling decoration, and canvas easel paintings. A summary of his work, both extant and lost or destroyed, shows that 65% of his painting market consisted of known patrons and collectors, while the remaining 35% went to unknown collectors (Table 1). Presumably most of the unknown collectors were part of the anonymous market that bought Rottenhammer’s copper paintings. Of Rottenhammer’s 105 copper paintings (extant and lost), almost 90% were produced in Italy.

Table 1. Rottenhammer’s painting market by support material and patrons.

Support Material	Total No. Paintings	For Known Patrons	For Unknown/Anonymous
Copper	105	55	50
Canvas	43	36	7
Fresco	3	3	
Wood	12	12	
Other Metal	1	0	1
TOTAL	164	106	58
%		65%	35%
Painting Function			
Altar	24		
Ceiling	13		

Rottenhammer, Bril, and Brueghel cultivated the taste for copper paintings with their successful formula of *istoria* painting (McCabe 2019; Borggrete et al. 2008). Copper paintings entered the Kunstkammer and cabinet collections of the late sixteenth- and early seventeenth-centuries, where the small-format paintings were appreciated and studied alongside sculptures, seashells, coins, and other *naturalia* and *artificialia* as seen in Van Haecht’s painting (Figure 3). The rise of cabinet collections helped to foster the market for copper paintings to anonymous buyers.

A further glimpse into the anonymous market emerges when we examine Rottenhammer’s themes. The most popular paintings among the anonymous buyers were themes of *The Rest on the Flight to Egypt*, *Holy Family with Child Baptist*, and *Diana and Actaeon*. Rottenhammer produced at least four versions of *Rest on the Flight to Egypt* with Brueghel, and at least two with Bril. Rottenhammer’s figures for the collaborations with Brueghel are almost identical: the Holy Family are placed at the bottom right corner of the composition with the Virgin nursing the Christ Child, and Joseph tending to the ass, left in reserve for Brueghel to complete (Honig 2016) (Figure 8). I suggest prints made after Rottenhammer’s designs, such as *The Rest on the Flight to Egypt* engraved by Crispijn van de Passe, helped bring Rottenhammer’s name and work to the anonymous market. The Sadeler family—Jan

I, Raphael I, Aegidius II, and Justus—and Lucas Kilian were frequent collaborators, producing the highest number of engravings after Rottenhammer's designs (McCabe 2019).



Figure 8. Hans Rottenhammer and Jan Brueghel the Elder, *Rest on the Flight to Egypt*, c. 1595. Oil on copper. Mauritshuis, The Hague, Inv. 283. <https://www.mauritshuis.nl/en/explore/the-collection/artworks/rest-on-the-flight-into-egypt-283/>. Used by permission.

3.3.2. Rottenhammer's Leading Patrons—Artists as Intermediaries

While about half of the copper paintings went to anonymous collectors, the other half is attached to leading seventeenth-century patrons. My analysis of the data shows that 55 copper paintings appeared in 23 known collections in Venice, Verona, Milan, Antwerp, Amsterdam, Besançon, Prague, Vienna, and parts of Germany during the seventeenth century. In other words, about half of Rottenhammer's copper painting market comprised of only 23 patrons and collectors, such as the aforementioned princely rulers, various cardinals, and merchants.

The international scope of Rottenhammer's patrons, the different types of patrons, and the various types of paintings indicate the artist maintained different means to markets. For princely patrons and cardinals, as I have already suggested, Rottenhammer gained access through working relationship with collaborators or artist-friends. For instance, the Prague inventory of 1648 documents ten paintings by Rottenhammer, including a "Göttermahl (banquet of the gods)" (Granberg 1902; Schlichtenmaier 1988), probably referring to the *Banquet of the Gods with the Marriage of Bacchus and Ariadne*, signed and dated "Giov. Rotnhamer F. 1602" (Christie's Paris, sold 21 June 2012, Lot 15; The Brueghel Family Database n.d.). Such a painting was lauded by Ridolfi, who noted Rottenhammer received 500 *scudi* for it (Ridolfi [1648] 1965).

Rottenhammer had trusted friends and intermediaries at court. Hans von Aachen and Joseph Heintz, could have provided him with an introduction to the imperial collection. That the painting "resulted in many commissions," according to Ridolfi, suggests Rottenhammer's social capital increased through the emperor's patronage.

Rottenhammer's path to collectors in the art market was also enabled by his intermediaries. His *Last Judgment* in Willem van Haecht's painting raises questions about the artist's social status and the intermediaries involved who brought the work to the attention of the Antwerp market, and its artists. For possible answers, we must look to Rottenhammer's artistic network.

Brueghel returned to Antwerp in 1596 but would continue his collaborative partnership with Rottenhammer through 1608. Since Rottenhammer sent unfinished panels to his collaborators, as suggested by Ridolfi, he could have easily included his own paintings in a shipment to Jan in order to find a discerning collector. Brueghel's two *Last Judgment* paintings, signed 1601 and 1602, indicate a deep knowledge of Rottenhammer's work in that they present horizontally the figures and composition of Rottenhammer's vertical panel (Honig 2016; Borggreffe et al. 2007; The Brueghel Family Database n.d.). Thus, Brueghel could have functioned as an agent to help Rottenhammer to locate a suitable patron for his painting (Honig 2016; Borggreffe et al. 2007). Through Brueghel or other landscape painters in Antwerp—as Rottenhammer seemed to have used assistants in Brueghel's workshop for landscape details (The Brueghel Family Database n.d.)—Rottenhammer gained a market for his paintings in the city. A second significant collector here was jeweler and merchant Diego Duarte II. His collection of Flemish, Dutch, German and Italian master paintings included Rottenhammer's *Fall of Phaeton* (1604), described by Constantijn Huygens II on his visit to the house of Duarte in 1676: “[i]n a small cabinet at the bottom there is a piece by Rottenhammer where there are many naked figures, the best that I have ever seen of the masters” (Meijer 2003). Twelve more Antwerp collectors emerge from the extensive study of inventories completed by Erik Duverger, including sales from Georges Villiers, Duke of Buckingham, to Marcelis Librechts de Jonge and William Widdrington, merchant–alderman Jan van Meurs, as well as Jan Gillis, silversmith (Duverger 1984). Notably, a *Children's Dance* by Rottenhammer and Brueghel is listed in the inventory of Nicolaas Cornelis Cheeus, merchant and patron of Jan Brueghel the Elder (Honig 2016). Given Brueghel's connections to Cheeus and Van der Geest, whether directly or indirectly through his friend Rubens—who was favored by Van der Geest and is represented in the Van Haecht painting (Held 1982)—Brueghel appears a key intermediary of Rottenhammer for the Antwerp market. Further provenance research will be necessary to determine if the paintings from the Antwerp inventories correspond to lost or existing Rottenhammer works. Thus, at this time, the Rottenhammer paintings listed in the Duverger inventories, except for *Fall of Phaeton* owned by Duarte and today at the Mauritshuis, The Hague, were excluded from my dataset.

3.3.3. German Agents as Art Agents

Not only did Rottenhammer utilize his artist-friends as intermediaries and agents, but he also delved into the resources at his disposal in Venice. From 1600 to 1606, Hieronymus and Christoph Ott, I argue, operated as key nodes in Rottenhammer's network. A closer view of the network visualization from Figure 6 shows Hieronymus Ott in a brokering position with his various patrons and colleagues, one of whom was the German merchant Hieronymus Kechel (Figure 9). A 1657 inventory conducted in Venice for his son Caspar Kechel lists three copper panels by Rottenhammer, including a “Portrait of the Signore Chechel, father of Signore Casparo, framed in partly gilded carving, by the hand of Hans Rottenhammer” (Schlichtenmaier 1988). That Rottenhammer painted a portrait of Kechel indicates the artist was commissioned for the work. Although Rottenhammer likely encountered the merchant at the Fondaco dei Tedeschi, I argue it was the Ott agents who strengthened this relationship, for Kechel hailed from Ulm, the same city from which the patriarch David Ott originated. This commonality helped to cement their working relationship, which benefitted Rottenhammer. As co-consuls of the Fondaco, the Otts represented the German merchant community in handling negotiations with the Venetian State and thus exerted great influence among the German merchants themselves. Since the Germans were allowed to govern themselves in the Fondaco (Calabi and Keene 2007), Rottenhammer seemed to have worked within the system of the German merchant network in order to gain commissions in Venice.

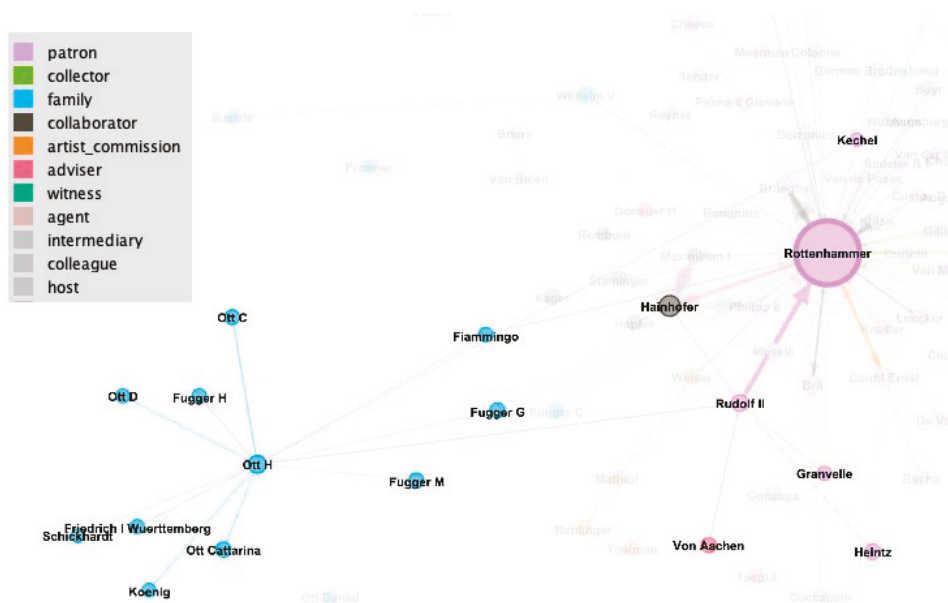


Figure 9. Microlevel view of Rottenhammer's network structure, connected to Hieronymus Ott (Ott H). Created by author with Gephi.

In 1606, after Hieronymus Ott brokered the sale of Dürer's *Feast of the Rose Garlands* from the German Brotherhood to Rudolf II, Rottenhammer was awarded the commission to paint the replacement altarpiece (Martin 2006). As leading members of the German merchant community, the co-consuls of the Fondaco would have actively recommended an artist for this high honor. Christoph Ott was co-consul during this period, 1605–1606. Although he died on 8 March 1605, his brother Hieronymus, who continued as the head of the firm until his death on 6 October 1606 (Archivio Storico del Patriarcato di n.d.), likely put forth the artist's name to the German Brotherhood. Not only did the Otts facilitate introductions to German merchants in Venice, they could also bring Rottenhammer's paintings along to fairs in Frankfurt and Leipzig, which they frequented, in order to introduce the artist's work to the art market (Backmann 1997). The mutually beneficial working relationship between the artist and his agents supported his copper painting enterprise.

3.4. Rottenhammer's Return to Germany: Business as Usual and Continuation of the Artist–Agent Model

After seventeen years in Italy, Rottenhammer returned to Germany with his family, settling in Augsburg by July 1606. He continued producing copper paintings, albeit at a lower number than previously, and increased his production of altarpieces and ceiling paintings, especially for Augsburg patrons such as the Fugger family. Based on the locations of known patrons and collectors, I argue that after his move, Rottenhammer's business strategy was to maintain some of the same key nodes gathered from Italy. The four cities that Rottenhammer supplied from both Venice and Augsburg, that is, before and after 1606, were Antwerp, Munich, Bückeburg, and Vienna (Figure 5). In these cities lived his collaborators, colleagues, and patrons.

Until about 1610, Rottenhammer continued to work with the same intermediaries and patrons he had established while in Italy. Brueghel in Antwerp and Bril in Rome maintained collaborative and intermediary activities for copper paintings. The Sadeler family of engravers, whom Rottenhammer likely met in Munich during his apprenticeship years, became close business partners with the artist in Venice. They produced engravings after his designs, and he served as a witness in a testimonial

for Jan Sadeler I (ASV n.d.; Sénéchal 1987; McCabe 2019). The names “Giovan Rottahamer” and “Raffaelle Sadoller” appearing on the Venetian document demonstrate the level of friendship and trust Rottenhammer established with the Sadeler family. Jan may have also been the intermediary who brought Rottenhammer’s *Coronation of the Virgin*, today in London’s National Gallery, to Rome for Clement VIII (McCabe 2019). Raphael Sadeler returned to Munich in 1604 and would be a viable resource in the ducal city. Rottenhammer’s altarpiece of St. Mauritshuis for Duke Wilhelm V emerged in this year, suggesting Raphael’s reappearance at court as a likely stimulus.

For Vienna, however, the situation is not as simple as it appears. A commission from Eleonora Gonzaga I, the wife of Emperor Ferdinand II, was never delivered, even though Ottheinrich Fugger functioned as the intermediary for the emperor (Hauser 1986). The paintings in the collection of Eugene of Savoy (1663–1736), while executed before 1606, could not have entered his collection until after Rottenhammer’s death in 1625.

Rottenhammer’s patronage support from the Bavarian duke and Count Ernst of Holstein-Schaumburg in Bückeburg, gained before 1606, continued after he relocated to Augsburg. For Count Ernst, Rottenhammer executed an allegorical cycle of *The Four Elements* as canvas ceiling decoration in Venice, as well as monumental decoration after his return to Germany. Rottenhammer also operated as an artist-agent for the count, locating the imperial sculptor Adrien de Vries to produce a baptismal font for Bückeburg’s cathedral, as indicated in Rottenhammer’s 1613 correspondence (Peltzer 1916). In the same letter, the artist suggested to have Augsburg patrician and humanist Marcus Welser provide the iconography for a decoration program. These activities suggest Rottenhammer moved within elevated circles at the imperial court, and within Augsburg. We know from Augsburg agent Philipp Hainhofer (1578–1647) that Rottenhammer served as an agent for Emperor Rudolf II while in Venice, seeking Venetian master works, “repaired and covered them with fresh varnish”, before sending them to court (Doering 1894; Borggrete 2007). Rottenhammer also acted as an independent art dealer, buying Venetian paintings by Veronese and other masters for sale in Germany, as indicated by his friend and imperial artist Joseph Heintz in a 1606 letter to Count Ernst (Zimmer 1988; Borggrete 2007).

From July 1610, Rottenhammer began working closely with Hainhofer, thus gaining another resource for patronage in distant lands, for Hainhofer’s patron was Duke Philipp II of Pommern-Stettin (HAB n.d.; Doering 1894; Schlichtenmaier 1988). In addition to his designs and paintings, Hainhofer valued the artist’s status and longstanding relationships with his artist-friends (McCabe 2019). His weekly reports to Duke Philipp II indicate the art agent’s dependence on Rottenhammer as an intermediary and agent, as expressed in a letter dated 28 July 1610, in which the agent wrote, “The other two [Bril and Brueghel] I know not personally, but Rottenhammer has good correspondence with Bril” (Doering 1894). Two months later, “if Your Grace wishes, I will through Rottenhammer order from him [Bril]” (Doering 1894). While the network visualization indicates Hainhofer is connected to Bril, it does not show that Rottenhammer functioned as the intermediary and agent. In order to understand Rottenhammer’s significance in Hainhofer’s relationship with Bril, it remains necessary to return to the archival document, namely, Hainhofer’s report.

4. Conclusions

That Rottenhammer maintained few patrons in Venice during the height of his copper painting production tells us something very important about how he engaged with his resources. In the lagoon city, Rottenhammer utilized artist-friends and German agents as key nodes for his business enterprise. The intermediaries and agents marketed his copper paintings to different cosmopolitan centers. After Rottenhammer returned to Germany, he continued to maintain working relationships with some of the same key intermediaries. Comprised of trusted friends and collaborators—Jan Brueghel the Elder, Paul Bril, Hans von Aachen and Joseph Heintz, the Sadelers, the Ott brothers, and Philipp Hainhofer—Rottenhammer’s intermediaries and agents commanded high social status and positions

in Venice, Rome, Antwerp, Prague, Munich, and Augsburg, where they lived and enjoyed relationships with the nobility in both court and city.

Digital technologies aided in the construction of my argument for how Rottenhammer established his business of art with the use of intermediaries and agents. The open-source platform Palladio presented clearly the cities Rottenhammer served during and after his time in Venice. The open-source platform Gephi visualized Rottenhammer's network structure in order to determine the possible key intermediaries Rottenhammer employed to enter these markets. Between the primary data of historical documents and works of art, to the mapping and network visualization tools, my project demonstrates that a combined approach—in which the content and context of historical documents work in tandem with computational analysis and visualization—remains the most effective approach for digital art history. The challenge of the project, and likely any digital humanities project, is the steep learning curve of various digital platforms. Therefore, in order to work effectively in this realm, art historians would do well to locate a collaborator with expertise in computational technology and in the digital platform most appropriate for the project's needs and goals.

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Article

Revisiting Harrison and Cynthia White's Academic vs. Dealer-Critic System

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Abstract: The field of art market studies is based on a famous opposition, coined by Harrison and Cynthia White in 1965, regarding the “academic” system, as opposed to the “dealer-critic” one. Published in 1965, their book, *Canvases and Careers, Institutional Change in the French Painting World*, was qualified by Patricia Mainardi and Pierre Vaisse, but their criticism dated back to the 1990s. In the meantime, the development of digital methods makes possible a broader reassessment of Harrison and Cynthia White’s theory. Based on a corpus of Parisian auction sales, from 1831 through 1925, this paper uses econometrics to call into question the antagonism between the academic and the dealer-critic system, and comes to another conclusion: the academic system was crucial to determine the value of artworks and its efficiency did not collapse in the 1870s, nor in the 1880s, but rather after the Great War.

Keywords: art market; Salon; econometrics; Harrison and Cynthia White; academic system; dealer-critic system

1. Introduction

In the field of art market studies, Harrison and Cynthia White’s book *Canvases and Careers, Institutional Change in the French Painting World*, appears as a foundation stone for any paper. Published in 1965, it analyzes the artists’ careers in the 19th century and describes the transition from one institutional system to another, i.e., from the academic system to the dealer-critic one. The former, heir to the Ancien Régime, is based on the Academy of Fine Arts, the School of Fine Arts and the Salon. To make a career, the artist had to be received at the School of Fine Arts, enter the spiral of competitions—the Rome Prize was the ultimate stage—and make himself known to the public by participating in the Salon. This exhibition was a token of recognition: a jury decided on admissions and then rewarded the “best” artworks with first-, second- and third-class medals.¹ The Salon captured the attention, caused ink to flow in the press and also constituted a commercial place where the State and collectors could buy the works on display. It was even the main supply source of artworks for the French public authorities.

The academic system showed signs of running out of steam from the late 1840s, with the growing number of artists who were accepted at the Salon: this exhibition became saturated and, from the point of view of an exhibitor, too large to be noticed. Moreover, the jury had become unpopular, due to its severity and to the opening of a Salon des refusés in 1863. From then on, the “dealer-critic system triumphed, in part because it could and did command a bigger market than the academic-governmental structure” (White and White 1965, p. 98). Harrison and Cynthia White situated the transition from

¹ The Salon was biennial from 1798, annual from 1833 to 1851, again biennial from 1853 to 1863, then annual from 1864 (Monnier 1995, p. 124).

the academic system to the dealer-critic one in the 1870s, with the Impressionists² and the dealer Paul Durand-Ruel, who appeared as a patron, because of the regular support he offered to artists. Unlike the academic system, which individualized careers by focusing on the canvases presented at each Salon, its rival had the advantage of building longer-term careers and, through group exhibitions, it encouraged pools of artists.

The transition from the academic system to the dealer-critic one continues to be a consensus among the researchers who focus on this institutional change.³ Pierre Vaisse found that Harrison and Cynthia White “have raised the problem of the Salon in relevant terms” (Vaisse 1995, p. 96). As for Patricia Mainardi, she postponed their chronology by only a few years: after the French state abandoned the Salon to the artists’ control in 1880, “the period from 1880 to 1885 saw the termination and collapse of the official French Salon system” (Mainardi 1993, p. 129).⁴ Finally, in 2002, David W. Galenson and Robert Jensen wrote a large paper in which they pointed out their disagreements with the Whites, whose analysis “credits the wrong people for changing the art world in the 19th century” (Galenson and Jensen 2002, p. 46) but they did not revise the chronology, stating that “the official Salon had been the key institution in the French art world until 1874”, i.e., until “the impressionist exhibitions broke the Salon monopoly over the ability to present artists’ works to the public in what would be generally considered as a legitimate setting” (Galenson and Jensen 2002, pp. 35, 42).

To establish evidence of a collapse of the Salon in the 1870s—or 1880s—Harrison and Cynthia White analyzed a random sample of a dictionary of artists (White and White 1965, p. 111), and Patricia Mainardi relied on speeches and debates about the Salon. While these sources are valuable documents, they are not sufficient, however, to show that the Salon ceased to play a role in artists’ careers: the first is not exhaustive and the second does not concern artists’ careers. The challenge of this article is to measure the efficiency of the Salon by measuring the artists’ economic performance at Parisian auctions. The conclusions then differ widely from those of Harrison and Cynthia White: only after the Great War did the official Salon cease to have an impact and did the academic system collapse.

2. Materials and Methods

To test the weight of the Salon on artistic careers, it would be ideal to have an exhaustive biographical information on all artists and to link it to the economic performance of their works. However, the artist dictionaries used by the Whites do not contain any exhaustive information on the prices of artworks. One solution to this methodological problem is to use a source that provides access to the price of works over a long period of time. Parisian auctions are the only way in. The results presented in Section 3 are thus based on the analysis of a twofold dataset, regarding Parisian auctions of paintings, drawings and sculptures.

2.1. The Exhaustive Surveys of 1875, 1900 and 1925

Auction catalogues are a very valuable source that allows a macroscopic view, whereas an artist’s or dealer’s account book only considers part of the market, by definition. The Getty Research Institute has put online a database of annotated catalogues, mainly for the 18th century up to the 1820–1840s in Europe, and for the 1900–1945 period in Germany. This exceptional source has already made it possible to identify the major changes in London sales between 1780 and 1835 (Fox and Lincoln 2016). It should be noted, however, that the period 1840–1900 is absent from the Getty’s dataset, which hinders any

² “The dealers and critics, one marginal figures to the Academic system, became, with the impressionists, the core of the new system.” (White and White 1965, p. 151).

³ The bibliography of the art market is very abundant. Nevertheless, the majority of publications do not take this institutional change as the focus of their study—for example, monographic studies of dealers, such as Goupil, Durand-Ruel, Vollard or Kahnweiler. Robert Jensen analyzed the socio-economic profile of dealers (Jensen 1994) and Béatrice Joyeux-Prunel, that of the avant-gardes (Joyeux-Prunel 2009).

⁴ This two-fold source is the only one that provides a comprehensive dataset. The private sales between dealers, collectors and artists thus constitute a blind spot, as there is no available and global archive.

cross-sectional analysis of the market for the 19th century. To have an overall view of Parisian auctions, it is, therefore, necessary to group together all the auction catalogues regarding paintings, drawings and sculptures and to transcribe them by hand into a database: this task being impossible for a single person over the entire period, I carried out surveys by considering all the auction catalogues for certain years: 1831, 1850, 1875, 1900, and 1925.⁵ In this paper, only the 1875, 1900, and 1925 samples are used to support the analysis.

After collecting the auction catalogues,⁶ I fully transcribed them into a spreadsheet, separating all the fields regarding the auction sale in different columns⁷ and extending this transcription to all the objects in the catalogue.⁸ In a second step, I matched the auction catalogues with their minutes (“procès-verbaux”), when available at the Paris archives. The minutes are a unique and typically French source, attesting to the transfer of ownership of each lot.⁹ By definition, a “procès-verbal” is an authentic and enforceable deed, used as a means of proof in case of a dispute or a claim. Officially drawn up by the auctioneer who carries out the sale—*de facto*, by his clerk—it mentions the following information: the name, address and occupation of the person at whose request the sale is made,¹⁰ the summary description of each item put up for sale with the hammer price in full, and finally, the name, or even the address, of the winning bidder.¹¹ As the minute is produced by the auctioneer himself, there cannot be any errors on the hammer price or the identity of the purchaser, unlike annotated catalogues. It is therefore the most exhaustive and reliable reference source available for researchers.

The combination of the auction catalogues and the corresponding minutes therefore provides information on the artworks and their hammer price for all the paintings, drawings and sculptures put up for sale in Paris in 1875, 1900 and 1925. At the end of this long work, this corpus includes 11,586 paintings, drawings and sculptures for sale in 1875, 8,137 in 1900 and 24,724 in 1925. The bibliographic references are fully available online ([Saint-Raymond 2018c](#)), as well as the database that served as a basis for the econometric analysis ([Saint-Raymond 2018f](#)).

Like most economic papers on the art market, seeking to explain the price of works,¹² I considered the following explanatory variables. First, I isolated the characteristics of the artwork sold at auction, with medium dummies¹³ (painting/sculpture/graphic work), size variables and the presence of a

⁵ I started in 1831 when the total revenue of the Parisian auctioneers became available; I then moved to 1850; taking a sample in 25 year blocks thereafter.

⁶ The auction catalogues were collected at the INHA library, at the Département des Estampes of the Bibliothèque nationale de France, on gallica and at the library of the Ecole nationale des beaux-arts. The choice of catalogues is based on the “long” title, and not on the short title of the first cover: this is why I had to carefully examine all the catalogues concerning the years of interest, without stopping at the library search engines which, generally, only take the short title into account.

⁷ I separated the following fields into different columns: date and venue of auction sale, names and addresses of the auctioneer and expert, short and long title of the catalogue, name of the seller, amount of buyer fee, total number of lots, number of pages in the catalogue, possible presence of illustrations, presence of a preface and name of any prefacer, name and address of the publisher.

⁸ Regarding the artwork, I separated the following fields into different columns: section of the catalogue in which the artwork was sold, catalogue number, name of the artist, title, date, presence of a signature, dimensions, medium, comprehensive description of the work, presence of a reproduction, exhibitions in which it appeared, possible exhibition of the work at the Salon, previous auction sales and collectors—this information forms the “pedigree” of the work—, mention of an engraving of the work and presence of a bibliography documenting the object. The catalogue annotations, if any, were added in separate columns, for the hammer price, the purchaser and, more rarely, the price setting and estimation.

⁹ In the other countries, the auctioneers were not considered as ministerial officers, i.e., State representatives, subject to very strict legislation. In England, for instance, there are no regulations on auctions ([Maurice 1971](#), p. 41–56).

¹⁰ The “real” seller can use an intermediary: in this case, the minute of the sale would only mention the name, address and occupation of the latter. Regarding the auction sales with different sellers—“composite sales” or “ventes composées”—, please confirm/ LSR : yes, necessary. the list of all the sellers appeared in the minutes from the 1920 onwards: beforehand, only the name of the expert was mentioned.

¹¹ The information on the winning bidder’s identity was not mandatory in the minutes, for instance it was absent from the minutes of the Bordeaux auction sales ([Rouillon 1928](#), p. 109).

¹² See, for instance, ([Mei and Moses 2002](#); [Ashenfelter and Graddy 2003](#); [Renneboog and Spaenjers 2012](#); [David and Oosterlinck 2015](#)).

¹³ A dummy variable equals to 1 if the proposition is true (e.g., the artwork is a painting), 0 otherwise.

signature.¹⁴ Attribution was also taken into account, based on the description of the artwork in the auction catalogue. I thus distinguished three dummy variables: artworks “made by” the artist, artworks “attributed” to the artist and, finally, artworks in the “style of” the artist (grouping together the mentions “school of” the artist/“in the style of”/“after” the artist). The “pedigree” variable equals 1 if the auction catalogue mentioned a previous collector or a previous auction sale for the artwork, 0 otherwise. Furthermore, the “Salon” variable equals 1 if the auction catalogue stated that the artwork was shown at the Salon. It differs from the “Exhibition” variable, which follows the same principle, but for all exhibitions other than the official Salon.¹⁵ I also paid attention to the information given by the catalogue: the “Bibliography” variable indicated a bibliographic reference for the artwork that was sold at auction, and the “Engraved?” dummy variable indicates whether the work was previously engraved. However, contrary to all the other papers in art market studies, my econometric results also include two variables on the auction catalogue itself: the length of the description for the artwork, i.e., the number of words, and a “Reproduced” dummy that equals to 1 if the work was reproduced in the catalogue, 0 otherwise. Finally, the “Sold by the artist?” variable indicates whether or not the artwork was sold by the artist himself.

2.2. Auctions Organized to Their Artists for Their Own Works

The constitution of this second corpus followed a more complex process than the previous one: it was no longer a question of grouping together catalogues of paintings, drawings and sculptures, but of identifying the sales organized by artists for their own works.

The main source of this corpus is Frits Lugt’s repository of auction catalogues (Lugt 1938), which ends up in 1925. First, all the Parisian auction catalogues with the mention “by him”, “by her” or “by them”, were selected: this means that the works put up for sale in Paris were made and sold “by” the artist. I extended the selection to the entries in which the seller’s occupation was “artist” or “painter” or “draftsman” or “sculptor”. This corpus was completed by the “*quitus*”¹⁶ of the Parisian auctioneers, kept in the Paris archives including sales for which the claimant was a “known” artist or already mentioned in the previous stage.

To ensure that the sales were indeed organized by the artists who wanted to sell their own works at auction, it was necessary to ensure that these artists were indeed alive at the time of the sale, i.e., that the auction sale wasn’t actually the liquidation of their studio, after death. I therefore identified the artists thanks to the Bénézit dictionary (Bénézit [1911] 1999). Once these biographical checks were carried out, I collected all the catalogues and eliminated the auction sales that did not concern the artist’s production as such, but rather any movable effects (furniture, personal objects, etc.). Then, I needed to check the identity of the seller,¹⁷ so used two sources: the minutes of the sale and, if the minutes of the sale are unavailable, the *quitus* of the auctioneers, accessible from 1864 onward.

In the end, this final corpus is divided into three groups, according to the degree of certainty of the seller: (1) sales where the applicant was indeed an artist or group of artists; (2) sales where the applicant was a dealer or expert, as it is impossible to verify whether the dealer/expert auctioned

¹⁴ In this case, I used a dummy variable (“signature”) which equals to 1 if the catalogue mentions a signature for the artwork put up for sale, 0 otherwise.

¹⁵ The “Exhibition” variable thus includes the mention, by the auction catalogue, of an exhibition in a dealer’s gallery or in an “unofficial” Salon, such as the Salon d’Automne, the Salon of the Société nationale des Beaux-Arts...

¹⁶ The *quitus* are administrative documents produced by the auctioneers themselves and by the Chambre des Commissaires-priseurs parisiens. These “settling of accounts” made it possible to verify that the previous management of the outgoing auctioneer was in good standing, thus giving him the right to retire and receive reimbursement of his bond. The individual *quitus*, available in the Paris archives since 1864, are a valuable source for the researcher because they provide an exhaustive list of the auctioneer’s sales during the year in question: the date of the minutes—which corresponds to the date of the sale—, the nature of the minutes—voluntary sale, legal sale, etc.—the name of the seller, and above all, the total amount of the sale in current francs.

¹⁷ I had to check that it was indeed the artist who had put his works on sale, and not a private individual who wanted to market the works of an artist of whom he would have been an amateur.

off his own stock or whether he acted as an intermediary or a mere applicant for the artist, and (3) uncertain sales, for which neither the minutes nor the quitus are available. I enriched this dataset with some biographical data, through the Bénézit dictionary. In particular, I added the artists' age at the moment of the sale, and a dummy variable that equals to 1 if the artist is a sculptor. If the artist previously organized an auction sale for his/her works, the variable "already come" equals to 1. I made a second data enrichment, regarding the artists' activity at the Salon. To do so, I used the "Base Salons et expositions de groupes 1673–1914", developed by the Musée d'Orsay and INHA. This resource is exhaustive until 1879: for the period after 1900, no online database provides any comprehensive information. Before the creation of the Société des Artistes français, in 1882, I thus created the variable "Experience", accounting for the total number of years since the artist first exhibited at the Salon. The dummy variables "hors concours" and "medal" respectively equal to 1 if the artist was awarded as a "hors concours" or received a medal at the Salon. After 1882, I therefore chose not to enrich my auction corpus with external information, but to analyze the auction catalogues themselves: the variable entitled "mention of the Salon" thus indicates whether the catalogue highlights the Salon in the artist's career or in the description of the works. Through the whole period, the variable "nb of lots" gives the total number of artworks that were sold at auction, and "illustrated cat." equals to 1 if there were any reproduction of artworks in the auction catalogue.

This corpus and the data that I used for the econometric analysis are available online (Saint-Raymond 2018e).

2.3. Econometric Analysis of These Two Datasets

These two corpora were analyzed by using the hedonic regression method. The purpose of this technique is to describe how an "explained variable" varies according to different "explanatory variables". In this paper, the two explained variables are the hammer price¹⁸ (Table A1) and the average sales revenue (Table A2). The hedonic regression method remains descriptive: it highlights correlations but does not reveal causalities.¹⁹ Its advantage is to make comparisons "all other things being equal", i.e., pretending that all the observed characteristics are unchanged, except for the explanatory variable in question. For instance, the impact of the explanatory variable "reproduction in the catalogue" is calculated as if two works were identical in all respects, with the difference that one will be reproduced in the catalogue and the other not. The correlation of a variable to the auction price can then be isolated by "freezing" all other explanatory factors. If the explanatory variable has an effect on the explained variable, then it is said to be "significant". The R^2 is called "coefficient of determination": it gives the proportion of the variance in the explained variable that is predictable from the explanatory variable(s). For instance, in the regression model 1 (Table A2), R^2 equals to 0.2951, i.e., the explanatory variables of this model account for 29.51% of the variation of the average sales revenue, between 1870 and 1881.

In the results tables displayed in the appendices, each explanatory variable corresponds to a line, and a figure, or coefficient, corresponds to the "direction of correlation". If the number is positive, then the correlation between the explained variable and the explanatory variable varies in the same direction. For example, in regression model 1 (Table A2), the variable "Nb of lots" is negatively correlated with the average sales revenue because the coefficient is negative, equaling to -1.04 . In the case where the variable explained is quantifiable—like the auction price of the average sales revenue—then the coefficient is also a number. In the last example, one extra artwork, sold at auction by the artist, makes the average sales revenue decrease by 1.04 francs, all other things being equal. By comparing the coefficients, we can thus compare the effects of the different variables on the auction price.

¹⁸ The hammer price is expressed without using a logarithm transformation, which keeps the reading of Table 1 in current francs, not in percentages.

¹⁹ To highlight causalities, it is necessary to deploy a heavier protocol with instrumental variables, which is difficult for the art market.

Nevertheless, the reading should not be stopped at simple coefficients: it is necessary to test the accuracy of the variables. To do this, the figures in brackets indicate the standard deviation of each coefficient, and the number of stars, its significance. Without going into detail, a coefficient is significant if its standard-deviation around it is “not too high”. Three stars mean that the coefficient is “true” / significant at a 99% level; two stars—respectively one star—mean that the accuracy of the coefficient is 95 to 99%—resp. 90 to 95%. When the coefficient has no star, its standard deviation is too high, so there is no real correlation between the explanatory and the explained variables.

For more rigor in the regressions, it is possible to add a “fixed effect”, i.e., to perform this regression technique by separating various entities, or groups.²⁰ For example, with an “artist fixed effect”, the regressions are performed by considering each artist separately and not altogether. The results are thus interpreted for a given artists, all the other things being equal.

The regressions were performed with the STATA software. The programming commands have been mentioned in the files available online, to ensure the reproducibility of the results.

3. Results

The econometric analysis of these two datasets, as shown in Tables A1 and A2 (Appendix A), sheds light on a different chronology than Harrison and Cynthia White’.

3.1. The Salon And the Market: Complementary and Non-Rival Systems (1850s–1870s)

With a demographic growth of art dealers in Paris from the 1850s (De Maupéou and Saint-Raymond 2013) and the increase of auction sales, following the opening of the hôtel Drouot in 1852 (Saint-Raymond 2018a), the Parisian art market experienced an unprecedented boom. For Harrison and Cynthia White, the dealer-critic system appeared as a rival of the Academic one, the former replacing the latter between the 1850s and the 1870s (White and White 1965, pp. 2, 151). However, the expansion of the Parisian art market does not necessarily mean that the Salon stopped acting as a taste-maker and gate-keeper.

3.1.1. Evidence from the Global Econometric Regression

Many monographic studies in art history highlight the role of the Salon as a springboard, allowing an artist to gain a certain notoriety and, in a second step, to make himself known by dealers. Félix Ziem’s career is particularly representative of this phenomenon (Saint-Raymond 2016a) as well as the Italian orientalist painter Alberto Pasini: the latter began to exhibit at the Salon from 1857, he won third-class medals in 1859, second-class in 1863 and first-class in 1864: from these years on, he entered into a commercial relationship with the dealer Adolphe Goupil, who monopolized his production, took care of his sales and supported his prices at auction (Saint-Raymond 2018b). Another significant example is the success of Alphonse de Neuville’s painting, *Combat sur une voie ferrée* (Figure 1): exhibited in the 1874 Salon, it was sold at auction one year later and bought for 11,500 francs by the lawyer Georges de Chambine: this hammer price ranked Alphonse de Neuville among the most valued living artists at Parisian auctions in 1875 (Saint-Raymond 2018c).²¹

²⁰ The R^2 within gives the part of the intra-individual variability of the left variable explained by those of the right variables. The R^2 between estimates the contribution of the fixed effects to the model. The R^2 overall reflects the overall quality of the regression.

²¹ Lugt 35571, lot 56. The bibliographic reference of the auction catalogue is summarized by its number in the repository by Frits Lugt (1938), and it is available online (Saint-Raymond 2018d).



Figure 1. Alphonse de Neuville (1835–1885), *Combat sur une voie ferrée ; armée de la Loire, 1870–1871*, oil on canvas, 172 cm × 216 cm, Chantilly, musée Condé, PE545. Neuville exhibited this painting at the 1874 Salon, with no. 1390. (Used by permission).

Beyond these specific examples, which are difficult to generalize, it is possible to globally measure the correlation between the presence at the Salon and the economic performance of an artist or an artwork. A good test is to consider all Parisian auctions of paintings, drawings and sculptures and to test the correlation between their auction price and the fact that the artworks were previously exhibited at the Salon—this information is always mentioned in the catalogues, which became very detailed in the 1870s. The year 1875 is an interesting date: the first impressionist exhibition took place a year earlier and in March 1875, the impressionists held their first auction sale in Paris. For Harrison and Cynthia White, this would therefore be the end of the academic system.

Table A1 clearly contradicts their thesis. Indeed, the mention of the Salon significantly increased the hammer price of the work (excluding repurchases): all other things being equal and for a same artist, the hammer price increased by 2528 francs when the artwork was previously exhibited at the Salon, which is very important compared to the other variables.²²

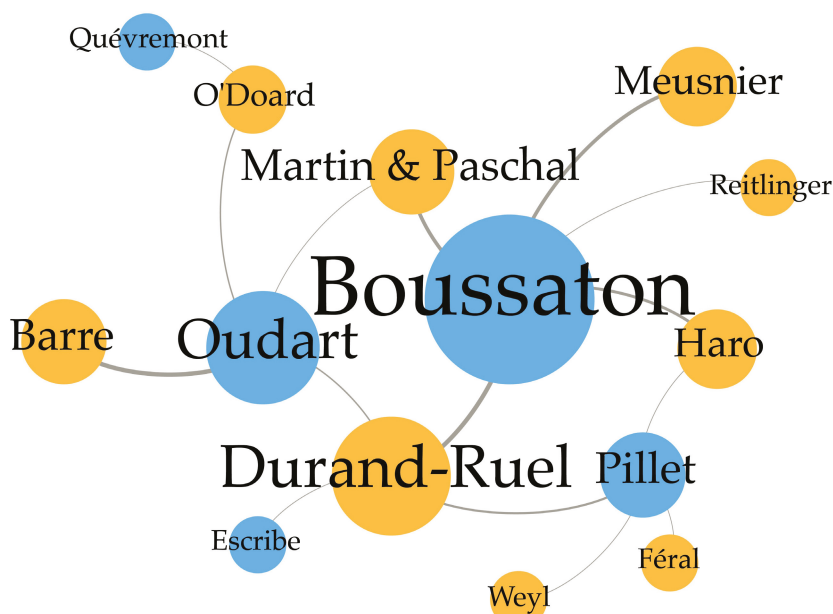
3.1.2. Evidence from the Auction Sales Organized by the Artists Themselves

On the other hand, it is possible to measure the influence of the academic system on artistic careers, based on an experience that artists themselves had, supposedly, to free themselves from the yoke of the Salon and its jury: the organization of an auction sale of their own works. This practice flourished in the period 1852–1881.²³ Until the 1840s, artists reluctantly went to the auction house, citing departure or health reasons to publicly justify the auction sale. The upheavals of the Salon, under the Second Republic, had then led to a first influx of artists, mainly landscape painters, who willingly put their works up for auction (Saint-Raymond 2018e). After 1852, with the opening of the hôtel Drouot and

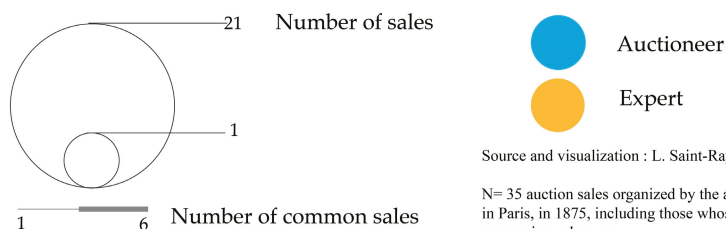
²² Regarding the sculptures, the exhibition at the Salon was even the strongest variable in the increase in the hammer price (Saint-Raymond 2016b).

²³ Jean-Paul Bouillon (1986, p. 92) confirms that the “public sale system, particularly at the hôtel Drouot”, was one of the three sectors of the “parallel market” at the Salon, along with the network of dealers and the associative formula, which developed in the years 1850–1860.

the subsequent expansion of the public, more and more artists organized an auction sale, during two waves, the first one in the late 1850s, of a magnitude equal to that of 1849–1851, the second one from 1867 onwards, culminating in the late 1870s. The auctioneer Jules Auguste Boussaton played a very important role in stimulating these artistic sales.²⁴ He was at the center of the network of professionals (Figure 2) who organized these events, along with some Parisian dealers who also encouraged “their” artists to sell their works at auction—especially those who held an expert position, such as Pierre-Firmin Martin and Paul Durand-Ruel.²⁵



Network of the auctioneers and experts of the Parisian auction sales that the artists themselves organized for their own works, in 1875.



Source and visualization : L. Saint-Raymond, 2019.

N= 35 auction sales organized by the artists for their own works, in Paris, in 1875, including those whose applicant is the expert or remains unknown.

Figure 2. Network of the auctioneers and experts of the Parisian auction sales that the artists themselves organized for their own works, in 1875.

²⁴ For instance, Jules Boussaton encouraged Jean-Baptiste Camille Corot to organize an auction sale of his paintings in 1858. (Moreau-Nélaton 1924, p. 117).

²⁵ Letter from Ludovic Piette to Camille Pissarro, 30 January 1872 (Bailly-Herzberg 1985, p. 70).

The artists who went to the hôtel Drouot were almost all men²⁶ and, mainly, landscape painters (Saint-Raymond 2018e). They asserted themselves in a more positive way than in the 1840s, as shown by the semantic change in the catalogue prefaces: they no longer “got rid of” their works, but “offered” them to the public or, in a more agonistic register, “delivered” them to the fire of the auction. Indeed, with its larger clientele, the new auction house—the hôtel Drouot—was then perceived as the place where artists could really “enter into communion”²⁷ with the audience. As the critic Philippe Burty stated, “the hôtel Drouot alone offers the advantage of attracting crowds on a daily basis and therefore provoking criticism to the fullest”.²⁸ Behind this romantic and mythical vision of the artist, being in direct contact with the amateur, there was a virulent criticism of the Salon which, by the “excessive agglomeration”²⁹ of the works on display, plunged the painters and sculptors into anonymity (Vaisse 1983, p. 78). The hôtel Drouot thus had a double advantage over the Salon: it was much more democratic and open, without the risk of a refusal or prohibition and without the barrier of the jury’s “firing squads”,³⁰ and it gave the artist better visibility, by offering the possibility of a real solo exhibition,³¹ with a substantial body of works and not “the two or three artworks tolerated annually by the jury”.³²

Was the hôtel Drouot the salvation plank of young artists, in order to launch artistic careers and to escape the Salon’s sanction? The econometric analysis for the period 1870–1881 (Table A2, model 1) shows that the average revenue of the auction sale was all the more important as the artist had succeeded in reaching the rank of “out of competition” (“hors concours”) at the Salon, meaning that he was exempted from going before the jury. Indeed, between 1870 and 1881, the average income from sales organized by artists for their own works was significantly higher if the artist was “out of competition”: it increased by 201 francs, all other things being equal. On the contrary, obtaining third-, second- or first-class medals had no significant impact on the auction price (Table A2, model 2).

Two other variables had a significant impact on the average sales revenue. On the one hand, the sculptors succeeded much better than their comrades, all other things being equal. On the other hand, and not surprisingly, the average auction price decreased with the quantity of works auctioned. It was therefore more profitable to sell little and control the scarcity of the artworks, than to flood the market.

These statistics thus contradict Harrison and Cynthia White’s theses: the dealer-critic system did not replace the academic one in the 1870s. On the contrary, the Salon continued to have a very heavy impact on the artists’ careers, even for those who wanted to escape it through auctions. The artists themselves were not mistaken. While criticizing the academic system, they continuously highlighted their awards at the Salon, in the title of the auction catalogue,³³ the preface³⁴ or pedigree of the works, even if it meant embellishing reality.³⁵ The landscape painter Louis Adolphe Hervier and the history painter Joseph Navlet embodied some unfortunate examples: despite their efforts to make a career at auction³⁶ and, for the first, despite the support of critics such as Théophile Gautier and Philippe Burty,³⁷ they cruelly missed the honors of the Salon. Both obtained catastrophic results at each of

²⁶ Only Louise Adèle Dumoulin, Louise Daru and Berthe Morisot sold their own works at auction between 1852 and 1881.

²⁷ Lugt 36282, Ernest Chesneau’s, p. 1. This expression is repeated in Louis Énault’s preface for the Hugard sale in 1878 (Lugt 38218, p. 1).

²⁸ Lugt 35506, Philippe Burty’s preface, p. 1.

²⁹ This accusation is explicit in Ernest Chesneau’s preface: Lugt 36282, p. 1.

³⁰ Lugt 36135, Philippe Burty’s preface, p. 1.

³¹ Lugt 36282, Ernest Chesneau’s preface, p. 1.

³² Lugt 35506, Philippe Burty’s preface, p. 1.

³³ Lugt 24157.

³⁴ Lugt 34703, 35492, 35496 and 35521.

³⁵ In 1876, Ernest d’Hervilly stated, in the preface to the sale of Jules Héreau, that the artist had obtained “for ten years the medals of the official Jury” (Lugt 36364, p. 1) but the Salon catalogue, this year, did not specify any official reward.

³⁶ Hervier organized seven sales, from 1856 to 1878, and Navlet, ten, between 1869 and 1885.

³⁷ Théophile Gautier wrote an article in the *Moniteur universel* of 11 February 1858, which was included in the preface to the sale of 5 April 1875 (Lugt 35516) and Philippe Burty wrote the preface to the following sale (Lugt 36195).

their sales, most of which were less than 50 francs per work, and barely enough to cover the costs (Saint-Raymond 2018e).

3.2. The Collapse of the Salon System? (1880s–1910s)

The threshold of the 1880s marked a turning point in the history of the Salon: with the decree of 27 December 1880, the State entrusted all French artists with the free and complete, material and artistic management of the Salon. A “Société des Artistes Français” was set up on 20 March 1882, in order to organize the annual Salon, i.e., the public and official exhibition of living art (Maingon 2009, p. 134). However, this same year, this event lost its cohesion, as the State decided to set up a—quickly abandoned—triennial Exhibition in parallel. In 1884, a Salon des “indépendants” appeared on the fringes of the annual Salon. Lastly, in 1889, a dispute led to a split between the Salon de la Société des Artistes Français and a newly created Société nationale des Beaux-Arts.

If Patricia Mainardi analyzes the institutional crisis of the unique Salon as a collapse of the latter, which paralleled political and economic tensions within the Third Republic (Mainardi 1993), Pierre Vaisse is more measured: not only did the official purchases and orders of the State continue but the “Official Salon” remained the Salon des Artistes Français, in the eyes of contemporary artists (Vaisse 1995, p. 94).

However, one question remains open: did the Salon des Artistes Français really lose all influence on the artists’ careers? Did it only remain a façade, with no real effect on market? By studying Parisian auctions, it seems that the Salon continued to play a major role in determining prices.

3.2.1. Evidence from the Global Econometric Regression

Following the same methodology as in 1875, the regression coefficient for the “Salon” variable, in 1900, was still positive and very significant: all other things being equal, and for a same artist, the hammer price of a work in 1900—excluding repurchases—increased by 16,210 francs if it had previously been exhibited at the Salon (Table A1). This result alone therefore calls the Whites’ theses into question because it shows that in 1900, the Salon played a significantly strong role in determining prices.

Table A1 also proves that, while the academic system remained a major prescriber in auction sphere, the dealer-critic system was also gaining in importance. Indeed, when the work put up for sale had been exhibited in a dealer’s gallery, its hammer price increased significantly but 5 times less than if the work had been exhibited at the Salon. Similarly, the price of a work was positively correlated with the way it was highlighted in the auction catalogue—by mentioning a bibliography on it, the number of words in the description and, above all, a reproduction by photoengraving. This enhancement through increasingly luxurious catalogues, was encouraged by the dealer Georges Petit (Figure 3), who played a crucial role in the Parisian art market.

At the age 25, Georges Petit succeeded his father and, inspired by the Grosvenor Gallery in London, he opened a very luxurious new exhibition venue, in 1882, at 8 rue de Sèze. He proposed this gallery to the Parisian auctioneers, for some prestigious auctions sales—of which he would also be an expert. The first one took place in April 1883. Georges Petit continued this model of vertical integration, based on luxury, by founding his own printing house in 1894. The auction catalogues he published were truly beautiful books, prefaced by art critics and illustrated by full-page reproductions, using the heliogravure printing process. In about ten years, Georges Petit revolutionized the Parisian dealer-critic system, since he invented a new “model” for the enhancement of works (Saint-Raymond 2018g). As shown by the econometric analysis (Table A1), this model had a very strong influence on hammer prices.



Figure 3. “Georges Petit, director of the famous gallery on rue de Sèze”, in “Les coulisses de la curiosité”, *Lectures pour tous*, 1911, p. 532. (Used by permission).

3.2.2. Evidence from the Auction Sales Organized by the Artists Themselves

If, in 1900, the Salon maintained a positive effect on auction prices, was it still as important in determining artistic careers? It is possible to measure the emotional and symbolic link maintained by the artists with the Salon, by observing the prefaces of the catalogues, when the artists sold their own works at auction. In the 1880s, they maintained a strong presence at the hôtel Drouot. Then, from the 1890s onwards, there were less than ten auctions per year, until a very marked slowdown in the 1910s (Figure 4).³⁸

Despite this decline in volume, art critics continued to preface many auction catalogues. The textual analysis of these prefaces also goes against a so-called collapse of the Salon: between 1880 and 1912, half of the prefaces mentioned the Salon des Artistes Français, in order to highlight the careers of artists who sold their works at auction (Figure 5).

Moreover, this graph shows no trace of any symbolic collapse of the Salon over time: whatever the period, half of the auction prefaces mentioned the Salon. In 1910 and 1912, the two available prefaces insisted on the role of the official Salon in the careers of Albert Ferdinand Duprat and Hyacinthe Royet. For artists, the Salon therefore remained a means of distinguishing themselves and a guarantee of their professional “quality”. The example of the painter Euphémie Muraton is meaningful: when she put her still-lives up for auction on 26 March 1888, she had an illustrated catalogue printed, prefaced by the journalist Octave Robin. The latter began his text by explaining how he discovered her works at the Salon:

While visiting the 1887 Salon with a famous painter of my friends, I stopped in front of an attractive painting entitled: *Old Memories*. [...] It was a painting by Mrs. Euphémie Muraton,

³⁸ See (Saint-Raymond 2018e) for more details about these auction sales.

whose artistic reputation spread so brilliantly. My companion considered this exquisite canvas for a long time, then he said to me: “Here is some painting! [...] See how all this sings in a discreet and fair harmony. This is one of the best things at the Salon.” I found this painting among those of Mrs. Muraton who were selected for this sale, and it seemed even more charming to me.³⁹

The preface begins with the work that also opens the auction catalogue; exhibited at the 1887 Salon *Old Memories* benefited from full-page reproduction (Figure 6).

This symbolic enhancement, by the mention of the Salon and by the engraving, had an economic consequence: *Old Memories* obtained the highest auction price of the sale, bought 1320 francs, excluding buyer fee, by a certain Mr. Piegu.⁴⁰ The example of this work cannot be generalized, due to the lack of a sufficient ratio of works exhibited at the Salon and sold by artists at auction. If it is difficult to carry out regressions at the level of works, it is nevertheless possible to measure the impact of the Salon on sales, by analyzing the correlation between the mention of the Salon in the preface, and the average sales revenue, in constant francs.

All other things being equal, the mention of the Salon in the preface significantly increased the average sales revenue for artists who put their works on sale between 1882 and 1912, by 105.5 constant 1890 francs per lot (Table A2, model 3). The revenue was also rising if the catalogue was illustrated. This result is striking and goes in the same direction as that of Table A1: the Salon therefore continued to play a positive role in the price of works and the careers of artists, economically and symbolically. In other words, the artists who entered the arena of auctions met a success all the more important as they had been recognized at the Salon, between the 1880s and the early 1910s.

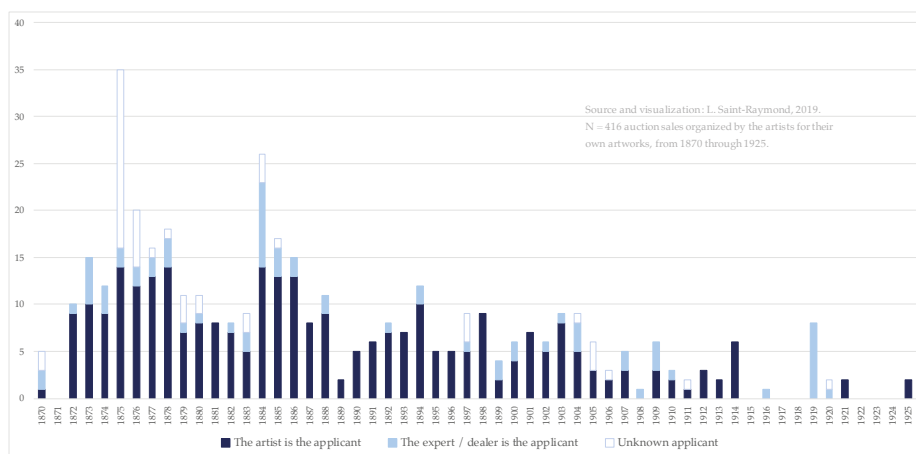


Figure 4. Number of auction sales organized by the artists themselves for their own works, depending on the identity of the applicant, from 1870 through 1925. (Used by permission).

³⁹ En visitant le Salon de 1887 avec un peintre célèbre de mes amis, je m’arrêtai devant un séduisant tableau intitulé : *Vieux Souvenirs*. [...] C’était une œuvre de Mme Euphémie Muraton, dont le renom artistique s’est si brillamment étendu. Mon compagnon de promenade considéra longuement cette toile exquise, puis il me dit : « Tenez, voilà de la peinture ! [...] Voyez comme tout cela chante dans une harmonie discrète et juste. C’est là une des meilleures choses du Salon. » J’ai retrouvé ce tableau parmi ceux de Mme Muraton qui ont été choisis pour être mis en vente, et il m’a paru plus charmant encore. (Author’s translation)

⁴⁰ Lugt 47210, lot 1.



Figure 5. Mentions of the Salon in prefaced auction catalogues, for the artists who organized a sale of their own works, from 1881 through 1912. (Used by permission).

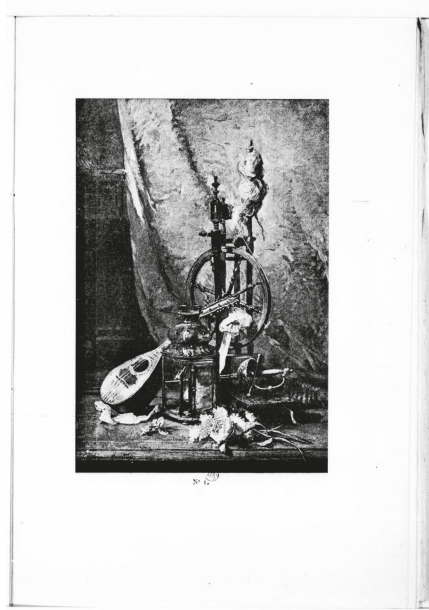


Figure 6. Euphémie Muraton, *Old Memories*, oil on canvas, 130 cm × 90 cm, reproduced in the auction catalogue of her works, 26 March 1888, opposite p. 10. (Used by permission).

3.3. The End of the Salon, after the Great War

After the Great War, artists nearly stopped organizing auction sales for their own production (Figure 4): it thus becomes impossible to carry out any econometric analysis for this corpus. However, the collapse of the official Salon can be tested through the exhaustive survey carried out on all the Parisian auction sales of paintings, drawings and sculptures in 1925 (Table A1). Unlike in

1900, the mention of an exhibition at the Salon des Artistes Français—the official Salon—ceased to play a significant and positive role in the auction price (Table A1). On the other hand, the other exhibitions were positively correlated with the price—among them, the Salon d’Automne and the Salon des Tuileries.

After the war, the Salon des Artistes Français thus crumbled. Indeed, the mention of the Salon had almost completely disappeared from the auction catalogues: in 1925, only eight works sold at auction were previously exhibited in a Salon des Artistes Français, after 1918, among which six paintings by the Egyptian painter Georges-Hanna Sabbagh. This mention did not bring success to the artists⁴¹ and Sabbagh had to buy three works back, at a very low price, below 250 francs.⁴² The journalist and art critic André Fage confirmed these results: in 1930, the opening of the official Salon “went almost unnoticed in the worldly splendour” and the paintings of these artists “were generally sold very cheaply at the hôtel Drouot”, while “the works of most of the painters of the Salon d’Automne, the Salon des Tuileries and the Independents, were sold at a golden price on auction sale.” (Fage 1930, pp. 232–34). More than the Salon des Tuileries and the Salon des Indépendants, which were rarely mentioned in the 1925 auction catalogues, the Salon d’Automne seemed to have a stronger power of prescription for young painters. *La Femme couchée* by Maurice Asselin, and *Les Bucoliques* by Jules Léon Flandrin, both exhibited at the 1921 Salon d’Automne, reached high prices in 1925, respectively 6050 current francs, excluding buyer fees, to Baron Fukushima and 5900 francs to the Druet gallery.⁴³

If the Salon des Artistes Français—and the academic system—had lost its efficiency, it meant that the dealer-critic system had become all-powerful to build artistic careers. This supremacy can be read on two levels. First, there was a parallel between the ranking of the most valued artists at auction, on the one hand, and the ranking of the most exhibited artists in the dealers’ galleries, on the other hand (Saint-Raymond 2019). As the number of Parisian galleries exploded after the war, rising from 146 dealers in 1918 to 195 in 1929 (De Maupéou and Saint-Raymond 2013), the exhibitions also experienced an exponential growth. Second, the omnipotence of the dealer-critic system was made visible with the disappearance of individual auction sales organized by the artists themselves for their own works. Indeed, the multiplication of exhibitions (in the dealers’ galleries) offered a springboard for young artists, making the auction scene lose its role as a substitute.

4. Discussion

This research allows qualifying Harrison and Cynthia White’s, then Patricia Mainardi’s, chronology: instead of showing a transition from the academic system to the dealer-critic one in the years 1870–1880, our econometric results prove that the official Salon continued to play its role as a prescriber until the early 1910s. Artists entering the auction arena were all the more successful as they had been recognized and rewarded at the Salon. In the aftermath of the Great War, the disappearance of the academic system as a legitimizing body, gave the dealer-critic system its full place: the consecration of artists, thus determined “from within” by dealers, critics, collectors and museums, was interpreted as the triumph of finance, or even the shameless agiotage of speculators—even today, this absence of “counter-powers” to the dealer-critic system gives rise to virulent denunciations, of a contemporary art dictated by the logic of speculation and money.

These results are largely dependent on econometric analysis of the 1875, 1900 and 1925 surveys. A research team would be needed to extend the research to other years and thus further refine the chronology. As this paper is based on a very specific part of the art market—auctions—it thus constitutes a first step to extend this methodology to private sales between dealers, collectors and

⁴¹ These eight paintings did not exceed 500 francs. Lugt 88024 lots 49–53, Lugt 89502 lot 134 et Lugt 89394 lot 141.

⁴² Lugt 88024, lots 52, 54 and 40, repurchased respectively 150, 205 and 250 francs excluding fees.

⁴³ Lugt 88156, lot 8. Lugt 88121, lot 84.

artists. Unfortunately, the scarcity of accounting books makes this research very difficult to undertake at a global level.

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Conflicts of Interest: The author declares no conflict of interest.

Appendix A

Table A1. Results of the hedonic regression, with a fixed “artist” effect, conducted on Parisian auction sales of paintings, drawings and sculptures, in 1875, 1900 and 1925. The explained variable is the hammer price (in current francs), excluding bought in prices (i.e., repurchases) and excluding fees.

Variable	1875	1900	1925
Painting	−2.577577 (291.4905)	976.6633 *** (376.4808)	4667.118 *** (1132.918)
Sculpture	1125.333 (1565.902)	376.4808 (2139.733)	2290.68 (7114.906)
“Made By”	853.1979 *** (394.8068)	1253.692 ** (596.0833)	8.172.804 *** (2171.302)
“Style of”	−904.3692 * (496.9929)	7.201052 (677.7574)	−3212.035 (2495.963)
Height	14.94605 *** (2.168301)	10.0338 *** (2.908872)	38.86232 *** (12.11977)
Signature	126.7633 (204.9359)	−100.1319 (277.6439)	−201.1149 (1384.687)
Pedigree	296.1964 (322.3809)	806.9372 ** (387.77)	3969.486 ** (1831.402)
Salon	2528.304 *** (939.5785)	16,209.97 *** (1601.941)	−4689.303 (8974.269)
Exhibition	5790.827 *** (1291.572)	3069.401 *** (670.9129)	45,417.9 *** (3270.153)
Bibliography	−416.5251 (911.2249)	8889.937 *** (2297.308)	18,680.4 *** (3127.569)
Engraved?	1201.144 *** (418.404)	1575.31 * (891.4136)	10,383.6 * (5608.545)
Nb of words	41.0335 *** (3.425411)	25.7238 *** (2.767241)	288.9323 *** (18.35597)
Reproduced	dropped	3836.237 *** (309.124)	5149.076 *** (1306.833)
Sold by artist?	392.3854 (1039.564)	dropped	dropped
cons	−1106.097 ** (462.4755)	−2095.695 *** (610.9522)	−9603.649 *** (2153.349)
Nb of obs	2102	2645	4853
Nb of groups	838	847	1441
R ² within	0.2487	0.3096	0.2649
R ² between	0.1327	0.2535	0.3580
R ² overall	0.1619	0.3515	0.2883

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2. Results of the hedonic regression, conducted on auction sales that were organized by the artists themselves for their own works. The explained variable is the average sales revenue, in constant 1890 francs.

Variables	Model 1 (1870–1881)	Model 2 (1870–1881)	Model 3 (1882–1912)
Already come	−58.58362 (78.33594)	−52.16356 (80.08711)	
Sculptor	405.9364 *** (115.2474)	526.354 *** (101.8726)	18.68906 (81.08568)
Age	−8.824865 (5.560554)	−9.531771 * (5.738429)	105.467 ** (49.67375)
Experience	5.417284 (5.747833)	9.238528 (5.592)	
Nb of lots	−1.044642 * (0.5454692)	−0.8757923 (0.5519728)	−2.458129 (1.878516)
Hors concours	201.0647 ** (97.29017)		
Medal		27.92747 (239.9008)	
Mention of the Salon			105.467 ** (49.67375)
Illustrated cat.	dropped	dropped	91.90935 * (51.13315)
cons	634.4661 *** (221.4988)	613.0044 *** (232.1221)	218.057 * (111.7723)
Nb of obs	98	98	66
R ²	0.2951	0.2622	0.2814

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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Article

Museum Photo Archives and the History of the Art Market: A Digital Approach

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Abstract: Digital images with metadata contain unique potential for research into the history of the art market. The embedding of digital images in a database allows for the possibility of an association with their historical context due to the presence of metadata, which includes economic data, such as the provenance chain, as well as information about collecting practices. The database becomes a historical reconstruction of context accompanying the reproductions of the works. In this paper, a case study of a museum photo archive of forgeries illustrates the ways in which digital methods can be helpful in analyzing these contexts. The archive was run by the secret “Verband von Museums-Beamten zur Abwehr von Fälschungen und unlauterem Geschäftsgebahren” (Association of Museum Officials for Defense against Fakes and Improper Business Practices). This archive allows the engagement of early 20th century museums in the art market to be traced within specific genres. The goal of the case study and methodology presented here is to learn more about the economic practices of museums. Specifically, this paper reconsiders a study by Timothy Wilson on fake maiolica, with a new focus on the involvement of museums in the art market.

Keywords: art forgery; archives; museums; art market; digital object; photography; photo object; 20th century; Verband von Museums-Beamten zur Abwehr von Fälschungen und unlauterem Geschäftsgebahren; digital art history

1. Introduction

The goal of the case study and methodology presented here is to learn more about the economic practices of museums. For this inquiry, we will look at a specific photographic corpus produced in museums, the archive of the International Association of Museum Officials for Defense against Forgeries and Improper Business Practices, which dates from 1898 to 1939 (the official title is in German: Verband von Museums-Beamten zur Abwehr von Fälschungen und unlauterem Geschäftsgebahren). The archive depicts fake objects and was collected and circulated by museum officials in the first half of the 20th century. This was a collaborative archive in which museums kept track of the art market. The relation between museums and the art market was often one of conflict, which becomes particularly evident with problematic objects such as forgeries.

In this paper, we will focus on a digitized version of this archive and discuss methods to analyze such a corpus with questions related to the economy of art in mind. The digital format is key here. Images in a database allow for the possibility of an association with their historical context due to the presence of metadata, which includes economic data, such as the provenance chain, as well as information retained from the collection context. The database becomes a historical reconstruction of context accompanying the reproductions of the works. Furthermore, research information can also be merged with the images. Both ways of adding information to the bare images make them “digital objects” (Hui 2012), with layers of information.

With the specific image corpus of illegitimate objects, this project takes a side route in the digital research of museum collections (Geismar 2018; Kohle 2017) and investigates the gaps in the collection.

It is these gaps and negations of the canonized display that the archive of the Association of 1898 represents with its focus on forgeries and fraud. With this hidden counterpart to the history of display in European museums in the early 20th century, a new contribution to museum history becomes possible, which highlights the work of museum officials behind the scenes. The intangible quality of the objects pictured in the archive—most of them are discarded and lost—particularly qualifies them for digital approaches. Employing such an approach is further strengthened by the fact that this physical archive of photographs is lost as well (Mundt 2018, p. 305). There are several sources, however, which allow for the reconstruction of sections of the archive. Traces of it can be found in the internal printed materials of the Association, which are kept in archives and have been digitized (see Section 3 and Supplementary Materials). Copies of some of the photographs can be found in museum archives, for example, in the Museum für Kunst und Gewerbe Hamburg.

This paper is an investigation of the economics of art—one that is focused on institutions, power structures, and how these operate as a system that shapes the economic form of artwork. The internal economic practices of museum officials—e.g., how problematic objects such as forgeries were handled and how museums reacted to and managed the “status change” (Dolezalek 2015) of objects—is directly connected to questions involving the external market—e.g., how objects were prepared, valued, and circulated. All in all, the fight against forgeries forms a fascinating documentation of the relation between museums and the art market in general.

2. Research Goal and Theoretic Framework: Economy of Art

In this paper, I am interested in exploring the economic practice of museums. Economic practice is understood here not only as evaluating art and buying it, but also how museum officials were reacting to the market and intervening in it through their practices. In the digital reconstruction of the lost image archive, the ties and interaction with the market can be traced. This is possible because in the digital space, photographs carry contextual information and this allows us to trace their economic function. We will return to this methodology in detail in the next section, after discussing the relevant economic theory.

Museums do not operate outside of the general economy of art; as institutions of the knowledge economy, they are an integral part of it. Our discussion of a theoretic framework for research into museums and the art market has to start on a broader scale. From an economic perspective, artwork extends beyond their artistic form, i.e., their style, to their economic form—how they are traded and how they are collected. In economic theory, works of art are often seen as singularities (Karpik 2010) and opposed to industrially produced commodities. Some artworks possess a high monetary value, and such pieces are often considered rare (Moulin 2011). A theory of regular dynamics of price building is ultimately in conflict with such specific objects that seemingly evade comparison with others. This is rooted in the production of art, which is different from industrial commodity production; that is, it is very often focused on producing singular objects outside the division of labor but carrying signs of single authorship documented in a signature (Heinich 2008). Consequently, their production is riskier, because the costs and returns are dependent on a high degree of speculation. Because production is risky, the cost calculation becomes speculative; the assessment of a piece’s valuation, which is formulated by artists or managers and marketeers of culture, rely on how to place the work in the larger context of art, hence the importance of the context of collection or corpus/oeuvre.

This also means that knowledge work is fundamental here, as it underpins the standards of the cultural logic of collecting and canonization (Graw 2009, p. 9). Works of art are, after all, not only valuable as rare luxury commodities, but also symbolic goods (Bourdieu 1993). An important factor associated with speculation includes the artist’s popularity, especially for western art beginning in the early modern period, when it was more consciously reproduced by the artists and their backers (Graw 2009). However, apart from this individual aspect of branding and fame, strategies for circulation play a critical role in the economic appreciation of art. Because production is risky, the cost calculation becomes speculative; the assessment of a piece’s valuation, which is formulated by

artists or managers and marketeers of culture, rely on how to place the work in the larger context of art, hence the importance of the context of collection or corpus/oeuvre. Everything that is understood as art is ultimately compared with other works. Even more so, most art is characterized by a very strict systematization in a group of works, in a periodic or local context, through the authorship or workshop source or through the corpus of a private or public collection. This amounts to a powerful value system that enables appreciation and commercial estimations of artwork. Luc Boltanski and Arnaud Esquerre recently have called this the “collection form”, in their pragmatic sociology of the pricing of art, describing valuation as a complex communication process (Boltanski and Esquerre 2018, pp. 205, 493).

We can see the collection form as a key referent in the process of artification (Heinich and Shapiro 2012) that can be observed in the collective efforts of art producers, experts, and institutions to justify art.

A key example of the process of artification is when works that have not been produced for the art world, such as non-western cultural objects, are forcefully transformed into art collectibles. This is not an intentional production process but a modification in accumulation.

Other approaches focus solely on the artification process and interpret art as a mostly speculative asset whose value is primarily generated in circulation (Coslor 2010, p. 211) or, as Marina Vishmidt has pointed out, an asset for which production itself is speculative (Vishmidt 2018, p. 36). The collection context then becomes a further basis for the speculation with art. Production as well as accumulation is aimed at this collection form, be it in explicitly financial terms such as in auctions, or more cultural terms such as in museums (Shaked 2015).

Knowledge economies of expertise and canon-building go hand in hand with the speculative economies of price fixing. The speculative economy and knowledge economy, however, can also be problematic terms, because they carry the connotation that this economy is about risky games (speculation) *versus* expert discourses (knowledge). Instead, we can describe both as strategies that are important for the commerce of art. The question then is how both factors stabilize and destabilize this economy. Deceitful production adapts to the same full circle, or encompassing system, of symbolic goods that encapsulates speculative valuation and knowledge economy exactly by taking part in and destabilizing it. Thus, to research forgeries means to investigate the economy of art (Heinich 2009).

In this paper, I aim to apply these theories to the topic of archival photography in the economic activity of museums. The central question is what this image corpus reveals about economic practices in museums. The photographs are connected to this question most directly, as will be shown in a case study on maiolica (Section 4). The images in this collection did not only represent an economic function of valuation, but some of them were also directly recovered from the market, e.g., from auction catalogues, and repurposed for interventions into the market.

3. Archives of Photographs as a Source for Art Market Studies

Photographs provide traces of the steps of production, accumulation, manipulation, and displacement of art. As documents, they are a static means adapting to dynamic changes and speculations in art commerce. Therefore, they serve as an important tool in the market strategies of museums. The issue of photographs in the museum archival practice (Tschirner 2011) is embedded in larger issues of photography in the discipline of art history, because behind the practices of evaluation in art history lies an archival practice (Osborne 1999, p. 58). Images were produced and deposited in an ordered manner and reproductions were circulated and multiplied as part of a general urge to organize the “disparate” (Alphen 2008, p. 66).

The photographs in this case study were documentation pictures from the internal museum practice stemming from various sources. They carried additional layers of information as archival “photo-objects” containing visual, material, and textual information (Bärnighausen et al. 2018).

This quality can be transferred into the digital realm, through building a database, which keeps the associated information beyond the visual data. In our case of the lost archive, reproductions of many of the photographs (ca. 350 of the 1200 photographs of the timeframe from 1898 to 1927) could be

extracted from internal printed materials of the Association, allowing for a reconstruction of parts of the archive. These materials have been scanned in the last years (see Supplementary Materials). Through automatic segmentation of the textual information, different parts of the encompassing information in the text around the images were saved in the database with them. In our case, this included title, description, author name, date, and archival number. As the Association produced registers to their materials (e.g., genre categorization), this dataset was enriched further, with a detailed categorization of each case. The genre register contains more than 300 detailed sub-categories, from leather book covers to Italian bronze aeolipiles (*Register über das auf den Tagungen des Verbandes von Museumsbeamten von 1898 bis 1927 behandelte Material an Fälschungen 1929*, pp. 3–13). All of this information reaches far beyond the practical question concerning the authenticity of artwork and thereby beyond the historic conclusion the museum officials drew regarding whether a work was original or fake. In fact, the archive documents ways of describing works of art, and by organizing the segmented information from these sources digitally, as tables in a relational database, we built a dataset on the networks and practices of museum officials engaging with the economy of art. Now, the database is able to combine various tables and request chains of information, e.g., which museum official was reporting on which forger and who was focusing on which artistic genre? As this database is a very rough prototype, it cannot be made available to the public yet.

We have to keep in mind that these are digital reproductions of photographs of objects, with both the original photographs and original objects now being lost. What remains are specific visual objects—images in their information context. Only when we deal with the images as “photo-objects” or “digital objects”, are we able to address our research questions pertaining to the economy of art, because now the logic of the archive can be explored through the image set as a relational dataset. For example, visual aspects of museum history, such as the history of display and the history of museum technology (Troelenberg and Savino 2017), become traceable not only in the photographs but in the relation of the photographs to the accompanying data.

In their original context (with accessibility limited to members), the images had a strictly practical use of strengthening knowledge about existing forgeries and new technologies of faking art. Furthermore, they were used for collecting visual evidence in a structured manner and were connected to written data, including reports and registers. For researchers today, the image archive as a whole, understood as a continuity of the visual practice of hundreds of museum workers for a historical investigation, offers more angles. Of interest is the practice and discourse of museum officials facing challenges from the art market, more specifically from art crime. This group of art historians and archaeologists not only reacted to the powerful structures they encountered, but with their archival practice and communication infrastructures, they built up a counterforce to the economic and deceptive strength of the illegitimate as well as the legitimate market. They were well aware of this antagonism. Already during the construction of art history as a scientific discipline in the 19th century, the fight against forgeries played a large role (Lenain 2011, p. 243). This shapes the pre-history of the Association. In its creation at the end of the 19th century, art historians took a step further in this conflict and organized themselves in a secret society to combat forgeries. As knowledge workers in the museum, they were directly in contact with the art trade. At the core of their efforts was an image archive and this image archive is, as I have argued, a most valuable source for inquiries into the economy of art. Beyond the practical question of the fight against forgeries, it contains evidence connected to various aspects of the art market, as can be illustrated through the following case study.

4. Case Study on Maiolica

In my case study, I draw on an existing study into a specific section of our archive by Timothy Wilson, an expert on a specific type of Renaissance-era earthenware called maiolica, characterized by its tin-glazed cover and decoration (Wilson 2011). This enables me to work with a reliable corpus that has already been evaluated, because I am not an expert on maiolica myself. I want to credit Wilson with providing an inspiring example of what experts can draw from this source for their specialized

work, and I hope that his work and my reference to it will inspire further studies. Indeed, one goal of my digitization efforts with respect to this archive is not only to enable specialized inquiries into specific topics, e.g., groups of actors or objects, but also specific discourses and practices. However, with reference to an existing study, I also aim to show how fruitful it can be to investigate one special section of the archive from various angles and with focus on the relation with the art market. With my approach in particular, I want to show how future research into commercial aspects of visual material in museum archives can be conceptualized methodologically and orientated towards the theoretical concepts of art and value formulated above. For example, we find that the photographs in the archive were not only coming directly from commercial catalogues but were also used by the museum officials for interventions into the market. As my research (see also Table 1) will show, having a digital overview of these images, produced by the method described in the previous section, helps to shift the focus towards these topics.

Table 1. Overview of maiolica cases in the Association's archive.

Year	Archive Number	Mitteilung/ Verhandlung	Report Name	Content	Source of the Archival Photograph
1899	2	M: 2	Purgold	Book cover	Literature
1899		M: 3	Purgold	Palissy	
1900		M: 31	Brinckmann	Casa Pirota	
1900		M: 33	Falke	Zschille, Bardinin	
1905	105	M: 154–155	Skinner	Della Robbia	Auction catalog
	811 (later)		Falke	Casa Pirota	
	211		Gröbbels	Della Robbia	
1909	403	M: 248	Brinckmann	Fayence plates	New documentation
1910	410–412	V: 1909	Bode	Can and jug	
1910	417	V: 1909	Vasselot	Albarelo	New documentation
1913	748–752	M: 411	Falke	Beckerath, Lepke	Auction catalog
1925	953–955	M: 515	Falke	17 albarelli, 4 plates	Existing documentation
1925	1051	M: 523	Falke	Mengarino	Dealer's catalog
1925		M: 555	Cube	3 bowls	
1927	1097–1103	M: 568	Schmidt	Karl Fischer	
1930	1270–1281	M: 656	Rackham	Various collections	
1938	1676a–b	M: 767	Rackham	Restoration	

The material of the Association has been mostly forgotten, which was intended by its actors, who took measures to prevent libraries from collecting its materials. Even after the material was made accessible by the Kunstbibliothek Berlin and the University Library Heidelberg in digital form (see also Supplementary Materials), almost no scholars referred to these sources. One exception is the study by Timothy Wilson, a renowned expert on maiolica, who has analyzed this material and completed a study on how the museum experts worked on fake maiolica. He organized his study chronologically and examined all the proceedings in order to trace the discussions the museum experts had at their regular conferences. In doing so, he followed the discussion of maiolica through the 40 years of existence of the Association. His primary focus concerns discussions of authenticity; however, I am more interested in what these materials reveal about the relation between museums and the art market.

As I argued above, it is through digitization and processing the images as a database that we can reconsider this set of photographs. Because we focus on the photograph archive at the core of the Association, the corpus appears differently than in the linear reconstruction by Wilson, who tells the story from conference to conference, from case to case, from 1899 to 1930. In an overview, supported by digital crossing of sources, we find, for example, that most of the visual archival material for maiolica was not produced by the museum directors but through the collection of documents from the art market. This is the starting point to our question: how was this archival strategy embedded in a larger interaction with the market and its media?

So, while Wilson tracked the forgers and middlemen who were discussed, such as Imbert and Mengarino, I am focusing on the auction and dealer's catalogs that were investigated by the museum directors. For me, Wilson's intense study of the discussions around some objects shows how the interest in one specific artistic medium and the question of authenticity conjures a lot of evidence related to how museum directors were monitoring the market. Tracing one genre across a corpus, we can examine how knowledge economies—the gathering, organization, management, and exchange of information—intervened more directly in the market through the collection of evidence. We can also investigate how the process of authenticating was not only a synchronic analysis of style and technological factors but essentially tracking objects and their provenance on the market for decades in a diachronic approach. The photographic reproductions of objects are sources across these time periods that were reproduced and archived for the purpose of keeping track of the originals. The photos document the visual appearance of the object, but they also function as a marker of time and space—when the object was where.

The collection value—the importance of which was described above—is actively deconstructed by these experts, who used the collection catalogs as a source for their archive of forgeries. An auction is the place where collections become highly visible; it is here that the experts approached the visual material and transferred it to their archive as a warning for their colleagues. As a result, the knowledge economy of the archive and the collection economy of the art market were in direct conflict, because the museum officials tactically chose to keep their archive secret in order to strengthen its efficiency for their own means of staying ahead of the forgers.

Following and adding to Wilson's description of the corpus, we can create a summary of the material on maiolica in the Association's documentation. The resulting table (Table 1) is different from the tables in the database. While the tables in the database are only used to organize the automatically segmented materials, this table contains basic information from the database and manually added information from the source texts.

The set of maiolica can be described as follows. It is what main museum officials critically had their eyes on in the early 20th century and what allowed them to keep track, down to the moment when collections and other sets, for example, one by workshop, came onto the market. In pointing out single fraudulent works, they were working on the canon and defending a genre. Their defense is not only an intellectual but also a practical one. For example, in 1900, the museum director Otto von Falke proudly reported that by spreading doubts on objects in advance, prices could be pushed down in the Zschille auction of 1899; he even states "in favor of the following auction by Bardini" (*Mittheilungen des Museen-Verbandes als Manuscript für die Mitglieder gedruckt und ausgegeben August 1900* 1900, Nr. 33). Wilhelm von Bode also describes market interventions in his presentation for the Prague conference (*Verzeichnis der im Archiv des Museen-Verbandes bewahrter Abbildungen falscher Altsachen n.d.*, Nr. 411).

The two main persons reporting on fakes of maiolica were Otto von Falke, from 1899 to 1913 and again around 1924 before resigning in 1927, and Bernard Rackham, who joined in 1925 and reported in 1930 and 1937 (Wilson 2011, p. 6). Rackham was contributing material on fake maiolica in the collections of the Victoria and Albert, Gustave de Rothschild, the Ashmolean in Oxford, and Beit in London (*Verzeichnis der im Archiv des Museen-Verbandes bewahrter Abbildungen falscher Altsachen n.d.*, Nr. 1270–1281). Other relevant members of the Association, for our purposes, were Bode and Jean-Joseph Marquet de Vasselot. Bode was also referenced by Falke as someone engaging in these debates (*Mittheilungen des Museen-Verbandes als Manuscript für die Mitglieder gedruckt und ausgegeben August 1900* 1900, Nr. 33), and he provided an illustration for the third photo volume of the Association in 1910 (Figure 1). Vasselot also provided an albarello depiction for the same volume. These direct contributions of single cases were the exception for maiolica. Arthur B. Skinner of the Victoria and Albert Museum contributed also, among a larger disclosure on terracotta (*Verzeichnis der im Archiv des Museen-Verbandes bewahrter Abbildungen falscher Altsachen n.d.*, Nr. 101–107).



Figure 1. Photograph provided by Wilhelm von Bode for the photo volumes (*Abbildungen aus dem Archiv des Verbandes von Museumsbeamten. Dritte Folge 1910*), an apothecary jug in the style of the 14th–15th century. Scan by Kunstbibliothek Berlin, used by permission.

In large part, this corpus of maiolica in the Association's archive is a critical archive of art auctions and price lists of workshops. Obviously, an archive dealing with forgeries is also implicitly involved with the art market, and in the archive, we see how explicitly it is doing so. As Table 1 shows, the archival documentation was drawn from various sources: exhibition catalogs, auction catalogs (e.g., Zschille, Bardini, Bourgeois), shop catalogues (e.g., the price list of Karl Fischer in Sulzbach and Georg Fischer in Bamberg—the successors of Fleischmann in Nürnberg), and individual buying offers and gifts to museums. In this sense, the maiolica set is quite representative of how the complete image archive was assembled. The Association's procedure involved generating lists of what they considered to be inauthentic in auctions (*Mitteilungen des Museen-Verbandes als Manuscript für die Mitglieder gedruckt und ausgegeben August 1900 1900*, Nr. 33; *Mitteilungen des Museen-Verbandes als Manuscript für die Mitglieder gedruckt und ausgegeben im Mai 1905 1906*, Nr. 154–155). In the beginning, the Association did not bother with collecting the auction catalogs in their archive, as the archive register shows and only began to do so retroactively. For example, archive Nr. 811 is the auction catalog of the collection, Bourgeois in Cologne 1904, which the Association discussed in 1905; however, Falke only archived the catalog after World War I. This overview, drawn from the various registers and by crossing the processed sources, shows how the museum officials were using art market media as catalogs to build their evidence and also traces how their strategies shifted.

In general, they were using commercial images (Figure 2) along with photographs produced by their personnel on the spot (see Table 1, last column, for the different sources of the photo archive). So, critical objects from their own collections were mixed in with items that were offered to them in their day-to-day business. The metadata of these images points to two art market-related dynamics in museums: networking and building of counter-collections in the depot.



Figure 2. Detail of a larger series of more than 20 maiolica provided as plates in the *Mitteilungen* by Otto von Falke in 1925, when he returned to the topic that he had treated before the war. Scan by Kunstbibliothek Berlin, used by permission.

While the Association operated in clandestine—going as far as hiding their archive, the archive inventory, and the internal publications on cases, as well as deliberately evading attention for their conferences—their members used their knowledge to directly intervene in the market.

Late into the existence of the Association, there was even a shift towards more publicity in the form of an exhibition. At the Victoria and Albert Museum in London and in other museums, directors started to actively collect forgeries in the early 20th century. Collecting forgeries became a means of fighting forgeries; when they were taken off the market, they could then be examined. This process can be seen in line with the larger communication strategy that Falke spoke of in 1900 about influencing public opinion in order for prices to drop. These sometimes very secret and sometimes not so secret counter-collections are documented in this dataset, allowing a mostly forgotten part of museum history to become visible for us through the photo archive. The large corpus of the collaborative image archive serves to illustrate a strategy that individual museums applied towards the art market not only to discard problematic objects but also to archive them and to communicate this knowledge for the purpose of warning others.

Later, the forgeries collections moved into the exhibition space. A fascinating shift in exhibition practice took place in the early 20th century, which began on a small, sporadic scale but grew to be regularly held exhibitions of forgeries over the course of the century. The Association itself held such an exhibition in 1937 in Vienna. This exhibition included a fake maiolica plate depicting a boy dated to 1871 ([Catalog 1937](#), Nr. 8). They also included a large set of photographs from the archive in the exhibition—a list of which is held in the Art Historical Museum in Vienna in the archival material on the Museum of Applied Arts. The exhibition featured prominently the work of Alceo Dossena, who had recently been uncovered as an influential forger of Renaissance sculpture.

We should interpret these exhibitions not as a newfound interest in the cultural history of forgery but as a drastic countermeasure of the museums against manipulations in the art market, that is,

continuing the fight or the “Abwehr” from the Association’s name. This was one of the rare occasions where the secretive Association decided to go public with their research. Due to the outbreak of World War II, these efforts ended in 1939. Still, a way forward for the museums had been carved out, and from the 1950s on, museums held even larger exhibitions on the topic, most notably in the Palais Royal in Paris in 1955 in cooperation with Interpol and an exhibition in Berlin and Folkwang in 1976–77 in the course of a large-scale research project, “Typologie der Fälschungen”, started in 1974 (Zacher 1976, p. 202). This research project also returned to the question of a central image archive on forgeries. Digitization of such networked approaches seems to be the reason that these efforts are mostly forgotten only decades later; similar to the earlier secret archive, now scholars focus on databases.

5. Conclusions

Art as a collective singular is very vague and complicated to grasp as an economic structure, as I have shown in a critique of theoretical approaches. An answer to this is to trace a solid set of objects, e.g., a collection context or another culturally specific group, and draw an account of its articulation and valuation. Our case on the Association demonstrated that digital processing and analysis of such a source is very helpful in shifting the research perspective from the goal that the Association ultimately had—fighting forgeries and manipulation—to telling a more comprehensive story of museums and the art market. This bigger story will have to be told by manageable sub-sets of the data, not only to stay close to the conflicts between different institutions and actors of interest but also to illustrate complex economic dynamics. Taking the complete set of information from more than 2000 documentations in the archive would not be a corpus helpful for digital analyses, as the scope of the archive is very broad. A useful mapping of places, for example, is difficult to do, because the references can refer to a point of contact, a provenance, a source, a point of sale, an exhibition space, an institution, a workshop, etc. Moreover, prices would be a quite random statistical signal, as the objects differ so much, from delicate crafts items to massive statues. Instead, I can imagine the set of sources of the Association being a valuable site of cooperative work in the future, where interdisciplinary interest among scholars working on the art market and experts on specific genres from art history as well as restoration practice could converge in drawing material from the documentation and build their cases. I hope that my case study, with its economic perspective of a corpus already treated by an expert on the genre, is indicative here. This source on forgeries in the early 20th century provides information, such as names and events, as well as representations of objects, and is very direct in doing so, as this was an internal forum. However, as I have shown with the corpus of maiolica treated by Wilson, it also enables present-day outsiders to look at the interaction of museums and the market based on a dataset of internal information.

Supplementary Materials: The Verband von Museums-Beamten zur Abwehr von Fälschungen und unlauterem Geschäftsgeheimnissen was a precursor to other associations of museums formed in the 20th century, similar to the Deutscher Museumsbund or the Office International des Musées (Cladders 2016, p. 260). It was started by Justus Brinckmann of the Museum of Applied Arts in Hamburg and included 400 German and international museum officials in the course of 40 years (Verzeichnis der Mitglieder des Internationalen Verbandes von Museumsbeamten 1936). The digitized materials of the Association are available at these links:

1. <https://digi.ub.uni-heidelberg.de/diglit/mitmusverb>
2. <https://digi.ub.uni-heidelberg.de/diglit/verhversverbmb>
3. <https://digi.ub.uni-heidelberg.de/diglit/regmusverb>
4. <https://digi.ub.uni-heidelberg.de/diglit/verzmusverb>
5. <http://digiview.gbv.de/viewer/toc/PPN616613466/0>

I discovered the only known complete copy of the archive list “Verzeichnis der im Archiv des Museen-Verbandes bewahrter Abbildungen falscher Altsachen” in a volume of photocopies of various materials in the Kunstgewerbemuseum Berlin, signature: MUS 50. It is scheduled for digitization. Once processed it will be found here: <https://katalog.ub.uni-heidelberg.de/cgi-bin/titel.cgi?katkey=68323438>.

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Article

Reflecting on the Development of a Digital Platform for the Analysis of Fairs for Modern and Contemporary Art—Approach, Challenges, and Future Perspectives Using the Project ART|GALLERY GIS|COLOGNE as an Example

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Abstract: Founded in 1967 under the name *Kunstmarkt Köln*, today's *ART COLOGNE* was the first art fair worldwide to specialize in contemporary art. Its primary objectives were to further the art trade in Germany, promote German artists, and establish a new center for the art trade in post-war Germany. Since then, the model of a 'fair for modern and contemporary art' has become a globally prosperous format. The starting point of this article is a discussion of an approach to establishing a digital platform for the analysis of the development of the composition of exhibitors at *ART COLOGNE* during its first 30 years. Its aim is to provide a useful model platform for future research into other art fairs worldwide. The project entailed locations of the participating exhibitors during the first three decades being gathered from the fair's catalogues, georeferenced, and visualized in a digital, interactive online map named ART|GALLERY GIS|COLOGNE. Through a reactive environment, the online map with open access has, in a second phase, been embedded with further information (e.g., special exhibitions, square meter prices) from other sources. The paper considers what contextual information is required for an adequate analysis of maps, which parameters may exist (e.g., in terms of copyright laws), and what routes could be followed in terms of method (e.g., deep mapping) in contributing to the exploration of the structures of the art market through a primarily visual approach.

Keywords: art fair; ART COLOGNE; galleries; art market studies; spatial art history; digital art history; digital mapping; deep mapping

1. Introduction: On the Potential and the Use of Digital Mapping in Art Market Studies

Digital mapping, present in everyday life in the form of navigation devices, is increasingly finding its way into art history research (Fletcher 2015; Drucker et al. 2015; Gagliardi and Gardner-Huggett 2017). Within the context of Art Market Studies, it is to date mainly English and French-speaking academics that have been using this method. The locations of, for example, artists, art dealers, gallerists,¹ and exhibitions, are mapped over time in longitudinal studies, visualizing the geographical structures pertaining to selected groups of protagonists and the changes relating to them.² In terms of

¹ For the linguistic distinction between gallery owner and art dealer in German, compare the explanations by Oberste-Hetbleck (2018b, p. 1).

² E.g., *Artl@s Exhibitions database* (Béatrice Joyeux-Prunel, Catherine Dossin, and Léa Saint-Raymond, "Artl@s Exhibitions database, The Artl@s Project," accessed 10 April 2019, <http://artlas.ens.fr/en/database-2>); *London Gallery Project* (Pamela Fletcher and David Israel, "London Gallery Project," 2007, revised September 2012, accessed 10 April 2019, <http://learn.bowdoin.edu/fletcher/london-gallery>); *Géographie du Marché de l'Art à Paris* (Julien Caverro, Félicie Faizand de Maupeou, and Léa Saint-Raymond, "Géographie du Marché de l'Art à Paris. GeoMAP," 2017, accessed 10 April 2019,

methodology, digital, interactive mapping projects provide users primarily with a different cognitive approach than texts or statistics, as a result of the visualized combination of space, time, and movement. As early as 2010, Ayers—as Fletcher (2015) points out—was arguing, with regard to statements being made by cognitive neuroscientists, that time transferred to the motion of objects in space is essential to the cognitive process in the human brain, consequently enhancing the recognition of spatial patterns (Ayers 2010, pp. 10–11 with reference to Cindy Bukach). Movement also generates attention in humans (Ayers 2010, p. 10). In addition, a feature of maps, in contrast to diagrams, is their ability to capture multiple attributes of the locations simultaneously and visualize them synchronously. This enables the user to create connections between the assembled information more rapidly; the brain, being relieved of such work, liberates its capacity for pursuing further thought.

Used for a long time mostly for the visualization of results at the end of the research process, maps in terms of a geographic information system (GIS³) have become part of the research process in the sense of a spatial science (Gagliardi and Gardner-Huggett 2017). Patterns, connections, nodes, etc. that have been recognized in maps will then be examined in more detail during the next phase. The maps are sometimes supplemented by archival research, eyewitness interviews, etc., resulting in a combination of quantitative and qualitative approaches. Maps can also be used to essentially generate new research questions (Williams 2018). Dossin and Joyeux-Prunel (Dossin and Béatrice 2015), who expound on the possibilities of a so-called geopolitical approach, employ mapping, amongst other things, as one method of distant reading and show, using maps, the founding of modern art magazines during the 20th century's interwar period, a case study in the enhanced value of mapping in understanding the history of modern art—in this case, the significance and contributions of so-called peripheries compared to such art market centers as Paris. In the area of research on fairs for modern and contemporary art and their development, mapping within the framework of GIS has not as yet been used as a method, although a large number of authors are addressing issues of globalization with regard to art fairs—in other words perspectives with a geographic interest (Baia Curioni 2012; Queminn 2013; Velthuis 2014; Baia Curioni et al. 2015; Vermeylen 2015). This research, originating mainly from the social sciences, especially sociology, to a large extent uses a network theory approach, as explained in Section 2.

It is from such a point of departure that this paper sets out to demonstrate how digital methods, and in particular digital mapping, can be used to examine fairs for modern and contemporary art. Its observations focus on considerations of what contextualizing information is required for an adequate analysis of such maps, what parameters exist (e.g., in terms of privacy and copyright laws), and what further methodological routes could be followed (e.g., deep mapping) in contributing to the exploration of the structures of the art market through a primarily visual approach. To this purpose, the project ART|GALLERY GIS|COLOGNE⁴ (hereinafter abbreviated to AGGC, www.aggc.uni-koeln.de)—my current project, which I have been working on since March 2017, and which has been online since 22 June 2018 in conjunction with my symposium *Mapping the Art Market*⁵ at University of Cologne—is

<https://paris-art-market.huma-num.fr>); *Artists in Paris* (Hannah Williams and Chris Sparks, "Artists in Paris: Mapping the 18th-Century Art World," accessed 10 April 2019, www.artistsinparis.org).

³ "A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. The key word to this technology is **Geography** [emphasis added]—this means that some portion of the data is spatial. In other words, data that is in some way referenced to locations on the earth. Coupled with this data is usually tabular data known as attribute data. Attribute data can be generally defined as additional information about each of the spatial features." (Definition of GIS following: Research Guides University of Wisconsin-Madison Libraries, "What is GIS? Information on Maps/Mapping & Geographic Information Systems (GIS)," accessed 10 April 2019, <https://researchguides.library.wisc.edu/GIS>).

⁴ The acronym GIS should already make it clear that this is a point of entry to a project that functions primarily through geographical locations (of the exhibitors).

⁵ For more information about the symposium, see: *Symposium | Mapping The Art Market*, accessed 10 January 2019, <https://amskoeln.hypotheses.org/1497>.

being used. It is a case study of the first 30 years of *Kunstmarkt Köln->ART COLOGNE*⁶, which, as the first fair for modern and contemporary art, had a pioneering role in this sector of art fairs, acting as a reference example for the establishment of subsequent fairs. Whilst the *Kunstmarkt* was, on the one hand, an inspiration for ensuing fairs, others deliberately distanced themselves from it in certain respects (for example, from its very exclusive invitation system and exhibitors being restricted to only one nationality during its early years). AGGC is centered on the exhibitors (gallery owners etc.) as one of the art fair's main groups of protagonists.

In employing AGGC to consider possible uses, challenges, sources, and parameters of digital mapping in the research of art fairs, this paper provides an insight into the development process of a project whose primary aim is not the digital presentation of completed research results, but rather the development of a platform for networked data that can be used as a research tool. It will therefore also be addressing the phases of work and development on AGGC that remain to be done in the future. To begin with, however, it is necessary to introduce the object of investigation, that is *Kunstmarkt Köln->ART COLOGNE* itself.

2. Introducing *Kunstmarkt Köln->ART COLOGNE* and Its Research Status

Initially, the primary objectives of *Kunstmarkt Köln->ART COLOGNE* as a temporary exhibition and platform for trade were to further the art trade in Germany during an era of economic recession, promote German artists, and establish a new center for the art trade in post-war Germany (cf. for example [Rombach 2008](#), pp. 9f; [Herzog 2016](#), p. 26). It was founded under the name *Kunstmarkt Köln* in 1967 as the first art fair worldwide to specialize in modern and contemporary art and has been known since 1984 as *ART COLOGNE*.

The concept behind *Kunstmarkt Köln->ART COLOGNE* was developed by the Cologne-based gallery owners Hein Stünke and Rudolf Zwirner. In 1966, together with sixteen other German gallery owners, they founded the *Verein progressiver deutscher Kunsthändler e.V.* (Association of Progressive German Art Dealers), the sole task of which was to organize the art fair. In 1974, the association was superseded as organizer of the fair by *European Art Dealers Association* (founded 1973) and, in 1976, by the *Bundesverband Deutscher Galerien e.V.* (*Federal Association of German Galleries*, today the *Bundesverband Deutscher Galerien und Kunsthaendler e.V. BVDG*, founded 1975). In addition to the practical organization of the art fair, the professional activities of these associations continued to be developed. In 1997, *Kunstmarkt Köln->ART COLOGNE* was taken over by *Koelnmesse*, the trade fair company based in Cologne. BVDG became, and remains to this day, the so-called 'ideal partner' of *Kunstmarkt Köln->ART COLOGNE*. This caesura also marks the preliminary end of the period under investigation by AGGC. Accordingly, it concerns an era (1967–1997) located in the pre-digital age, in which the number of art fairs worldwide was still relatively limited, since it was only at the end of the 1990s that the art fair boom really started (cf. [Baia Curioni 2012](#), pp. 138–39; [Morgner 2014b](#), p. 329).

Even before work on AGGC began, art historical and sociological research had both been addressing *Kunstmarkt Köln->ART COLOGNE*, even if extensive gaps in its research remain. The existing literature often focuses on the establishing, that is the beginnings, of this particular art fair, examining it in both depth and detail (e.g., [Zentralarchiv des internationalen Kunsthandels ZADIK 2003](#); [Baus 2008](#) provides an economic perspective; [Mehring 2008](#); [Genoni 2009](#)⁷). In addition, there are also those publications that, for the fair's anniversaries, look at the development of *Kunstmarkt Köln->ART*

⁶ The art fair best known under its current title *ART COLOGNE* has changed names several times over the course of its history: 1967–1969 *Kunstmarkt Köln*, 1970–1973 *Kölner Kunstmarkt*, 1974–1983 *Internationaler Kunstmarkt Köln/Düsseldorf*, and since 1984 *ART COLOGNE*. In the following, the term *Kunstmarkt Köln->ART COLOGNE* is used throughout for reasons of representability and better legibility. The arrow serves to visualize the development of the art fair's name from 1967 to today.

⁷ [Genoni \(2009\)](#) examines *Art Basel* in its development 1970–2008 and in this context also comparatively analyzes *Kunstmarkt Köln->ART COLOGNE* into the 1970s (especially its first three years), because she understands *Art Basel* primarily as a response to this first fair for modern and contemporary art, positioning itself in the subsequent years in opposition to it (id., p. 7).

COLOGNE over time, in an informative but more cursory manner that sometimes eschews directly referencing the relevant primary source material, since they are first and foremost aimed at a wide readership. These are the publications that were endorsed by the association for the 20th and 30th anniversaries (Rattemeyer 1986; Krüger 1996), and there is also the opulent bilingual publication by *Zentralarchiv für deutsche und internationale Kunstmarktforschung e.V. ZADIK*⁸ (*Central Archive for German and International Art Market Studies*) containing particularly generous source material in the form of quotations, photographs, and original documents, celebrating the fair's 50th anniversary (*Zentralarchiv des Internationalen Kunsthandels ZADIK* 2016). In keeping with the organization's goal of initiating new areas of research, the ZADIK publication offers a condensed overview of each edition of the fair, and in doing so provides a point of departure for future research. ZADIK also publishes the journal *sediment*, whose volume 25/26 from 2015 included a paradigmatic tracing of how *Kunstmarkt Köln->ART COLOGNE* helped to increase the profile of Pop Art in Germany (*Zentralarchiv des internationalen Kunsthandels ZADIK* 2015 as well as Link 2000, pp. 151–56). There has also been a shorter concise analysis in English by Christine Mehring in *Artforum*, addressing the early years of the fair, the circumstances of its founding and subsequent impact, as well as accompanying protests and other related initiatives in this context (Mehring 2008).

In general, essays on fairs for modern and contemporary art employ social-scientific approaches. It can, at this point, be observed that the research on specific fairs—predominantly Art Basel (Baia Curioni 2012; Battaglia 2014; Baia Curioni et al. 2015; Schultheis 2015) and subsequently Frieze (Kapferer 2010; Baia Curioni 2012; Lee and Lee 2016)—as well as specific periods, the time since 2005 being the prevailing one—provide analysis of the geographic distribution of artists and galleries as well as connections between them, amongst other matters. Other research focuses on developments in international art fair events in general, that is the number of art fairs worldwide or chronologies of the founding of trade fairs and exhibiting galleries by country, etc. (Yogev and Grund 2012; Quemini 2013; Morgner 2014a⁹). In terms of methodology, network analysis in particular is employed. Remarkably, the *Art Market Report* in its latest two issues likewise addresses the significance of art fairs very extensively (McAndrew 2018; McAndrew 2019). Results are visualized by diagrams, whilst none of the art-historical research, apart from Genoni (2009), ventures beyond tabular presentations.

A work that is already several years old, but should still be highlighted within the context of mapping in the present essay, is that of Kessler-Lehmann (Kessler-Lehmann 1993), which was based on a geographical perspective, focusing on Cologne in its spatial structuring as an art city, and examining the individual groups of protagonists in further detail, in particular locating galleries spatially on maps by city districts, for the years 1992/93, and which also included a short excursion to *Kunstmarkt Köln->ART COLOGNE* 1967–1992, but once again the data remained on a tabular level.

To summarize, it can be stated that no publication has ever examined the exhibitor development of a single fair for modern and contemporary art in detail as part of a longitudinal analysis over 30 years using a spatial-visual approach and direct reference to primary sources. There is also a lack of comprehensive discussions engaging critically with the source materials. For *Kunstmarkt Köln->ART COLOGNE*, the case study selected for AGGC, this means that none to date has provided a spatial-visual presentation of the quantitative ART COLOGNE data in detail, directly referencing primary sources, in order to make developments in the art fair available in a longitudinal section, rapidly, and customizable to differing geographical scales (country, region, city, districts, streets). This is an omission that the AGGC project seeks to fill.

⁸ As a specialized archive for the art market, ZADIK—based in Cologne—comprises approximately 160 individual archives and has been an associated institution and research archive of the *University of Cologne* since 2015. It is a very close collaborative partner in the Art Market Master module at the *Department of Art History* in Cologne.

⁹ According to Morgner (2014a, p. 34), fairs for modern and contemporary art developed in especially those locations lacking the density of galleries that were to be found in such art metropolises as New York and Paris, but which were geographically located close to such centers; id. 2014b.

3. ART[GALLERY GIS]COLOGNE—Aims, Previous Stages of Development, and Status Quo

In order to clarify the project's initial question concerning how the fair has developed in relation to regional, national, and international protagonists that have been involved since its founding, AGGC addresses central questions of how, when, and why the composition of the participating exhibitors has changed over the course of time.

The brief outline of the two previous stages of development is intended to highlight the project's methodological structure and approach.

In answering the first two questions of how, and when the composition of the participating exhibitors has changed over the course of time, a set of data was required in an initial stage that included all exhibitors—on the one hand galleries, art dealerships, and publishers of limited editions and on the other hand all other exhibitors—at *Kunstmarkt Köln->ART COLOGNE* between the years 1967 and 1997. For this, the names and addresses of the exhibitors were collected from the fair catalogues for *Kunstmarkt Köln->ART COLOGNE* as recorded in the index of exhibitors.¹⁰ For each edition of the fair up to and including 2017, a printed version of the catalogue was published by the organizer (in 2018, for the first time it only appeared in digital form). 5328 entries from the catalogues from the first thirty years of the art fair were entered into a database for AGGC.¹¹

The exhibitor data was processed and visualized in different ways to allow for various approaches. All the locations of *Kunstmarkt Köln->ART COLOGNE* exhibitors (name and location data of the exhibitors) worldwide between 1967 and 1997 were geo-referenced and visualized in a digital map (Figure 1).

The map is interactive, that is, the display can be customized by selecting the data set (galleries, including art dealerships, publishers of limited editions, and/or all other exhibitors), the zoom factor (ranging from a world map to street view), the display mode (individual locations or a cluster),¹² and the point in time according to the user's individual needs. Clusters of exhibitors from a particular continent, country, region, or even city can be rapidly identified—as well as changes over time, making the digital map particularly suitable for longitudinal studies. The number of exhibitors were, in addition, grouped in bar graphs and visualized in tabular form according to city and country. The development of the number of participants in individual cities and countries can also be tracked via line graphs (Figure 2).

¹⁰ In those cases where a tabular listing was not available, the individual entries for exhibitors were reviewed and evaluated. Where discrepancies arose between the address in the list of exhibitors and the one noted on the gallery's catalogue page, the address from the list of exhibitors was preferred.

¹¹ These entries are, however, not identical to the total number of exhibitors, since various exhibitors have participated in the fair several times. The addresses for some exhibitors had to be further researched, the reasons for which were various: 1. Missing addresses of the participating exhibitors in *Kunstmarkt Köln->ART COLOGNE* catalogues/in some cases only the PO box was noted. 2. Historical addresses that no longer exist as such/for several other addresses no clear coordinates could be determined. 3. In some cases, several locations for one and the same exhibitor were noted in the catalogue. The missing historical addresses were identified during intensive research using source materials (e.g., contemporary correspondence, gallery publications), works of reference (e.g., the International Art Directory, specialist publications), by computer, and through contact with those who owned a respective business at the time. To date, 16 addresses remain absent, that could not be discovered. Missing and hitherto unidentifiable historical addresses are listed in the left navigation bar of AGGC under *Annotations* for each year. There are no points for these on the map; they have, however, been taken into account statistically.

¹² In the latter display mode, the locations are bundled in accordance with the zoom factor, thus enabling more meaningful visualizations on the world map view.



Figure 1. ART|GALLERY GIS|COLOGNE, 1994 (a) display mode: cluster, (b) display mode: individual locations. Used by permission. © ART|GALLERY GIS|COLOGNE.

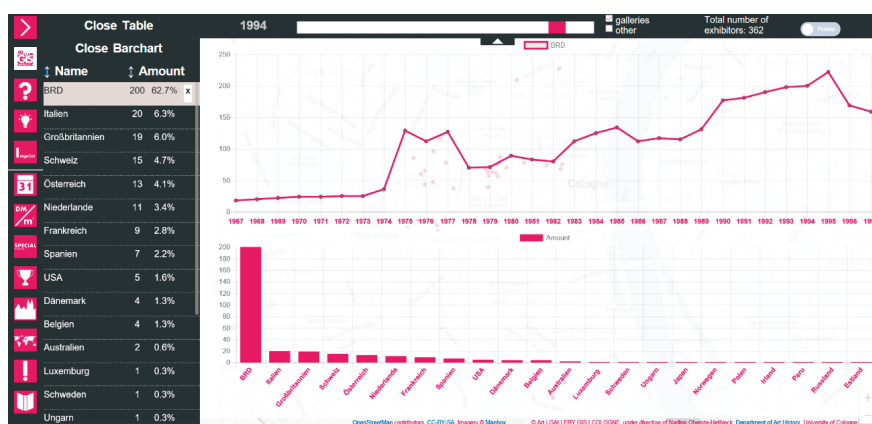


Figure 2. ART|GALLERY GIS|COLOGNE, 1994, number of galleries, art dealerships, and publishers of limited editions from Federal Republic of Germany who participated in *Kunstmarkt Köln->ART COLOGNE 1994* sorted by country of origin by number and percentage. Three ways of visualization: tabular list, line diagram, and bar chart. Used by permission. © ART|GALLERY GIS|COLOGNE.

Users are provided with detailed information on the geographical origin of the individual exhibitors via pop-up windows, which open when clicking on the location points (Figure 3). This includes the address of the exhibitor and a reference to the source from which the location information originates, insofar as it is not from the art fair catalogues.

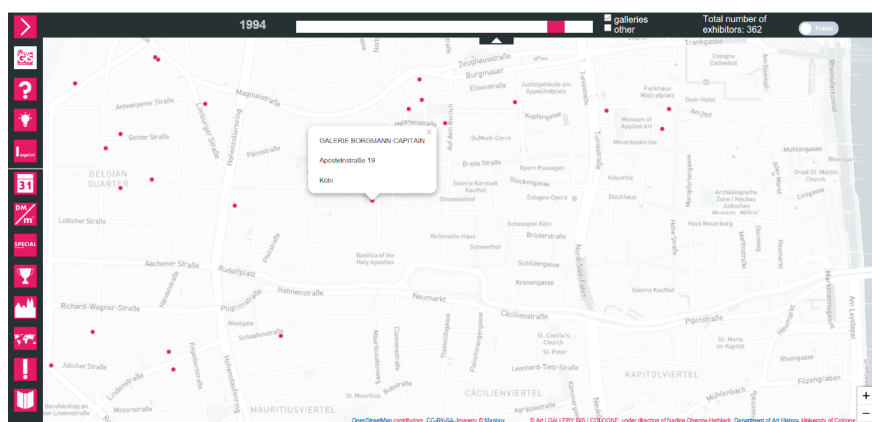


Figure 3. ART|GALLERY GIS|COLOGNE, 1994, pop-up window for the entry *Galerie Borgmann Capitain*, Cologne, including location information; left navigation bar hidden. Used by permission. © ART|GALLERY GIS|COLOGNE.

During the second phase, the quantitative location data was continuously supplemented by further contextual information. The net square meter price of stands per year, special exhibitions and auxiliary programs, and awards and awardees have already been entered into AGGC. They are all entered in the left navigation bar, which can be individually hidden or shown (Figure 2 versus Figure 3). What further contextual information should follow, the challenges and limits that exist, and what stages of development are being worked on, are explained in Section 4, Section 6, and Section 7.

4. Challenges of Digital Mapping and the Importance of Providing Contextual Information to Support Adequate Analysis of Digital Maps in the Example of AGGC

As already discussed in the literature, the analysis of the visualization of geographical relations in digital maps requires a studious visual literacy, posing enormous challenges to academics in various disciplines who are currently working with mapping (e.g., Joyeux-Prunel 2013; Dossin 2015). For AGGC, the ‘raw,’ so to speak contextless exhibitor data collected in phase 1, visualized in the map and in the tables of exhibitor numbers according to city and country, conceals greater risks. For example, it could be hastily deduced from the small number of exhibitors at the fair’s first editions that only a few gallerists and art dealers—which at first and at times were just German ones—showed any interest in participating in the fair (Figure 4). But this was not the case. Rather, it is clear that *Kunstmarkt Köln->ART COLOGNE* during its early days established an aim of becoming a deliberately exclusive, closed event, which strictly limited the participation of exhibitors, originally exclusively to selected German exhibitors—all essentially members of the *Verein progressiver deutscher Kunsthändler e.V.*

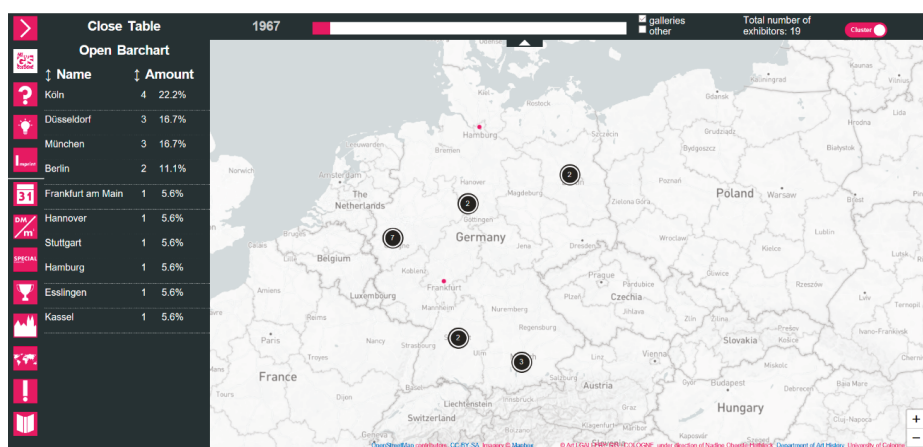


Figure 4. ART|GALLERY GIS|COLOGNE, 1967, number of galleries, art dealerships, and publishers of limited editions who participated in the first edition of *Kunstmarkt Köln->ART COLOGNE*. Used by permission. © ART|GALLERY GIS|COLOGNE.

It was only under pressure from emerging competitors in the Rhineland (e.g., *prospect* 1968, *Internationale Kunst- und Informationsmesse IKI* 1970), as well as internationally (e.g., *Art Basel* in 1970), that the association began permitting foreign exhibitors to participate, at first for a single year (1968), then in principle from 1971 onwards. Until 1996, the Verein was responsible for the process of admitting galleries to *Kunstmarkt Köln->ART COLOGNE*. The association defined and decided upon the conditions of admittance and coordinated the admission committees (and other juries), which came into being during the 30 years. In addition, the mergers of *Kunstmarkt Köln->ART COLOGNE* with other fairs, such as *IKI*, had an impact on the number of exhibitors (an increase in the number of exhibitors from 78 in 1974 to 203 in 1975, Figure 5), or with *Unfair* (in 1994 the integration of galleries that had exhibited at *Unfair* during the two previous years)¹³.

¹³ The minutes of the admissions meeting for the 1994 edition of *Kunstmarkt Köln->ART COLOGNE* note the cumulative admission as a result of the merger. Cf. minutes [Irene Saxinger] of the admissions meeting for *ART COLOGNE* 1994 on 25 and 26 April 1994, Cologne, 28 April 1994, ZADIK, no signature.

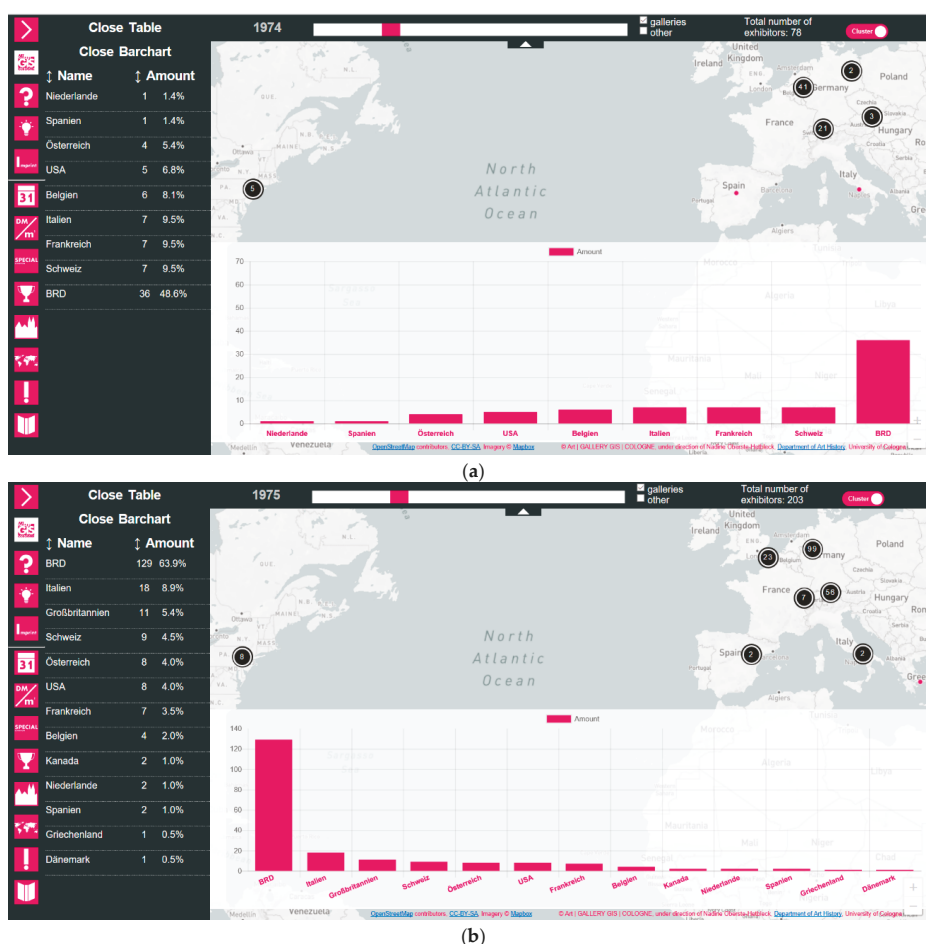


Figure 5. ART|GALLERY GIS|COLOGNE, number of galleries, art dealerships, and publishers of limited editions who participated in *Kunstmarkt Köln->ART COLOGNE*, three ways of visualization: tabular list, bar chart, and map (a) 1974, (b) 1975. Used by permission. © ART|GALLERY GIS|COLOGNE.

In order to be able to accommodate such a substantial increase in exhibitor numbers, the availability of space was decisive, which, following the use of the historic festival hall Gürzenich (1967) and Kunsthalle (1968–1973) as venues, was provided by the exhibition spaces at *Koelnmesse* (1974, 1975, 1977, 1979, 1981, 1983–present), as well as *NOWEA* in Düsseldorf (1976, 1978, 1980, 1982).¹⁴ In this context, the trade fair companies also took over the organizational side of *Kunstmarkt Köln->ART COLOGNE*, which led to trade fair practices being accordingly adapted—including the fair companies publishing the conditions of exhibiting and subsequently terms of participation as well as comprehensive indexes of artists and galleries in the art fair catalogues. Rombach (2008, p. 63) explains that here again the influence of Art Basel, the fair’s competitor, played a role. Whether a gallery or art dealer was even able to apply to participate also depended on their economic circumstances (which in turn were influenced

¹⁴ In the period 1975–1983, the location of the fair alternated annually between the trade fair exhibition spaces in Düsseldorf and Cologne.

by prevailing economic developments) and on the costs incurred (including the square meter prices for the stands) in relation to sales. One incentive for participating could also be special exhibitions, especially for exhibitors obliged to undertake transatlantic travel. For example, after two years without any galleries from the USA present at *Kunstmarkt Köln*->*ART COLOGNE*, in 1984—spurred by a special exhibition dedicated to the New York art scene—there were once again five US American galleries, all from New York (Figure 6). In 1986, six Canadian galleries also attended on the occasion of a special exhibition dedicated to the Canadian art scene.

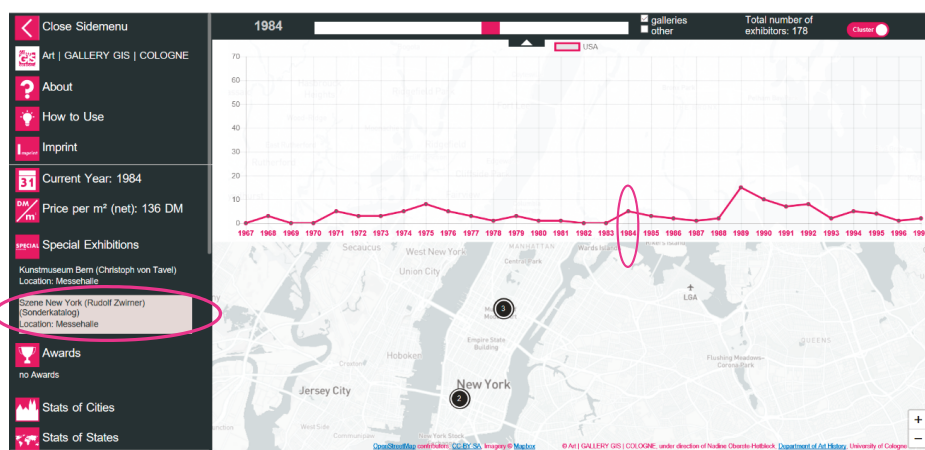


Figure 6. Line diagram for the number of galleries, art dealerships, and publishers of limited editions from the USA who participated in *Kunstmarkt Köln*->*ART COLOGNE* 1967–1997, combined with information about special exhibitions at *Kunstmarkt Köln*->*ART COLOGNE* in 1984. Used by permission. © ART|GALLERY GIS|COLOGNE [emphasis in the map added].

It became appropriately clear when working on AGGC that there was a risk of premature misinterpretation in mapping exhibitor locations alone.¹⁵ This is why the following factors, extracted from the literature,¹⁶ were identified that have already been addressed in the previous explication. As the history of *Kunstmarkt Köln*->*ART COLOGNE* makes paradigmatically apparent, these were factors that have had an impact on the composition of exhibitors (including the number and geographic distribution) and are therefore very useful in providing an adequate viewing of the AGGC digital map:

- Economic and political events,
- Competitor fairs and mergers of art fairs,
- The organizers of the fair,
- Conditions of admittance,
- Admission committees (and other juries) and the selection criteria they employ,

¹⁵ Ultimately, researchers who create and provide digital maps cannot be held responsible for misinterpretations by third parties, and such a warning in AGGC would make users accordingly aware.

¹⁶ In reviewing the research literature, certain contextual information has been considered by general consensus to be relevant and compiled. These include the venue, the number of exhibitors, and the number of visitors. Rombach (2008) collates the following contextual information in tabular form: Table 2: year, number of exhibitors in total, as well as national and international exhibitors, location, dates, number of visitors, entrance fees, and sales in deutschmarks; Table 12: artists represented at *Kunstmarkt* (categorized by specific styles); Tables 3–10: the most frequently represented artists; Table 11: galleries represented. ZADIK (*Zentralarchiv des Internationalen Kunsthandels ZADIK* 2016) in its yearly reviews systematically surveys the number of exhibitors, the number of visitors, the venue, and the accompanying program. In addition, extensive relevant contextual information is also included.

- The respective location and spatial configuration of the fair,
- Special exhibitions at *Kunstmarkt Köln*->*ART COLOGNE* (already included in AGGC)
- Awards and Awardees (already included in AGGC),
- Net square meter prices of the stands per year (already included in AGGC),
- Total turnover at the fair and the individual turnover of exhibitors,
- The exhibitors' artistic program,
- Contemporary assessments of the significance of *Kunstmarkt Köln*->*ART COLOGNE*.

Nevertheless, they should neither be understood as a hierarchical list nor as a conclusive one. Furthermore, the different factors occurred in different configurations and strengths over time. Measuring their exact level of influence and interaction, in turn, presents a challenge that can only be briefly indicated here. In addition to those factors that are particularly relevant for understanding the composition of exhibitors, further contextual information can also be identified that will form the densest, most comprehensive information network possible around *Kunstmarkt Köln*->*ART COLOGNE*. These include:

- Subsidies made available by city of Cologne authorities,
- Displays on the stands,
- Number of visits,
- Number of fair catalogues printed.

The previous explanations have clarified the relevance of including a range of information of differing origins in AGGC. Therefore, the initial digital map was, and will be, further developed in a direction that could be covered under the designation 'deep map,' which Bodenhamer, Corrigan, and Harris define as follows: "A deep map is simultaneously a platform, a process, and a product. It is an environment embedded with tools to bring data into an explicit and direct relationship with space and time" (Bodenhamer et al. 2015, p. 3). As a result, AGGC will become a special case: the origin of the exhibitors is visualized and not their location (=stand) at *Kunstmarkt Köln*->*ART COLOGNE*, that is their business premises (=gallery, art dealership, etc.) are indicated at the time of the event, when the exhibitors gather and meet in one place in Cologne. These two spatial points of reference to the exhibitors will in future be assembled virtually in AGGC with the assistance of photographic documentation from *Kunstmarkt Köln*->*ART COLOGNE* that is currently being assessed for use (see Section 5.3). It constitutes one of the sources relevant to AGGC and will be discussed in more detail in the 5th section that follows.

5. From Where? Or: A Critical Consideration of the Source Materials

Considerations of 'what should be included in AGGC?' were simultaneously closely related to decisions concerning which sources should be used, evaluated, and inserted. Where could the relevant information be found? And what critical challenges would emerge in the use of such source materials? What is the extent of their informational value with regard to the representation and reconstruction of historical reality? It is absolutely essential that such mapping projects as AGGC clearly identify their source materials, link the information presented with sources, consider them critically, and ensure they are prominently displayed.

ZADIK's holdings in combination with the photographic documentation in the *Rheinisches Bildarchiv*¹⁷ (Rhenish Photo Archive, RBA) provided anchoring points for AGGC. ZADIK possesses

¹⁷ In 2013, RBA received more than four million analogue photographs from *Koelnmesse*. See the press release from *Koelnmesse*. 2013. *Neue Bleibe für historische Koelnmesse-Fotos*, no. 11/Cologne, from May 2013, accessed 29 December 2018, www.koelnmesse.de/Koelnmesse/Presse/Pressemitteilungen/index.php?aktion=pfach&plid=kmpresse_kmu&format=html&base=&tp=k3content&search=&pmid=kmeigen.km_pr08_1369306979&start=0&anzahl=10&channel=kmeigen&language=d&archiv=.

a complete set of catalogues covering each edition of *Kunstmarkt Köln->ART COLOGNE*, as well as photographs of some editions of the fair, and the archives of the abovementioned organizing associations, which include the minutes of the partner associations, most of the general and special conditions for participation (GCP + SCP), reviews in the press, and personal correspondence involving exhibitors, the fair organizer, rejected applicants, etc.¹⁸

5.1. Fair Catalogues

As already mentioned, the fair's catalogues can be identified as a central source of material, in which not only the location-related data of exhibitors can be determined, but also the floor plans of the fair, special exhibitions at *Kunstmarkt Köln->ART COLOGNE*, together with awards and awardees (e.g., Art Cologne Prize). A further fundamental set of data is the works of art exhibited at *Kunstmarkt Köln->ART COLOGNE*, and the artists who created them. They form, alongside the exhibitors, a further central group of protagonists at the fair. The compilation and adequate visualization of the exhibited works of art and their producers pose great challenges. It is not easy to generate data sets which reflect the actual situation at the time. Similarly to exhibitor data, the names of the artists whose works have been shown at the art fair could be taken from the fair catalogues. Until the beginning of the 1970s, the rather formal standardized catalogue entries of the galleries usually listed most of the exhibited works at *Kunstmarkt Köln->ART COLOGNE* individually. The gallery entries subsequently became more individual in their design, and only sometimes containing lists of artists. For the years 1974–1997, each catalogue provided an index of artists for the entire fair, a central list of the names of the artists including the galleries that had exhibited them. Nevertheless the fair catalogues are not an entirely reliable source for the construction of an adequate pool of data, since it cannot be assumed that, on the one hand, works by all the artists listed in the catalogue were actually shown at the respective stands and, on the other hand, all exhibited works were actually listed in the catalogue. In comparison to auction catalogues, art fair catalogues do not always list every single work of art exhibited, but often merely the names of the artists and a few reproductions of selected works of art. In 1989, for example, the catalogue pages for *American Fine Arts* were even empty, whilst the artist/exhibitor index likewise fails to list the required data (Figure 7).

It was obviously the case that gallery owners occasionally decided at short notice what to actually present, or works were replaced after they were sold. There were also the rounds of the so-called Exhibition Jury, which in some cases called for the removal of disputed works of art. It should also be remembered that considerable business is also generated from the storage spaces integrated into the stands, for which there is almost no information in the research to date.

In addition to the fair's catalogues, further sources were also required, individual examples of which are listed below, and the critical challenges the source materials entail are also identified.

¹⁸ For this, see the holdings C1 *Bundesverband Deutscher Galerien [und Kunsthändler] BVDG*, Cologne, and C2 *Kunstmessen Köln u. Düsseldorf* (submitted by BVDG). In addition, the archives of those galleries and art dealers who participated in *Kunstmarkt Köln->ART COLOGNE* or were even members of one of the fair's organizing bodies also contain relevant documents on *Kunstmarkt Köln->ART COLOGNE*.

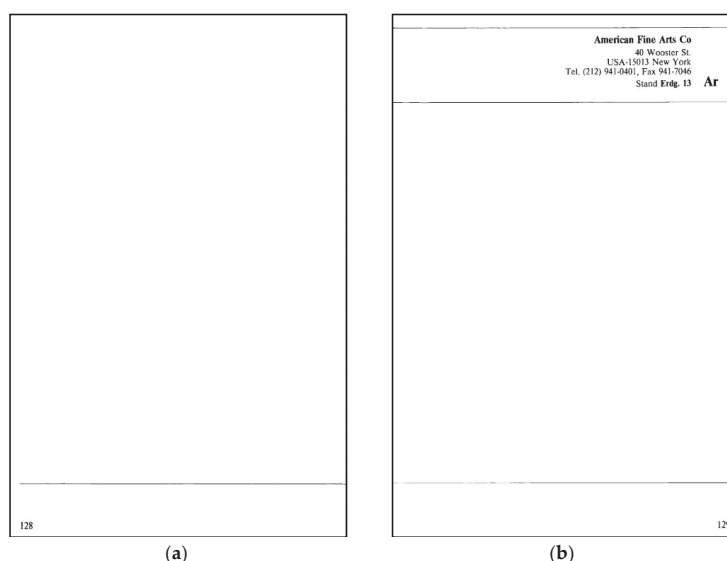


Figure 7. Catalogue entry from *American Fine Arts Co*, New York. (a) left side, (b) right side (*Messe- und Ausstellungs-Ges.m.b.H.* 1989, pp. 128f).

5.2. Press Releases

The number of visits, which are generally easier to determine in comparison to the number of visitors,¹⁹ were communicated by the organizers of *Kunstmarkt Köln->ART COLOGNE* in press releases. These are unlikely to be verifiable due to the type of source material. This means that relying on information supplied by the organizers in their press releases remains academically unsatisfactory, since it is not clear what system was being employed in determining the number of visits during the 30 years. In addition, a press release is basically a public relations item and as such part of an organization's communication policy. The situation is similar for total sales at *Kunstmarkt Köln->ART COLOGNE*, which are also communicated in the organizer's press releases and—probably adopted from them—appear in reports by the media.²⁰ Individual exhibitors' turnover at the fair is seldom communicated by the galleries themselves, who generally limit the information they publish to individual (spectacular) sales. However, within the history of the art market this is no surprise, as it is already known that such details remain largely opaque. As a result, figures concerning number of visits and turnover—if taken from press releases—should be regarded at most as merely indicative.

5.3. Photographic Documentation

For the period 1967–1973—as far as is presently known—the photographic record is very limited for *Kunstmarkt Köln->ART COLOGNE*.²¹ Since the beginning of the collaboration between *BVDG* and *Koelnmesse* in 1974, fair photographers have been photographing regularly at the art fair. Today, slides and negatives of photographs taken on behalf of *Koelnmesse* to document exhibitor stands, special

¹⁹ These concern the number of individual visitors to the fair, which means that statistically multiple visits should not be taken into account.

²⁰ Cf. *Rombach* (2008, p. 7), who states with regard to *Art Basel* that no reliable data is available concerning the turnover at the fair.

²¹ See for example the holdings of Wolf P. Prange, Berlin (ZADIK, H6), Johanna Schmitz-Fabri (ZADIK, H1), Anita Kloten, and Peter Fischer (Historisches Archiv der Stadt Köln/HASStK, inventory no. 1401). Angelika Platen, in particular, also took photographs at *Kunstmarkt Köln->ART COLOGNE*.

exhibitions, promotional programs, panel discussions, previews, award ceremonies, charity auctions, press conferences, and accompanying events, as well as the scene with visitors at the entrance to the respective trade fair buildings are—as already mentioned—included in the holdings of RBA in Cologne. The complex tagging of the stands,²² works of art, and people depicted is the greatest challenge accompanying the use of such photographs.²³ Furthermore, there is no claim to completeness; not all stands and special exhibitions were photographed by *Koelnmesse*. A prime example is the research conducted in the archive on photographs documenting the special exhibition *Förderprogramm Junge Galerien*²⁴ (Promotional Program for Young Galleries) in 1989, which proved to be unsuccessful.

Ideally, the photographs could be used to generate information about exhibited works of art (and their producers)—becoming a sort of cross-check for the artist names recorded in the fair catalogues—as well as for the design of the exhibition stands and special displays. As a result, AGGC can, in the future, make a contribution to the history of the curating of art fairs. Furthermore, the photographs will be used in the exhibitor map to create a spatial connection to the venue of *Kunstmarkt Köln->ART COLOGNE*, via, on the one hand, the pop-up window of exhibitors in the map (see Figure 3), in which a link forwards the user from AGGC to the entry on the RBA database, enabling the respective photograph that has been made available to be viewed along with the associated metadata. And on the other, all the photographs of each edition of *Kunstmarkt Köln->ART COLOGNE* will be merged to create a digital tour, which can be navigated on the basis of the floor plan for the stands. In principle, it is additionally possible to include the meta-data of the works of art (retrievable by clicking on a work in the photograph) OR to design a virtual space with placeholders for the works of art (here as well, the meta-data of the works of art would also be retrievable by clicking on them).

5.4. Minutes of the Board, Member, and General Meetings of the Associations and Admission Committees

The minutes enable deep insights into the work of the associations that have organized *Kunstmarkt Köln->ART COLOGNE*. They have been essential in the reconstruction of the genesis of the conditions for admittance and the composition of the admission committees. At the same time however, they entail one of the biggest challenges concerning data protection, as described in 6. below. The compiling of the minutes turned out to be especially time-consuming, because for this period of 30 years they were not housed in their entirety in archives about the fair and the organizing associations that have been under examination, but unsystematically scattered across various archives—including those of the exhibitors.

5.5. The Art Fair's General Conditions for Participation (GCP) and Special Conditions of Participation (SCP)

Since their first publication in 1974, the terms and conditions of participating at *Kunstmarkt Köln->ART COLOGNE* have included information concerning the prices per square meter for the stands²⁵, which have already been included in AGGC. It has, however, not been possible to take into account any special conditions that may have been agreed with individual exhibitors, to which the documentation frequently points. The GCP also contains official information on the admissions committee and the fair's jury—although no names are specified—and on the prerequisites for the

²² Since, according to current information, the stands' identification is rarely photographed, the exhibitors' stands can only be assigned to the photographs on the basis of the works of art in each stand, handwritten notes by the photographers, and the clues displayed on such identifiers as information signs that can be discerned in photographs of the fair's aisles. This requires use of the researcher's knowledge of *Kunstmarkt Köln->ART COLOGNE*, the art market, and art history.

²³ As a collaborative partner, the RBA is currently digitizing just one initial year, namely 1974. With the involvement of students at the Department of Art History at the University of Cologne, during a seminar by Johanna Gummlich and Nadine Oberste-Hetbleck in the 2019 summer semester, the digitized photographs in the *Art Publishing System* (APS) database of RBA are being formally inventoried and indexed, and in addition some are being more deeply examined for the research project. It is a trial run focusing on one year, to assess the effort that will be required in the subsequent years.

²⁴ For more information see Oberste-Hetbleck (2018a, pp. 9f).

²⁵ They were taken from the SCP for AGGC.

admission of applicants as exhibitors, as regularly referred to by the admissions committee during its work.

A systematic compilation and evaluation of both the minutes and the conditions for participation, covering a period of thirty years, has been carried out for the first time. However, they could not yet be included in AGGC, as explained in the following section.

5.6. First-Hand Reports from Protagonists Involved in Kunstmarkt Köln->ART COLOGNE²⁶

A highly valuable source in the study of the history of fairs for modern and contemporary art are eyewitness interviews. Although oral history poses some challenges as a scholarly source (Spuhler 2010), such as the reliability of remembering long past episodes (the brain's selective memory) and subjective perspectives on events, it at the same time offers a kind of counter narrative to information from documentary records, such as those archived by the organizers of *Kunstmarkt Köln->ART COLOGNE*. Their strength lies, moreover, in the investigating of circumstances that cannot be extracted from existing sources or are not addressed by them. Therefore, the focus here should lie in particular on gallery owners who participated in *Kunstmarkt Köln->ART COLOGNE*, members of the admissions committee or the vetting commission, Koelnmesse employees, rejected applicants, and contemporary observers. In any case, from an academic perspective the verifying of data and facts is indispensable, and that is why eyewitness interviews require a careful process of assessment.

6. The Parameters of Integrating Contextual Information

This section will be examining to what extent the information previously mentioned and considered essential can be integrated into AGGC. This is not just a technical issue, one that does not require discussion here,²⁷ but in many respects it is, above all, a legal one.

The integrating of further archival materials into AGGC, be it in the form of digital facsimiles or merely information generated from them, is not readily possible. In particular, there are restrictions relating to data protection (keyword: privacy rights) and copyright. Since this extends deeply into legal issues, only aspects concerning those archival materials which are considered essential to the history of *Kunstmarkt Köln->ART COLOGNE* and consequently ought to be included in AGGC are touched upon. It also becomes clear at this point that the legal situation differs, to an extent, from state to state and that the specific legislation of the state or of the group of member states in which such projects are published establishes the framework for data protection and copyright. The following remarks apply to AGGC in accordance to the conditions pertaining to publication in Germany as part of the European Union.

Much of the archival material that has been identified as relevant to AGGC, and ideally should be published there, names specific individuals. This is particularly the case for the process of admitting exhibitors to *Kunstmarkt Köln->ART COLOGNE*. It begins with the specific naming of members of the various bodies responsible for admission and scrutiny of the works on display and layout of the exhibition stands, the names of both applicants who have been admitted or rejected, and third persons also involved. In this case—especially as a consequence of the European General Data Protection Regulation (EU-DSGVO, exceptions for academic purposes are regulated under Art. 85 EU-DSGVO)—at the time of publication of this paper, the consent of all natural persons named is to be obtained for the processing of the relevant data, which means a great deal of effort, and with the assumption that some of them could withhold consent. In addition, under German law at both federal and state level, there is a general period of protection for documents held in public

²⁶ Especially gallery owners who participated in the art fair, members of the admissions committee or the Exhibition Jury, Koelnmesse employees, rejected applicants, and contemporary observers.

²⁷ At this point, the media-informatic aspect of AGGC should be briefly mentioned: The locations of the participating galleries during the first three decades were georeferenced (GeoJSON) and visualized in an online map (Leaflet.js). Through a reactive environment (Vue.js), the online map is embedded with further information.

archives. This dates from the creation of the documents and remains valid for 30 years thereafter (§11 Absatz 1 Bundesarchivgesetz (BarchG); §7 Absatz 1 Archivgesetz Nordrhein-Westfalen (ArchivG NRW)). Restrictions regarding personal documents are based on the date of death of the person concerned. Without appropriate permission, these may only be used ten years after the death of the respective person at the earliest (§11 Absatz 2 BarchG; §7 Absatz 1 ArchivG NRW). These regulations are often used as a guideline for private archives, whereby the use is specified by the respective owner (Hausmann 2016, p. 19).

Another major area concerns copyright, which covers works of art of various types. The starting point here is likewise the date of the artist's death (=copyright owner): according to §64 UrhG, copyright expires 70 years after the death of the author—as does the copyright of the artist with regard to both works of fine art and photographic works. This is particularly challenging with regard to photographs of exhibition views including people and works of art. In such cases, in Germany, insofar as the periods of protection have not yet expired, both the rights of the photographer as the author of the photograph and the rights of the authors of all works of art that are identifiable must be taken into account. In addition, usually all the people who have been photographed (the rights to one's own image §22 KunstUrhG) must also be asked for consent (exceptions are regulated under §23 KunstUrhG).

The reasons already mentioned make it clear that even though some documents researched and compiled for *Kunstmarkt Köln->ART COLOGNE*, such as the minutes, are indeed being evaluated,²⁸ they cannot currently be published, or only following much effort, whereby the chances of success are questionable. It remains to be considered whether these absences should be visibly included in AGGC in the course of its future development. One possibility would be to insert placeholders in AGGC for the signatures of the respective documents or for the inventory ID (for example, in the *ZADIK* archives), if the relevant holdings have not been developed in depth yet. Due to the modular structure of the Vue framework, which has been selected for the programming of AGGC, it is possible to both expand and scale the project, offering a variety of prospects for the future. Such placeholders could then be replaced, changed, and updated accordingly during future research.

7. Conclusions and Future Developments

Work on AGGC was initially begun in order to trace the historical development of the first fair for modern and contemporary art, systematically and source-related, employing primarily visual and timeline-based networked data. To this end, the emphasis has been on the exhibitors, as they form a central group of protagonists at the fair, and their composition in terms of numbers and geographic origin—as well as their artistic programs (that is the artists and their works of art)—is key to understanding the profile of the art fair. The focus of AGGC has been, and still is, on a digital map of the exhibitor's locations, which functions as a point of entry into the platform for AGGC users, as well as forming the center of the data organization. It enables the user to intuitively—being consistent with the human brain's search for patterns—recognize geographic clusters quickly in terms of the composition of exhibitors over time. These can be tracked for 30 years, depending on specific interests, at international, national, regional, city, or street levels, initially focusing on questions of **who**, **when** and **where** that are answerable in detail with regard to the composition of exhibitors. However, in order to support an adequate analysis of said composition and to approach the question of **why** the composition of exhibitors took a specific form each year, requires the contextual information, identified in this paper, relating to the factors that were of influence. The quantitative exhibitor data needs to be supplemented by qualitative information that AGGC would like to merge at the level of Open Access. AGGC pursues a direction towards a deep map, where the contextual information and data paths (tables, line graphs) that partially surround the map can be switched on and off. This is accompanied

²⁸ Making the data relating to the relevant persons anonymous would be one solution, which would at least make statistical evaluations feasible.

by a fundamental challenge in the further development and enhancing of AGGC, that is the issue of the layout and structuring in terms of the way in which the information is provided. Where exactly should contextual information be placed, in what manner should it be combinable, and what should be simultaneously visible? There are also additional challenges specifically relating to the previously mentioned issues relating to data protection and copyright restrictions.

However, in order to clarify existing relationships between protagonists (exhibitor's partner galleries, artists being represented by exhibitors, positions occupied by exhibitors on *Kunstmarkt Köln->ART COLOGNE* committees, etc.) in their various manifestations and intensities, it would be necessary to have a presentation and analysis of data which goes beyond those employed to date in AGGC. By using the data that has been collected as well as that from documents still currently being assessed and made accessible (photographs of the stands) and additional evaluations of existing sources (e.g., fair catalogues, minutes from the *Kunstmarkt Köln->ART COLOGNE*'s admission committee), another level of visualization and analysis could be added, with the assistance of network analysis. This remains a task for future stages of development.

In line with the visual-spatial approach pursued by AGGC, and to complement the locations of the exhibitors in their countries of origin and the views of their stands at the fair, a further spatial component will be added in the future. This will be a result of the analysis of the composition of exhibitors over the period under investigation. Despite fluctuations, during its first 30 years *Kunstmarkt Köln->ART COLOGNE* was characterized by a predominance of German galleries (caution: this says nothing about the origins of the works on view).²⁹ Except for two surges of over 40% in the years 1974 and 1989, the participation of foreign galleries over the course of these 30 years averaged 30%. Galleries from a total of 40 countries were represented in various constellations and frequencies. When we once again look specifically at the German galleries that participated during the 30 years, one can see that increasingly more galleries took part in *Kunstmarkt Köln->Art Cologne*, in some cases only for particular periods of time. It is notable that galleries from Cologne constantly formed the largest group from one city with large numbers of exhibitors. This remains so even after the addition of foreign cities. Therefore, the next stage of the project, which has already begun, will be focusing more on the situation in *Kunstmarkt Köln->ART COLOGNE*'s home region during the period under investigation. For this, the geo-referenced locations of all protagonists in Cologne are currently included who—according to the selected source, a consistent one over time—were dealing in art during the period under investigation.³⁰ This phase is intended to address questions around the impact of the art fair on the city itself and in particular the development of Cologne as a center for the art trade. It has also become clear that comparing data from various art fairs worldwide would be of great interest and could add a supra-regional focus. This too could become a future stage in the working process.

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²⁹ Quemin (2013), 166 assesses the composition of exhibitors with regard to countries of origin, in the context of an analysis of Art Basel 2008, stating: "The national diversity of exhibiting galleries is generally a good indication of the quality of an art fair, which should ideally resist the frequent pressure to favour domestic galleries and limit the number of places available to national exhibitors (unless it is organised by a leading art-market country with highly reputable galleries)." He also, with reference to his statements in Quemin (2006), includes Germany amongst the latter, so that a strong presence of German galleries at *Kunstmarkt Köln->ART COLOGNE* is not essentially surprising.

³⁰ For this purpose, a data set was created from the business telephone directory. This included all entries found under the categories of art dealers, paintings, galleries, even though not every category was to be found in every edition of the business telephone directory.

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Article

The Painting Industries of Antwerp and Amsterdam, 1500–1700: A Data Perspective

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Abstract: This study presents a data driven comparative analysis of the painting industries in sixteenth and seventeenth century Antwerp and Amsterdam. The popular view of the development of these two artistic centers still holds that Antwerp flourished in the sixteenth century and was succeeded by Amsterdam after the former's recapturing by the Spanish in 1585. However, a demographic analysis of the number of painters active in Antwerp and Amsterdam shows that Antwerp recovered relatively quickly after 1585 and that it remained the leading artistic center in the Low Countries, only to be surpassed by Amsterdam in the 1650's. An analysis of migration patterns and social networks shows that painters in Antwerp formed a more cohesive group than painters in Amsterdam. As a result, the two cities responded quite differently to internal and external market shocks. Data for this study are taken from ECARTICO, a database and a linked data web resource containing structured biographical data on over 9100 painters working in the Low Countries until circa 1725.

Keywords: Amsterdam; Antwerp; painting; Dutch Golden Age; Flemish Baroque

1. Introduction

At an auction in the early autumn of 1637, Rembrandt bought the painting *Hero and Leander* by Peter Paul Rubens for a little less than 425 guilders. Today, two paintings by Rubens with this subject are known: One in the collection of the Gemäldegalerie in Dresden (Figure 1) and a smaller version of the same painting in the collection of Yale University. From these paintings, we know that the painting bought by Rembrandt depicted a dramatic scene in which the Nereids out of a stormy Hellespont bring ashore the dead body of Leander who drowned during a midnight swim to meet his lover Hero. She is depicted at the right side of the painting, throwing herself into the Hellespont out of devastation over her lover's death. Prior to being purchased by Rembrandt, the painting had been in the possession of the Amsterdam painter Jan Jansz. Uyl who had given it as collateral to the lawyer Trojan de Magistris. Uyl was no stranger to Rembrandt, who had previously bought a number of works painted by Uyl himself.¹ Visiting his workshop, Rembrandt would have become familiar with the *Hero and Leander* before he had the opportunity to actually purchase it. This might well have been as early as 1633 when Rembrandt painted his own dramatic scene at a dark and stormy sea: The famous—but stolen—*Christ in the storm on the lake of Galilee* (Figure 2).

¹ The documents concerning Rembrandt buying the Rubens painting and his relation to Jan Jansz. Uyl are discussed by Van Eeghen (1977). She suggests that Rembrandt participated as a shill bidder at the auction and might not have bought the painting on purpose. However, she fails to explain how this would make sense.



Figure 1. Peter Paul Rubens, *Hero and Leander*, ca. 1608, oil on canvas, Gemäldegalerie Dresden), artwork in the public domain.

Rembrandt admired Rubens. According to [Schwartz \(2018\)](#), he admired him to such a degree that in his early career he was driven by a fierce ambition to equal and to outperform the grand master of ‘Flemish Baroque’. For many who are familiar with seventeenth century Netherlandish art, this might still come as a surprise. After all, there is a large body of literature and critiques in which the two artists and their works are described in antithetical terms: The Roman Catholic versus the Calvinist, the aristocrat versus the miller’s son, grace versus realism, and extravaganza versus introspection. However, as Schwarz also pointed out, this Rubens/Rembrandt dichotomy is largely the product of nineteenth and early-twentieth century nationalist historiography and museology. In the aftermath of Belgium becoming independent of the Netherlands (1830–1839), the new Belgian authorities actively supported the creation of an own national history. In this climate, a series of events and publications around the Rubens Year 1840 (two hundred years after his death) contributed to the appropriation of Rubens as a Belgian national icon ([Schwartz 2018](#); [Pil 1993](#); [Wijnsouw 2018](#)). The Dutch, of course, responded by claiming Rembrandt as their national icon. Catalyzed by publications like those by [Busken Huet \(1879, 1882\)](#), this identification of Rubens with Belgium and Rembrandt with the Netherlands quickly became institutionalized in Dutch and Belgian historiography. Even the celebrated Johan Huizinga wrote—without any reservation—that ‘you grasp Rembrandt through the Netherlands, and the Netherlands through Rembrandt’ ([Huizinga 1941](#), p. 150).

Seventeenth century Netherlandish painting and painters would—in terms of classification—suffer the same fate as its most famous artists. Whereas contemporary biographers like Van Mander, De Bie, and Houbraken still spoke about Netherlandish artists indiscriminately, nineteenth century biographers like Kramm started to subdivide them into Dutch and Flemish artists. This practice has continued until today. As a result, the Flemish Baroque painting and Dutch Golden Age painting are almost always studied in separation, as distinct phenomena. However, there are some notable exceptions. [Briels \(1987, 1997\)](#), for instance, demonstrated that many Dutch Golden Age painters were actually of Flemish descent and consequently, he argued, Northern Netherlandish painting was strongly rooted in Flemish traditions. The work of Briels was the onset of a gradual rethinking of the ‘North–South divide’ in the history of seventeenth century Netherlandish art by many scholars. Most explicit in this rethinking were [De Clippel and Vermeulen \(2015\)](#) who called for a more integrative history of Dutch and Flemish art. Their research project *Cultural transmission and artistic exchanges in the Low*

Countries, 1572–1672 yielded a number of studies that highlighted the interconnectedness of painting in the Dutch Republic and the Habsburg Netherlands from various perspectives.



Figure 2. Rembrandt, *Christ in the Storm on the Lake of Galilee*, 1633, oil on canvas, Isabella Stewart Gardner Museum (stolen), artwork in the public domain.

With the present study, we continue in this line of research. Considering the current developments in the historiography of seventeenth century Netherlandish art, the question arises how the painting industries in Antwerp and Amsterdam, the main artistic centers of the Netherlands, actually compared. Were they comparable in size, development, and social structure? To which extent were those industries connected by means of migration? Furthermore, thinking of painting as an industry also allows us to take into account broader spatial and economic developments. This is particularly relevant in the case

of Antwerp and Amsterdam, because after 1585 the latter city took over the former's position as the most important gateway in the Northern European trading system (Lesger 2006). Antwerp's economy, however, experienced a remarkable revival in the first half of the seventeenth century, a period often referred to as the Indian Summer of Antwerp's Golden Age.

2. Data

The sharp distinction being made between Dutch and Flemish art is obviously an important reason why a comparative analysis, let alone an integrated analysis of the painting industries of Antwerp and Amsterdam, is still lacking. Another reason is data. What we need for such a comparison is structured data on all the persons involved in this trade, some of their characteristics (occupations, periods of activity, et cetera), and preferably also data on the relations between these persons. Considering that besides Rubens, Rembrandt, and of course Jan Jansz. Uyl, more than 4000 other painters have been active in Antwerp and Amsterdam during this period, one will understand that this is by all means a very tedious task. Nevertheless, we accepted this challenge, and over the past years we have collected such data on a very large portion of the painter populations of Amsterdam and Antwerp in the sixteenth and seventeenth centuries. These data were structured and stored in a prosopographical database and web resource called ECARTICO.²

ECARTICO has its roots in a research project on history painting in Amsterdam in the mid seventeenth century. While building a research database—which was quite limited in scope—for this project, we were so fortunate that the late Pieter Groenendijk was willing to share his data that were collected to draw up a lexicon of Netherlandish visual artists from ca. 1475 to ca. 1725 (Groenendijk 2008). As a consequence, we were able to build a data set with a much wider scope than originally intended. In consecutive projects, we also added data on book sellers, printers, publishers, sculptors, gold- and silversmiths, and other representatives of the 'creative industries'. Currently, ECARTICO is being further developed as a central Linked Open Data resource for Golden Agents, a digital research infrastructure for the Dutch Golden Age (Brouwer and Nijboer 2018).

In its design, ECARTICO is being geared toward the aggregation and grouping of biographical data. In this objective, it takes a different approach than documentation systems that are primarily designed for storage and retrieval of single data. Both our data model and our data entry policy are focused on avoiding, for instance, non-standardized input and duplicate entries. In case of uncertainty, this offers less room to leave things open for interpretation by the (human) end user. Choosing data consistency over expressiveness at the level of single facts, however, ensures more reliable results at higher levels of aggregation.

Currently, the database contains biographical data on more than 45,000 persons, of whom more than 9100 are labeled as painters. Unlike traditional art historical resources which are biased toward artists whose works are still known, we also included data on minor artists whose names are only known from written sources. By including all persons who are mentioned as 'painters' in written sources, we also included data on painters who may actually have been house painters. That is not just an imperfection to be accepted for the sake of inclusiveness, but rather an acknowledgement of the fact that in the sixteenth and seventeenth Low Countries there was often a gliding scale between minor artists and ordinary house painters (Mund 2005; Bakker 2011).

In the past years, we have extensively corrected the existing data and added many data on the relatives of artists and on visual artists that were not covered by the original Groenendijk data. We have done extensive research on the Amsterdam baptism, marriage, and burial registers in the past years. This has yielded a lot of new data on Amsterdam painters in the Dutch Golden Age. In 2010, we had data on 1010 painters who had been active in Amsterdam in the seventeenth century (Nijboer 2010); at the time of writing, this number has risen to 1744. Unfortunately, the admission

² <http://www.vondel.humanities.uva.nl/ecartico/>.

ledgers of the Amsterdam guild of Saint Luke have not survived the ravages of time. Regarding Antwerp, however, these lists—although with a few omissions—are still at our disposal, and they were published by [Rombouts and Van Lierus \(1864\)](#). These *Liggeren* are not completely covered by the ECARTICO database yet. However, current coverage is well over 90%, and data processing on Antwerp painters is steadily proceeding. We expect to have covered the *Liggeren* and auxiliary resources (e.g., [Duverger 1984](#); [Van Hemeldonck 2007](#)) more completely in the course of 2020.

The ECARTICO database is accessible through an online interface. Web users can browse through individual records, but they can also use several tools to visualize and analyze the data. All these tools run directly against the database. In the following section, we use these tools to provide some new insights into the topic under discussion. Keeping in mind that we are dealing with data that are not complete, we provide some provisional statistics on the Antwerp and Amsterdam painter populations in the sixteenth and seventeenth centuries.

3. Counting Painters in Antwerp and Amsterdam

Using the (dated) work locations documented in ECARTICO, we can calculate the total number of painters that were active in a given place for each year. In Figure 3, we have plotted these numbers for Antwerp and Amsterdam between 1500 and 1700. Since we are dealing with incomplete data, these numbers are of course lower boundaries above which the actual population size has to be estimated. The plotted numbers for Antwerp between 1585 and 1590 are expected to be very close to the actual population size because there are two fairly complete lists of guild members for that period and because extensive research has been done on the painter population of that period. Outside of this range, we expect the actual population sizes to be higher than the plotted numbers. Going back further in time, the difference is likely to become more significant.

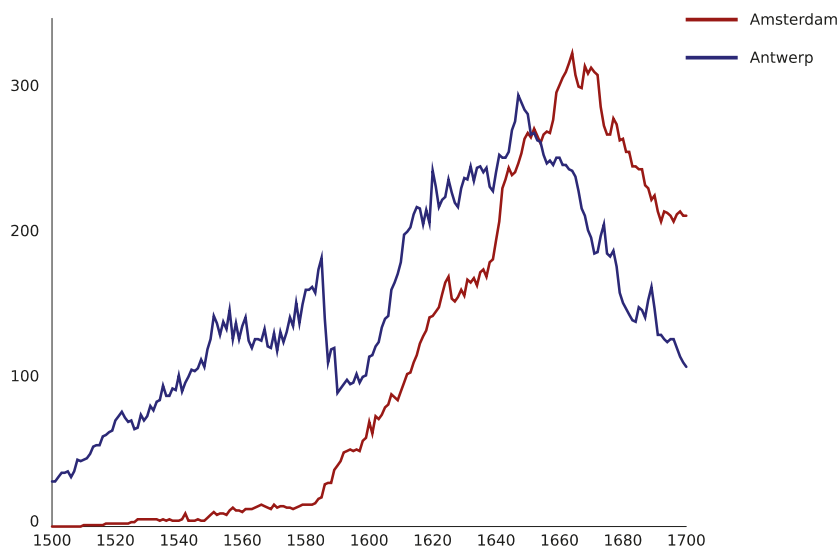


Figure 3. Number of painters active in Antwerp and Amsterdam, 1500–1700. Source: ECARTICO, date accessed 10 April 2019.

Notwithstanding that they represent lower boundary estimates of actual population sizes, the curves plotted in Figure 3 reliably reflect the demographic trends of the two painter populations under consideration. Since we are dealing with two finite populations that are already extensively

covered by the available data, additional research and data entry will lift the curves but is not likely to significantly alter their shapes.

Until the last two decades of the sixteenth century, the chart does not show a very surprising pattern. While Amsterdam was still an artistic center of modest importance, Antwerp developed into an important market for art while becoming the main commercial metropole north of the Alps (cf. [Vermeylen 2003](#); [Martens and Peeters 2006](#)). The only thing that might be surprising is that the data collected so far suggest that the Antwerp painter population stagnated from circa 1550 onward, the more so since we may safely assume that the peak in 1585 can be attributed to the sampling bias described above. We have considered the possibility that this phase of stagnation could reflect a lack of sources, since the *Liggeren* are very incomplete for the 1560's. However, if we narrowed the Antwerp painter population to only painters whose works are known, the curve would indicate a similar phase of stagnation, and the 1585 peak would disappear.

Therefore, the stagnation of the Antwerp art market may well have predated the religious, military, and political events and developments that had such a profound effect on artistic life in Antwerp: The rise of Protestantism and the revolt of the Dutch against their ruler, the king of Spain. After the iconoclasm of the 1566 *Beeldenstorm* and the looting of the city by Spanish troops in 1576, Antwerp took the side of the rebels in their struggle against the king of Spain from 1579 onward. In 1581, Calvinism became the official religion of the town. Antwerp had a good starting position to become the leading city in the independent Dutch Republic. However, on 17 August 1585, after being besieged by Spanish troops for fourteen months, Antwerp surrendered to the Spanish Crown. Protestant inhabitants of Antwerp were offered the choice to reconcile with Catholicism or to leave the city. Many chose the latter option.

Emigration and the fact that very few painters entered the trade in the years following 1585 had a dramatic effect on the Antwerp painter population which decreased in size by about one half. Meanwhile, the Amsterdam painter population rose rapidly in size. Shortly after 1590, the Antwerp and Amsterdam painter populations were almost comparable in size. At the same time, the Antwerp painter population started to grow again and—according to the chart—continued to be larger than that of Amsterdam for six decades. Recalling that much more data have been processed on Amsterdam than on Antwerp, we may safely assume that the latter city stayed ahead of the former until the late 1640's. Only after 1650 did the Amsterdam painter population surpass that of Antwerp.

The continuing importance of Antwerp compared to Amsterdam between circa 1590 and circa 1650 is one surprising outcome of this time series. Even more remarkable is that the growth of the painter populations in Antwerp and Amsterdam between 1590 and 1620 runs almost perfectly parallel, and between 1620 and 1640 both populations suffered from an almost equal phase of reduced growth. This similarity in development means that both the 'restoration' of painting in Antwerp and the 'rise' of painting in Amsterdam *cannot* be explained by focusing on mere local conditions (and specifically local demand) as has been done so far (e.g., [Bok 1994](#); [Timmermans 2008](#); [Sluijter 2009](#); [Nijboer 2010](#)). Instead, the pattern discussed here points at a high degree of market integration, something that is also evidenced by the lively trade in Antwerp (and Mechelen) paintings in the Dutch Republic and the frequent travels by Antwerp painters and art dealers to the north (cf. [Duverger 1968](#); [Sluijter 2009](#); [Rasterhoff and Vermeylen 2015](#)).

4. Migration

Most historians will agree that the Fall of Antwerp in 1585 was a pivotal event in the shift of the economic focal point of northwestern Europe from Antwerp to Amsterdam. In the years following 1585, about 38,000 people left the city ([Briels 1985](#), p. 80). Briels has argued in several publications ([Briels 1971, 1974, 1985, 1987, 1997](#)) that the flux of (mostly) religious refugees was instrumental in the actual relocation of commercial activities, including painting, from the Southern to the Northern Netherlands. [Gelderblom \(2000\)](#), however, has shown that most merchants originating from the Southern Netherlands, who were active in Amsterdam in the late sixteenth and early seventeenth

century, were relatively young when they settled in Amsterdam and that they arrived with modest capital. *van der Linden* (2015) analyzed the 1584/85 Antwerp painter population and concluded that only a minority of the painters left the city after 1585. Moreover, painters with an established reputation were even more likely to stay, and when they left, they did not go to Amsterdam. Similar reservations with regard to the claims by Briels have been made by *Sluijter* (2009).

When we take a look at the figures for Amsterdam in the period 1585–1620 (Table 1), we find more ground to be critical about the thesis of Briels. In this period, we have evidence for 321 painters being active in Amsterdam, from whom 61 were born in Antwerp. However, the number of painters that had actually been working in Antwerp prior to settling in Amsterdam was much lower: Only 32 on a total of 321. When we narrow the period under investigation to 1585–1600, Antwerp links become a little more prominent, but even then it is clear that the growth of painting in Amsterdam in the years following 1585 was certainly not the result of the relocation of painter workshops (or to put it in the abstract: Production capacity) from Antwerp to Amsterdam.

Table 1. Painters in Amsterdam and their relation to Antwerp, 1585–1600 and 1585–1620.

	1585–1600	1585–1620
Total number of painters active in Amsterdam	112	321
Born in Antwerp	31	61
Active in Antwerp prior to settling in Amsterdam	24	32

Source: ECARTICO, date accessed 10 April 2019.

Notwithstanding this conclusion, Antwerp born artists were conspicuously present within the Amsterdam painter population of the late sixteenth and early seventeenth century. However, there was a much wider area from which Amsterdam painters were recruited.³ Amsterdam was an immigrant town and remained so for the rest of the seventeenth century. This was in sharp contrast with Antwerp where most artists were natives, as is illustrated in Table 2.

Table 2. Number of painters in Antwerp and Amsterdam according to place of birth, 1600–1700.

	Native	Non-Native	Unknown
Amsterdam	640 (37%)	909 (52%)	195 (11%)
Antwerp	534 (36%)	155 (10%)	811 (54%)

Source: ECARTICO, date accessed 10 April 2019.

Throughout the seventeenth century, the Amsterdam painting industry was much more open to outsiders than the Antwerp industry. This is also reflected in the degree to which the trade of painting was handed over from father to son (Table 3). The number of painters in Antwerp who were both natives of the city and sons of painters was large in both a relative and absolute sense. This indicates that the Antwerp market for paintings was much more than its Amsterdam counterpart an insider's market. This implies that both markets were quite different in terms of information asymmetries, market access, and competitiveness, but there is no reason to assume that such differences in market conditions seriously affected the economic performance of the painting industry of one city over the other. More important is the implication that the painting industries of Amsterdam and Antwerp evolved around different stocks of social capital.

Recent contributions to social capital theory state that networks of tight interpersonal relations (bonding social capital) are beneficial to enhancing high levels of mutual trust and the formation of informal institutions that make markets operate smoothly. However, such networks are also susceptible to lock-in effects (situations in which the costs of change are higher than the benefits of

³ See also the zoomable map on: <http://www.vondel.humanities.uva.nl/ecartico/analysis/?task=origin>.

change). Networks of loose and outward interpersonal ties (bridging social capital), on the other hand, tend to facilitate innovation and access to new opportunities (Knorringa and Van Staveren 2006; Wang et al. 2016).

When, like in Antwerp, economic and artistic activities are embedded in a local network of strong interpersonal ties, relocating such activities is likely to result in a loss of social capital. That makes insider markets relatively resistant to external shocks, like the Fall of Antwerp, because leaving would simply cost too much (cf. van der Linden 2015). On the other hand, as De Marchi and Van Miegroet (2012) have recently argued, because of the strong kinship ties, the Antwerp art market was also characterized by a tendency toward risk avoidance and rent seeking behavior. As a result, painters in Antwerp were less equipped to deal with internal shocks, like a drop in demand. The heterogeneous and loosely connected painter population of Amsterdam had more and better opportunities for exploring new directions when the market called for change. This might well have been one of the reasons why the Antwerp painter population was surpassed by that of Amsterdam after the market for Netherlandish paintings had reached its summit between circa 1640 and 1650.

Table 3. Painters that were painters' sons, Amsterdam and Antwerp, 1600–1700.

		Number of Painters	Number of Painters Who Were Painters' Sons	
Antwerp	Natives	534	212	(39.7%)
	Other	966	79	(8.2%)
	Total	1500	291	(19.4%)
Amsterdam	Natives	640	124	(19.4%)
	Other	1104	168	(15.2%)
	Total	1744	292	(16.7%)

Source: ECARTICO, date accessed 10 April 2019.

5. Conclusions

In this short paper, we have set a first step toward the systematic comparison of the painting industries of Antwerp and Amsterdam in the sixteenth and seventeenth centuries. Using aggregates of the biographical data stored in the ECARTICO database, we have demonstrated that even a rather straightforward analysis of the Antwerp and Amsterdam painter populations yields important new insights into the development of the two most important artistic centers in the Low Countries between 1500 and 1700. By using the same data, we could also provide some new metrics on the impact of migration and on the social cohesion of both populations.

To summarize our most important findings:

1. The Antwerp painting industry recovered quickly after 1585, and Antwerp continued to be the leading center of painting in the Low Countries until the late 1640s.
2. The Amsterdam painting industry grew parallel to that of Antwerp between 1600 and 1640. This might indicate that the painting industry in Amsterdam was still in many ways dependent on Antwerp as the main center for the production and distribution of paintings in the Low Countries.
3. The migration of painters from Antwerp to Amsterdam after 1585 did not involve a large relocation of established production capacity.
4. The Antwerp painter population formed, as compared to Amsterdam, a rather cohesive social group. This strong cohesion might explain why the Antwerp painting industry quickly recovered after 1585. On the other hand, the relative weak cohesion of the Amsterdam painter population might explain why Amsterdam painters were better equipped to deal with the changing market conditions after 1640.

At a methodological level, we have demonstrated in this paper that datasets with structured biographical data can be used to map the development and social structure of industries, and that

as a consequence the research potential of such data collections goes beyond the retrieval of single data. We acknowledge that data quality, both in terms of accuracy and coverage, is a serious issue when using data in such a manner. A more inclusive data collection strategy is definitely needed to overcome the bias induced by the biographer's gaze in traditional biographical resources. On the other hand, we should not be too afraid of incomplete data either. As always in the statistical analysis of economic or social data, one should be aware that incomplete or inconclusive data may undermine the value of outcomes at the level of absolute numbers at a given point in time. However, our main concern has been long term trends and changes over time. In this respect, even incomplete data sets may reveal patterns that are unlikely to change after additional data entry. Moreover, even provisional results can guide us into further research and data collection.

In future papers, we will explore other methods and techniques to deal with the very rich data that are already present in ECARTICO. Meanwhile, we will continue to review, update, enhance, and expand our data. More data on basic biographic properties like life dates, places of birth, and places of death, especially for the Antwerp painter population, would help to strengthen or weaken the conclusions reached in this paper. Future research should, of course, include other towns as well. Furthermore, it would be interesting to investigate whether other creative industries in Antwerp and Amsterdam like printmaking, gold- and silversmithery, and the book trade developed in a similar way as the painting industry.

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Article

Innovative Exuberance: Fluctuations in the Painting Production in the 17th-Century Netherlands

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Abstract: The surprising and rapid flowering of Dutch art and the Dutch art market from the late 16th century to the mid-17th century have propelled scholars to quantify the volume of production and to determine the source of its growth. However, existing studies have not explored the use of known paintings to specify and visualize the fluctuations of painting production in the Dutch Republic. Employing data mining techniques to leverage the most comprehensive datasets of Netherlandish paintings (RKD), this paper visualizes and analyzes the trend of painting production in the Northern Netherlands throughout the 17th-century. The visualizations verify the existing observations on the market saturation and industry stagnation in 1630–1640. In spite of this market condition, the growth of painting production was sustained until the 1660s. This study argues that the irrational risk-taking behavior of painters and the over-enthusiasm for painting in the public created a “social bubble” and the subsequent contraction of the production was a market correction back to a stable state. However, these risk-taking attitudes during the bubble time spurred exuberant artistic innovations that highlight the Dutch contribution to the development of art.

Keywords: painting production; Dutch Golden Age; social bubble; data visualization; big data; behavioral analysis; decision-making under risk; uncertainty

1. Introduction

From the late 16th century to the mid-17th century the sudden, meteoric rise of Dutch economic power was accompanied by the surprising and rapid flowering of Dutch art, paintings in particular. During the Dutch Golden Age, the volume and the variety of genres and styles of the painting production reached unprecedented levels (Van der Woude 1991; Montias 1990). Although it has been suggested that the Dutch art market reached its pinnacle around 1660 and collapsed after the 1660s (De Vries 1991; Bok 1994, 2001), scholars have not yet been able to elucidate the exact trend and fluctuations of painting production in the Dutch Republic. Due to the lack of historical sources on the painting production, existing studies either extrapolate the available materials to fill the missing data (Van der Woude 1991; Montias 1990; De Marchi and Miegroet 2006, 2014), or use the number of painters in the Republic to indicate the size of the art market (Rasterhoff 2017; Nijboer 2010). Nonetheless, both approaches are subject to a wide margin of error and are yet to yield convincing results (Brosens and Stighelen 2002). Meanwhile, several photo archives of paintings were digitalized and published online in the past years, which have offered an alternative framework for estimating the painting production using comprehensive modern databases. Yet, except for Bok (2002) study on portraits, no existing studies were able to utilize big data on paintings to provide new insights into the trend of painting production.

This research aims to fill this gap by analyzing big, art historical data to bring the scholarship of the Dutch art market into the digital realm. Even though art history is said to be a discipline

that is reluctant to emerge fully into the new digital world (Zorich 2013), digital art historians have already demonstrated how computational methodologies could shed new lights on the existing debates (Lincoln 2016; Klinke et al. 2018, etc.). Extending the digital art history scholarship into the study of the art market in the Dutch Golden Age, this research will employ computational methods and data visualization to facilitate observations of painting production. In particular, I will combine the quantitative analysis through data mining with the qualitative examination of historical sources. This study will first illustrate the trend of painting production in the Golden Age by visualizing the number of surviving/documented paintings produced over time. Then, the observations derived from the data analysis will be interpreted with historical evidence which forms hypotheses using theories in economics and social sciences. In this way, I hope to bridge the digital and traditional art historical scholarships of the art markets of the 17th-century Dutch Republic.

2. Data on Painting Production

The data for this research is drawn from the visual collections preserved in the Netherlands Institute of Art History (RKD). The online version, *RKDImages*, features broad and deep collections of photographs and reproductions of paintings by Dutch and Flemish artists from 1400 to 1800. In particular, it contains more than 55,000 paintings (including copies of known attributed paintings) produced between 1550 and 1750.¹ Together with the images of paintings, the RKD has released meticulous curatorial data about its collection, amenable to computational processing. This research employs the *RKDImages* data acquired through the public API and uses R for data processing and visualization. It must be noted that while the RKD collection has remarkably rich holdings, it cannot be regarded *perfectly representative* of the full range of paintings produced in the 17th century. For example, the quality of the paintings may have played an important role in determining what was carefully preserved and what was not.² RKD's own collection history may exacerbate this survival bias and inevitably introduces a selection bias favoring the high-quality paintings or the famous Dutch artists of the 17th century. Even though still far from a perfect database, the *RKDImages*, with its sheer volume, wide coverage, and diverse sources, has grown to be viewed as one of the most complete repositories for surviving and/or identified Netherlandish paintings. Building onto the 19th-century photo archives, the *RKDImages* covers collections in both public and private holdings and is even able to include the now-lost paintings with only photocopies survived. The RKD database provides an unprecedented opportunity to test, at a larger scale, the existing observations of the 17th-century Dutch art market derived from studies using different sources and approaches.³ Mining this database to calculate painting production will offer a novel perspective, going beyond the scope and scale that previous scholars could ever reach.

As the quantitative analysis in this study inevitably inherits the biases from the *RKDImages*, it would be ideal to compare it against contemporary archival records.⁴ If an inventory-based sample was to exhibit similar characteristics to the RKD sample, we could be more confident that the trend is not simply an artifact of the source (De Vries 1991). Therefore, this study will use the inventories in the Getty Provenance Index as a reference.

¹ *RKDImages*, contained 55,718 unique paintings in the dataset acquired via the RKD public API, accessed February 2018.

² The low-quality paintings, such as “works-by-the-dozen” (*dosijnwerck*) had a much lower survival rate than those of Rembrandt or Vermeer and are thus under-represented in the modern database. Jager (2016) lifts the curtain to the lower segment of the art market for which the “works-by-the-dozen” were produced. Yet, the inventories of few art dealers can hardly be a representative sample to quantify the degree of distortion in the RKD database.

³ Cf. (Van der Woude 1991; Montias 1990; De Marchi and Miegroet 2006, 2014; Rasterhoff 2017, etc.)

⁴ However, there is no thorough survey of all archival inventories, and the majority of known inventories were collected to suit art historical interests and are biased towards the collections of the wealthy with more works of art in the few large cities. The inventories in the Getty Provenance Index only has inventories from Amsterdam, Haarlem, Utrecht, Leiden, and Delft with a focus on the inventories in Amsterdam. As a result, they cannot truly reflect the collecting pattern of the whole society and are therefore also a biased sample (Montias 1996).

3. A Probability Approach to Account for Uncertainties

Mining the new dataset also imposes new challenges—the approximate dating of paintings, as an art historical tradition, for the first time, becomes an issue that may impair the accuracy of the estimation of painting production over time. Unless the paintings were dated by the artist or were accurately recorded in contemporary sources, the cataloged date of a painting is often a result of connoisseurship and scholarship. As a common practice in art history, dating paintings to a time period reflects a certain degree of tolerance of uncertainties in art historical research given the limited historical sources. Only one-third of the *RKDimages* collection is dated to a specific year, leaving the majority either dated to a time period or the active period of the artist. Striving for a more accurate estimation of the production trend by year, it is essential to minimize the impact of the imprecise dating of paintings on the calculation.

The common method of dealing with approximated dates is to pick the average/medium year of the period. This arbitrary approach, however, introduces biases from the number heaping—rounding numbers to the nearest 5 or 10—as art historians are inclined to date paintings to a five- or ten-year period (De Moor and Zuijderduijn 2013). To avoid the number heaping problem, this research takes a probabilistic approach, assuming an even distribution of probability that the painting j was created in each year of its assigned time period.

$$prob_j = \frac{1}{\# \text{ of years in dated period}} \quad (1)$$

The undated paintings with attribution are assigned to the active period of the artists, and the undated, unattributed paintings in the *RKDimages* are often dated to a time period ranging from 25–100 years, which this study employs.

The painting production of year i is thus the sum of all paintings R dated to a period including year i .

$$Production_i = \sum_j^{j \in R} painting_j \times probability_j, \quad (2)$$

This probabilistic approach tries to acknowledge and to accommodate the uncertainties in dates without making arbitrary selections within an assigned time period. Admittedly, this approach is still a proxy of the trend of the actual production each year and contains biases if intended for short-term analysis or a small number of paintings; but for a longer period using tens of thousands of paintings, it could still provide a relatively accurate picture of the general trend of production levels.

This research further divides the total production into five major painting genres commonly used in the historiography of art history: history painting (including mythology, classical history, biblical stories, and religious scenes, etc.), portrait, landscape, still-life, and genre (also known as scenes of everyday life, and others). Although the RKD does not assign genres to its collections, each painting in the *RKDimages* has a title that often explicitly indicates a subject matter (e.g., Landscape with river scene), and is tagged with a series of keywords describing the content (such as river, boat).⁵ The RKD uses a hierarchical-structured vocabulary from Getty's *Art & Architecture Thesaurus*® (AAT) for the keywords and assigns them to each painting in a systematic way, which minimizes the biases introduced by the heterogeneity in labeling. Using titles and keywords, the whole *RKDimages* catalog is categorized into the five painting genres, and the painting production of each genre is calculated using the same approach.

⁵ The categorization of genres in this study follows the main genre described in the RKD database. For example, a landscape with the staffage figures embodying a religious lesson is still regarded as landscape instead of history painting.

4. Production Trend Visualized

Applying the probabilistic approach to the *RKDimages* database, I am able to revisit the question that has long intrigued art and economic historians—how did painting production evolve in the 17th-century Dutch Republic? With this new source, Figure 1a shows the total production trend, indicated by the number of paintings in the RKD database. This visualization tallies the trend of the active painter population in the Dutch Republic (Rasterhoff 2017), corroborates the pattern described by De Vries (1991) and parallels the Republic's economy in the same period (Israel 1997). Beyond confirming existing studies, the trend that emerged from the *RKDimages* offers more details. Figure 1a demonstrates a steep climb in painting production in the first three decades of the 17th century, which stumbles after 1630. Figure 1b shows the first derivative of the painting production from Figure 1a which indicates the growth rate of painting production. It, too, shows in the first three decades of the 17th century, the painting production grew in an accelerating pace, before hit the wall around 1640, when the growth rate almost dropped to zero. This stagnation shows an early sign of saturation in the art market given the fact that the population of painters underwent a spectacular increase at the same time as Rasterhoff (2017) observed. Remarkably, the production managed to break through and embraced another stage of rapid growth, although at a slightly lower and diminishing rate, in the following two decades (the growth rate see Figure 1b). In the mid-1650s, the growth rate dropped below zero—the contraction started. After the 1660s, a sharp downturn is observed in Figure 1a, as De Vries (1991) suggested using the number of painters active in the Dutch Republic, the fall was more abrupt than its growth (see Figure 1b). The recession of painting production went on till the end of the century; yet, beyond the plummet that De Vries (1991) observed, the decline slows down after 1675, and painting production became stable by the end of the century (the growth rate went back to zero). By the end of the century, the production level returns to that of the 1620s before the explosive growth, making the collapse more like a return to the stable state, which I will elaborate on in Section 7.

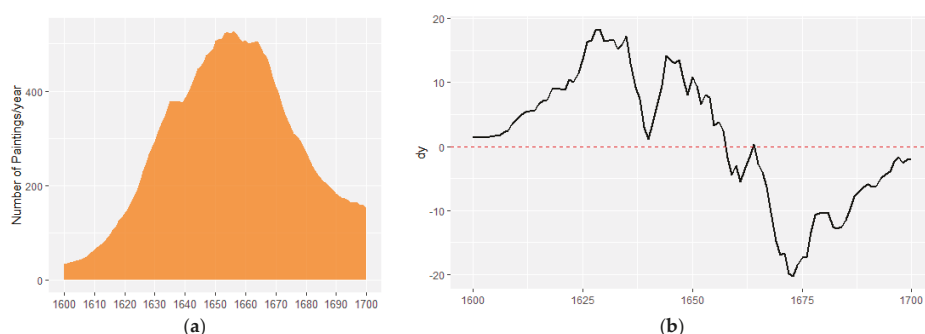


Figure 1. (a) Painting production trend 1600–1700 (5-year moving average). Source: *RKDimages*, accessed February 2018; (b) First derivative of Painting production trend in Figure 1a (5-year moving average).

To compare with the trend revealed in the *RKDimages*, the number of paintings in the inventories in the Getty Provenance Index together with the total number of inventories are shown in Figure 2, which resembles the pattern of Figure 1 but with a lag of 10 years. This lag fits Montias's estimation that the works of art in probate inventories were acquired, on average, 10–11 years before the date of the inventory (Montias 1996). After 1670, a preference for collecting works of the “old (deceased) masters” over those of living masters was observed by Montias. Hence the inventories after 1670 may have suffered from inflation from the secondhand paintings.

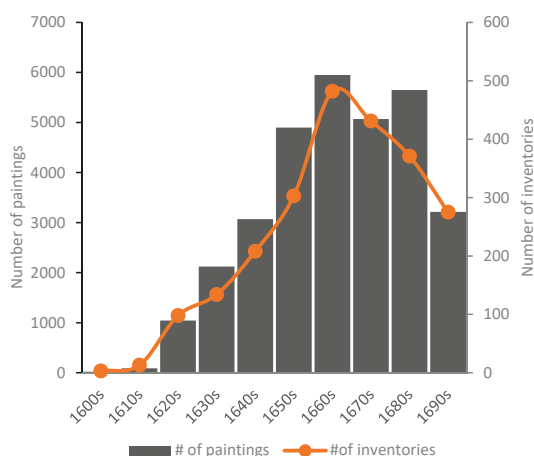


Figure 2. Paintings in the Getty Provenance Index 1600–1700. Source: Getty Provenance Index, accessed February 2018.

The production trend in Figure 1 is almost perfectly correlated with the total number of painters in the *ECARTICO* database, a source used by [Rasterhoff \(2017\)](#) and [Nijboer \(2010\)](#) (Figure 3), with a correlation coefficient of 0.99 at the 0.01 significance level. As the inventory-based sample and painter's population both indicate a similar trend as Figure 1, I am more confident that the RKD data should be able to accurately reflect the production trend of Dutch paintings in the 17th century. The observed biases are most likely random, especially in the short run, and therefore only impact the scale of production without distorting the trend.

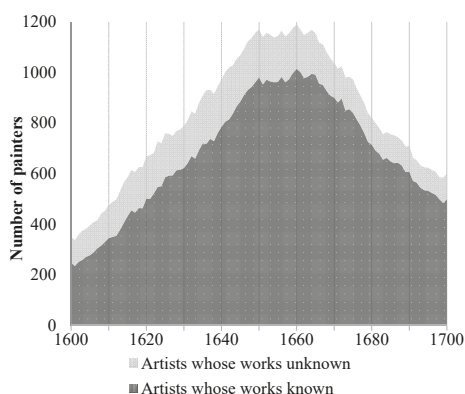


Figure 3. Number of painters active in the 11 big cities in the Dutch Republic, 1550–1750. Source: *ECARTICO*, accessed February 2018 (5-year moving average).

On top of the overall trend of production, the *RKDimages* allows me to further explore the production trend by individual genres (Figure 4). The variation in the fluctuations for each genre is evident: The difference in the magnitudes of production suggest that each genre developed at its own pace, and partially corresponded to the overall production trend. In general, all genres experienced rapid growth from 1610 to 1635 and managed to push through the stagnation, with landscape paintings taking the lead, and reached new heights between 1650 and 1660 before facing the fall.

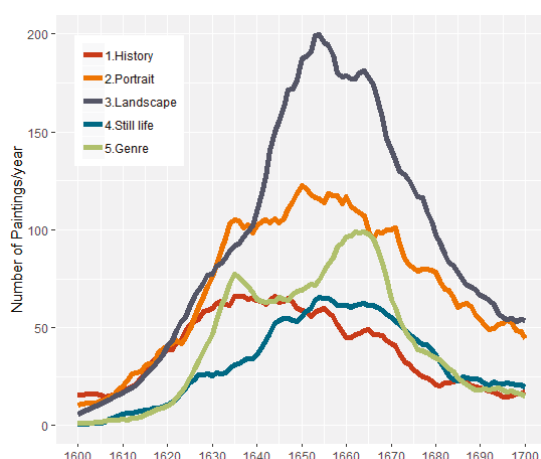


Figure 4. Painting production trend 1600–1700 (5-year moving average) separated by genre. Source: see Figure 1.

Except for history painting, the production trends of different genres are closely correlated, presumably driven by the same factors. History painting (religious painting included), on the other hand, reached its peak around the 1640s and started to decline gradually while the others still enjoyed rapid growth for the next two decades. In particular, history painting, which started as the most-produced painting genre at the beginning of the 17th century (red line in Figure 4), was soon sidelined by other genres, which verifies Bok (2008) observation derived from inventories. The secularization of the demand in the protestant Republic seems to have shifted painters and their customers from the sacred to the secular, turning to depict and to appreciate the mundane world, especially landscapes, which, by the 1640s, outshone other genres in terms of production, revealed both in Figure 4 and in the inventories in Bok (2008) study. The dominant position of landscape painting (grey line in Figure 4), “a worldly art” as Westermann (2005) called it, echoes Svetlana Alpers’s controversial argument that the 17th-century Dutch art “turned to describe the world seen” (Alpers 1983). For the “modern” arts that were introduced around the turn of the 17th century, still life painting followed almost the exact same trajectory of development as landscapes, with 0.99 correlation, presumably driven by the same “worldly” forces. As for genre paintings, the camel-hump-shaped production trend matches two phases of the development of this genre. The first generation of portraying merry companies, as Kolfin (2006) observed, was losing public interest due to the lack of innovation, and by the mid-1640s stagnated both in quantity and quality. Amazingly, the genre overcame this impasse around 1650 with a new generation of artists, led by Gerard Dou, who applied more refined styles, themes, and techniques, catapulting this genre to new heights and making the second growth spurt even more significant than the first one. Finally, portraits, which faced the steadiest demand compared to other genres, enjoyed growth in numbers and suffered less after the collapse with a relatively mild decline.

The number of paintings as a measurement of production inevitably overlooks the heterogeneity in paintings: one monumental group portrait is treated the same as a small landscape painting hung above the door. Size, or the area of the painted surface, is known to have a high correlation with the efforts and time spent on painting (Bok 1998). Furthermore, the inventories of dealers sometimes abound the support size with their monetary value (“guilder size”, “26 stuiver size”), pointing out a direct link between size and market value (Bredius 1915–1922, vol. 6). Therefore, I further calculate the production trend using the

canvas area based on the width and length measurements recorded in *RKDimages* (Figure 5a).⁶ It shows that the production measured by area of the paintings follows the same trend as the production measured by number, with correlation coefficients of 0.95 or higher at the 0.01 significance level for each genre. Yet, the fluctuation in the production measured by size is more volatile, evident in history and portrait paintings (Figure 5b), perhaps due to the fluctuations of commissions. For genres that mainly served the open market (landscape, still life, and genre), the trends are much smoother. Surprisingly, portrait narrowly surpassed the landscape as the most-produced genre. Admittedly, the painted surface area only provides an alternative measurement of painting production. Furthermore, since the surface area is closely correlated with man-hours spent on the painting, this measurement also serves as an indicator for the labor cost of painters. Yet, given the complex and heterogeneous nature of the Dutch art market, this measurement is far from capturing every nuance in the production process. It warrants further investigation into the production measured by surface area separated by different market segments, styles, and techniques.

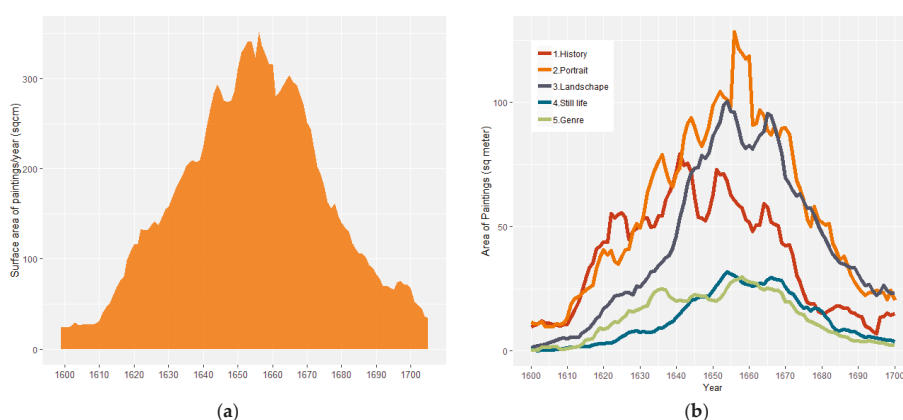


Figure 5. Painting production trend 1600–1700 by surface area (5-year moving average) stacked (a) separate by genre (b); Source: see Figure 1.

The meteoric growth of the painting production and the explosive expansion of the Dutch art market shown in Figures 1–5 have long propelled scholars to seek the source of its growth and the cause of its collapse. Over the decades, scholars from various fields have done extensive research into this phenomenon and offered numerous, often convincing and sometimes controversial, explanations from various angles. Historians tried the external historical factors such as economic prosperity, population growth, the secularization of demand for paintings, and the influx of skilled craftspeople from the Southern Netherlands (Prak 2008; Bok 2008). Cultural historians used fashion and taste (Fock 2007). Economic historians explored the market conditions and market forces in supply and demand (Bok 1994; Montias 1982). Yet, there are still unaccounted aspects in the existing explanations which are mostly rooted in the neoclassical economic theories of supply and demand. Current explanations fall short in explaining why the painter population kept growing after the market had already become saturated around 1635, and how they managed to break through the stagnation in the absence of internal and external shock. It is worth noting that most existing studies cling to the assumption of *homo economicus*, which supposes that agents in the art market behaved in exact accordance with their rational self-interest. However, such an assumption has been challenged by behavioral economists who have shed light

⁶ 96.6% of paintings in the *RKDimages* have size recorded in the dataset. The loss of data due to the change of measurements is thus negligible.

on the fact that economic agents only have bounded rationality and are subject to the effect of social, psychological, cognitive, and emotional factors (Kahneman and Tversky 1979, 1992, 2013).

The bounded rationality is confirmed by cultural economists that painters and other creative workers in the contemporary cases are willing to settle for a lower income to create more artworks, which is considered irrational in the economic sense (Caves 2000). Furthermore, collectors are often observed to be subject to several cognitive biases (Thaler 1993). These behavioral anomalies, i.e., systematic deviations from the Von Neumann–Morgenstern axioms of rational behavior, are considered to be one of the major characteristics of the contemporary art markets (Frey and Eichenberger 1995; Pesando 1993). In studies of early modern Netherlands, De Marchi and Miegroet (1994) have stressed the importance of studying the actual behaviors in the art market using the case of Antwerp. However, the interplay of social, cultural, and psychological underpinnings of the art market have not yet been fully explored to interpret the rise and fall of the painting production. To answer this question that emerged from the data analysis, in Sections 5 and 6, I will apply behavioral economic theories to show how painters, art dealers, and the public interacted in the art market and created loops of reinforcement, providing a new hypothesis accounting for the unprecedented painting production in the 17th-century Dutch Republic.

5. Becoming a Painter: Expectation and Risk

5.1. Painting as a Promising Profession

Behind the explosive growth of painting production in the first decades of the 17th century was the equally extraordinary rise in the painters' population, disproportionate to the overall population growth. Rasterhoff (2017) estimated that the average number of painters per 10,000 inhabitants in the ten largest cities in the Dutch Republic almost doubled from 7.9 in the 1610s to 14.9 in the 1640s, and the absolute number of painters active in the Dutch Republic grew seven-fold. By 1630, painting as a profession had already attracted aspiring painters even from well-to-do families with no background in artistic trades, such as Rembrandt's successful pupil Ferdinand Bol, who was born into a surgeon family (Sluijter 2015). Scholars have noted the long tradition of regarding painting as a respectable trade, which by itself, cannot fully explain the attractiveness of a painting career outside artist and artisan circles (Montias 1982). What else may have attracted so many young men to venture into the painting business?

Since the publication of Karel van Mander's *Lives* in 1604, the painter profession was buttressed with a respectable history filled with illustrious "old masters," reassured by Hendrik Hondius *Effigies* (1610) and Anthony van Dyck's *Iconography* (1630) that portrayed the famous artists. These books and print series seemed to promise each painter the chance to attain a similar status as their predecessors. The painting profession was glorified with public endorsements from numerous laudatory poems dedicated to painters. Famous painters were included in several prestigious city descriptions as a part of the city's pride.⁷ In 1642, Philips Angels published *De Lof der Schilderkunst*, claiming that the art of painting deserves even more praise than that of poetry, as painting is far more "profitable and useful" (*profijtelicker en nutter*) and can make good money for the artists and his family (Angel 1642).⁸ All of these publications may have boosted the expectations of painting as a liberal art and elevated the expectation of painting as a profession within and outside the artistic circles. The more people that

⁷ Cf. Hadrianus Junius, *Batavia*, Leiden, 1589 (the first city description in which painters were included as "famous sons" of the city); J.I. Pontanus, *Historische beschrijvinghe der seer wijt beroemde coop-stad Amsterdam*, Amsterdam 1614; Jan Orlers, *Beschrijvinge der stad Leyden*, Leiden 1641. Preacher Samuel Ampzing and theologian Schrevelius wrote in 1628 and 1648 respectively the praise for the city of Haarlem with several laudatory poems dedicated to painters.

⁸ Angel went as far as saying: "I win a lot of money, [as] I make large paintings." (*Ick winne machtich gelt, ick maecke groote stucken*). See (Angel 1642, pp. 28–29). Mentioned in (De Marchi and Miegroet 1994).

became painters, the more stories of successful artists appeared, which attracted even more aspiring painters and produced even more stories of success—a positive feedback loop was formed.⁹

In addition to the potential gain in fame and social status, economic incentives also played a role. An established master painter could expect to earn somewhere between 1000 and 2500 guilders per year, favorable when compared to the income of masters in many other trades (Montias 1982). Apart from the higher average income, certain painters were able to acquire such wealth and social status through painting that they could marry the Burgomaster's daughter, as in the case of Corstiaen van Couwenbergh in Delft (Montias 1982). Some painters in the 17th-century Dutch Republic seem to have high, if not excessive, expectations towards the value of their work and hence, as Boers-Goosens (2006) shows, demanded exorbitant prices. The marine painter Hendrick Cornelisz Vroom once quoted an astonishing fee of fl. 6000 for a large marine painting for the Amsterdam Admiralty, and the celebrated portrait painter Bartholomeus van der Helst tried to charge fl. 1000 for a family portrait, while 80% of the population earned less than fl. 600 per year (Boers-Goosens 2006). Rembrandt even wrote to Constantijn Huygens, the stadtholder's secretary, to demand a higher price for his Passion Series made for the stadtholder. Even though this excessive expectation of the price of paintings was often turned down, as in Boers-Goosens's examples (2006), the rare but successful stories of high charges were perhaps circulated among artists and other agents in the market, tempting the aspiring artists to believe they can do the same.

The superstardom of successful painters made the promised reward for painting so alluring that it may well have stimulated the enthusiasm towards this profession as a shortcut to wealth and status, even though the chance was slim. Ferdinand Bol, after climbing the social ladder through his brushes and palette and finally married to a wealthy widow, retired from painting (Sluijter 2015). But very few, if any, painters were able to copy Bol's success. Tempted by the elevated expectation of the profession, more and more aspiring painters joined workshops of the successful masters in different cities, like that of Rembrandt in Amsterdam, Abraham Bloemaert in Utrecht, Gerard Dou in Leiden, and Frans Hals in Haarlem, learning the art of painting. Rasterhoff (2017) called the masters' studios "incubators"; perhaps they can also be called *dream-factories*—where the apprentices line up hoping to become great masters in their own right and enjoy the same social and economic success of their masters. Even some painters who worked for the lower-end of the art market also fared very well in the financial terms—even better than their more famous peers. Jan Micker, who painted staffage for many cheap landscape paintings, owned a house on the Prinsengracht opposite the Noordermarkt, and another 1/3 of a house in the Langestraat nearby, both of which were prime locations at that time (Bredius 1915–1922, vol. 1; Sluijter 2015). Around the same time, the prominent still life painter, Willem van der Aelst, could only afford to rent two *bovenkamers* (upper rooms) in Bloemgracht, a working-class area in Jordaan in Amsterdam (Bredius 1915–1922, vol. 7).

Nonetheless, an expanding market with an increasing production usually leads to swelling competition and a diminishing marginal return. As early as the 1610s, competitive pressure in the Dutch art market intensified to the extent that local artists complained to the guild or demanded the establishment of new guilds to protect their privileges (Sluijter 1999; De Marchi 1995). These petitions from artists reveal the other side of the glorified painting profession—a competitive business full of uncertainty and risk (Dempster 2014). The enthusiasm and high expectations from the upper layer of the art market may have triggered a ripple effect to the lower segment of the art market with the help of the enthusiastic public who avidly collected paintings (to be discussed in Section 6), attracting young men to this lucrative and possibly promising trade.

⁹ More prominent painters (A++, A+ samples according to Rasterhoff's categorization) were born around 1590–1630, entering the market around the first decades of the 17th century (Rasterhoff 2017, p. 206, Figure 7.4).

5.2. Painting as a Risky Business

Becoming a painter involved considerable cost and significant risks. It was a very costly undertaking for the parents to pay for the full six years of apprenticeship required by the Guild of St. Luke. During his lengthy training, the apprentice was a sheer financial burden to his family, as hardly any income was generated, as opposed to most other kinds of trades in which the apprentice would do practical labor, producing goods and earning an income right away.¹⁰ Montias (1982) estimated that pupils who lived at home paid anywhere from fl. 20 to fl. 50 per year to their masters as tuition, while those living with their masters were charged between fl. 50 and fl. 100 (board and tuition), depending on the reputation of the master and the age and previous education of the pupil. Famous masters like Rembrandt charged a tuition fee up to fl. 100 per year, which is a considerable cost to ambitious pupils who expected a prosperous career. More importantly, this costly investment in education was no guarantee for becoming a skilled and artistic craftsman: Many apprentices never became independent masters, and, as a result, often disappeared from the records (Boers-Goossens 2001).¹¹ Pieter Cosijn (1630–?) paid fl. 350 to study with the Hague portrait painter Pieter Nason for a year and then got training in Antwerp at a rate of fl. 255 per year (Jager 2016). In spite of the huge investment in his training, Cosijn had no success in his trade and his wife ended up pleading with an orphanage that her husband could not feed his own children (Jager 2016).

However, the risk of embarking on a career as a painter is not limited to the topmost layer of the market. Apprenticeships at all levels involved financial risks to a varying degree depending on the cost of training. Aspiring painters and their families seem to have been aware of the risks and usually took smaller risks first by choosing less famous masters first—even Gerard Dou did not start his training with Rembrandt, but first with less-famous and thus less expensive painters before gradually advancing to better and often more expensive masters.

Even if the apprentice eventually became an independent master, the return on investment of training is still far from certain, since paintings are luxury goods, rather than substances, for which the demand is closely related to the economic situation. This uncertainty and dependency on external circumstances make professional painters vulnerable during times of economic downturn. Scholars have observed that many painters went bankrupt or died in poverty after the wars broke out (Bok 1994; Crenshaw 2006). Besides, the specialized training for some painters even exacerbates such a risk, as their painting skills are not versatile enough to adapt to the changes in the market. Houbraken (1718–1721, vol. 1) tells us an anecdote of the Utrecht fish still life painter, Jacob Gillig (1636–1701), who, after the *Rampjaar* of 1672 when the demand for his still life paintings vanished, tried to paint portraits, but was rejected by the sitter for the lack of likeness.

Furthermore, the lack of clarity in the development of taste and preference in the first half of the 17th century added even more uncertainties; and the art market, according to Nijboer (2010), was subject to a permanent state of “crisis.” Painters who produced paintings *on spec*, were even more vulnerable to the financial risk as they had to invest upfront, not only to pay for the painting materials but also for their opportunity cost of labor consumed. Many painters got into debt and encountered financial troubles, and some of them, including Rembrandt, went bankrupt (Crenshaw 2006; Rasterhoff 2017).¹²

Professional art dealers, who became more common in the 1630s and 1640s, were able to hedge some of the risks for the painters; yet they also reaped all surplus realized in the market. Art dealers were

¹⁰ An artist-painter (*kunstschilder*) was often literate and had attended school full-time for three years. After this initial investment in basic education, for which Montias has estimated an accumulated expense of fl. 150 to fl. 200, aspiring artists had to invest in an apprenticeship period. Some pupils finished their training with a trip to Italy at a considerable cost, which was often a privilege of the pupils from affluent families. For basic education see (De Jager 1990; Boers-Goossens 2001, p. 87). And for painting apprenticeships, see (Montias 1982, p. 169). For the entry barriers for artist, see (Rasterhoff 2017, p. 232). See also (Bok 1994, pp. 53–97).

¹¹ See ECARTICO for numerous cases for pupils of masters of whom we do not know their works.

¹² Jan Porcellis, Jan van Goyen, Frans Hals, Jan Steen, Hercules Seghers, Pieter de Hooch, Vermeer and Rembrandt have been found taking debts. See (Rasterhoff 2017, p. 237).

very much aware of the risks and tried to manage it as Van Miegroet and De Marchi (2012) demonstrated using the case in Antwerp. Beyond the normal business of buying and selling, dealers sometimes ordered works from artists in advance, agreed to pay a fixed fee for the artists' production during an agreed time, or even operated a "galley," getting artists to work for a fixed salary (Montias 1987, 1988; Bredius 1891).¹³ For artists, the dealers took a substantial part of the risk off their shoulders by acquiring their works in advance, and at the same time tied their hands and capped their profits.¹⁴

5.3. Decisions under Risk and Uncertainty

With the substantial cost and risk topped with the fierce competition in the art market, the economic man with the perfect, logical, deductive rationality, as assumed in neoclassical economics, would hesitate to take on the painting profession after the 1610s. However, Rasterhoff (2017) observed that the proportion of newcomers to total active painters started to increase in the 1620s without apparent grounds for a surge in demand for paintings while the economy wavered after the war resumed in 1621 (Goldgar 2007). Previous historians explained it as a result of the expectation of future demand (Bok 1994). However, this rational assumption cannot fully account for the inordinate tolerance to the risks brought by the costly investment and highly competitive and ever-changing art market. In fact, the painting production (Figures 1 and 5a) seems to have slowed down in the 1620s and stagnated in the 1630s.

Risk and uncertainty, as behavioral economists have illuminated over the past decades, affect human decision-making in a way that consistently diverges from neoclassical economic theories under the *homo economicus* assumption (Kahneman and Tversky 1979, 1992, 2013; Thaler and Sunstein 2008). Behavioral observations on decision-making can be traced back to Daniel Bernoulli's experiment in 1738, in which Bernoulli illuminated the bounded rationality of human nature (Bernoulli [1738] 1954; Kahneman and Tversky 1984). The influential prospect theory developed by Kahneman and Tversky (1979, 1992) arises as a descriptive model not only complicating Bernoulli's experiments, but also verifying the consistency of human behavior across time and culture. In particular, prospect theory points out exactly where Bernoulli's risk-averse utility model fails—when individuals are amid a crisis (Kahneman and Tversky 1992), a state which Nijboer (2010) used to describe the 17th-century Dutch art market. Prospect theory further explicates that decision-makers tend to take unreasonably high risks and reject favorable settlements when the promised gain is significant even though the chance of winning is very slim. Decision-makers often overrate small probabilities of winning and underrate large probabilities of losing, exhibiting non-linear probability estimation in the face of risk and uncertainty (Kahneman and Tversky 2013).

Even though prospect theory was developed from highly controlled experiments conducted in the modern Western world, their observations, such as the bounded rationality of human nature and the reduction in risk-aversion, were very present in the early modern Dutch Republic as we can observe from the notorious tulip mania and numerous legal and illegal lotteries spread across the entire country. Many aspects of the early modern Dutch economy echo the modern Western world. At the beginning of the 17th century, modern financial institutions like bank and stock exchange were established, and the derivatives and securities market was developed, revealing the capitalist root of the Dutch Republic (Petram 2014). Petram (2014) further suggests the derivative market tempted the

¹³ There are a handful of examples of such contracts. Just to name a few: In 1625, for instance, painter Jacques de Ville decided upon delivering fl. 2400 worth of paintings over the course of a year and a half to skipper Hans Melchiorz; in 1641, art dealer Leendert Volmarijn is known to have ordered thirteen pictures from Isaac van Ostade; art dealer Joris de Wijs contracted with Emanuel de Witte to paint for fl. 800 a year plus room and board (Montias 1988, pp. 65–66; Montias 1987, p. 99; Bredius 1891, pp. 56–57).

¹⁴ Samuel van Hoogstraten told the tale of Hercules Pietersz Seghers that Seghers sold a copperplate to an art dealer for very little money. The dealer, "after having printed a few copies from his plate he cut it into pieces, saying that the time would come that collectors would pay for one copy four times as much he had asked for the whole plate, which actually did happen because each print later brought sixteen ducat, [...] but poor Hercules did not get any of this" (Van Hoogstraten 1678, p. 312). Translation is taken from (Haverkamp-Begemann 1968, p. 8).

traders to take unbearable risks, like entering into a forward contract with no upfront payment with a prospect of possible profit. It was the exact same reason that triggered the 2008 financial crisis. Not to mention the fast and convenient public transportation system (*trekvaart*) which connected the whole country, smoothing the commercial activities and facilitating the flow of information (De Vries 1978). It is no wonder De Vries and Woude (1997) claimed that the 17th-century Dutch Republic was the first modern economy. Therefore, given the consistent observations of bounded rationality from Bernoulli to Kahneman, and the higher level of risk tolerance present in the capitalist, “modern” Dutch economy, prospect theory should be applicable, as a theoretical framework, to understand the behaviors observed in the 17th-century Dutch art market.

The world of painting is considered an economy of superstars wherein relatively small numbers of people earn enormous amounts of money and dominate the activities in which they engage (Rosen 1981; Caves 2000). Employing the Prospect Theory, I would argue that aspiring painters, attracted by the glorified rewards of the superstar painters, may have overestimated the chance of becoming a superstar themselves and underestimated the much larger possibility of ending up like the distressed painter in Adriaen Both’s drawing, who sits on a basket in ragged clothes with his family shivering in poverty (Figure 6).



Figure 6. Adriaen Both, *The distressed painter*, drawing, 1624–1640, 17.7 cm × 15.3 cm, British Museum (artwork in the public domain, Image © British Museum).

This behavioral hypothesis of the expansion of the art market does not deny the factors of the increase in purchasing power and demand or the fashion of collecting paintings that previous research elucidates. Rather, as I will show below, it was exactly the society-wide enthusiasm towards paintings that kept feeding the aspiring painters with the promise of legendary rewards and reinforcing the painters’ belief in reaching superstardom in their own right.

6. Collective Enthusiasm and Wide-Spread Endorsement

Dutch society, at least in certain segments, in the words of Sluijter (1991), “showed an incredible avidity for paintings.” A substantial number of households in inventories drawn in Leiden between 1625 and 1675 had between 100 and 250 paintings in their collections (Sluijter 1991). An increase in purchasing power is surely an important factor; so are taste and fashion for interior decoration. Yet, hundreds of paintings were far beyond the necessity to fill the blank walls of the houses. The *nouveau riche*—the affluent merchant class—may have imitated each other and mimicked members of higher

status, displaying strong herd behaviors towards collecting paintings (Veblen [1899] 1934). French writer and philosopher Samuel Sorbière observed an “excessive interest in paintings” (*l’excès de curiosité pour les peintures*) during his sojourn in the Dutch Republic during the 1640s (Martin 1901) and Constantijn Huygens wrote around 1630 in his childhood memoirs that people were “presently” confronted with paintings everywhere (Huygens 1987). Laudatory poems were versed around the famous collections of paintings, publicly endorsing both artists and their collectors. “Here is the stock exchange and the money, and the love of art” (*Hier is de beurs en ’t geld en liefde tot de kunst*), wrote Thomas Asselijn in 1653 for a festive occasion in Amsterdam where painters, poets, and art lovers gathered. This line underlines the city’s pride in its flourishing community of not only artists but also art lovers. The frenzy was in the air.

The collective enthusiasm is not limited to collecting arts: Scholars have observed from the surviving diaries of art lovers that it was a common practice for artists and art lovers to visit shops of painters and art dealers, to call on burghers with well-known collections, and to go to numerous auctions and fairs (Sluijter 2015; Roodenburg 2006). Houbraken (1718–1721, vol. 1) tells us the anecdote of Rembrandt being visited by art lovers while still living with his parents in Leiden. Pieter Codde’s painting of 1630 captures one of such visits to an artist’s studio (Figure 7).



Figure 7. Pieter Codde, *Three gentlemen examining a painting in a painter’s studio*, c. 1630, oil on panel, 38.3 cm × 49.3 cm, Stuttgart, Staatsgalerie (artwork in the public domain, Image © Staatsgalerie)

Eventually, the hype trickled down to the lower segments of the society as captured in the English merchant Peter Mundy’s travel account of 1640, which tells of butchers, bakers, blacksmiths, and cobblers “all in generall striving to adorn their houses, especially the outer or street roome, with costly peeces” and “such is the generall Notion, enclination and delight that these Countrie Natives have to Paintings” (Mundy 1925). One year later John Evelyn, another English traveler, described a *jaarmarkt* (annual market) in Rotterdam where “it is an ordinary thing to find a common farmer lay out two or three thousand pounds in this commodity [paintings]. Their houses are full of them, and they vend them at their fairs to very great gains” (Evelyn [1641] 2005). Mundy and Evelyn’s words may be an exaggeration, but it is clear that the lower segment of society was also actively involved in consuming and trading works of art as observed in the probate inventories (Montias 1996).

This enthusiasm for paintings from the public seems to have resulted in unreasonable investments, as Jacques de Ville in his pamphlet bristled at the art lovers who marveled at and paid excessive sums for paintings which did not possess a “good symmetry” (Sluijter 2015). Even though, unlike buying tulips, buying paintings was not harshly criticized as an act of folly by the contemporary writers, this collective enthusiasm for paintings prevailing in the Dutch Republic cannot be fully regarded as an act of rationality. It is perhaps why Jeremias de Decker (1610–1666), in his late brother’s memorial poem, proudly stated that he was “into tulips, shells, paintings, /never [being] foolish or got lost” (*Aan tulpen, schulpen, schilderijen/Nooit zottelijke en heft verkwist*), putting buying painting on a par with the infamous tulips (Engelberts Gerrits 1844). This wide-spread avidity for paintings can hardly be justified by pure economic reasoning and therefore cannot be fully explained by the neoclassical economic theories.

In spite of De Ville’s warnings, the public still spent a fortune on paintings through various channels, such as bidding in auctions. Montias (2002) summarized over 500 auction sales from 1597 to 1638 held in the Orphan Chamber alone, where almost 10,000 paintings were auctioned off, fetching more than 80,000 guilders. Interestingly, of the buyers in Montias’s sample, nearly one third were merchants who were involved in international trade and were no strangers to risks and uncertainty by trade. In addition to their greater purchasing power, the merchant’s mentality, and risk-seeking aptitude may explain their high representation in auctions while the affluent people in liberal professions (medical doctors, attorneys, and preachers) account for only around 3% of the total buyers.

Besides bidding in auctions, buyers of paintings also took part in more exciting and entertaining events such as lotteries, dice games, and shooting competitions offering paintings among the prizes as witnessed in Buytewech’s drawing of a crowd attracted by the lottery (Figure 8)—clearly painters were not the only ones who were willing to bet on paintings. The lottery events were sometimes celebrated with a huge *Landjuweel* or pageant, organized by the local rhetorician’s chamber, an occasion where the lottery tickets with their identification “rhymes” (verses or mottos) were read out loud to the public (Bok 2008). The almost 25,000 rhymes that survive from the Haarlem lottery of 1606 offer a solid testimony to the popularity of such events and the widespread endorsement of the sales of art throughout the society.



Figure 8. Willem Pietersz. Buytewech, *Lottery at the groenmarkt in The Hague*, ca. 1617–1622, drawing, 27.3 cm × 39.8 cm, Paris, Fondation Custodia, Paris (artwork in the public domain; Image © Fondation Custodia).

Poets and art-lovers composed countless verses praising arts; collectors flooded their collections with paintings; governments commissioned painters to paint prestigious works for public display, and consumers from all segments of society decorated their rooms with paintings. Although none of these behaviors are new to scholars, taken together, the direct and indirect social interactions among painters, poets, art-lovers and other members of the society forged into positive feedback loops topped by the psychological craze were a powerful force that amplified the invisible hand of the market and pushed up the painting production to an unstable stage which cannot be justified by an increase of demand.

7. Art Market as a “Social Bubble”

To explain the phenomenal growth in painting production and the abnormal behavior observed in various agents in the art market in the first half of the 17th century, I would like to introduce the concept of “social bubble,” a term coined by Didier Sornette and Monika Gisler ([Gisler and Sornette 2008](#)). The concept brings together the social and behavioral underpinnings of the art market, different from existing studies on the art market bubbles that focus on the speculative bubble revealed in the price of artworks fetched in the contemporary auctions (c.f. [Kräussl et al. 2016](#)).¹⁵ A social bubble is defined as “strong social interactions between enthusiastic supporters weave a network of reinforcing feedbacks that lead to widespread endorsement and extraordinary commitment by those involved, beyond what would be rationalized by a standard cost–benefit analysis in the presence of extraordinary uncertainties and risks.” Social bubbles are characterized by “collective over-enthusiasm as well as unreasonable investments and efforts, derived through excessive public and/or political expectations of positive outcomes associated with a general reduction of risk aversion” ([Gisler and Sornette 2009](#)). In the 17th-century Dutch Republic, these features of “social bubble” are clearly present. As mentioned in the previous sections, various agents in the art market reinforced positive feedbacks through their direct or indirect interaction and created a society-wide avidity for paintings that built up the expectation of return and caused neglect of risk. The explosive growth in the painter population and the painting production in the Dutch Golden Age observed in Figures 1–5 can be likened to an emerging bubble, which is inherently vulnerable to endogenous and exogenous shocks. In the 1650s, the painting production started to show signs of instability and eventually plunged around 1660—the bubble burst.

The contemporaries attributed this downturn in the art market to changes in taste and a revived interest in old masters, as well as the fallout of the Franco-Dutch war (1672–1673) and the preceding Anglo-Dutch wars (1652–1654, 1665–1667) ([Bok 1994](#); [Montias 1987](#)). More recent studies linked the decline of the art market to the structural overproduction of paintings in the first decades and the market impact of second-hand paintings ([Bok 2001](#)). I would like to add another hypothesis that the preference for old (deceased) masters and the return of their works to the market ruptures the positive feedback—more young artists in the market no longer produced more celebrated artists and therefore could not attract more newcomers. As a result, I argue that the illusion of the increasing return dissipated, the over-optimism and the excessive expectation of rewards from painting were corrected, and the artists and other agents returned to the risk avoidance. In other words, the market started to correct itself and returned to a stable, mature state. The increasing competitive pressure in the art market accumulating from the first half of the 17th century may have helped the development of a more complex, segmented, and heterogeneous market that we witness during the contraction. The market stratification and occupational differentiation that took place in the last quarter of the 17th century suggest a mature market ([Rasterhoff 2017](#)). From a system point of view, a downturn after

¹⁵ Existing studies use extensive data on the price of painting in auctions and sales across time to develop a price index to identify abnormal bumps in the price index. However, collecting large and representative 17th century price data of Dutch paintings is almost impossible as most sales of paintings do not have records. Most of the price information of paintings are from probate inventories and contracts: the former can hardly represent the sale price and the latter is too small to be representative. For these reasons, this research will limit its scope to the social bubble without claiming a speculative bubble in the 17th-century Dutch art market.

an unstable exponential growth in painting production and painter population is unavoidable; the cycle of exponential development punctuated by corrections and crashes can also be observed in other complex systems (such as the financial markets and earth ruptures) (Sornette 2008). Social bubbles, per Sornette's definition, are non-sustainable transient regimes that end at a tipping point, beyond which a new regime is established. The new phase can be a crash followed by revulsion, or simply a plateau or slow decrease of the market (Sornette 2017).¹⁶ As seen in Figure 1, after the 1680s, the rate of decline slowed down. Given the unstable state of the art market after the exponential growth, I argue that the downturn could have happened anytime, depending on the timing of internal (change in fashion) or external shocks (wars). It could have even grown further had there been major innovations, although the risk of a fall would have grown with it. But the downturn is inevitable—a complex system like the art market will correct its earlier deviation from the stable state by way of decline or plummet, not only in the art market but perhaps also in other sectors of the Dutch economy (De Vries and Woude 1997).

8. Exuberant Innovation

Besides the explosive growth in painting production, the Dutch art market in the Golden Age is known for its high quality and vigorous innovations of new genres and techniques (Rasterhoff 2017; Prak 2008). The historical and socioeconomic circumstances were favorable to the flourishing of arts, but it has long puzzled scholars where exactly the auspicious circumstances and the artistic geniuses crossed paths. The social bubble hypothesis may provide new insights.

As mentioned before, during bubbles, people take inordinate risks that would not otherwise be justified by standard cost-benefit considerations. Their risk-taking behavior is temporarily rationalized by speculating on the market, fueled by positive feedbacks and herding behavior, and amplified by a wide-spread public endorsement. In this context, people dare to explore new opportunities, many of them unreasonable, a fertile ground for the emergence of outstanding achievements. Alan Greenspan, the former U.S. Federal Reserve Board chairman, described bubbles as “irrational exuberance.” I conjure that it was this “irrational exuberance” in the art market in the first half of the 17th century that led to *exuberant innovations*—a great number of radical innovations breaking existing traditions in terms of iconography, technique, and composition (Rasterhoff 2017; Li 2018). New genres and new styles were explored and were introduced to the market. Many of the innovations did not survive the market competition, and we can only detect them from the notaries' descriptions of paintings in the probate inventories (Falkenburg 1997; Li 2018). Besides the product and process innovations that Montias (1990, 1987) described, Rasterhoff (2017) further added the innovations in marketing strategy in the first half of the 17th century. More importantly, this collective over-enthusiasm seems to have compounded the “slices of genius” of individual artists into a “collective genius,” which could have accelerated the innovation process in the development of art as it often does in business (Hill et al. 2014).

The burst of the social bubble also marks a significant shift in the scale and form of innovation. Li (2018) illustrates that the iconographies used in history paintings shrunk after 1660. Furthermore, recent studies on the high-life genre paintings show that the innovations in the last quarter of the 17th century fall back to a small circle of interconnected artists who resorted to very limited and highly repetitive repositories and provoked the connoisseurs to discern their distinctions made through innovative painting techniques (Ho 2017; Gifford and Glinsman 2017). Clearly, the large-scale, diverse, exuberant explorations in all levels of the market during the bubble subsided into the delicate variation of novel techniques in the upper segment of the market after the burst of the social bubble. 18th-century art critics such as Arnold Houbraken, Johan van Gool, and Jacob Campo Weyerman acknowledged the artistic decline in the second half of the 17th century (Houbraken 1718–1721; Van Gool 1750–1751; Weyerman 1729–1769).

¹⁶ For examples of the new phases of market after the tipping point, see Sornette (2017).

Sornette argued that bubbles “break the stalemate of society resulting from its tendency towards stronger risk avoidance.” Social bubbles, he further suggested, are “essential carriers for pushing segments or even sometimes the whole of society to invest considerable efforts in very risky endeavors that bring enormous rewards decades later” and “an absence of bubble psychology would lead to stagnation and conservatism as no large risks are taken and, as a consequence, no large return can be accrued” (Gisler and Sornette 2008). Beyond the art market, this “bubble psychology” or risk-taking attitude was evident and omnipresent in the Dutch society built on the craft- and trade-economy (Goldgar 2007). Therefore, I dare to conjure that the Dutch Golden Age was built on this principle, not only in the art market but also in other sectors of the cultural industry as well as in commerce as the Dutch East Indian Company (VOC)’s share price also witnessed the same surge-and-plunge cycle over the same time period (Petram 2014). The application of the social bubble hypothesis to other sectors of the Dutch economy warrants further investigation.

9. Conclusion

This research analyzes and visualizes the fluctuations of painting production in the 17th-century Dutch Republic using the surviving or known paintings in *RKDImages* as an indicator. The trend of overall painting production correlates with the expansion and contraction trend in painters’ population, indicating an explosive growth followed by a steep decline all within decades in the 17th century. I further examine the production trend by major genres showing each genre had its own development pattern yet contributed to the same overall trend. I also probe an alternative way to quantify production—canvas area—as opposed to the number of paintings. In this metric, although following the similar growth-decline trend, portraits surpassed landscape and ranked first as the most-produced genre.

Economic art historians have tried to explain the short but intense flowering of the Dutch art market within the framework of neoclassical economic theories. This research challenges their basic assumption that painters made their decisions rationally according to the market condition by introducing the idea of cognitive biases and irrational risk-taking borrowed from behavioral economics and studies in complex systems. Breaking down the *homo economicus* assumption, I suggest applying the “social bubble” hypothesis to the phenomenon and identify the presence of the essential characteristics of such bubbles in the art market in the Dutch Republic like over-enthusiasm, wide-spread public endorsement, unrealistic expectations of return, herding/imitation, and inordinate risk-taking. All agents in the society created a network of reinforcing feedbacks that drove up the painting production. Although the endogenous instability during the bubble led to the anticipated fall, the inordinate risk-taking behavior had led to exuberant artistic innovations that highlighted the Dutch contribution to the development of art. Without the collective enthusiasm and risk-taking attitude, artistic innovations would probably not have taken place within such a short period. The social bubble and the suspension of rationality may have played a significant role in the flourishing of the Dutch art market and other sectors of Dutch society in the 17th century.

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Article

Imperfect Data, Art Markets and Internet Research

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Abstract: The sheer volume of data generated on the Internet has reached unprecedented numerical heights and has enabled new data-driven methodologies to study art and its markets. Yet, this type of data-driven research has also generated several unexpected methodological constraints for art markets researchers, particularly due to informational asymmetry. This observation is related to how various players on the Internet make data available, as well as summarize, transmit, gather, and access those data globally. It is not our ambition to present another historiography of art markets research, past and present. Rather, and in keeping with the theme of this special issue, we would like to focus on a few key constraints related to data-driven, contemporary art markets research, the Internet, and the structural recurrence of imperfect data. This contribution focuses on four areas of Internet research and its methods that are particularly problematic for researchers today, namely (1) auctions and online auctions; (2) dealers and galleries; (3) art indices; and (4) art fairs.

Keywords: art markets; informational asymmetry; data constraints; online auctions; art indices; Internet galleries; art fairs

1. Introduction

At present, online data about art, its production, its history, reception, sales and consumption are abundantly available on all kinds of Internet platforms. Advanced research on both historical and contemporary art markets has embraced the many opportunities this medium and the resulting data explosion has offered, yet this has not always resulted in improvements to informational transparency, here defined as the optimal level of availability, accessibility, and reliability of data regarding art and its markets, broadly defined. The question immediately arises as to why we should even care or expect the Internet to reduce the information asymmetry of art markets; or conversely, whether or not the Internet needs to mitigate agency issues between information providers—opaque or not—and end-users, regardless of whether or not those users are researchers.¹ Likewise, the question of how to mediate deficiencies towards higher levels of market transparency, permitting researchers to observe previously unavailable data, is of increasing need of discussion.

Visual artists, not art markets scholars, were among the first to experiment with new digital platforms. Since the early 1990s, the online presence of artists and their work has never been more visible and significant than on the Internet (McLaughlin 1996). Artists are represented in every arena of network activity: electronic mailing lists, websites, and social media (especially Instagram), particularly used by emerging artists, museums, galleries and dealers among others (see for instance, Soboleva 2015; Kazakina 2016). Additionally, groups concerned with policy issues and arts advocacy, and art price indices have set up all kinds of digital and data-driven media platforms to reach a broader, more

¹ For a substantial overview of the literature focused on many cyberlaw issues with intermediaries, including cyberlaw deficiencies, how to resolve these, and how to address Internet asymmetry, see (Pasquale 2010).

diversified audience. Museums, auction houses, dealers, galleries and art fairs have followed suit, as have art markets constituencies with scholarly and/or business-oriented objectives.²

Data-driven research on art markets and its attendant new methodologies are historically the province of economists, cultural economists, social historians and sociologists.³ These studies, in turn, have opened many new perspectives for historians, art historians and a new breed of hybrid, cross-disciplinary researchers interested in art markets as objects of inquiry, here conveniently referred to as art markets scholars. For this new breed of researchers, the Internet has been the prime locus to gather data on historical and contemporary art markets in the aggregate. The sheer volume of data generated on the Internet has reached unprecedented numerical heights and has enabled new data-driven methodologies to study art and its markets. Yet, this type of data-driven research has also generated several unexpected methodological constraints for art markets researchers, particularly due to informational asymmetry. This observation is related to how various players on the Internet make data available, as well as summarize, transmit, gather, and access those data globally.

It is not our ambition to present another historiography of art markets research, past and present. Rather, and in keeping with the theme of this special issue, we would like to focus on a few key methodological constraints related to data-driven, contemporary art markets research, the Internet and the structural recurrence of imperfect data. This contribution focuses on four areas of Internet research and its methods that are particularly problematic for researchers today, namely (1) auctions and online auctions; (2) dealers and galleries; (3) art indices; and (4) art fairs.

2. Auctions and Online Auctions

At present, a sizable amount of data-driven research focuses on sales results obtained from auctions and online auctions (Ashenfelter and Graddy 2006). The choice to focus on prices fetched at auction, which can also be interpreted in terms of marginal willingness to pay, or a proxy for a buyer's preference, is related to the long-standing debate in economics on the theory of value. At the end of the nineteenth century, this shifted towards a theory of price, which is foundational for many present-day economic theories that rationalize art and art prices as part of all kinds of professional investment vehicles (Hutter and Shusterman 2006). Herein lies the rationale for the increasing the amount of price information mediated through the Internet today in an attempt to turn artworks into investment vehicles. As a result of this process of connecting art markets with financial markets, the Internet is increasingly used as a platform to distribute price information and promote market and organizational devices from the financial world. As such, the Internet, as an information platform, is continuously mediating between financial and art constituencies, sometimes referred to as the "financialization" of art and art markets (Velthuis and Coslor 2012). The quality of this mediation, of course, depends on the quality of the players involved. On the surface, all of this seems to create new opportunities for art markets research. However, these data have not been constructed for this purpose, and this has critical repercussions for how we approach contemporary art markets as objects of inquiry. While, auction houses, for example, consistently publish their sales results online, these data have not been structured (at least in its public-facing form) for aggregate analysis. E-commerce sites for art, on the other hand, seldom make all of their past results available, or may even publish price information that is not independently verifiable due to their status as third-parties.

Another long-standing debate in the economics of art and culture is that the theory of value in economics is not equipped to adequately connect economic to cultural value (Throsby and Zednik 2014).

² An appropriate example of art markets studies with imperfect data, but with a distinct historical dimension is Brill's *Studies in the History of Collecting & Art Markets*, which is a peer-reviewed book series dedicated to original scholarship on the social, cultural, and economic mechanisms underlying the circulation of art and markets. For an overview of their Art & Market Publications, see: <https://brill.com/view/serial/HCAM?lang=en>.

³ For a good introduction to cultural economics and its objects of inquiry, see (Frey 2003; Towse 2011; Ginsburgh and Throsby 2006, 2014).

In fact, the methods of economic valuation—including the heterogeneity of art, or its illiquidity—are far more quantitatively advanced as compared to those studies concerned with cultural value assessment. The consequence for online (and offline) research is that economic value, or rather, the theory of price, has become one of the preferred approaches among many scholars. In past years we have witnessed a rise of all kinds of relational databases, art sales indices, new online auction platforms, as well as applied research on price dynamics, online bidding behavior, and so on.⁴

Current and aggregate data on auction markets, both offline and online, can be hard to come by. While auction houses publish their results online, they organize these data by individual auction events, and it is thus not indexed in a way that would allow visitors to the site to download the aggregate data. The result is that researchers, as well as active participants in art markets (i.e., dealers, collectors, financial institutions, etc.), often rely on private companies' indices, databases, and reports out of necessity.

For instance, the Blouin Art Sales Index (BASI) gives access to over 9 million records from 425 artists and 3000 auction houses. Likewise, ArtNet, AskArt, and other private entities offer subscription or pay-per-search databases of auction results gathered from auction houses of varying scales worldwide. Platforms such as these, however, have also not been built for the use of data in the aggregate, and most often serve participants in art markets as supplementary tools for art advisory and appraisal, rather than art markets scholars seeking to advance research into these markets. There is no “download” button that furnishes the user with the raw data to reproduce these indices or perform new analyses. Though BASI, for instance, offers customized reports, produced by their team of data-scientists and art markets experts using their database, these services are again geared towards appraisers, collectors and dealers ([Blouin Art Sales Index BASI](#)). The lack of transparency and public availability of the data used in these and other art markets reports need to be critically considered to avoid taking the information therein at face value.

In addition, scholars engaged in data-driven research, including anthropology, art history, history, sociology and cultural studies have also recognized that there are both aesthetic and commercial dimensions to the value of artworks ([Throsby and Zednik 2014](#), p. 83). Recent attention to “external effects” has also opened new ways of interpreting artistic value in a manner consistent with economic theory ([Hutter and Shusterman 2006](#)). Despite the ever mounting availability of online data, the study of the history of art markets has not received the same amount of scholarly attention one would expect in art history and cultural economics.⁵ Though here too, new hybrid art history-economics methodologies are deployed based on empirical historical evidence in the aggregate, or more creative approaches to dealing with imperfect data, with or without regression analyses.⁶ It remains, however, a critical question as to whether or not we can move beyond the hype of new media expectations and generate more appropriate avenues of investigation to better grasp possible changes amongst actors within the contemporary art world ([Arora and Vermeylen 2013](#)).

In this digital age of abundant, yet imperfect data, online statements surface regularly praising the unrestricted availability of information. An almost Leibnizean optimism reigns supreme or how data and digital connectedness has created a global art market mediated through a variety of Internet platforms. Though it is true that participants online produce all kinds of new knowledge about art and markets, the question remains whether this knowledge is always as empirically testable as it seems to be, not to mention whether or not the data are reliable or have been retrieved with opaque gathering

⁴ One example are the Mei-Moses price indices now owned by Sotheby's; for a model study on online bidding behavior, see ([Pownall and Wolk 2013](#)).

⁵ A very useful source as a broad introduction of scholarship on art markets in the aggregate with ample references to past literature is ([Hulst 2017](#)).

⁶ On developing new methodologies using imperfect data to study historical art markets, see for instance ([Vermeylen 2006](#)), and a more collective approach in ([De Marchi and Van Miegroet 2006b](#)). In addition, see ([Velthuis 2011](#)). A more recent, and inspiring example of the study of historical art markets with imperfect data and innovative research strategies is ([Van Ginhoven 2016](#)).

methods and algorithms. Even when we use online information that appears bona fide, such as online auction results posted by Sotheby's or Christie's, or reputed price indices created by Mei and Moses or Blouin, a few caveats are in order. We will discuss art indices a bit further.

Reputable auction houses, such as Christie's and Sotheby's not only have distinct web presences but have also organized online auctions since 2012 (Christie's) and 2016 (Sotheby's).⁷ The phenomenon of online auctions in combination with the Internet data explosion, is seen as dismantling the age-old buyer-seller paradigms, introducing new business models, and creating a digitally connected global art market. Apart from the fact that a singular, global art market does not exist, studies in the history of art markets (plural) has shown that such markets emerge in very specific locations at very specific points in time with locally determined constraints, taste preferences and regulatory environments (De Marchi and Van Miegroet 2006a). Several types of art markets can even coexist in the same geographical location and at the same point in time. Even today, a wide variety in local art markets in various stages of development can be observed. These can be dealer or collector dominated, suffer from informational asymmetry, or be inefficient due to a lack of substitutes and the presence of monopolistic or duopolistic positions.

Though the notion of an "online auction sale" may create all kinds of transparency expectations, including that of a digitally mediated global market, there is, in fact, no such thing as a global market and the local component should not be neglected (Velthuis 2013). To repeat, all art markets are local and in various stages of development; factoring in the global component has merit when considering that local art markets are often connected globally through the Internet. This more nuanced understanding of art markets will help to create some epistemological and methodological clarity in critical, scholarly research using online markets data in the aggregate.

Fairly recently, in May 2017, Christie's began releasing the results of their online auction sales, with Sotheby's following suit in October of that year. Another point of methodological confusion is the recurring notion of the "online sale." It is critical to make a clear distinction between what is coined as an "online-only" sale, and what is considered an auction sale that has an online presence and/or the possibility of online bidding. Online-only sales should only refer to sales for which no bidding occurs in the auction house itself. When compared over the course of the entire 2018 auction year, sales online and offline at Christie's and Sotheby's were geographically located in New York, London, Hong Kong, each location with their associated regulatory constraints and currencies. In addition, Christie's continues to host in-person viewing hours for many of their "online-only" sales, particularly for those sales containing fine art objects. This suggests that online-only sales are, in fact, not exclusively as online as they claim to be. The term is misleading, for they have still a distinct brick-and-mortar component, both in terms of market-specific currencies and regulatory environments, not to mention the ability to view artworks in person and in a brick-and-mortar setting, before any transacting takes place online. At best, these auction sales represent a hybrid model that should be defined as such to avoid confusion.

As shown in Table 1, of all lots sold at Christie's New York, London and Hong Kong in 2018 (those deemed online-only, as well as those taking place offline), 21.3% of lots were sold through these hybrid online-only sales, which only accounted for 1.8% of the total sales revenue in that year.⁸

⁷ While the first online-only sale at Christie's occurred in 2012, they did not begin reporting their results until May 2017; they began offering online bidding several years prior to 2012. Sotheby's, on the other hand, announced in 1999 a plan to create an online marketplace, but shut down this plan in 2003. In 2016 Sotheby's partnered with the Invaluable marketplace to manage both their online bidding and online-only sales. For more information on the development of online art markets, see (Pownall 2017).

⁸ (Ali et al. 2019). The share of online-only lots and revenue for Christie's is comparable to the conclusions drawn for South Korean auction markets in a DALMI Working Paper by Yoon et al. (2018).

Table 1. Auction results of Christie's New York, London, and Hong Kong (2018). Source: (Ali et al. 2019).

Location	# of Lots	% of Total Lots	Total Revenue (incl. BP)	% Total Reue
Online-Only	7149	21%	\$64,635,251	2%
New York	10,439	31%	\$1,648,322,934	47%
Hong Kong	4592	14%	\$740,230,005	21%
London	11,322	34%	\$1,059,447,683	30%
Total	33,502	100%	\$3,512,635,873	100%

So far, there have been six “online-only” sales at Christie’s (London and New York) in March 2019. Of these six sales, five sales have offered brick-and-mortar viewing times for all or for a selection of objects being offered for sale.⁹ The online auction calendar at these houses also closely follows patterns of the offline, brick-and-mortar auction calendar. To illustrate, sales of *Contemporary and Modern Art* are offered in the spring, although, as observed earlier, their sales results represent a lower segment of this auction market.¹⁰

As the majority of sales data for online art auctions was not available until recently, and data regarding online art sales outside of auction markets is not widely available, previous research into this subject has been based predominately on surveys of buyers and sellers. One of the prime movers in the field of online art markets research has been Hiscox, an international insurance company headquartered in Bermuda, which published its first report in 2013.¹¹ The Hiscox reports rely mostly on data collected from surveys of international art buyers subscribed through ArtTactic’s client mailing list, and from a group of international art galleries operating in the contemporary art market.¹² The amount of survey respondents has varied over the years, with 130 collectors and 48 galleries in 2013, and 706 collectors and 128 galleries in 2019. However, these numbers of respondents remain quite small given the number of art markets participants that exist worldwide (there are well over 1000 galleries in New York City alone). This selection becomes even more problematic when looking at the characteristics of these respondents. For instance, in 2019 54% of respondents stated that they spend less than £5000 per year on fine art and collectibles.¹³ Hiscox, however is not the only report currently available that attempts to predict new developments in the online art market. In 2017 TEFAF published its “Online focus” as a supplement to their Art Market Report. In the data overview for this supplement we see, however, that this report is, too, based on the data collected by Hiscox.

The consequences of data selection methodologies have become increasingly apparent, especially as evidenced in 2016, when the economist Clare McAndrew (who had previously authored the art market reports published by TEFAF), was recruited to write the reports for Art Basel. With this changeover, the 2017 TEFAF Art Market Report was assumed by finance professor, Rachel Pownall. However, the two scholars’ varying methodologies for calculating the global value of the art market presented much cause for discussion.¹⁴ This resulted in the decision of TEFAF to discontinue their annual art market reports, and instead produce a series of in-depth studies on various subjects (Gerlis 2018).

⁹ Auction Results. Christie’s, stable URL: https://www.christies.com/results?sc_lang=en&lid=1.

¹⁰ Sale #18084 at Christie’s (“Matisse on Paper: Prints and Drawings from the Estate of Jacquelyn Miller Matisse”) took place from 21 February to 1 March 2019. The sale included 28 lots and brought in a total revenue of 891,250 USD (including the Buyer’s Premium). Additionally, Sale #16753 at Christie’s (“Picasso Ceramics Online”) took place from 22 February to 1 March 2019. This sale included 114 lots and brought in a total revenue of 1,458,250 GBP (including the Buyer’s Premium).

¹¹ Since 2013, Hiscox has released reports on the online art market annually. While the numbers of respondents in 2019 was greater than 2013, the numbers of respondents to the Hiscox survey in recent years has decreased. Between the 2018 and 2019 report, for example the numbers of respondents decreased from 831 collectors and 130 galleries to 706 collectors and 128 galleries. All past reports can be accessed here: <https://www.hiscox.co.uk/online-art-trade-report/archive>.

¹² ArtTactic (<http://arttactic.com>) is an art markets analysis firm based in London.

¹³ Stable URL: <https://www.hiscox.co.uk/sites/uk/files/documents/2019-04/hiscox-online-art-trade-report--2019.pdf>, p. 28.

¹⁴ While Pownall estimated the value of the global market in 2015 at \$44 billion, McAndrew calculated its value at \$63.8 billion; the following year Pownall appraised the value at \$45 billion, while McAndrew arrived at \$56.6 billion. See (Pownall 2017; McAndrew 2017).

3. Galleries, Dealers and the Internet

When looking horizontally at the history of art markets over time, and that of galleries in particular, we see that art galleries have always operated in a predominantly urban, brick-and-mortar industry that placed a premium on building unique, personal relations among artists, gallerists and potential clients. One of the recurring problems in gathering research data on gallery sales is the continued lack of transparency and informational asymmetry despite a growing Internet presence. This lack of transparency is not resolved when a gallery assumes partial or total online activity. While inventories are displayed to a larger public and transactions may be made online, the innerworkings of the gallery remain undisclosed. The role of dealer, virtual or not, remains that of an intermediary who selects what is sold, curates, sets prices, facilitates transactions, etc. In this sense, the Internet does not challenge conventional art trade practices; it rather supplements, or complements, by reaching larger publics, practices that have historically been in play in art markets. While an online presence of galleries and dealers is often expected to bring increased transparency and information symmetry both for consumers and researchers, this is rarely the reality, at least not at present.

A notable exception to this observation are South Korean art markets, where galleries are required by law to report their sales results annually. These are kept in the aggregate in publicly, though highly regulated, databases that present a unique opportunity for insights into the South-Korean gallery market. A caveat to this, however, is the unavailability of the raw data for these sales, which are only accessibly as summary tables and charts online.¹⁵ Galleries remain a marker of preference and one of their key roles lies in nurturing local talent through a multiplicity of platforms. Galleries tend to thrive in collector-dominated markets, since these often produce higher sales prices, even for beginning artists. Private treaty sales in galleries and auction sales inform each other, though here too, galleries lack transparency, even in cases such as the South Korean markets where annual reporting of all sales results is legally required. While galleries and private dealers routinely use all kinds of “price scripts” and auction results to understand price formation and preference as expressed through the marginal willingness to pay, the opposite, is seldom true.¹⁶

As a result of this lack of publicly accessible data, reports on dealers are dependent upon survey results sourced from private consulting firms. In the 2018 Art Basel Art Market Report, Clare McAndrew, noted the primary issues in gathering data on dealer markets and the consequences this had on analyses resulting from those data. Importantly she notes the limits of using industry data, which are often restricted in terms of their scope and consistency, and the constraints of having to rely on surveys with low response rates and imperfect sampling processes. While work such as this allows us some insight into the magnitude of dealer markets, it is still, as McAndrew makes clear, by no means comprehensive (McAndrew 2018, pp. 342–47).

An additional curious phenomenon worthy of study are expensive paintings sold in brick-and-mortar galleries or at public auction, especially those sold in collector-dominated markets. These can be seen as positional goods that show an inverse relationship between price and demand. They often behave as Veblen goods, a term coined after the American economist and sociologist Thorstein Veblen (1899, chp. 4). Veblen goods are types of luxury goods for which the demand increases as the price increases. This counter-intuitive, and apparent contradiction of the law of demand, results in an upward-sloping demand curve.¹⁷ In other words, Veblen goods violate the law of demand and after prices have risen above a certain level, demand will also increase. Utility gained might arise from the fact that not many people in society can afford to buy or own such an

¹⁵ See: K-Art Martket, <https://k-artmarket.kr/member/index.do>. In addition, see DALMI working paper on South Korean art markets (Yoon et al. 2018).

¹⁶ The term “price scripts” is borrowed from Olav Velthuis, and discussed at great length in his inspiring (Velthuis 2002).

¹⁷ Veblen’s theory of consumption behavior has not always gained acceptance, both in institutional economics and sociology. An unfortunate effect of this neglect of the Veblen effect has been the marginalization of consumption behavior in economics. See (Dolfsma 2000).

expensive painting. Considered in this context, brick-and-mortar galleries and auction houses are ideal “third locations,” to coin a Starbucks metaphor, in which to create the social environment that engenders conspicuous consumption and social distinction. There is, however, a major problem to test this hypothesis. We simply do not have enough sales data to allow for data-driven research into this phenomenon. This recurring constraint does not allow us to test when law of demand holds in particular art sales and at what price point a painting begins to assume the role of a Veblen good, in the process violating the basic law of demand in microeconomics.

Galleries remain central in branding, creating a “third location” for social positioning, even “Veblenization,” if our hypothesis holds. Yet, the relationship between artist and gallery, as well as between the gallery and the prospective buyer(s) also seems to have shifted towards a more autonomously acting artist. The artist active on social media is, in part, a participant in the making of his or her own brand. The role of the gallery has and will continue to be one of the loci for validating artist reputation and the related marginal willingness to pay for a particular artist. Galleries will continue to be a part of this branding, albeit requiring new media skillsets and web presences. Galleries and dealers active on social media, and particularly on Instagram, give the illusion of transparency and even an opening of art markets to new participants, although prices generally remain available only upon request and there are no available data on the actual number of transactions that are made or facilitated via these platforms. Here, again, the Internet serves as an intermediary or a supplement to traditional pathways and practices but does not supplant or fundamentally alter the ways in which art is privately transacted.

A potential innovation are e-commerce platforms, such as Lofty and Catawiki, although, like online-only sales at auction houses, these seem to serve the lower end of art markets better than the upper end.¹⁸ Segmentation between e-commerce and brick-and-mortar locations (i.e., galleries and auction houses) is especially clear when we consider artists who, in brick-and-mortar contexts, would be associated with Veblen goods. Online, however, these Veblen artists, too, constitute the lower end of art markets. Online sales platforms tend to mimic traditional auction models rather than dealer/gallery models. Lofty, to illustrate just one example, has a dedicated fine arts department and collections devoted to specific artists, but its general inventory is heavily skewed towards the market for collectibles and memorabilia (only a handful of items offered have estimates at or over \$25,000).¹⁹ The creators of Lofty had originally envisioned an e-commerce platform for the lower end of the fine arts market, modeled off of RubyLane.com, which specialized in antiques and collectibles. Interested sellers would be able to submit photographs and documentation of their objects to experienced appraisers who would, in turn, value the objects and approve or reject them for sale. This is currently the business model being employed by Catawiki. Lofty, however, whose tagline is “The Trusted Marketplace,” does not currently offer appraisals, and they only offer items for sale that have been sourced from approved, established auction houses, such as Freeman’s.

In addition, Lofty advertises collections of works by notable artists such as Marc Chagall, Pablo Picasso, Keith Haring, and others. Of these artists’ work currently shown on Lofty’s website, all but one Chagall work has passed (gone unsold), while the highest selling Picasso was a print, which sold for just \$250.00. Keith Haring is somewhat of an exception as a handful of his works have sold for well

¹⁸ Lofty and Catawiki are just two examples, which we have studied in detail, of many online art and antiques sales platforms that have implemented vetted online auction environments for fine arts, collectibles and antiques. Over the past decade online auction platforms such as ArtNet, Artsy, 1stdibs, LiveAuctioneers, Singulart, and others have developed. Often constructed on the principles of eBay with auction-like sales environments and “buy-now” options, such platforms have varied vetting processes and sales strategies (at times, as is the case of 1stdibs, adopting a hybrid “bricks-and-clicks” model wherein both an online and brick-and-mortar presence are utilized).

¹⁹ On Lofty, as of 24 April 2019, only 25 items total, including both fine art and jewels, had estimates over \$25,000. This is compared to the 15,109 items which had estimates between \$1000 and \$5000, which primarily consisted of collectibles and memorabilia.

above \$25,000 (the current highest price for a Haring being \$290,000). However, again, the majority of his works on the site have also either passed or have sold at below the \$100 mark.²⁰

In addition to platforms such as Instagram and Artsy, where galleries and dealers are increasingly publicizing inventories and engaging with larger audiences (bit of a show-and-tell model), there are also sites such as Incollect, which describes itself as “a world-class curated marketplace where you can shop the finest furniture, decorative art, fine art, and jewelry by the design masters of the 18th through 21st centuries.”²¹ Further claiming that “Over 1000 commission-free listings are posted every Tuesday by the industry’s finest dealers. Interior Designers and Architects are invited to join our Trade Program.” Here, dealers and galleries may apply to have a page on the site, which is meant to provide “collectors, interior designers and enthusiasts with the absolute best experience for discovering and acquiring art, antiques, jewelry and design.” However, as with Artsy, prices are rarely listed and must be inquired about, and some pages are seldom updated. Thus there is no guarantee that the objects shown on the website even remain available for sale.²² While Incollect allows vetted dealers/galleries to advertise inventories, and facilitates communication between sellers and potential buyers (requesting prices, emailing, making offers, requesting holds, etc.) it functions more as an additional, albeit somewhat exclusive, social media account. As is the case with other online platforms for transacting or facilitating the transaction of artworks, the results of these social interactions (be they in terms of revenue, total transactions, engagements, etc.) are never made public.

4. Art Indices

Given the fact that much of the art markets data available on the Internet are auction prices for artworks, one of the recurring questions in Internet research involving the value of a work of art is focused on whether art should be considered an asset class or a consumption good, or both.²³ The majority of scholars, especially those in economics, tend to consider art an asset class, whereas sociologists and art markets scholars based in the humanities seem to be a bit more measured and nuanced (Kräussl 2015).

Online research facilitates a focus on price and on art as an asset class. Here, a key approach is to measure financial performances of very specific, attributed works of art over time. The methodological rationale is obvious: market value and marginal willingness to pay (actual price paid for a work of art) are seen as a proxy for measuring how preferences change over time. In order to research this systematically, constructing a repeat sales performance index of works of art is often necessary. Jianping Mei and Michael Moses are two pioneers of this methodology, which is based on hedonic and repeat-sales estimators (Mei and Moses 2002). These two estimation methods are frequently used to construct all kinds of art indices. According to Mei and Moses, a repeat-sales regression (RSR) uses the prices of individual objects traded at two distinct moments in time. If the characteristics of an object do not change (which is the case for works of art), the heterogeneity issue is bypassed, for each art work is, per definition, different. The basic idea of the hedonic regression (HR) method is to regress prices on various attributes of works of art, such as artist, dimension, subject matter, and so on. According to Mei and Moses, the residuals of the regression can be considered as “characteristic-free prices” to compute the price index. However, since the works of art that are part of such an index do not come to the market often, the changes in market value—the marginal willingness to pay—and therefore changes in preference, are not easy to evaluate.

A recurring problem with art indices like Mei-Moses is their selection bias in data gathering, or, in other words, which data they choose to include or exclude. While making a laudable attempt to bring transparency to international art markets, they have always been plagued by the lack of sales data

²⁰ These values are based on information available via Lofty.com as of 24 April 2019.

²¹ See Incollect, stable URL: <https://www.incollect.com>.

²² See Third-Party Professionals and Services, stable URL: https://www.incollect.com/terms_of_use.

²³ See the pioneering studies by Mandel (2009, 2014) and Horowitz (2011).

available. In addition, art indices such as Mei-Moses rely on data from just half of art markets—the auction market—when an estimated 53% of art sales globally are actually made up of private gallery and dealer sales.²⁴

Mei-Moses focuses exclusively on repeat auction sales made within Christies and Sotheby's, but the index does not account for anything sold in online markets. Further, the index was bought by Sotheby's in 2016 and is no longer available online.²⁵ When conducting data-driven research on art markets, it is critical to understand the methodology behind these platforms' data gathering. ArtNet, for instance, uses data from 1600 auction houses and includes online sales results when are available (including what is being sold in ArtNet auctions). ArtNet works with comparable objects rather than resales, while ArtPrice uses the resales model and data from 4500 auction houses (excluding online sales).²⁶

5. Art Fairs

Art fairs, like galleries, tend to focus on branded (or brandable) artists and high net worth individuals (HNWI), which seems to suggest that, here too, the earlier mentioned "Veblenization" is going on. The social context that art fairs provide helps to create and maintain the trust that is particularly important for valuable, higher quality items that are required for the online market to further develop.

Branding in high-profile art fairs occurs in a very similar manner. Art fairs can bring new buyers into the market by focusing more on local talent and local creative industries. Recent economic and technological trends threaten the viability of this model. Art galleries feel obliged to participate in art fairs, even when it causes significant costs and loss of revenue (Halperin 2017). The art fair has become a very challenging environment that suffers from the same lack of transparency and asymmetrical information regarding price performance. This lack of informational symmetry, regardless of the affordances of the Internet, generates more questions than answers about management practices, performance, and factors affecting success (Smith et al. 2005). The common denominator in many of these studies is the observation that a serious study of the gallery model and its research suffers from a chronic lack of reliable data.

Art fairs tend to project a false sense of transparency by reporting prices at the end of the fair; however, this remains a highly curated and selective list of objects that have been sold from a select group of sellers.²⁷ Since these art fairs are intimately connected to private galleries and dealers, prices are largely kept private as well. The relative handful of exceptions that are made public serve to showcase the "success" of the fair itself rather than to report on aggregate statistics. Most researchers working on historical and contemporary art fairs rely on lists of dealers and/or artists who are participating. The primary focus of these studies then tends to be on the geographical origin of the exhibitors and the types of artworks they represent. Additionally, some scholars have utilized firsthand observations. Filip Vermeylen, for example, collected data directly from exhibition stalls at the 2013 India Art Fair in Delhi including tags, red dots, and price lists. Importantly, Vermeylen (2015) noted the variations between the artists advertised in the fair's catalogue and the realities of the exhibition stalls. Such methods are not without their own specific flaws; however, they do emphasize the need for finding and testing alternative methodologies and metrics for measuring art markets phenomena

²⁴ The 2018 Art Basel Art Market Report found that in 2017 dealer sales accounted for approximately 53% of sales globally. This was based on survey results, interviews and industry data gathered by Arts Economics, a private research and consulting firm founded by Clare McAndrew. See (McAndrew 2018).

²⁵ For more on Sotheby's acquisition of Mei-Moses, see (Maneker 2016; Boucher 2016).

²⁶ Artprice. <https://www.artprice.com/indexes/artinvestment>.

²⁷ For example, the 2019 sales report from TEFAF lists only a selection of 30 objects sold by 25 exhibitors. Of these, only seven mentioned the final sales price, eight mentioned the asking price and one provided an approximate sales price. See: <https://www.tefaf.com/press/press-releases/collector-and-dealer-confidence-precipitates-sales>.

beyond auction markets, especially in instances where scholars have typically encountered a lack of accessible and reliable sales data.

Another constraint which makes it difficult to analyze the impact that the art fair has on actual sales is the moment of the sale. As Rachel Pownall rightly points out, in thinking about sales we should differentiate between sales that are made during the fair and those that are made after the fair ends. While buyers may become interested in artworks or galleries during the fair, it may not be until after the event has concluded that actual transactions are made. This phenomenon should also be taken into account, according to Pownall (2017, p. 54), in how we consider online sales. Similarly, while Internet users globally can interact online with artworks available at galleries, whether or not a transaction occurs online or a simply a new buyer-client relationship is formed initially via the Internet are two separate phenomena.

An important point of overlap to consider is when the art fair attempts to go digital; here, however, the significance of direct social interactions at art fairs and seeing the visit itself as an experience becomes most evident. Digital art fairs that have attempted to mirror the experiences of traditional art fairs online but have generally failed to secure their position in art markets. The first example of a digital art fair was the VIP Art Fair, which took place in January 2011 including virtual boots by 138 contemporary art galleries from 30 countries. This event promised clients private video chats with gallery directors and access to “back rooms,” but failed due to its lack of online infrastructure to support these promises (Brown 2011). The second trial a year later, VIP Art Fair 2.0, and a similar event in India, India Art Collective (2011), weren’t able to establish the online art fair as a new model (Esman 2010; Maneker 2011).

The popularity of art fairs seems to be on the rise, at least in terms of attendance and the number of events being held annually (be they the art fairs themselves or the many social events held in conjunction to adjacent to art fairs). This is especially for larger franchises such as Art Basel and TEFAF.²⁸ Yet, the impact of these fairs on actual art sales or on the development of existing and emerging art markets remains impossible to measure with certainty. This because of both the lack of transparency regarding sales and the vagaries of how we define sales occurring at art fairs or as the result of relationships formed at these and related events.

6. Concluding Thoughts

Even when digital platforms imply or even state that their information is fully transparent and easy to access, the examples we’ve discussed suggest that researchers have little assurance that Internet intermediaries—such as auctions houses, art funds, databases and all kinds of art markets carriers—are not withholding information or biasing the presentation of their data in accordance with commercial interests.

Auction houses such as Sotheby’s and Christie’s have now fully embraced making their sales results publicly available, but the same cannot be said for eBay-style auction platforms and emergent e-commerce sites for art, where the lack of reliable and consistent data is rampant. This precludes establishing trustworthy art indices or conducting serious data-driven research. As we have seen, art indices also seem to have distinct selection biases in data gathering, not least which data they choose to include as well as what they leave out. Further, as we have seen in the example of Sotheby’s acquiring the Mei-Moses art index, relationship serves no other purpose than to improve the auction house’s financial interests, whereby access for researchers is not an option.

As to dealers and art galleries, data-driven research is not an option for the moment. Here, too, informational asymmetry rules supreme, excluding approximately 50% of art markets from serious scholarly scrutiny and applied data-driven research. Here too, the regulatory environment in

²⁸ In October 2016, TEFAF began hosting two additional fairs in New York (fall and spring). Previous to this, in 2002, Art Basel expanded to Miami, and in 2013, to Hong Kong.

South Korea has created the legal conditions for some additional transparency in the art markets and ultimately, more transparency on the Internet, although this is still quite imperfect.

We have also observed that it remains difficult to predict the future of online art markets, though it is obvious that over the past ten years online market platforms have been gaining in importance, particularly in lower market segments. The existence of online preference algorithms (i.e., Artsy) offers new opportunities to familiarize oneself with new artists and hitherto unknown artworks. Yet, the often observed “boom” in the online art trade, or assumption that the Internet will somehow fundamentally alter how we buy and sell art needs further research and nuance. Based on our current research, it is one of our working hypotheses that many online sales are probably serving (and enhancing) demand in market segments for cheaper works of art, compared to those offered for sale in brick-and mortar auctions, galleries and art fairs.

The earlier mentioned hybrid model of a combined brick-and-mortar and online presence seems to be a viable risk averse strategy to enhance demand. It is only when, however, serious efforts are made to collect sales data in the aggregate, on a large scale and in publicly accessible online platforms that we will be able to assess with a higher degree of precision how, where and when price and preference formation actually works. In other words, these online sales do not threaten the traditional models, but actually segment the demand. While data on private sales, online as well as offline, remain undisclosed, data on the emerging online auction markets are gradually becoming more available. From those data, which are now attainable for big name auction houses such as Christie’s and Sotheby’s, we see that the online art trade is growing, though, once again, not seriously threatening to replace brick-and-mortar sales. At present, they often seem to complement each other.

As to art markets scholarship, serious efforts need to be made to collect sales data in the aggregate, on a large scale and in publicly accessible online platforms with a higher degree of informational transparency, trust and reliability. By way of a concluding thought, a desired hermeneutic payoff is that art markets, as objects of inquiry, need to be studied in the aggregate, not only with new sets of questions and new methods in mind, but also with a sense of urgency that more transparency, whether implemented through voluntary self-regulation or through legislation, is indeed a priority for both scholars and buyers.

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Article

The Cyber Turn of the Contemporary Art Market

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Abstract: The paper addresses the issue of digitalization of the contemporary art market. It analyzes key features of today's online art market and discusses three technological innovations—cryptocurrency, blockchain, and artificial intelligence—that have the potential to contribute to the further development and growth of online art trade. The paper demonstrates that whereas cyberspace attracts new talent and great business ideas intended to make global art commerce more versatile and efficient, online art market players alongside with providers of online art market data and analytics offer interesting avenues of future research in this sector.

Keywords: online art market; cryptocurrency; blockchain; artificial intelligence (AI)

1. Introduction

Academic research on art markets heavily depends on surviving guild records, inventory studies, financial statements, and legal documents (McNulty 2014). One of the pioneering books on the history of art markets, Gerald Reitlinger's trilogy *The Economics of Taste* was published back in 1961. Since then, there has been a steady increase in the number of scholars working on multiple issues of the economics of art. As the majority of art market operations still take place offline, contemporary art market researchers do not pay too much attention to the phenomenon of the Internet as a powerful art market disruptive innovation and treat cyberspace as a mere supportive tool to boost art sales. As the art market scholars of the DALMI (Duke Art, Law & Markets Initiative) research consortium Van Miegroet, Alexander, and Leunissen suggest in their paper *Imperfect Data, Art Markets and Internet Research*, also published in this special issue, "it is hard to predict the future of online art markets, though it is obvious that over the past ten years online market platforms have been gaining in importance". Our paper, while totally agreeing with Van Miegroet, Alexander, and Leunissen's findings, offers a more "optimistic" view on the cyber turn of the contemporary art market. Whereas DALMI's researchers focus on some crucial methodological constraints related to Internet data-driven art market research, we, in turn, explore the conceptual transformation of the contemporary art market under the influence of new digital technologies. We argue that the Internet has turned from an art-marketing instrument to an apart-standing art market segment with its unique features and development patterns. To support this argument, we first analyze the evolution and the current state of the online art market and then examine three particular technologies that have the potential to contribute to the future expansion of the online art trade. Methodologically, our research is complicated by two issues. On the one hand, due to the academic novelty of the topic under consideration, we have to deal with the lack of statistical data, which makes it quite difficult to develop a comprehensive retrospective narrative on the given topic without sounding avant-garde and futuristic. On the other hand, due to the marginal presence of the online art market segment in the overall contemporary art market, we have to anticipate the skepticism about our research on the part of the "conservative" art community that does not recognize the issue of the online art market as worthy of separate analysis.

2. Evolution and the Current State of the Online Art Market

The development of information and communication technologies has fueled the digital economy by accelerating the production, delivery, and consumption of goods and services. The Internet has left no economic field untouched, the visual arts being no exception. Whereas various art market players increasingly embrace new technologies to display, promote, and conserve artworks, artists engage with innovative media to intensify cultural branding in the digital age and to give birth to new art forms that push the boundaries of the contemporary art canon. Moreover, information and communication technologies have intensified the globalization of art. As a result, art currently develops in two tiers: “As local avant-gardes at the fringes of the many art sectors, and as a global commodity disseminated instantly across institutional and national boundaries” (Hackforth-Jones and Robertson 2016, pp. 165–66). As for the art-market relation in particular, new technologies progressively lead to the paradigm shift in art trade and mediation, as well as stimulate the emergence of “novel structures for art businesses, which are supported by the new interdependencies between art, technology and commerce” (Hackforth-Jones and Robertson 2016, p. 171). In fact, the idea of the online art market is not quite new. The very first art sales websites were launched during the dot-com-economy boom back in the late 1990s. However, most of them collapsed “in the spectacular bust of 2000, sometimes with astonishing rapidity” (Adam 2014, p. 121). In spite of the economic fiasco of the first-generation online art startups, the belief that the Internet is the future for art commerce in the era of globalization has not gone away, and a whole new generation of online art businesses are currently battling for attention. Moreover, the issue of online art trade appears more and more frequently in the academic literature on the future of art markets (e.g., Meyer and Even 2002; Moulin 2003; Horowitz 2011; Zorloni 2013; Adam 2014; Schmitt and Dubrulle 2014; Velthuis and Curioni 2015; Flynn 2016; Schneider 2017; Winkleman 2017, etc.).

We suggest that the cyber art trade has turned over time from just a mere art-marketing instrument to an apart-standing art market phenomenon with its unique features and development patterns. What we observe nowadays is “the restructuring of the Hows, Wheres and Whos that shaped the art world until now” (An and Cerasi 2017, p. 121). Today’s online art market is an autonomous segment of the contemporary art market that offers alternative ways to buy and sell art. It differs from the offline art market in two respects. On the one hand, due to its capacity to spread information about art and artists instantly and worldwide, the art market connected to the Internet can “reach manifold new buyers and grow the market colossally” (Adam 2014, p. 121). On the other hand, while existing in the virtual cyberspace beyond national borders and continental divides, the online art market can “be held by any number of vendors around the world but displayed on a single site”, which makes it accessible to a larger number of potential customers who “would be hesitant about entering an art gallery to browse and educate themselves before buying, from the comfort of their homes” (Adam 2014, p. 122). Assessing the size of today’s online art market is rather tricky. Different analytical reports present various statistical data. Thus, according to the Hiscox Online Trade Report 2019, the online art market has grown 9.8% in aggregate to \$4.64 billion, marking a slowdown from the 12% growth experienced in 2017 (Hiscox 2019, p. 2). In contrast, according to The Art Market 2019 Report, in 2018, although global sales in the online art market accounted only for 9% of the value of global art sales, they reached \$6 billion, which was 11% higher than in 2017 (The Art Market 2019, pp. 258–62). The TEFAF (The European Fine Art Fair) Art Market Report Online Focus 2017, in turn, has revealed that the size of the online art market depends on the definition and price range of artworks. As the report writes, in 2017, online art sales reached at least \$3.1 billion, where \$1 billion accounted for the online trade of art and antiques over \$500, \$1.6 billion comprised the online trade of art, antiques, and collectibles over \$500, and between \$0.5 and \$2 billion corresponded to the online trade of art, antiques, and collectibles under \$500 (TEFAF 2017, pp. 38–39).

As for the structure of the contemporary online art market, it is possible to distinguish between “hybrid” online–offline art businesses and “pure” online art enterprises. Online–offline companies present on the contemporary online art market are traditional primary (galleries) and secondary (auction

houses) art market players that operate both online and offline. They use cyberspace to increase sales and create new marketing channels. According to The Art Market 2019 Report, “brick-and-mortar auction companies continued a strong trajectory of online sales in 2018, making up one of the largest segments of the online art market by value” (The Art Market 2019, p. 272). To be more precise, at Christie’s, total online sales reached \$250 million in 2018, compared to \$214 million in 2017 (The Art Market 2019, p. 272). At Sotheby’s, in turn, total online sales reached \$220.4 million in 2018, a 24% increase from 2017 (The Art Market 2019, p. 273). The statistics of the dealer sector in 2018 show that the online channel represented 6% of total sales, 4% of which were made through dealers’ own internal online channels, such as a website or an e-mail, and the remaining 2% were arranged through third-party platforms, like Artsy, 1stdibs, and Artnet (The Art Market 2019, p. 292). In contrast to brick-and-mortar art galleries and auction houses, online-only art businesses exist exclusively in the virtual space. There are three main types of online art enterprises currently functioning in the art market—online auctions, online galleries, and online marketplaces. Online auctions (e.g., Auctionafterale, Barnebys, Birdsquare, Heritage Auction, Hihey, Invaluable, Liveauctioneers, Thesaleroom, Paddle8, etc.) give their customers the “chance to bid for art from the comfort of their own home, taking away the social barriers of bidding at traditional auction houses, where you often have to be of a certain status and wealth” (Le Journal de ArtmarketGuru 2018). Online galleries (e.g., Artgallery, Degreear, Ideelart, Newbloodart, Upriseart, Weng Contemporary, Zatista, etc.) are virtual “showrooms” intended for the display and sale of artworks. They attract art dealers who do not want to spend money on renting physical gallery spaces because their new-generation clients are not used to conventional offline art viewing and art buying norms. Online marketplaces (e.g., 1stdibs, Artnet, Artsy, Artandcollect, Artviatic, Saatchiart, etc.) are non-auction online art platforms that let buyers immediately purchase art using a “click-to-buy” function. They act as an entry point for new art collectors and, unlike online auctions, ensure direct communication between artists, art dealers, and prospective art buyers. Since the structure of the online art market is constantly evolving, we should expect the emergence of new online art market players in the nearest future. Most importantly, we should anticipate the increasing influence of social media in online art trade (a.k.a. social media art market). According to Hiscox 2019, 80% of art buyers use social media to discover new artists and 89% of art galleries use social media to attract new customers (Hiscox 2019, p. 9). As for The Art Market 2019 estimates, social media remain a strategic tool to build trust and brand awareness, as well as to facilitate sales and convert more social media users into active buyers (The Art Market 2019, p. 287).

Online art sales channels are in high demand in the contemporary art market for two reasons: They make art trade more convenient and more comfortable. The convenience of online art sales channels consists of the relative easiness to find wanted artworks. Experienced art collectors can search for the necessary artworks much faster online than they could otherwise “by randomly visiting many physical spaces” (Winkleman 2017). The comfort of online art sales channels presupposes instant access to demanded artworks without placing customers on a waiting list. This second feature is especially important for younger art collectors who feel intimidated “by the legendarily icy reception or arcane rituals” (Winkleman 2017) typical to physical galleries and high-profile auction houses. In spite of being convenient and accessible, online art sales channels struggle a lot to establish trust among the influential clientele of older generations. As Hiscox 2019 suggests, building consumer trust is the biggest challenge for all online art businesses: In 2018, 60% of them admitted that “difficulties establishing the reputation of the seller was a key obstacle” (Hiscox 2019, p. 22). Among other problems that online art sales channels currently face are the issues of authenticity and physical inspection of artworks. In 2018, 62% of online art customers said that they were afraid of buying online “a fake or an object which is not what it purports to be” and 74% of online art customers complained that they were unable to inspect the artwork ahead of a purchase (Hiscox 2019, p. 22). Although online art sales channels are not perfect, they maintain a positive rate of growth and have bright development prospects. Online buying in the art market has become more mainstream. As The Art Market 2019 Report points out, the expectations of traditional offline art dealers, surveyed in 2018, were that online

art sales would increase over the next five years, with 70% of them expecting online art trade to increase significantly and a further 24% predicting online art trade to remain at about the same level ([The Art Market 2019](#), p. 294).

By and large, the cyber turn of the contemporary art market exerts an enormous influence on the modalities of trading and valuing art. On the one hand, online art market transactions “robotize” art commerce, as they involve “a minimal amount of personal contact between the buying and selling practices because of distance and the way in which the sale is conducted” ([Vickers 2005](#), p. 198). On the other hand, gradual diversification of online art market players and practices educates a new breed of art collectors who, instead of valuing artworks in the “traditional” terms of money, power, and beauty ([Findlay 2012](#)), “evaluate digital images, conduct price comparison surveys, and pay electronically from the comfort of home” ([Vickers 2005](#), p. 198). Besides, from a scholarly perspective, the digitalization of the contemporary art market has contributed to the emergence of Art History 2.0 ([Bailey and Gardiner 2010](#); [Rodriguez-Ortega 2019](#)) as a separate academic field. The acceptance of technological innovations as applied to online art market research has resulted in the creation of new methods of analysis and visualization of online art market data ([Bentkowska-Kafel et al. 2005](#); [Hai-Jew 2017](#); [Flanders and Jannidis 2019](#)) and the establishment of digital archiving as a socially engaging and responsive practice of documentation of online art commerce ([Bentkowska-Kafel et al. 2009](#); [Hatchwell et al. 2019](#); [Jaskot 2019](#)).

3. Technologies Used to Expand the Online Art Market

Although academic research on the online art market remains at the outskirts of art historians’ attention and does not attract any significant number of sociologists of art and culture, art market analysts take this issue seriously and offer innovative approaches to study the quickly developing patterns of online art commerce. The most respectful analytical art market reports, such as *The Art Market Report* and *The Hiscox Online Trade Report*, distinguish between three cyber phenomena—namely, cryptocurrency, blockchain, and artificial intelligence—that hold big promises for the future development and expansion of online art trade. In this paragraph, we explore these three digital technologies under consideration and analyze their potential to further transform the organizational and functional underpinnings of the virtual art marketplace. It is worth mentioning at once that our attempt to research the issues of cryptocurrency, blockchain, and artificial intelligence in connection with online art market research is experimental, as these issues have so far been raised exclusively by art market analysts and practitioners, whereas scholarly research on art markets is still silent about this emergent aspects of online art trade.

3.1. Cryptocurrency and Blockchain

There has recently been a noticeable increase in art-and-cryptocurrency/blockchain-related news in the mass media, and a number of conferences have been held for art professionals dedicated to the subject. For example, on 11–12 May 2018, the experimental software development company ConsenSys hosted the Ethereum Summit, an international conference about blockchain held annually in New York, that placed special emphasis on the contemporary art market, even concluding the event with a live charity auction for the benefit of The Foundation for Art & Blockchain. On 19 July 2018, the London-based auction house Christie’s organized the Art + Tech Summit that discussed, among other topics, the potential of blockchain and cryptocurrency to create decentralized, secure, and trustworthy channels of online art market operations. In September–October 2018, the Paris-based innovation hub ERM Développement mounted the innovative art show Bitcoin Art (R)evolution dedicated to the role of cryptocurrency in the contemporary art market. The show presented a new artistic movement called CryptoArt and demonstrated the ideas of several living artists about the influence of cryptocurrency on artistic creativity. Moreover, all the artworks on display were offered for sale exclusively for bitcoins, whereas physical money was not accepted at all.

The phenomena of cryptocurrency and blockchain are rather new to online art market research and practice. From an economic point of view, cryptocurrency is a digital asset used as a medium of exchange and based on the principle of decentralized control that enables users to send payments without passing through a central authority, such as a bank or a payment gateway (Rosenberger 2018, p. 9). It uses the mechanism of strong cryptography to secure the execution of financial transactions and control the creation of new units of “virtual” money. Bitcoin, which appeared as an open-source software written by Satoshi Nakamoto in 2009, is the most frequently used cryptocurrency in today’s world, generally speaking. Bitcoins represent a specific form of “virtual” money that are given as a reward for the process called mining, which stands for a record-keeping operation executed through the use of computer processing power (Antonopoulos 2017, p. 15). Financial transactions conducted with the use of bitcoins are verified and recorded in a publicly distributed ledger called a blockchain, which is a type of payment rail that secures the protocol of peer-to-peer network communication embedded in the algorithm of creation and verification of operations with a specific cryptocurrency (Furneaux 2018, p. 39).

Due to the absence of relevant data that would allow us to conduct an in-depth retrospective study on the virtues and perils of both cryptocurrency and blockchain for the contemporary art market, the overwhelming majority of art market scholars prefer to omit these two issues from their analysis of emerging art market trends. Despite this persisting academic skepticism, art market professionals treat cryptocurrency and blockchain as two most salient technological innovations able to transform the online art market in the nearest future. Since 2018, the influential Art Market Report published annually by the Art Basel art fair in cooperation with the UBS bank has recognized blockchain and cryptocurrency as one of the most important developments that happened on the global art market in the previous year. The 2018 Art Market Report introduced three key advantages of the application of blockchain in art market operations; namely, the potential to improve authentication and provenance of artworks, the potential to protect privacy of art collectors, and the potential of traceability of art sales and commissions. At the same time, the same report emphasized the risks of introducing cryptocurrency in art market transactions. In particular, the report mentioned that “while blockchain technologies could help reduce fraud in some sectors, cryptocurrencies could also create a black market of dubious transactions that could worsen the reputation of the online market with new buyers” (The Art Market 2018, p. 249). The 2019 Art Market Report continued the discussion about the modalities of integration of blockchain and cryptocurrency in the contemporary art market. Most importantly, this report introduced the phenomenon of the tokenization of art, which puts forward the idea of fractional ownership of art. The report provided as example the tokenization of Andy Warhol’s painting *14 Small Electric Chairs* (1980) undertaken by the online art investment platform Maecenas in July 2018. In fact, Maecenas has issued more than 6 million ART tokens, each of which offering a small “virtual share” in Warhol’s work. As a result of this unusual auction, 49% of *14 Small Electric Chairs* has achieved “a reported value of \$6.5 million”, whereas the original owners of the artwork have retained the remaining 51% of the artwork (The Art Market 2019, p. 295).

In addition to the inclusion of the phenomena of blockchain and cryptocurrency in art market analytics, we can observe two major applications of cryptocurrency and its accompanying blockchain technology in today’s art market. On the one hand, cryptocurrency represents a new form of money with which art can be bought and sold. It is rather curious that both public and private art institutions are eager to acquire artworks with cryptocurrency instead of real money. Both online and offline art businesses gradually turn to bitcoins and other cryptomoney as an alternative payment method to reach a global audience and attract more customers. The London-based Moniker Art Fair that specializes in street art was the first among all European art fairs to introduce “virtual” money into art business. The also London-based Dadiani Fine Art was the first European art gallery to have completely shifted, since 2017, to making art market transactions in cryptocurrency. Today, the most “crypto-active” online art trading platforms include Cointemporary, Whitestone Coin, and Maecenas. Unlike art market players, public museums, in turn, do not have an established practice of using cryptocurrency because

of the absence of a precisely defined legal framework on this issue. Nevertheless, a limited number of world museums are gradually engaging in activities with cryptomoney. The first European museum to buy art for bitcoins was MAK Wien (Museum of Applied Arts in Vienna). In 2015, it purchased Harm van den Dorpel's *Event Listeners* for a particular amount of bitcoins (the sum was not revealed to the public). In addition to the development of art trade in cryptocurrency, contemporary art market players have turned to blockchain technology as a means of protection of the artwork's ownership rights. In particular, blockchain is already widely used to prove the authenticity of works of art. The code can be either directly encrypted in the artwork by the artist himself or can be purchased as a separate certificate. Presently, such ownership certificates generated through blockchain are offered by the online art platforms AllPublicArt and Seezart. In addition to the verification of the authenticity of art, blockchain has the potential to become an innovative methodological tool in provenance research. For example, the art startup Arte Questa applies blockchain to trace the provenance of artworks stolen from Jews during World War II. Like cryptocurrency, blockchain is an Internet-based technological innovation but can serve different commercial needs of both online and offline art market players.

The growing presence of cryptocurrency and blockchain in the contemporary art market has several vital implications for art market research. Thus, the introduction of "virtual" money in art trade affects the principles of art banking. Most importantly, cryptocurrency has the potential to change the norms of art-based lending. Currently, the contemporary art market employs two categories of art-based lending services—loans to galleries to "give dealers an available lien of working capital" (McAndrew 2010, p. 121) and loans to individuals to help art collectors "monetize their art holdings" (McAndrew 2010, p. 122). These loans come from either banking institutions or non-banking boutique lenders and major auction houses. With the introduction of "virtual" money in art trade, it is not clear anymore how art-based lending services will evolve in the future. On the one hand, this technological innovation could diversify art finance by means of offering alternative mechanisms and procedures of art patronage. On the other hand, cryptomoney may result in further consolidation of online art-based lending services around one single large tech company that would dominate cross-border digital art finance. Under such circumstances, online art financial services are likely to be expected to "boom in value and economic importance" (MacDonald-Korth 2018, p. 20). The application of blockchain in art market operations, in turn, has created new sources for the study of art market history. In this respect, the information recorded in the blockchain-based registrar can be considered as both digital-born art market data and an Internet-generated archival database. With the development of new technologies, the data sources available to art market scholars have become ever more diversified. Prior to the advent of the digital age, most sources on art trade were available only in print and only in select research and museum libraries. Moreover, the vast majority of these sources were not properly indexed, making the search for sought-after information a daunting prospect. Numerous digitalization projects that have been undertaken over the past decade "have gone a long way toward not only making these rare research tools accessible, but also, and perhaps more importantly, making them usable" (McNulty 2014, p. 261). With blockchain, the quest towards the digitalization and comprehensive catalogization of art market data can go much further. In particular, this technology can make art market data accessible to a larger number of scholars and practitioners and solve the problem of bulky archival storage of physical art market historical records. At the same time, blockchain makes art market data more dependent on virtual reality. In other words, to access the art market data stored on blockchain, a researcher needs to have a stable and unlimited online connection guaranteed by the Internet provider and the country-specific online traffic regulations, which are different across the globe.

3.2. Artificial Intelligence

Most recently, Christie's became the first auction house in the world to trade art created with artificial intelligence (AI) technology. On 23–25 October 2018, as part of the Print and Multiples auction, it offered for sale the portrait painting of *Edmond de Belamy*. The artwork was produced by the

Paris-based art collectible Obvious with the machine-learning algorithm GAN (Generative Adversarial Network), which was, in turn, written by the American computer scientist Ian Goodfellow. A canvas print of the AI-generated portrait of a fictional character (Belamy is, in fact, a direct French translation of Goodfellow's surname and it literally means a "bel ami", or a "good fellow") was sold for \$432,000, which was more than forty times the estimated selling price of \$7000 (Hitti 2018). In fact, *Edmond de Belamy* is not the only example of artworks generated by AI, nor is Obvious the only art collective that deals with the creation of art by means of AI. The algorithm-made art started to gain ground a while ago but appeared on the art market only recently. Thus, back in 1981, Peter Kugel published one of the earliest articles dedicated to the power of computers to be universal symbol-processing symbols. In his article, Kugel (1981) claimed that algorithmic programs could serve as models of artistic processes going on the outside of a human brain. In 2015, computer scientists Babak Saleh and Ahmed Elgammal of the Art and Artificial Intelligence Laboratory at Rutgers University published an article in which they presented the machine-learning algorithm CAN (Creative Adversarial Network) that was able to generate artworks representing a particular artistic style. Saleh and Elgammal (2015) findings represent the only comprehensive academic research project conducted on the issue of AI-generated art so far. Apart from academia, art museums and art galleries have also attempted to present their views on the issue of the creative potential of machine-produced art. For example, in early 2018, Le Grand Palais in Paris organized the exhibition *Artists and Robots* that critically assessed the interaction between the human mind and the immersive digital world in an ever more robotic society. The exhibition offered a gateway to an immersive and interactive digital world that subverted the human notions of time and space through the augmented body sensory experience. In late 2018, the Natura Morte art gallery based in New Delhi mounted an exceptional group show, *Gradient Descent*, featuring artworks created entirely by AI in the post-human age. The show explored the intersection between AI and contemporary art by creating a dynamic human-machine relationship. Both *Artists and Robots* and *Gradient Descent* were remarkable events, as they made an attempt to mainstream both in the art market and the art world the phenomenon of AI-generated art and present it as a nascent art movement of the twenty-first century.

AI-generated art is the most salient example of the presence of AI-based technology in the contemporary art market. Furthermore, AI is also widely used as an e-marketing tool to link art and collectibles. In this case, AI functions as a machine-learning recommendation program that matches prospective customers with a particular product upon examination of their online activities, such as Internet searches and web browsing. This technology is already extensively used in the movie and TV industry. It is estimated that the choice of at least 80% of watched content is made upon algorithmic recommendations (The Art Market 2019, p. 302). The online art market has only recently endorsed AI-based marketing. The biggest online art marketplace that offers this service is Artfinder launched in 2013. The company's AI algorithm recommends artworks "based on visual similarities to a piece selected by a buyer" (Sheffield 2017). Basically, Artfinder works similarly to a famous music streaming service, Spotify, that uses the Discover Weekly algorithm to recommend songs to listeners with matching music tastes. Besides Artfinder, some other online art companies that have developed AI-generated e-marketing strategies to stimulate online art trade include ArtAdvisor (provides users with information about artists and helps improve their product searches), Thread Genius (suggests similar artworks coming up for sale and assists with the attribution of artworks), and The Art Genome Project (maps together the characteristics of "genes" that connect artists, artworks, art objects, design, and architecture over time). Recommendation-based e-marketing developed with AI can be good "where buyers are sensitive to costs, or there is a high price elasticity of demand" (The Art Market 2019, p. 302). At the same time, there is one important limit to the applicability of this algorithm to online art trade, namely the impossibility to generate or find a complete substitute for unique and highly valuable items such as works of art. Even though there might be some substitutability between artworks by some artists, suggesting a substitute that simply looks identical or has the same size, material, or contents to an experienced art collector may not always be satisfactory.

Whereas AI-generated art and AI-based art marketing are the most branded innovative tools able to contribute to the further development of the online art market, there are three more lesser known AI-generated technologies that are slowly gaining ground in online art trade. The first emerging technology, developed by researchers from Rutgers University in cooperation with the Atelier for Restoration and Research of Paintings in the Netherlands, is represented by a machine-learning algorithm that detects art forgeries ([Elgammal et al. 2017](#)). It uses AI to analyze thousands of tiny strokes that compose a picture and detect fake pieces. The algorithm is able to identify a forgery in every instance, simply by looking at a single stroke, a task that cannot be physically done by a human being. The second emerging technology is Virtual Reality (VR). As a technological innovation, VR is not new per se. However, VR has only recently been integrated into the online art market. Given the falling foot traffic in offline art galleries, online art companies have started to apply a 360-degree on-screen view of art to offer a VR tour of art shows. By creating an alternative method of attending art events and art exhibitions, VR enhances e-commerce “by reaching buyers who are unable to visit galleries and exhibitions but remain reluctant to buy from a flat image” ([The Art Market 2019](#), p. 300). The third emerging technology is Augmented Reality (AR). Like in the case of VR, AR is not the most up-to-date technological innovation. Nevertheless, it has only recently appeared in the online art market. AR makes it possible to combine physical elements with the digital world. Online art platforms such as Saatchi Art and Artsy have developed AR applications to offer their clients the possibility to “preview works of art at home or in other contexts through digitally hanging them on their walls” ([The Art Market 2019](#), p. 300). This technology is very welcomed by the majority of contemporary art market players as it reduces the need to “move” real artworks, hence saving significantly on transportation and installation costs.

The introduction of AI to the online art trade has several crucial implications for art market research. On the one hand, AI-generated art reshapes the boundaries of the so-called creative economy. In more general terms, creativity can be defined as “making something new that also opens up a new category, a new genre, or a new type of thing” ([Gold 2007](#), p. 5). With the introduction of digital coding to cultural and creative industries, the creative economic sector becomes a combination of creativity and electronics. In this context, AI stands for one of multiple weightless and intangible “digital bits” that exert a major influence on “how we have ideas and how we express, share and communicate them” ([Howkins 2007](#)). AI, being a specific form of digital coding, fosters the development of the notion of collaborative creativity that bears consequences for “the ownership of, and compensation for, creative products” ([Howkins 2007](#)). Furthermore, algorithm-produced art challenges the conventional phenomenon of the singularity of art ([Boden and Edmonds 2019](#)), hence leading to the emergence of the term “technological singularity of art” ([Kurzweil 2005](#)), which implies that a non-biological medium has a computational capacity to emulate the richness of human intelligence to detect and suggest new original ideas. Unlike AI-generated art, AI-based online art market practices turn art market data into actionable intelligence and contribute to the emergence of machine-learning driven art market analytics. Traditional art market analytics requires “heavy IT involvement” and generates “lots of data points” that are difficult for an average user “to navigate or contextualize” ([MIT Technology Review Insights 2018](#), p. 2). As AI-driven art market analytics is still not applied in practice, we cannot characterize precisely its advantages and drawbacks. Notwithstanding, we suppose that this innovative analytical method can potentially enable art market players to “drive greater automation of tasks and derive insights at breakneck speed” ([MIT Technology Review Insights 2018](#), p. 2). In addition, AI makes art market analytics more predictive and prescriptive. This technology allows art businesses to foresee outcomes and “proactively seize opportunities rather than waiting to react” and helps art consumers exploit the autonomous capabilities of the software to “query the optimal data sources” and “serve up insights based on identified correlations and patterns” ([MIT Technology Review Insights 2018](#), p. 3).

4. Conclusions

All in all, the paper has touched upon several aspects that the contemporary art market currently experiences due to the emergence of new digital technologies. It has analyzed the composition and the functional orientation of the online segment of the contemporary art market and has revealed three most salient cyber phenomena that can potentially exert an enormous influence on the further development of the global online art trade. The cyber turn of the contemporary art market discussed in this article provides both opportunities and constraints to art market scholars. On the one hand, new technologies can result in the methodological renewal of academic research on the history of art markets by introducing new methods of analysis (e.g., AI-based art market analytics, blockchain provenance research), new fields of study (e.g., cryptography or algorithms-writing for art experts), and new areas of expertise (e.g., AI art marketing, art-crypto-mining, art-blockchain-banking). On the other hand, new technologies can equally challenge “traditional” art historical academic research by confronting the philosophical foundations of Aesthetics with the questions of the singularity of art (e.g., criteria and conditions for creativity), artist’s identity (e.g., debate around human vs. artificial intelligence), definition of taste (e.g., certification of art through blockchain), and measurements of the value of art. We suggest that to overcome the methodological difficulties that digital technologies impose on the contemporary art market research and practice, it is necessary to adopt the spirit of academic flexibility in the three following respects: Encouragement of transversal research on the history of art markets, acceptance of the mixed-methods research methodology, and intensification of the exchange of ideas between art market “practitioners” and “theoreticians”. All things considered, the main findings of this paper could serve as an impetus for the further conceptualization of Online Art Market Studies as an academic discipline and stimulate more scholarly research on other cyber art market challenges, such as the virtualization of art gallery spaces, cyber-art-crowd-funding, platform-art-economy, and digital arts management.

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