

Evolution in art display

Évolution de la présentation des œuvres d'art

Karl Heinz Szekiolda¹

¹ Alumnus, Fulbright Scholar and City University of New York

karl.szekiolda@gmail.com, kszekiolda@ateneo.edu

ABSTRACT. Picture display in frames is only a recent development compared to the oldest known artwork that was created several thousand years ago. Artwork from the Stone Age shows no man-made borders, and artistic expressions were physically restricted by natural and geological structures. First picture display and framing in the Western culture is documented with examples from the Antiquity, in approximately 800 BC to 500 AD. More sophisticated picture display was observed in Western Europe only at the beginning of the 13th century, and from 1910 onward, modernism formed the new style of frames. At the end of the 20th century the contemporary period dominated, and merging abstract paintings with antique frames became a new trend that fuses components from different cultures and time periods. However, the frame came to be a distraction to some viewers for certain types of artwork, because subconsciously, people perceive an emotion from the artwork and the contribution of the frame. A recent competitor to framed artwork for classical interior design is digital art by offering new experience and interaction with art. However, modification of living space by remote work may give preference to digital art and 3D-hologram displays, and it seems to be that our view on electronic art may have to undergo a significant revision.

RÉSUMÉ. L'encadrement des œuvres d'art est une pratique récente si l'on considère que les premières créations artistiques remontent à plusieurs millénaires. Les œuvres de l'âge de pierre ne comportaient pas de bordures artificielles, leur expression étant physiquement limitée par les structures naturelles et géologiques. Dans la culture occidentale, les premières formes d'encadrement et de présentation des images sont attestées dès l'Antiquité, entre 800 av. J.-C. et 500 apr. J.-C. Des modes de présentation plus élaborés n'ont fait leur apparition en Europe occidentale qu'au début du XIII^e siècle, tandis que le modernisme a imposé un nouveau style d'encadrement à partir de 1910. La période contemporaine a pris le relais à la fin du XX^e siècle, voyant émerger la tendance consistant à associer peintures abstraites et cadres anciens, fusionnant ainsi des éléments issus de cultures et d'époques différentes. Toutefois, le cadre peut parfois distraire le spectateur, car celui-ci perçoit inconsciemment à la fois l'émotion émanant de l'œuvre et l'apport du cadre lui-même. Dans le domaine de la décoration intérieure classique, l'art numérique s'impose aujourd'hui comme un concurrent de l'œuvre encadrée traditionnelle, en proposant une expérience et une interaction inédites avec l'art. Par ailleurs, l'évolution de nos espaces de vie liée au télétravail pourrait favoriser l'art numérique et les affichages holographiques en 3D, laissant penser que notre perception de l'art électronique devra probablement être profondément réévalué.

KEYWORDS. Picture frames, history, merging antiques with abstracts, holograms.

MOTS-CLÉS. Cadres, histoire, mariage d'antiquités et d'art abstrait, hologrammes.

1. Introduction

The western society is passionate about having pictures positioned against the walls without recognizing that pictures or artworks combine artistic and psychological components that generate emotional sensations. However, when viewers are exposed to visual artwork, the question of why we hang pictures in the first place remains unexplored. Additionally, pictures and their frames play a central role in the presentation and perception of artworks because they not only provide protection against mechanical impact, but also amplify the visual experience of artwork as an important feature in interior design. Questions of why pictures are in a household and why they have to be framed have been asked over the years, and have been addressed by scientists, romantics and philosophers. Simmel (1994) stated “boundaries for the work of art are that absolute ending which exercises indifference toward and defence against the exterior and a unifying integration with respect to the interior in a single act.” This view can be further expanded with results in experimental psychology and cognitive sciences that showed motion and representational momentum can be perceived in static images based

on one's visual system that has the capability to detect motion, even where it is only implied (Marchetti, 2022). It can be speculated only why we actually decorate our home with image material. An explanation could be that the enclosed walls in housings provide silence and individuality, security, and build a contrast between the inside and outside, and the compulsion to decorate the interior of a habitat may result from the wish to simulate a natural view within. Kaplan (2001) pointed out that having natural elements or settings, viewed even from a window, generates psychological benefits to residents' satisfaction. Furthermore, a boundary around artwork in form of a frame restricts the content from its surrounding environment, and in a more realistic world, a picture frame is basically a mechanical structure that supports the artistic content. Not all artwork requires a frame and a trend exists that frames are even rejected, because attention may be detained from the actual art. Frameless artwork is also enhanced by the availability of pre-constructed gallery-wrapped canvases that are meant especially for displays in galleries. The view that frames and borders may be considered as having only a secondary function is supported by the argument that for instance, abstract images are important in their own right (Kiilerich, 2019).

The perception of frames in artwork is a psychological process that enhances the interaction between art and a viewer and subconsciously adds to the value of art, because an appropriate frame complements the content. However, the question of why we frame pictures remains unanswered and a view back may highlight reasons and purpose of framed pictures in connection with the surrounding environment. In a philosophical context, Kant introduced toward the end of the 19th century, his concept on borders and frames with emphasis on the enhanced beauty of paintings by frames that act as aesthetic boundaries. However, Kant's exploration of boundaries extended far beyond just picture frames, and he integrated the issue of frames and boundaries more broadly in his philosophy as interpreted by Prager (2002).

2. Earlier art

In recent times, the function of frames is to separate images from their surroundings and set individual boundaries in rather constraint living environments compared to previous eras when displays of visual expressions were carried out in open natural spaces without man-made boundaries. Works created during the Stone Age are fascinating, but their purpose of artistic expressions can only be guessed. Rock art or petroglyphs date back to approximately the Neolithic and late Upper Paleolithic, about 10,000 to 12,000 years ago, but in Western Australia, petroglyphs are found to be 40,000–50,000 years old, and it is generally assumed that they had cultural and religious significance for the societies that created them (Wikipedia). It should be emphasized that paintings from the Stone Age had no established man-made borders, and that artistic expressions were restricted by natural and geological structures that provided the workable surfaces.



Figure 1. Cave painting from the Aurignaco-Périgordien period in Pech-Merle (France) of black horses and blackened hands. Arrows and numbers indicate the approximate size of the painting in meters.

The early techniques and aesthetics in creating artwork in the Western world are well documented with cave paintings in France and Spain in the caves of Lascaux, Altamira and La Marche. Amongst others, the Chauvet-Pont d'Arc cave is one of the major decorated caves of prehistory and dates back between 38,000 and 30,000 years (Fritz and Tosello, 2025). Figure 1A shows an example of a cave painting in Pech-Merle (France) with horses on a natural rock relief that dates back about 35,000 to 20,000 years and demonstrate the details with which artists executed their work (Breuil and Berger-Kirchner, 1960).

Extreme artistic expressions are the Nazca lines that were created between 500 BC and 500 AD and consist of a group of geoglyphs in the surface soil of the Nazca Desert in southern Peru. Those geoglyphs are based on a circular design that was mathematically described by Scholten (1984). Two examples of geometrical figures of a spiral and a spider show that they are large enough to be recognized in satellite images and are presented in Figure 2. The sharp visual appearance of the geoglyphs is created by the different reflective properties of the glyphs and the surrounding soil, because the incisions in the desert floor removed the top layer of reddish-brown ferric oxide-coated pebbles and revealed the yellow-grey subsoil (Weller et al., 2013). The size of the images in the desert location would make it unreasonable to consider a frame around those images; however, the large surrounding mountainous region, and the vertical geological stratification with its chemical and spectral differences, set natural boundaries. The major point is that man-made borders and restrictions around artwork were not considered in the natural environment.

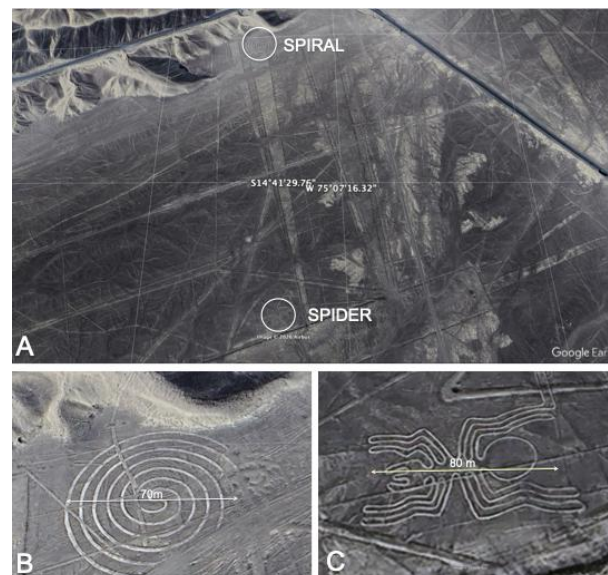


Figure 2. A: Satellite coverage of the Nazca lines shows the locations of two geoglyphs as indicated by the circles. The area is located on the Nazca plain, between the Andes and the Pacific Coast. B: The image shows a spiral at the foot of the mountains; C: Spider. The width of the lines is around 10 to 15 cm, but some may be 1.8 m wide.

The basic questions arise as to why, where and when did humans start to transfer their art to interior living space and introduce framing for artwork? To answer these questions, one has to go back to the time when spatial and temporal factors of domestication, particularly the construction of permanent residence and development of agriculture began, because animal and plant domestication required human domestication. That led Wilson (2007) to conclude that architecture preceded agriculture with the appropriation of space for permanent dwelling to support agriculture. As artwork from prehistory showed no evidence of intentionally imposed physical restrictions or human-made boundaries, it can be assumed that framing of art must have started shortly after humans developed structural habitats for interior living. Although limited in size, wall space became available to display artwork in new surroundings. There is no exact date when this process

started, but picture framing in the Western culture is documented in the Roman Antiquity from approximately 800 BC to 500 AD.

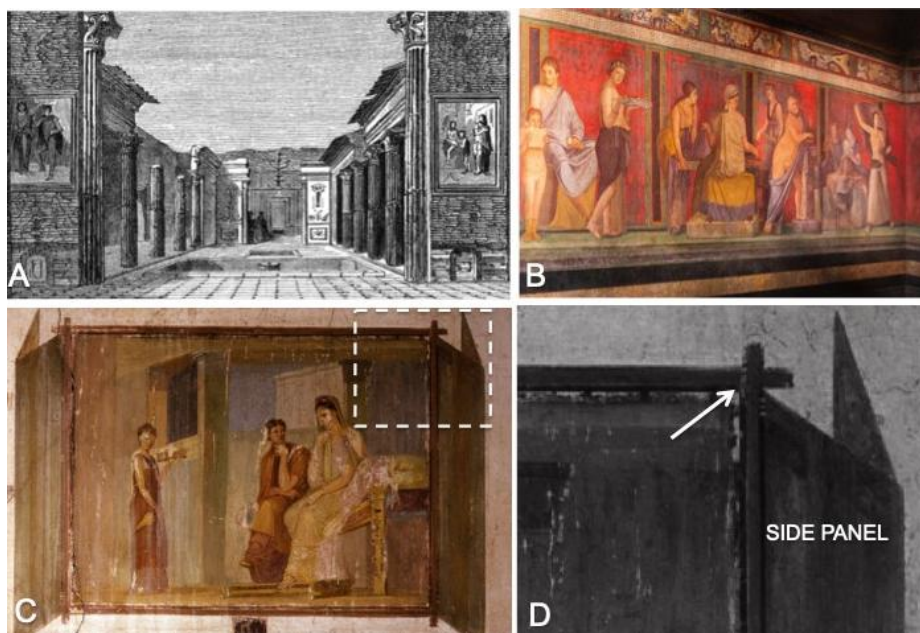


Figure 3. A: Court or internal garden of the house of the castors in Pompeii, (after Monnier, 1864). B: Partial view of ancient Roman fresco in Pompeii. C: Fresco painting at Pompeii, showing a painting with a frame consisting of four wooden strips that overlap at the corners. Image source: German Archaeological Institute, Berlin. D: Enlarged section in the white dashed rectangle shown in frame Figure C after image-enhancement.

A house in Pompeii, shown in Figure 3A, had beautiful paintings and rich architectural elaboration of the two courtyards and were described by Monnier (1864) stating that “dans les maisons simples, ces panneaux unis étaient partagés par de simples lignes; puis, peu à peu, la maison s’enrichissant, ces lignes devenaient des cadres ornés, des guirlandes, des pilastres, bientôt des pavillons fantastiques où l’imagination du décorateur s’ébattait librement. Cependant les socles se couvraient de feuillages, les frises d’arabesques et les panneaux de peintures, simples d’abord: une fleur, un fruit, un paysage, bientôt une figure, puis un groupe, enfin de grands sujets historiques ou religieux qui couvraient parfois tout un pan de muraille et auxquels le socle et la frise servaient de pompeux encadrement. ” A fresco in Figure 3B shows subdivisions of the contents into sections, and painted borders that surround the whole fresco, that can be considered as a precursor for solid framing. Another precursor of frame for paintings is indicated in another fresco shown in Figure 3C with simple stretching of the painting that linked to folding panels that were most likely intended to protect the fresco (Meyer-Graft, 2021).

3. History of image content and frames

Although picture framing can be assumed to have started around the period of Roman Antiquity when development of more complex picture arrangements required more elaborated frames, it can be generally accepted that classical framing started around the 12th century as an artistic form of expression, and it is considered as a unique phenomenon in relation to different cultures (Grimm, 1987). However, picture framing as we understand it today, was observed in Western Europe only at the beginning of the 13th century, and at that time, the frame was often just a solid part carved out of the same panel that carried the painted surface. During that time, a picture frame was described as the process by which the area to be painted was carved out and that the framing border was like a tray (Day, 1998).



Figure 4. Left: Russian icon with painting and gold on wooden panel; year unknown but most probably around 1600, size 23 x 29 cm (private collection). Right: Duccio di Buoninsegna, Madonna and child, about 1290-1300, tempera and gold on wooden panel around 28 x 21 cm (Metropolitan Museum of Art).

Examples of paintings incorporating flat carved surfaces with borders are shown in Figure 4 with a Russian icon and a painting from the 13th century, where both have the painting on a wooden panel with the frame carved out from the same base as the painting's support. Compared to the rather simple arrangements of picture framing in antiquity, a large variety of frames followed that showed support of painted panels. Gilded frames started to show in the early 14th century and were used as altar ornamentation when gold was incorporated also into the paintings as well.



Figure 5. The weight of a sketch is amplified by its presentation in a frame. A: Original colour sketches, B: Framed sketch shown on the left.

Modernism formed a new style of frames that started at the end of the 20th century with shiny frames that dominate framing of contemporary artwork. However, there are views that a frame should not distract or detract from the content of the art within a frame, and some contemporary artists add frames to their works but move against understated, unobtrusive frames that dominated exhibition spaces in the past (White, 2025). The view on picture framing changed with the progress in architecture, and in the late 19th and early 20th centuries, it was realized that sculptors, painters and architects are not isolated components of the arts, and integration of art and architecture followed (Ghisleni, 2023). This concept is especially recognized in the movement through the Bauhaus in Germany, and resulted in unification of architecture, painting, sculpture, industrial design and crafts (Ridler, 2022).

4. Frame selection

At present, it is common to select a frame in order to enhance the aesthetics, to stimulate additional emotions, and to present the content in a different perspective. According to Christensen et al. (2023) the psychological impact of framing on art is expressed in the emotional response of a viewer; for instance, a heavy frame can induce different intensity and desire compared to a simple light frame. In addition, a frame may enhance the appearance of a simple painting as is shown in Figure 5 with sketches on paper of which one was framed. It is not the objective to judge the value of such approach, but rather, it emphasizes the value-added effect of a frame. A general but not exhaustive summary of picture frames and corresponding content from various periods is shown in Table 1. Selected specific styles are listed according to the periods during which they developed, and the various styles of which some are even carried over to present times in reproductions. For example, during the Baroque/Rococo time, gold leaf frames were more naturalistic ornaments and their aesthetic appearance still has a lucrative market today. Another example of the impact of frames is documented with the reframing of a group of Van Gogh's canvases by replacing previous frames with those that associate more closely with van Gogh's own artistic vision, and it showed that "Le contraste avec les cadres précédents est tel que l'expérience esthétique est complètement renouvelée. Là où les bordures sculptées, âgées de quatre siècles, rehaussaient les lignes tortueuses et patinaient les toiles, les nouveaux encadrements les éclairent et les calment. Ces copies nous permettent donc aujourd'hui de proposer une présentation de ces toiles plus proche du regard de Van Gogh." (Crépy, 2023). It is interesting that the physical framing effect has an analogy in psychology, where the perception of one quality is influenced by the perceived value of surrounding qualities. It is expressed as the Halo Effect that gives the impression of a frame to be more precious than the actual value of the artwork, and the opposite may occur when an inferior frame encompasses a more valuable artwork but reduces its aesthetic value. There is a move whereby artists working in abstract presentations completely avoid framing their paintings, because the assumption is that a frame distracts viewers from the content of the artwork. So the question arises on why having frames at all? This question was raised, *inter alia*, by Keim (1962) who considered that it couldn't be answered easily because it would address the limits of aesthetics at the border between painting and the adjacent living environment. Furthermore, a frame is not only a boundary between the image content and the surrounding environment, but illusory reality created by perspective and reliability, which deconstructs the false aesthetic relationship of frame and picture (Ke-bing, 2015). That means that frames provide a visual link between artworks and their surrounding environments, and Redies and Groß (2013) showed that viewing a painting alone, compared to viewing the painting with its frame in a museum environment leads to varying results.

PERIOD	MAJOR ELEMENTS	FRAME
1000–1250	ROMANESQUE Massive, thick, compact, elements from antiquity	
1140–1530	GOTHIC Picture frame as church ornamentation and work of art. Structural features are related to the architecture of the era.	
1420–1610	RENAISSANCE Artistic corner ornaments, finishes, partly oil-gilded.	
1600–1750	BAROQUE Flowing forms, concave and convex shapes, ornamental elements.	
1730–1780	ROCOCO Stucco-like artistic elements, rich ornamentation.	

Table 1. *Approximate times of selected different cultural epochs and characteristics of corresponding picture frames*

Conclusions derived from observations on paintings and their frames, at different museums, showed that frames from 20th century art tended to be smaller and less complex than in other museums that exhibit paintings from the 13th to 18th century and 19th century, respectively.

Another factor that is less addressed is the size of a frame in relation to the actual size of a painting. That seems to be critical especially in large abstract paintings when a heavy frame may diminish the importance of the content. An example of a large-scale painting by Jackson Pollock who revolutionized action painting, is shown in Figure 6. His large format revealed freedom and strength, and the composition engages the viewer to focus on the whole surface. However, the relative thin frame around this painting is rather modest and almost negligible, but it substantiates the focus on the content of the painting. The same painting in a simulated heavy broad golden frame (not shown here out of courtesy to the artist) would diminish the typical characteristics of Pollock's painting, and would also demonstrate equally, the importance of selecting or designing frames for modern abstract art.



Figure 6. Jackson Pollock's *Convergence*, 1952, oil on canvas, 237.5 x 393.7 cm. Collection Buffalo AKG Art Museum. Gift of Seymour H. Knox, Jr., 1956 (K1956:7). Pollock-Krasner Foundation/Artists Rights Society (ARS), New York. Photo: Tom Loonan and Brenda Bieger, Buffalo AKG Art Museum.

A recent trend in picture framing is the merging of abstract paintings with antique frames. This process basically combines components from different cultural periods and is appreciated due to the contrast between minimalism in abstract art and the beauty of old and handcrafted frames with combining both the past and the present. It may create an elegant and stylish look especially when the color, texture and aesthetic attributes in an antique frame are in harmony with the abstract art as is suggested in Figure 7.



Figure 7. Example of an abstract painting in an antique picture frame.

5. The trend in digital art display

Presently, we are in a transition phase during which the arts are driven by electronic communications and related products from artificial intelligence. Our daily life is filled with electronic transfer of information and is screen-displayed on computers, phones, video games, watches etc. This resulted in a substantial contribution to the development of digital art by taking advantage of image processing and the use of advanced computer technology. Starting in the 1960's, digital technology was used in presentations with typical commercial applications and use in science data processing.

However, most of the digital art is still framed and displayed in a two-dimensional plane and mimics digitally the historical canvas and picture frame. The effect of this digital display of art may be a loss in individuality, because the development of taste for the public sphere is market-generated. The advantage, however, is that an owner of digital equipment is involved in selecting the type and format of the display, with the option to select also the type of frame, both to be in equilibrium with the surroundings. Furthermore, the digital display of art has the advantage of low cost with a wide selection of types and topics to be displayed that can adjust the display according to seasons and events. Bill Gates forecasted in 1987 that by 2007 “you’re sitting at home. You have a variety of image libraries that will contain, say, all the world’s best art. You’ll also have very cheap, flat panel-display devices throughout your house that will provide resolution so good that viewing a projection will be like looking at an original oil painting. It will be that realistic” (Novac, 2012).

The progress in digital art display was shown in 2005 with the first digital billboard that changed images by computer, but the technology was primarily applied in advertising although limited use in other public service was observed. At that time, the transfer of this technology to the home environment was already visible in the installation of digital art frame on wall space in order to display artwork. Even motion visuals with the advantage of balancing the interior design with the change of artwork by season or even according to daily events were feasible (CEDIA, 2025). At that time, Bill Gates also predicted that the day would come when almost any middle-class American family could enjoy large monitors in the house and would display great works of art, changing every day. The considered digital art frames could even react as you walked past, no button pushing required (Gibbs, 2015). Digital art techniques are now widely used in advertising by mainstream media, and by filmmakers to produce visual effects. Thus, artists have increasingly new tools and opportunities to expand their creativity and interact with their audience. Such interaction in art takes place already through the use of electronic communications of which the smart phone is one of the best examples in the use of cameras that have technical means that attracts artists (Halpern and Humphreys, 2016). The impact of the smart phone on art is demonstrated with the contemporary iphoneography movement to merge technology with traditional fine arts. Artificial intelligence has already made significant contributions to the arts, and future developments in digital arts may blur the boundaries between the physical and digital environment (El Hajj, 2022). However, this unclear boundary between AI and digitally created art demands a multi-disciplinary approach and has the advantage to merge art products with those from other disciplines. Examples are evident in the collaborations of artists and scientists who explore artistic expressions in connection with scientific advancements.

The impact of digital art on the art world has been demonstrated by Kukka et al. (2017), when they assessed artists’ experiences at digital art exhibitions with interactive displays in public locations and traditional art galleries. In the regular home environments, screen savers also demonstrate that digital art plays an important role in the use of television screens for interior decoration purposes (Slutskiy, 2018). Furthermore, large digital picture frames for home design are WiFi-connected, have remote control, touch screen and other supports for different image formats. More complex arrangements of digital display boards are interactive walls that incorporate images, videos, news updates, or even personal messages. They operate with motion sensing technologies, projection and display technologies and have been already adapted for home operations and for display of digital art galleries. Incorporated in this scenario, is available software to allow artists to generate digital holographic prints on light-sensitive substrates, and digital art files are formatted for projection on volumetric displays, to

create visual experiences (Azevedo, 2026), such as those found in museums, galleries and live and cinematic entertainment.

An outlook in the progress in the arts shows that AI will challenge the permanence of traditional art, by mimicking any painting style and will set the characteristics according to individual desires (Kun et al., 2024). This means that display and viewing of future art may deviate from our present standard in art of the two-dimensional frame, and will be driven more into a three-dimensional direction. The desire for the two-dimensional plane continues, but a new trend is emerging to perceive space as a dominant factor in the artistic exploration, through computers, ranging from the 3D world to the Internet as an alternate virtual reality constructed by communication (Paul, 2003). Holographic works in the 1970s were considered by Kramer as “kind of sleazy, acid reds, blues and greens we used to find adorning juke boxes and still find in the cheapest kinds of picture postcards” (quoted in Santiago Cortés, 2026). However, the application of holography in support of museum displays had impacts on various spheres of culture as was already demonstrated by Markow (1990). Progress in holographic research showed that holographic applications are useful not only for museums (Pi, Liu and Wang, 2022), but holograms are presently also found particularly in the mechanical engineering sector and in holographic displays for marketing during trade fairs and showroom installations as demonstrated with examples shown in Figure 8.

Art displayed in three-dimensional space allows a viewer to perceive an object to float freely in a room without the need for physical materials or screens. The development of computer-generated colored holographic displays however still has constraints and limitations. The advances in photonics and electronics contribute to the fast development of computer-generated holography although still some restrictions apply (Blinder et al., 2022). However, the time is not too far away when every household will be equipped with a TV set or any other image display system with holographic displays even for the evening news in real time. The progress in digital technology development for image display shows a very fast response in the market. According to Parks Associates in 2009, digital photo frames exceeded already 25% in the U.S. broadband households, up from 7% in 2007 (Press release October 26, 2009). The market for digital frames is still expanding, and manufacturers compete to meet the demands for state-of-the-art devices that support smart technology (Admin, 2026). The holographic display market shows equally a trend in market value with a forecasting for 2035 of about 138 billion US dollars.



Figure 8. Examples of commercially available holography for the public domain (1), museum operations (2)
The figure was arranged from <http://www.holofanco.com/>, HOLOFA Co.

6. Final remarks

When examining the evolution of art over the past 100,000 years, as illustrated in Figure 9, it becomes evident that the presentation of art is closely linked to the development of human living spaces, ranging from simple shelters, huts, and tents to the establishment of villages and permanent cities. While living spaces became more elaborate in design, the available interior space grew increasingly cramped, a trend that persists to this day. The high population density found in modern metropolises such as Tokyo or New York further exacerbates this situation. The resulting shortage of space within small residential units favors a preference for digital art. Digital art is already widespread and poses serious competition to traditional wall décor, offering new possibilities for interaction and the experience of art, particularly regarding the selection and display of works. Furthermore, the preference for digital art is reinforced by the shift toward remote work, which alters how living spaces are utilized and introduces new functions into the home environment. In this new domestic setting, conventional artworks may play only a minor role in interior design, whereas digital art along with the associated technology that can be controlled via simple on/off mechanisms is increasingly preferred.

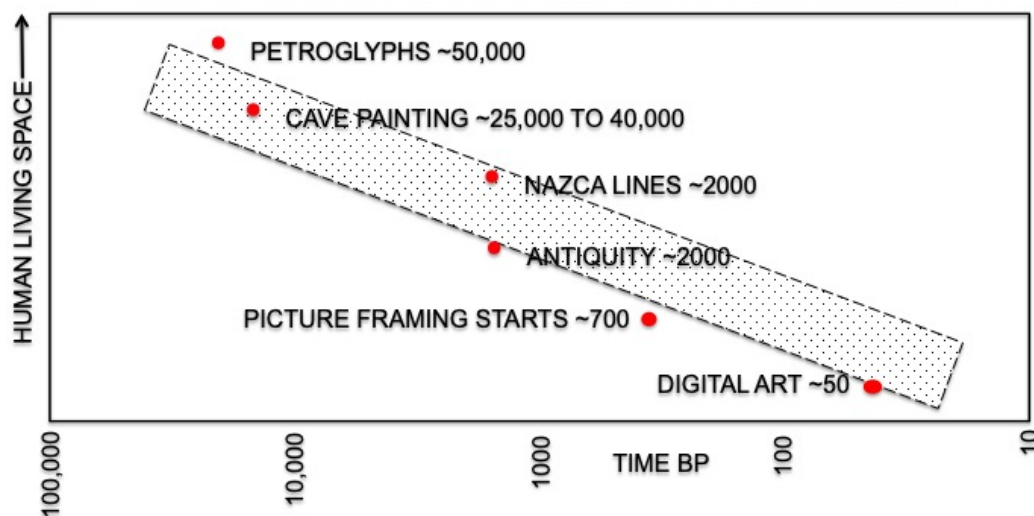


Figure 9. Approximate time of art events (BP) and the reduction of human living space schematically shown with the shaded area.

The development in digital art and 3D-hologram displays seems to be a challenging task to conventional art displays, but the existence of digital art covers only a very short-time frame compared to centuries of conventional art display. However, considering the fast development in computer technology, the time nears when our view on electronic art may have to undergo a significant revision and the possibility of a completely different concept on art display is foreseeable.

7. Acknowledgment

Amanda Smith Collections Digitization Specialist at the Buffalo Art Museum provided images and granted permission for use in this communication. The holograms in Figure are reproduced with the permission of Rhea L., consumer specialist at HOLOFAN Co.

8. References

- Admin (2026)> Digital Frame. <https://www.artsandcompany.com/blog/digital-frame>
- Azevedo, M., I. (2026). Digital art holograms: exploring concepts in a dynamic space. Proc. SPIE 13917, Practical Holography XXXX: Displays, Materials, and Applications, <https://doi.org/10.1117/12.3078812>.
- Blinder, D., Birnbaum, T., Ito, T., & Shimobaba, T. (2022). The state-of-the-art in computer generated holography for 3D display. Light: Advanced Manufacturing, 3, 572-600. Article 35. <https://doi.org/10.37188/lam.2022.035>.

- Breuil, H. and Berger-Kirchner, L. (1960). Franko-Kantabrische Felskunst, 9 -96. In: Bandi, H-G., Breuil, H., Berger-Kirchner, L., Lhote, H., Holm, E. and Lommel, A. (1960). Die Steinzeit: Vierzigtausend Jahre Felsbilder, Holle-Verlag, Baden Baden, Germany 1960, 253pp.
- CEDIA (2025). What is a digital art frame? A guide to smart home art displays. Last updated: Apr 17, 2026, Blog.
- Crépy, S. (2023). Vincent Van Gogh, Les Chaumes de Cordeville à Auvers-sur-Oise, 1890 Paris, Musée d'Orsay, exposition « Van Gogh à Auvers-sur-Oise.
- Christensen, A., Darda, K., & Chatterjee, A. (2023). Does the frame of an artwork matter? Cultural framing and aesthetic judgments for abstract and representational art. *Psychology of Aesthetics, Creativity, and the Arts*, 17(4), 428–450. <https://doi.org/10.1037/aca0000569>
- Day, D. (1998). A survey of frame history, part 1. *Picture Framing Magazine*, 82, 84.
- El Hajj, M., H. ^{SEP} (2022). The future of digital arts. *International Journal of Education and Learning Research*. 5, 1, 109 – 129. Online ISSN: 2785-9568.
- Fritz, C. and Tosello, G. (2025). Arts and sciences before science and art: facsimiles of ornamented caves. *Arts et sciences d'avant la science et l'art : fac-similés de grottes ornées*. *Arts et Sciences*, 9, Spécial, 70-78 pages, DOI : 10.21494/ISTE.OP.2025.6771.
- Ghisleni, C. (2023). The close relationship between art and architecture in modernism. (Arquitetura como síntese: o diálogo entre projeto e arte no modernism). <https://www.archdaily.com/962541/the-close-relationship-between-art-and-architecture-in-modernism> ISSN 0719-8884.
- Gibbs, W., W. (2015). The ultimate digital picture frame. *IEEE Spectrum* 52, 11, 20-21. doi: 10.1109/MSPEC.2015.7335891.
- Grimm, C. (1987). Histoire du cadre: un panorama. *Revue de l'Art* 76, 15-20.
- Halpern, M. and Humphreys, L. (2016). Iphoneography as an emergent art world. *New Media & Society*. 18. 62-81. 10.1177/1461444814538632.
- Kaplan, R. (2001). The nature of the view from home, psychological benefits. *environment and behavior*, 33, 4, 507-542.
- Ke-bing, T. (2015). The lack of the frame and transformations of the concept of art. *Sino-US English Teaching*, 12, 7, 491-496. doi:10.17265/1539-8072/2015.07.004
- Keim, J., A. (1962). The picture and its frame. *Diogenes*, 10, 38, 95, 111. DOI: <https://doi.org/10.1177/039219216201003806>
- Kiilerich, B. (2019). Abstraction in Late Antique Art Universitetsbiblioteket i Bergen, 77-94. <https://doi.org/10.1515/9783110546842-005>
- Koutstaal, W. (1998). Memory for Picture Frames. *Empirical Studies Of The Arts*, 16, 1, 47-57. <https://doi.org/10.2190/4CCH-9030-3THM-LTMH>
- Kukka, H., Ylipulli, J., Goncalves, J., Ojala, T., Kukka, M., and Syrjäla, M. (2017). Creator-centric study of digital art exhibitions on interactive public displays. *MUM 2017*, 37-48, Stuttgart, Germany. <https://doi.org/10.1145/3152832.3152835>
- Kun, P., Freiburger, M., Risi, S. and Løvlie, A. S. (2024). GenFrame: An interactive picture frame painting the portrait of any girl. In: *Designing interactive systems conference July 01–05, 2024, IT University of Copenhagen, Denmark*. ACM, New York, NY, USA, 6 pp. <https://doi.org/10.1145/3656156.3665437>.
- Lewis, H. (2020). Petroglyphs: Imagination chiseled in stone. *Gallivance, fascinated by the world*. <https://gallivance.net/2020/08/22/petroglyphs-imagination-chiseled-in-stone/>
- Markov, V., B. (1990). Display and applied holography in culture development. *Proc. SPIE 10308, Holography*, 103080D. <https://doi.org/10.1117/12.2283695>.
- Marchetti, L. (2022). Depicting motion in a static image: Philosophy, Psychology and the Perception of Pictures. *The British Journal of Aesthetics*, 62, 3, 353–371. <https://doi.org/10.1093/aesthj/ayab044>
- Markov, V., B. (1990). Display and applied holography in culture development. *Proc. SPIE 10308, Holography*, 103080D. <https://doi.org/10.1117/12.2283695>
- Meyer-Graft, R. (2021). Beobachtungen zur antiken Bilderwelt Pompejanische Wände. *Die AdR-Arbeitsgemeinschaft der Restauratoren*.
- Monnier, M., M. (1864). Pompéi et les Pompéiens. *L'Art. Le tour du monde*, 9, 401-407.

- Novak, M. (2012). 1987 Predictions From Bill Gates: Siri, Show Me Da Vinci Stuff. <https://www.smithsonianmag.com/history/1987-predictions-from-bill-gates-siri-show-me-da-vinci-stuff-500/>
- Paul, C. (2003). Virtual reality and augmented reality. *Digital Art*, 125-132. London, UK, Thames & Hudson Ltd.
- Pi, D., Liu, J. and Wang, Y. (2022). Light: Science & Applications, 11, 231 Official journal of the CIOMP 2047-7538. <https://doi.org/10.1038/s41377-022-00916-3>. www.nature.com/lsa
- Prager, B. (2002). Kant, art and art history: Moments of discipline (review). *Journal of the History of Philosophy*. 40. 547-548.10.1353/hph.2002.0078.
- Press release October 26, 2009. Digital Photo Frames enter mass market with 25% penetration in U.S. broadband households <https://www.parksassociates.com/blogs/broadband-pr/digital-photo-frames-enter-mass-market-with-25--penetration-in-u-s--broadband-households-2>
- Redies, C. and Groß, F. (2013). Frames as visual links between paintings and the museum environment: An analysis of statistical image properties. *Frontiers in Psychology*, 1- 14. doi: 10.3389/fpsyg.2013.00831.
- Ridler, M. J., (2022). Color and Architecture: Walter Gropius and the Bauhaus Wall-Painting Workshop in Collaboration, 1922-1926. *Architectural Histories* 10, 1, 4, 1-27. doi: <https://doi.org/10.16995/ah.8308>
- Santiago Cortés, M. (2026). Holography is enchanting a new generation of artists. <https://ocula.com/>
- Scholten de d'Ebneth, M. (1984). Nazca. Testimonio de una alta cultura descubrimiento del mas grande liobro de geometria del mundo. Lima, 65pp.
- Simmel, Georg (1994). The picture frame: An aesthetic study. *Theory, culture and society* 11, 1, 11-17. <https://doi.org/10.1177/026327694011001003>
- Slutskiy, P. (2018). Is video-art becoming a form of popular art? The case of Apple TV's aerial screen savers. *IAFOR Journal of Cultural Studies*, 3, 1, 72-82.
- Weller, A., Rosas, S., Eidner, M. and Hartsch, K. (2013). Geophysical, petrographic and geochemical survey on the Nazca lines. *Journal of Earth Science and Engineering*, 3 159-167.
- White, K. (2025). Bordercore: Why frames became the new frontier in contemporary art. *artnet*. <https://news.artnet.com/art-world/contemporary-frames-2622949>.
- Wilson, P. J. (2007). Agriculture or architecture? The beginnings of domestication. 101-121. In: *Where the wild things are now*, 326 pp. Editors: Cassidy, R. and Mullin, M. SBN 9781845201531, Routledge.