Review Article

'Digital Art History: The Beginning of a New Paradigm or another Research Method of the Postmodern Paradigm of Art Historiography?'

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Abstract

This article is an analysis of research practices carried out in the field of Digital Art History through comparative approaches with the methods of both Art Historiography and Social Sciences. The aim is to show that the in literature highlighted association of Digital Art History with Social and Data Sciences due to the application of empirical methods and data-driven research, which would mark the beginning of a new paradigm in Art Historiography, is questionable, because the methods followed are a continuation of the way art historians have been recording the development of art since antiquity. It is argued that Digital Art History is a trend in the postmodern paradigm, with a central focus on the use of digital technology to redefine the methods of both modern and postmodern paradigms.
Keywords: Digital Art History, Digital Art History as Social Science, Digital Art History as Data Science, Postmodern paradigm, Methods of Digital Art History.

INTRODUCTION

Today, Art Historiography is at a transitional stage, as the use of digital tools defines the research methods of an increasing number of art historians. It has been argued that the shift from the hermeneutical character of Art Historiography to the application of the empirical method of data analysis represents the beginning of a revolution (Drucker et al., 2015) that may signify a transition to a new paradigm. This study aims to show that although a revolution is taking place at an instrumental level, Art Historiography has always combined interpretive and empirical research methods. In other words, the systematic study of empirical data is not novel but has been a fundamental practice since the beginning of Art Historiography. Moreover, the methodological changes observed in digital art historic research share a common ground with other trends in the postmodern paradigm.

This study is divided into five parts. The first (1.) provides a brief overview of the historical development of both Digital Humanities and Digital Art History, focusing on the distinction between Digitised and Digital Art History. The second part (2.) presents an analysis of the traditional distinction between empirical and interpretive disciplines, focusing on the relationship between both with data and theory. The aim is to show that the distinction between 'theory-centric' and 'data-driven' sciences is based on an outdated phenomenological model that does not always correspond to reality. In the third part (3.), it is argued that the study of data, at both empirical and interpretive levels, is a key feature of art historical research over time. In the fourth part (4.), after presenting definitions and basic principles of Digital Art History, the discussion will focus on Digital Art History as just another trend of the postmodern paradigm, with the central aim of highlighting pre-existing theories of both the modern and postmodern art historical paradigm through the new and reinforced possibilities of digitality. In the last part of this paper (5.), methods that digital art historians have borrowed from Social Sciences are presented, with emphasis on common aims with pre-existing methods in art historical research.

A brief overview of Digital Humanities and Digital Art History

According to Fickers2, there have been three 'waves'/periods of what we call 'Digital Humanities'. During the first wave, which began in the 1950s and lasted for about three decades, those working on Digital Humanities were a small group of computer-literate scholars, who came mainly from the field of linguistics and secondarily from that of Historical Sciences. Their work did not have a significant impact on the scientific community. At that time, the term 'Digital Humanities' was not yet used, as more common was the term 'Humanities Informatics'. Jesuit scholar Roberto Busa and English professor Josephine Miles were the first to combine these two hitherto completely distinct areas was the Jesuit scholar Roberto Busa (Nyhan & Passarotti, 2019) and the English professor Josephine Miles (Wimmer, 2019). In collaboration with IBM, Busa and his team digitised Thomas Aquinas's writings in Index Thomisticus. Gradually, other researchers in the humanities began to use computers' capabilities for automated actions such as word search, sorting and counting, and gaining time and accuracy. In the decades that followed, archaeologists, scholars, historians, and some art historians applied emerging computational methods to facilitate and achieve better practical results in their work. This is a rapidly evolving technology, in which great contributions were made by organizations such as ACM SIGGRAPH, but also by creative artists such as Charles and Ray Eames and the members of the Experiments in Art and Technology (E. A. T.) (Paul, 2003), who focused on demonstrating the creative and interactive potential of computers by combining technology and art.

The second wave, which stretched from 1990 to 2010, was characterised by massive digitisation of historical sources. To enable this, the necessary infrastructure had to be developed, leading to important results. Strong criticism was formulated according to which historical research would exclusively be driven by technology: research questions were asked not on the basis of how important they were for the understanding of a historical era, but on whether they could be answered by both the possibilities and the tools provided by technology.

In the 1980s, the need for a specific protocol in relation to text digitisation became imperative. The Text Encoding Initiative – TEI (Burnard, 2014) was developed, launched in 1987, and published its first full set of guidelines in May 1994. Around this time, the field of Digital Text Analysis was established, and researchers began to experiment with databases and hypertextual captures using links and clusters. In the 1990s, large digital archives of texts and images appeared in humanities computing centers in the US (e.g., the Women Writers Project, the Rossetti Archive, and the William Blake Archive). The advent of personal computers and the World Wide Web meant that Digital Humanities' work could focus more on design, which would become increasingly complex as the multimedia nature of the Web allowed for the incorporation of audio, video, and other elements, in addition to text and static images.

The change of the term 'Humanities Computing' to 'Digital Humanities' is attributed to John Unsworth, Susan Schreibman and Ray Siemens, who, were the editors of the anthology, A Companion to Digital Humanities (2004). The anthology's essays revolve around the distinction between digital and digitised scholarship, and the editors' aim was to study the new trend in depth and remove its misconceptions as a practice of digitising sources. It is important to distinguish between Digitised Humanities and Digital Humanities: the former refers to digital tools and the latter to empirical methods and the use of digital technology to study traditional subjects in the Humanities. In 2006, the National Endowment for the Humanities (NEH) launched the 'Digital Humanities' Initiative' (renamed the 'Office of Digital Humanities' in 2008), where the term 'Digital Humanities' was formally adopted in the United States.

In the third and contemporary wave, the Digital Humanities have a strong presence. The weaknesses of the previous wave have been recognised, and the gap between explanation as a result of cause and effect, the main method of the Empirical Sciences, and interpretation, the traditional method of the Humanities, have come to the fore. On the one hand Historians have been able to collect Big Data and identify explanatory patterns with a universal validity. In other words,

they now have the ability to explain a period as the result of a large number of events linked together. However, this approach is more descriptive in nature and does not contribute to in-depth understanding, as it is not guided by specific questions and does not consider more complex parameters that cannot always be measured quantitatively.

The Classical Hermeneutics that we have been using for the last two centuries is essential to achieve an understanding of a historical era, part of which is its art production. A fundamental principle of Hermeneutics is that intellectual work is understood in relation to a reference point. In the 20th century, there has been a transition from contextual Hermeneutics (16th century–first half of the 20th century) to the Hermeneutics of reception: the point of reference became the interpreter himself/herself, his/her subjective intentions, and his/her cultural framework. The interpreter's subjectivity is a new cognitive factor through which intellectual work becomes meaningful.

According to Fickers, today we find ourselves between traditional Hermeneutics which is under the umbrella of the 'Reception Theory'3,and Hermeneutics which is technology- driven and which in essence seeks understanding through quantitative- empirical methods. What we need is a new type of process that combines the two approaches mentioned, so that we arrive at a new 'Digital Hermeneutics'. Fickers accepts the existence of a new paradigm in the Humanities, defined by the dominance of digital technology that imposes discrete methodological approaches. To achieve Digital Hermeneutics, tools from different disciplines, such as History, Computer Science, Anthropology, Economics, Linguistics, are required. This is where the concept of the 'Trading Zone', introduced by the historian of science, Peter Galison, comes in. According to Galison (1997), scientists from different areas and paradigms, despite the fact that they have major differences in boththe meaning or importance they attach to objects and the methods they use, can create a common language to exchange knowledge, methods, and principles that, despite their differences, can be useful to the other side. What Fickers is essentially proposing, by also referring to Galison, is a return to Contextual Hermeneutics; that is, the interpretation of artworks in relation to their wider context, which now, because of the enormity of digitised knowledge from all disciplines, will have even greater potential.

The transition from the second to the third wave of the Digital Humanities coincided with the transition from digitised to Digital Art History. Art historians interested in the possibilities of computers have focused on digitising tools that had already been used in their non-digital versions since the previous century (e.g., slide shows, photographic reproductions of artworks, television shows featuring museums or artists, on-site archival research, and printed books). Digitised Art History, which exists today alongside Digital Art History, refers to a technological change that modernises existing tools without affecting the research methodology or purposes of their use. This big change came with Digital Art History, that is, the use of new tools that allow and promote new methodological and interpretive approaches. Digitised Art History is part of Digital Art History because the latter draws data from the former, but at the same time from more digitised sources that allow numerous correlations of empirical data from more fields (Drucker, 2013).

The first formal reference to the association between arthistorical research and computers, which dates back to the mid-1960s, was by art historian Jules Prown (2001), in a presentation of his research in the College Art Association of America, which provoked a negative reaction from many pundits in the attending audience. Projecting on his first slide an IBM punch card that represented cutting -edge technology of the time, Prown described how he arrived at this presentation. Working in the computer lab at Yale University, he conducted research to find connections between the socio-economic level of buyers of works by the American painter John Singleton Copley and their preferences for portraiture.

Prown used digital computer technology to prepare a monograph of Copley. In assembling 350 works, he asked questions related primarily to the social level of his clientele: 'Were Anglicans more affluent than Calvinists, and if so, did Copley paint more portraits of the former for his own

well-being?''Who commiss ioned the larger portraits, merchants, or ministers?''Which of both groups preferred pastels?'According to Prown, these questions, as well as many others relating to Copley's patronage issues, could be answered through statistical analysis that combines the economic-social data of the commissioners and the data of the paintings, from their material to their style and subjects. Indeed, statistical analysis showed that certain categories of patrons, arising in relation to profession, political connections, and others, were more likely to buy Copley's work in certain periods or that certain professionals bought paintings of certain sizes. Using statistical-empirical methods, Prown was able to discern trends in Copley's career that would have been obscured by using different methods. Quantitative empirical research complemented qualitative-interpretive understanding, and vice versa, as quantitative statistical data were then interpretively analysed by art historians.

Empirical and Humanistic Sciences: Theory and Data

The distinction between empirical and interpretive methods in Science goes back to the German philosopher Wilhelm Dilthey (1833-1911), who identified two major groups of sciences, the Empirical and Humanities: the Empirical Sciences (Social and Natural Sciences), which aims to explain phenomena through the discovery of causal relations, and the Humanities (Historical and Philological Sciences), which seek to understand intellectual works by focusing on interpretive approaches to their meaning. This distinction provides a satisfactory phenomenological framework for classifying Sciences (Tillman, 1979), but when it comes to reality, its applications are not always explicit.

Focusing on the Empirical Sciences, there is a distinction between 'theory-centric' and 'data-driven' sciences. All Empirical Sciences follow the scientific method, which begins with a hypothesis based on systematic observation of data. Through both theoretical reasoning and experimental procedures, this hypothesis assumes the character of a strong theory. Thus, theory is central to Empirical Sciences: the distinction between 'theory-centric' and 'data-driven' sciences concerns the share that data and theory have in the context of scientific work, as all sciences include both, theory and data.

The boundaries of the distinction between 'theory-centric' and 'data-driven' are not fixed in the same way that there is no single definition for all sciences. Let us consider the following example: The most typical case of a science with data at its core is Data Science, which provides knowledge, methods, and tools for Digital Art History. This interdisciplinary field is concerned with the extraction of knowledge from unstructured or structured data. Essentially, it is a continuation of disciplines, such as Statistics, Predictive Analytics, Machine Learning and Data Mining. Methodologically, it is a quantitative science involving techniques and ideas for data analysis, that originated in the 1960s and is constantly evolving with the help of computers and other fields linked to Computer Science (Manovich, 2015).

Even for Data Science, there is debate in the literature regarding whether it is theoretically neutral. In the Stanford Encyclopedia of Philosophy entry 'Scientific Research and Big Data, the author has collected individual theoretical approaches in literature related to the application, analysis, and exploitation of Big Data: some of them stress that even if the emphasis is on data, theoretical thinking is not absent, since it is directly linked to what philosophers call 'mental predisposition'. By this term, they refer to the fact that what we perceive is not only the image reflected in our vision but also a mix of sensory data, pre -existing knowledge, expectations, and, more generally, our cultural environment. Even the language used by a scientist to record observations contains theoretical assumptions. According to Nigel Warburton (2013) observation statements are 'theory laden'4, in other words, making observations in Science presupposes the existence of fairly complex theories. Theory always comes first. Even when scientists choose where to focus their research, this choice is unconsciously based on theory.

The Role of Data and Theory in Art History

Both data observation and theory coexist in the Humanities in a different way than in Empirical Sciences. Focusing on the discipline of Art History, its writings up to the 19th century were based purely on empirical data. Since Antiquity, and starting with Pliny the Elder's History of Painting (Natural History. Book 35), art historians have focused on writing narratives on art with an emphasis on both the biographies of artists and references to their cultural context. Great importance has been attached to both collecting and verifying the authenticity of information and material by later historiographers such as Giorgio Vasari and Johann Joachim Winckelmann, who emphasised that art historians should have first-hand contact with the works they are dealing with (Fernie, 2005). Expertise has been a basic parameter in recording the history of art for many centuries.

The method used by art historiographers was narrative on the one hand (Stone, 1979) and comparative on the other: they used to make both empirical and hypothetical correlations to attribute works to specific artists or even to identify the style of each cultural era. In other words, they followed both inductive and deductive methods, which, although focused on data, cannot exist independently of theory. At the end of the 19th century, there was a shift in art historians' approaches to both philosophy and the theoretical foundations of their narratives.

By bypassing the narrational recording of data, art historians started consciously asking theoretical questions concerning the ways in which art evolves, as well as the possibilities of both perceiving and understanding the changes that artistic works undergo over time (Hatt & Klonk, 2006). They have also focused on limiting subjectivity in the interpretative process to strengthen the scientific character of their research. It was then that they partly applied the scientific method by making the necessary adaptations to the specificities of their science, which, as belonging to the Humanities, cannot aim to derive laws with both absolute character and predictive power. In this sense, art historians of the modern paradigm5 worked according to the following model. They took observation of data as a starting point and then constructed a theory in the form of a hypothesis on specific questions. However, the validity of the theory could not be demonstrated through experimental methods, as in the Empirical Sciences, but through its application in the context of analyses of artwork or the recording of art historical narratives. For example, Wölfflin formed the theory that art evolves according to the role of people's sense of their bodies at any given time. To prove his theory, he wrote Renaissance and Baroque (1888), in which, through practical applications and comparative analyses, he showed the transition from balanced and calm renderings in the Renaissance to intense kinetic and, even violent expressions in the Baroque, in relation to the different perceptions of the body in each period.

A further way to strengthen a theory in the context of arthistorical research is to link it to pre-existing theories that have already been proven and accepted by the arthistorical community. For example, Panofsky elevated the already existing practice of iconographic study of artworks into a theoretical model using the triple schema of sociologist Karl Mannheim6. Based on this, Panofsky documented three stages of gradual deepening in the analysis of artworks by limiting the subjectivity of the interpreter. In his book Studies in Iconology, he transformed his theoretical approach into a method of analysing artworks by providing important analytical tools for later art historians.

Thus, data played a decisive role in the modern paradigm of Art Historiography despite its theoretical foundation and orientation towards philosophical questions7. The theories of the modern paradigm are dominated by the fundamental principle that, for every artwork, there is just one correct interpretation that is directly dependent on both its creator and cultural context. Modern art historians have also accepted the existence of principles of an intersubjective nature that define ways of perceiving and understanding the world and, by extension, art. Common to all their theoretical approaches and methodological applications was the belief that art evolves, in the sense that it changes over time, and that the historian has the capacity to identify, understand and record these changes due to general principles of perception that are the same for all subjects in all

eras: this concept gave an empirical-scientific character to modern theories as the inter subjective understanding of art was highlighted.

The postmodern paradigm of Art Historiography8has constituted theoretical studies that, on the one hand, have been part of the reception theory and, on the other, highlight new frameworks for both understanding and interpreting artworks that relate to social groups that had been discredited in the past. Reception theory, however, has been the dominant umbrella theory through which the change of direction in the research of art historians since the second half of the 20th century is to be understood. Contemporary researchers have focused on the study of artworks through new interpretive approaches that are not linked to their historical context or to the intentions of their creators; artworks have been understood as autonomous travelers in time with their meaning redefined according to the approach of each interpretive community. Pre- existing methods of the modern paradigm have been applied to highlight the importance of the interpreter as the one who creates the meaning of each artwork.

For example, neo-psychoanalytic art historical studies are based on the Lacanian psychoanalytic theory, which focuses on an observer rather than a creator.9This is one of many postmodern arthistorical theories that is based on data, concerning more interpretative communities and less artworks, their creators, and their context.

Digital Art History: Definition and Basic Principles

Digital Art History, which applies the principles of Data Science to the research of Art History to assemble large numbers of artworks and process them using computer technology, is composed of studies that share common ground with theories and methods of both modern and postmodern paradigms. 'Large' data doesnot necessarily refer to the concept of big data, which means the use of huge amounts of data and their correlation with others (Boyd& Crawford, 2011); Digital Art History is by now mostly practiced through a smaller and focused number of data in order to deepen its understanding of specific fields.

The collection of data, smaller or larger in number, is only the starting point of arthistorical research, as the purpose of this collection is to obtain enough information to answer an initial hypothesis: it is not enough to simply gather a large number of artworks on a platform for working in the field of Digital Art History. The focus is on the applications of algorithms and search engines that constitute clusters of artwork, as far as they provide new information and innovative correlations, leading to important conclusions.

Giving a more comprehensive definition of Digital Art History, it is a contemporary method in Art History that exploits the potential of Data Science to apply pre-existing methods of the modern and postmodern paradigm to a much larger number of works, highlight new forms of correlations between artworks or between artworks and other data, and/or reveal entirely new possibilities for arthistorical research through both comparative and statistical methods.

For example, digital programs offer tools for iconographic studies in the spirit of Warburg and Panofsky (belonging to the modern paradigm). On the one hand there is a large-scale digitisation of historical photographic art archives and on the other hand there is the so-called machine vision', 'computer vision' or 'artificial vision', the artificial intelligence that algorithmically reproduces the sense of vision on the computer. Machine vision is associated with systems that receive and analyse data from digital images. These data can include photographs, videos, views from multiple cameras, and multidimensional images from medical scanners. In essence, it is a type of interdisciplinary exchange between biological and computer vision that is now able to understand images, detect events and movements, recognise objects, categorise them, and convert 2D images into 3D structures and videos. By utilising these advances in digital technology, iconographic research has gained several new possibilities. For example, both posture and gesture research particularly benefits from the ability of machine vision to accurately recall and detect postures and gestures. The study of gestures as an interdisciplinary field, involving Art History, Anthropology,

Psychology, Semiotics and Linguistics, is closely related to Digital Art History. It is, however, also a parameter of traditional iconography; there are even encyclopedias on the subject of gesture in art (Garnier, 1989 & Deuchler, 2014). For example, gestures have been used in digital art historical research as an indicator of similarity in grouping religious scenes in azulejo tiles (Carneiro et al., 2012).

A good example to show the limited possibilities of traditional methods in comparison to digital ones is Joaneth Spicer's research, published under the title The Renaissance Elbow (1991). Spicer, through 20examples of the 16th and 17th century portraits of predominantly German and Dutch origin, explores the iconographic and sociological terms of the akimbo position, finding that it has been much more common in men, conferring social status and power. However, their conclusions were based on data representing less than 1% of the production of portraits with this pose during the period under consideration (Impett, 2020). The same study, in the context of Digital Art History, would allow for the collection of a much larger number of works, clearly redefining the conclusions drawn. As mentioned previously machine vision provides the ability to recall poses and gestures with tremendous accuracy.

This, combined with the large-scale digitisation of historical art photographic archives, such as Bildindex (https://www.bildindex.de/), Prometheus (https://prometheus-bildarchiv.de/en/prometheus/index)and the Federico Zeri Foundation (https://fondazionezeri.unibo.it/en/photo-archive/photo-library/the-online-database), increases the possibility of iconographic research to an incredible degree. Many major libraries, museums, and cultural institutions are working systematically to digitise artworks and other associated data. For example, the Bibliotheca Hertziana is in the process of scanning and publishing three quarters of the one million images in its collection, and the photographic archives consortium 'Pharos' (http://pharosartresearch.org/) has digitised twenty-five million images.

Pharos is an international consortium of 14 European and North American art historical photographic archives committed to creating a digital research platform that enables a comprehensive unified access to photographic archive images and their associated scholarly documentation. In this case, potential long-range search engines targeting specific gestures will be able to bring together all work with a common focus on the pose under investigation, thus allowing for more certain conclusions regarding the preference of the posture akimbo in the depiction of men.

A second representative example of working methods in Digital Art is related to feminist theory in Art History. Feminist Art Historiography belongs to the postmodern paradigm, proposing new perspectives for understanding artwork at all times. As already mentioned, the postmodern paradigm includes theories and methods that either have reception theory as a common axis or focus on new interpretations through social groups that were overlooked within the classic and modern paradigm. Feminist Art History focuses on the social position of women and their role as both creators and artistic subjects in the context of male-dominated cultural eras, in which dominant ideologies not only influenced artistic creation but also constructed its recording. One problem addressed in feminist art historical texts is the possibility of highlighting the true extent of women's artistic creation, which has been apparently discredited in the past. In recent years, an increasing number of websites have been aimed at mapping this field. Making use of digital mapping tools through projects such as Artl@s (https://artlas.huma-num.fr/en/), scholars are investigating artistic networks that highlight the collaborations between women. Artl@s, founded at the ENS University in Paris in 2009, is structured around a digital database of exhibition catalogues, with the aim of including all types, from the invention of the catalogue (Salon de Paris, 1673) to the present day. This database is defined by geographical and chronological criteria, and allows exhibitions to be mapped to follow the circulation of works and exhibitions. When this information is available, it also links the works exhibited to their location, their owners, the birthplace of their creator, and all other types of information provided in the catalogues. The use of various digital techniques, such as

Geographic Information Systems, for the visualisation of networks according to location opens up new perspectives in the field of Art History (Gardner-Huggett, 2017 & Brown and Mitchell, 2020).

In digital art historical research, emphasis is placed on the correlations between artwork or artwork and other data. However, these alone are not sufficient for the production of comprehensive knowledge; they describe phenomenal situations without explaining them. Of course, the more sophisticated a program, the closer it is to formulating inductive and productive approaches to data on its own. Even however in this case, the researcher's intervention is considered essential. Not all correlations derived through a particular algorithm have the same value, which means that a critical separation between those evaluated as significant and valid, and those perceived as unimportant and invalid, is necessary.

Digital Art History as a Social Science

Interpretation is part of all sciences, regardless of whether it focuses on certain artworks or on the results of certain studies. In Digital Art History, there is no interest in the understanding of each artwork separately, but in the interpretation of phenomena and attitudes connected to art and its history. Such purposes seem familiar with the quantitative and qualitative methods used mainly by social scientists, but as will be shown next, they are not very different from the methods that have been applied in Art History since antiquity.

According to Denzin and Lincoln (2005, 43), "Qualitative research is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them". Thus, the qualitative research method has an anthropocentric character because it focuses on the interpretative community and the ways in which its members perceive and understand each phenomenon.

It explores responses or observations, and gathers detailed descriptions and explanations of experiences, behaviors, and beliefs. This is the purpose of the theories of the postmodern paradigm in Art Historiography, which have been researching the way that certain interpretative groups give meaning to art and interact with it in the framework of certain eras. Thus, postmodern arthistorical theories have a qualitative orientation as they "locate the observer in the world. […] attempt to make sense of or interpret phenomena in terms of the meanings people bring to them'.

The purpose of quantitative research is to discover the causes of changes in social phenomena through objective measurement and numerical analysis (Creswell, 1994) . It is used in Natural and Social Sciences, and can be used in Art History when questions concern numerical data. For example, in the context of artistic production, how many works come from men, and how many from women? Alternatively, how much has women's involvement in the artistic field increased over the years? Quantitative research is useful for grouping the population; the researcher divides the population of interest into equal groups to better control it.

Moreover, it may quantify views, attitudes, and behaviors within specific groups or larger populations. For example, the opinions of visitors of an exhibition regarding specific questions can be measured. Quantitative research can explain this phenomenon by predicting the factors or variables influencing it. Certainly, numbers are the safest empirical data, as long as the hypothesis is of the type that can be both strengthened and verified through quantitative tests. Unlike anthropocentric qualitative methods, quantitative methods are purely empirical and aim to reduce subjective intervention and understanding.

A quantitative method applied by Digital Art History is network analysis, which in recent years has been gaining increasing ground, finding applications in a number of art historical research

projects in both Europe and the USA. Its aim is both to measure and graphically represent the relationships or flows developed between people and groups that function as data carriers. In the context of Digital Art History, network analysis explores the relationships formed between the historical actors of artistic creation, that is, artists, collectors, commissioners, and art theorists, and also between museums, galleries, exhibitions, and even between the artworks themselves. These are hubs around and through which all types of relationships are formed, from communication to exchange and interaction. These relationships can be measured using quantitative indicators that show the density or centrality of each factor's position within the network. Such analyses are made possible by the digital processing and interconnection of a large amount of data, which sometimes appear at first sight to be disjointed, disparate, or even marginal in terms of traditional research that always relies on a limited amount of data. This allows a more supervisory approach to more complex data, leading to original combinations. It may reveal hidden relationships and unknown structures that were previously unknown since traditional interpretative methods did not lead to them.

Digital Art History uses quantitative methods: empirical data are at the center, while the computer acts on the one hand as a "bank" of information and on the other hand as a carrier of web pages and programs that produce targeted correlations between data of the art world (works, artists, collections, etc.), either between themselves or with other data (historical, social, intellectual, economic, etc.), carrying out inductive and productive approaches. Simultaneously, qualitative-anthropocentric methods are applied to investigate human behavior in relation to the reception of artworks and, by extension, their evolution over time. These methods do not necessarily exist separately; they may coexist in the same research.

Quantitative methods are empirically driven, as has the traditional method of recording art history through the rhetorical tool of narrative. As already shown in part 3, in Antiquity, historiographers were not interested in interpretive analyses of artworks, in reporting as many of them as possible, usually in conjunction with a brief description of both their context and the biography of their creator. Pliny the Elder collected a large number of artworks, which he very briefly described, mentioning their size, especially if they were very large; their price, especially if it was high; their creator, especially if he was famous; and he sometimes made references to their originality and beauty (Fernie, 2005). Arthistorical narratives are work-centered (with an emphasis on both the creator and his framework) and more descriptive-empirical than analytical-interpretive.

Concluding Remarks: Digital Art History as a Method of the Postmodern Paradigm of Art Historiography

This paper aimed to show that Digital Art History, as it has been served by now, is another trend in the postmodern paradigm of Art Historiography and not the beginning of a new one. The main argument was that the revolution it brought was more instrumental, connected to the increased possibilities of digitality, and not methodological. In order to speak about a new paradigm in Art Historiography, there must be a novel methodological approach in research, as was the case of both the shift from the classic paradigm dominated by the recording of art history through the rhetorical instrument of the narrative, created mostly by empirical-descriptive and teleological presentations of the development of art through time, to the modern paradigm that had a more philosophical character by recognizing both inter-subjective cognitive principles for the understanding of the development of art, and the artist and his/her context as responsible for the one and correct interpretation of each artwork, and the shift from the modern to the postmodern paradigm highlighted by the application of reception theory and the belief that the interpretive community is the one that gives meaning to art. Postmodern researchers have mostly focused on interpretative communities that were ignored in the past.

It has been argued that the traditional distinction between Empirical Sciences and Humanities as well as between data-driven and theory-centric sciences is not accurate: Digital Art History has not to be recognised as pure Data Science, nor as a Social Science, because the applied

methods are common with pre-existing methods of Art Historiography since antiquity. Of course, it is up to the future to show whether Digital Art History will eventually dominate and develop new methodological directions by inaugurating a new paradigm in the discipline of Art Historiography. However, there are still many issues to be resolved for this method to be considered both functional and applicable by the scholarly community as a whole (Drucker, 2013).

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