11. Art and technology as tools for creating inclusive and sharing spaces

Giulia Gerosa, Federica Guarnieri

11.1 Origins and evolution of technology in art

The artistic trend of digital art developed in the 1960s and 1970s within the science and technology laboratories of universities in the United States, and later in Europe.

During those earliest years of experimentation, the trend evolved into the multiple fields of activity and languages that still characterize it today. But despite more than fifty years of activity and research, it only began to attract the attention of a wider audience in the new millennium (Galansino and Tabacchi, 2022).

Digital art was first touched upon in Europe with the 1968 exhibition *Cybernetic Serendipity*, organized by the Institute for Contemporary Art (ICA) in London with the aim of highlighting how computers were being employed in many traditional creative processes: from art to music, poetry to dance, sculpture to animation (Paul, 2015). Although the exhibition was a success, as time passed, interest in anything that required the use of technology in the pro-

duction of works diminished. As can be read in the article *Computers and the Visual Arts* (Mezei, 1967), while there was great interest in using computers to create works of art, there were few interesting results at the time due to the technical difficulties of processing two-dimensional images, the complex nature of use and the high cost of the software.

Digital art, however, was beginning to carve out a niche for itself within the vast artistic landscape, thanks to experiments – by painters, sculptors, architects, photographers, scientists and engineers – with new techniques for creating and manipulating images by means of computers, from the 1970s onwards.

The event that led to the change and (re)discovery of digital art was a Christie's auction on 11 March 2021, when Mike Winkelmann's NFT work sold for 69.3 million dollars (Galansino and Tabacchi, 2022). From that point on, the art world turned its attention to the digital world, leading to explosive growth in the number of NFT works.

In recent decades digital art has changed dramatically, as it involves the use of tools and technologies that are in continuous development and modernization: it is defined as a fluid art, one that is changing all the time because the technologies and the society in which it operates are also in constant evolution. Using digital technologies and interactive tools, the phenomenon has challenged traditional concepts of artwork, the artist and their audience (Paul, 2015) and, ultimately, the definition of appropriate spaces for production and enjoyment of the works themselves. In fact, digital artists have always created their pieces in the *wrong places*: beyond the artistic sphere, and instead on the web, in laboratories, in scientific and technological research facilities (Quaranta, 2010).

The strong link with the Internet has also made it possible for artists to create real communities by forming a network in which there is no sale and purchase of artworks; rather, they are exchanged for free via websites, email lists and alternative spaces.

Digital art was therefore born to be characterized by free and accessible sharing to anyone, which is typical of the anti-establishment spirit of the web: an ephemeral spirit that reflects this art's aesthetics and technologies (Tribe and Jana, 2006).

It is exactly this ephemeral appearance that has slowed down the

development of digital art, leading to strong misgivings among collectors and gallery owners regarding the procedures for the creation, storage and display of artwork.

This naturally leads to the question of what has changed in recent years and, in particular, what has prompted the collective interest of the artistic and cultural scene in the digital world.

As the movement has grown in recent years, there has been an increase in the number of research and outreach centres, festivals and museums, and more traditional institutions are even taking steps into the digital world. Many art galleries were founded in recent years with the objective of acting as a bridge between the public and digital art. As the place of investigation changes, many other aspects inevitably do, too: the artist's tools, the stimuli, the means of production, and consequently the places of creation, preservation, and display of digital works.

11.2 Definition of the first centres: from 1970 to 1999

Since the early 1970s, which were marked by significant experimentation, digital art has evolved into multiple fields of practice and languages. It is, however, as a result of the rapid development of the Internet and new media, which has mostly occurred since the early 1990s, that the European digital art scene has evolved.

Throughout these twenty years of intense activity, the first communities for the popularization, discussion, and documentation of digital culture – institutions and centres for research and creation, as well as festivals and conferences – began to emerge, playing a key role in the international evolution of the movement.

Among the places that have contributed to the birth of the European system of reference is the *Ars Electronica* in Linz, which has been in a continuous process of reinvention since it was founded in 1979. From it sprang forth the Ars Electronica Futurelab, a research and development laboratory that brings art, technology and society together, dealing with topics ranging from future narratives to Art Thinking to creative artificial intelligence, from virtual and mixed reality

to co-immersive spaces, and green innovation to Industry 5.0. Another example is the IRCAM in Paris, founded in the 1970s at the request of George Pompidou as a centre for musical creation to accompany the eponymous National Centre of Art and Culture, and hidden until 1990 under the iconic *Stravinsky fountain* by Jean Tinguely and Niki de Saint Phalle. A more recent icon is iMAL in Brussels, a non-profit organization founded in 1999 by Yves Bernard, aimed at stimulating the process of creative appropriation of new technologies. In 2007, iMAL inaugurated a 600 m² Centre for Digital Culture and Technology focussed on new artistic forms, emerging cultural practices and industrial innovations arising from the convergence of information technology, telecommunications, networks, media and digital manufacturing processes. An integrated space, it is a cross between a contemporary art centre for holding exhibitions, lectures, concerts and performances, and a multimedia laboratory where artists can research, experiment, share, discuss and exchange new technologies.

Born out of the gathering of artists and scientists to discuss the digital revolution and its possible consequences, these venues are tasked with communicating the multiple themes addressed by Digital Art through different initiatives, methods and approaches.

It should be noted that although the nature of each centre's activities varies, in general they seek to support artistic and technological innovation, providing spaces for exhibitions, residencies, workshops and discussions in the field of digital art.

The mapping process made it possible to identify these places and gain an understanding of their characteristics.

Four main macro-areas have been identified in which each centre promotes its initiatives:

- *events* (festivals, conferences, talks);
- *exhibitions* (permanent and temporary);
- *disclosure* (physical/online archives, publications);
- *production* (artistic residencies, workshops, fablab).

While most of the centres promote a wide range of events and exhibitions, some differentiate themselves by presenting an experimental research component, a space where art, research and creation can coexist.

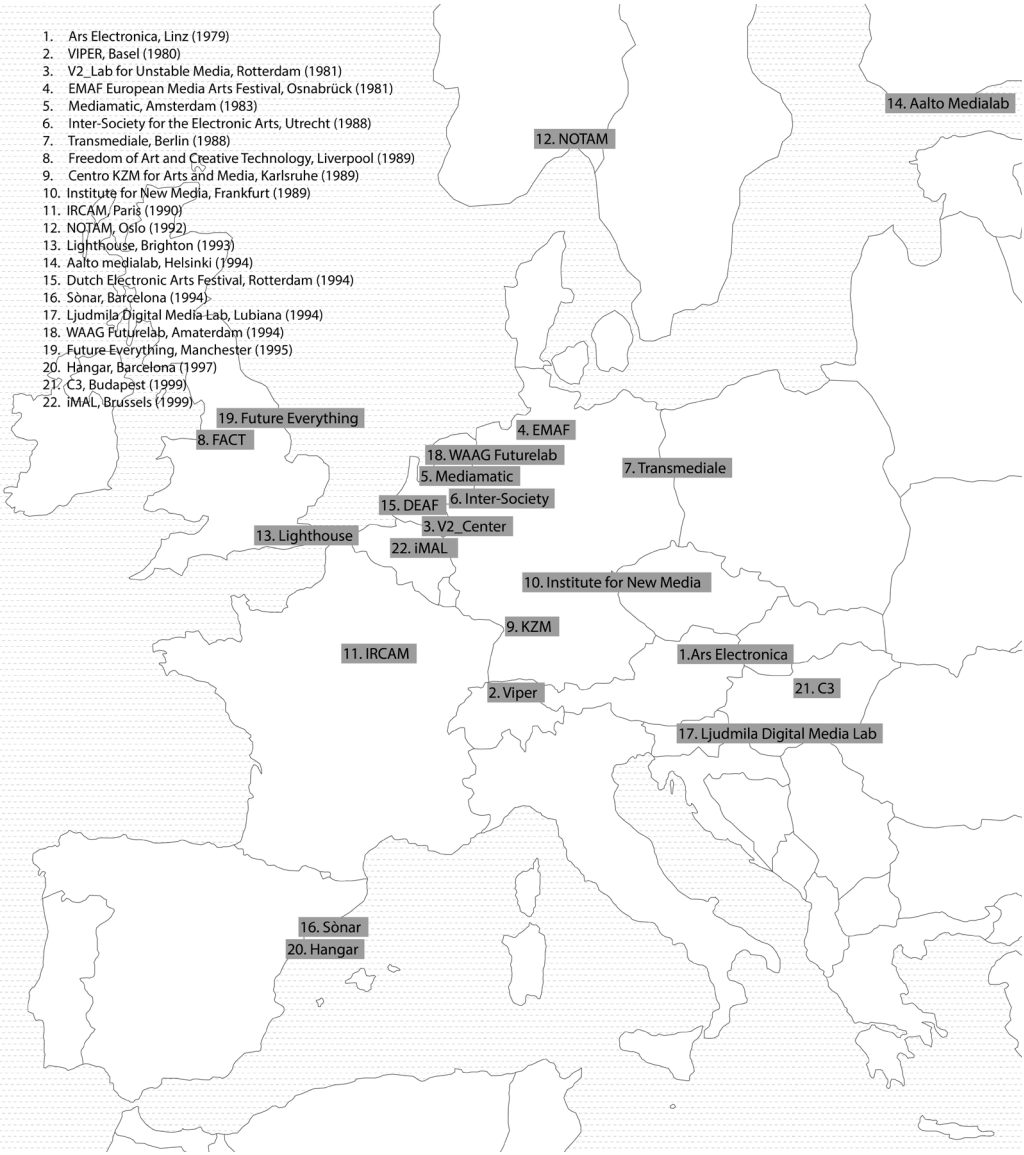

Figure 1.
Development of the European scene between the '70s and '90s.

These are places such as the Ars Electronica (1979), the V2_Lab for Unstable Media (1981), Transmediale (1988), FACT (1989), the KZM Centre (1989), IRCAM (1990), NOTAM (1992), the Ljudmila Digital Media Lab (1994), the WAAG Futurelab (1994), the Hangar (1997) and iMAL (1999), all of which have maintained the original spirit of Digital Art and created an extensive production activity.

These spaces differ from others in that they promote open, free and accessible sharing for all, employing several common strategies and practices such as:

- involving artists from different backgrounds, with the aim of presenting themes and artworks that reflect the cultural diversity of society;
- initiating a programme of artistic residencies offering resources, spaces, tools, materials and financial support to artists;
- actively involving the public in the creation process through workshops, laboratories and other initiatives.

By means of these creative activities even among people who are not necessarily artists, the idea of art being accessible to everyone takes shape and begins to unfold, and digitization begins to be seen not so much as a technological development, but rather as a social development (Granata, 2009).

The social aspect therefore becomes a key element of digital art, which involves artists, scientists, technologists, designers, developers, entrepreneurs and activists from all over the world, gathered together to address the issue of the future development of digital society by focussing not simply on what technology can do, but on what it can do for sustainable development.

11.3 The evolution of the system: from 2000 until today

The production centres that emerged in Europe in the early years played key roles in supporting, promoting and developing digital art. They themselves have developed during a historical period characterized by ongoing novelties, defining a dynamic and ever-changing artis-

tic landscape, leading to the emergence of new centres and initiatives. It was, however, during the '00s, as a result of the evolution of digital technologies, new artistic trends and an increasingly extensive internet, that digital culture underwent a profound transformation.

Much like in the early '60s within the academic laboratories where the earliest relationships between technology companies and artists were established (Mancuso, 2018), the early '00s ushered in the first collaborations between the centres and some of the companies dealing with digital tools, software development and hardware innovation. Scientific research centres, and laboratories of quantum physics and science, are also showing an interest in digital art, creating unique partnerships to explore the deep connection between art, science and technology through international projects and unseen art residencies.

Among the many places that have contributed to the growth of the European system in the last two decades are the *Node Institute* in Berlin (2008), the *Resonate Festival* in Belgrade (2012) and the MEET Digital Culture Centre in Milan (2018), which co-creates and distributes digital culture in Italy by means of projects and initiatives implemented with national and international partners, aiming to narrow the digital divide and enhance skills in the expressive and creative use of technologies. Despite the exponential growth of technological devices and the increase in funding from public and private bodies, the centres that have sprung up over these years continue to have a structure very similar to the original, dividing their offerings into events, exhibitions, dissemination and production.

The swift growth of the internet has contributed to the emergence of a multitude of free and accessible online platforms and resources such as the DAM (Digital Art Museum), which since 2000 has been collecting works, testimonies, biographies and texts, often unpublished, relating to the most influential artists in the history and practice of Digital Art from the 1960s to the present day. In 2003 it initiated *DAM Projects*, to mediate digital art and make it more widely available thanks to a collaboration with Berlin's Center Potsdamer Platz (then known as the Sony Center) presenting the artists' work on the square's screens, and in 2005 the *DAM Digital Art Award*.

Other online resources include *Digicult*, founded in 2005 in Milan to give a voice and visibility to a new generation of artists interested in

exploring and narrating the impact of digital technologies. *Digicult* publishes interviews, news, professional calls and reports through its own online journal, and is dedicated to putting artists in touch with leading institutions, festivals, galleries, research centres and national and international academies. Another example is the *Archive of Digital Art* collective project, created in collaboration with media artists, researchers and international institutions to explore a wider concept of documentation, reflecting the process-oriented, ephemeral and interactive nature of digital artworks.

Compared to the analysis carried out during the first development phase of the *Digital Art system* (1970-1999), in this second phase of evolution there was an increase in the number of spaces dedicated to the exhibition of digital works.

Collectors and gallerists, who had initially raised doubts about seeing this art exhibited within traditional circuits (Tribe and Jana, 2006), begin to develop new strategies for conserving and exhibiting the works. They not only organize themed exhibitions or integrate permanent collections into museums, but the first dedicated museums such as MuDA in Zurich, the Museum of Contemporary Digital Art in London and HeK in Basel are now beginning to emerge.

In parallel with the emergence of museums, exhibition spaces, events and festivals, the European system has been enriched by further centres offering the opportunity for research to produce works and work of a digital nature, even though centres promoting creative support workshops and artistic residencies continue to be in the clear minority. The Edith Russ Haus for Media Art (2000), MediaLab Matadero (2002), Laboral Centro de Arte y Creacion (2007), Baltan Laboratories (2008), IMERA (2011), Arts@Cern (2011) and Lab for Electronic Arts and Performance (2011) are true training places that not only provide the opportunity to take part in artistic residencies, but also represent the first step on research paths with reputable institutions that offer financial support through scholarships, grants or other means in support of artistic production and the creation of innovative projects.

The primary objective of these locations remains the promotion of open, free and accessible sharing for all, not only for the wide range of talents and artistic expressions, but also in terms of involving the public.

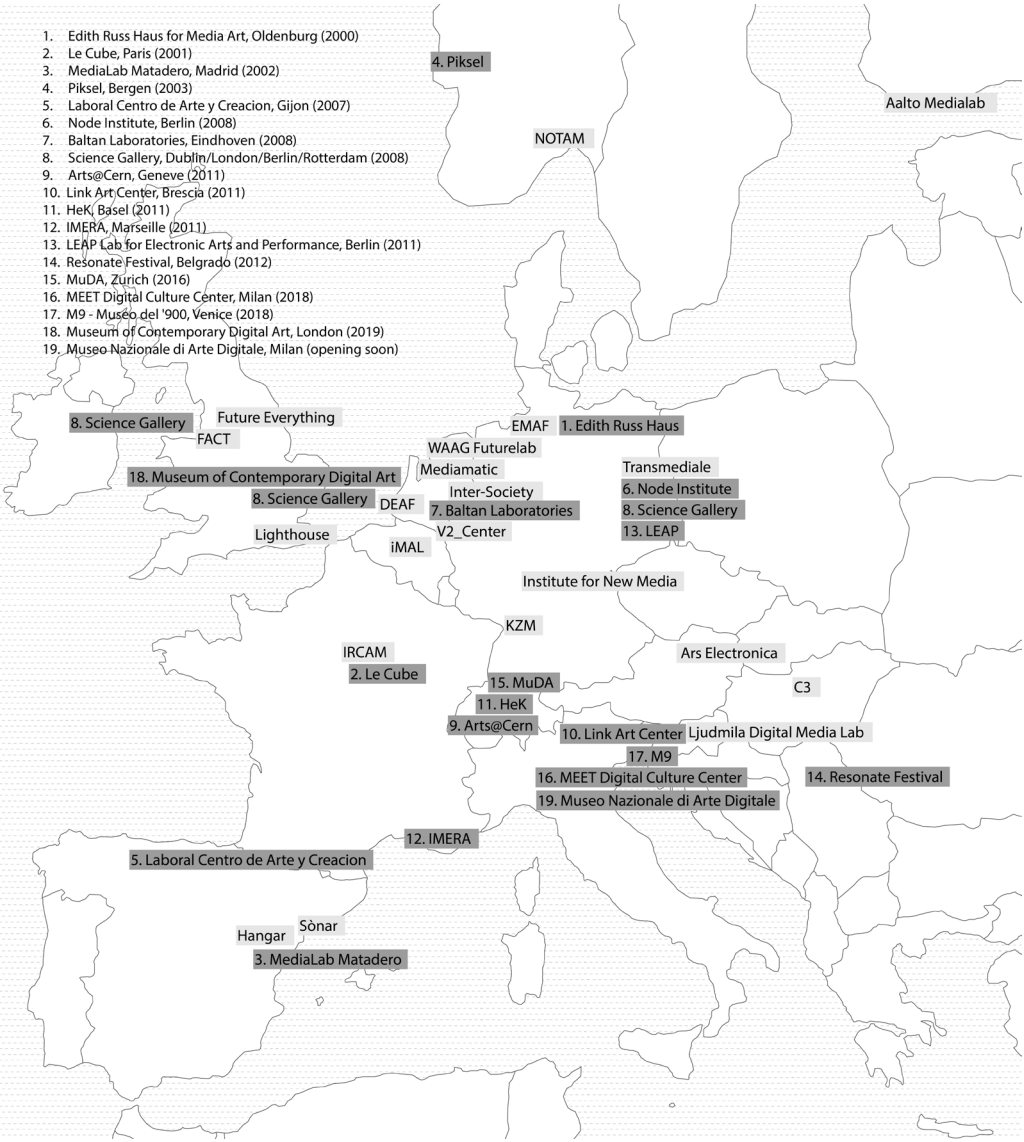

Figure 2.
Development of the European scene from the '00s to the present.

In particular, the system of these international institutions seeks to get the public increasingly (actively) involved through a wide and dynamic programme of initiatives that includes:

- organizing theme-based workshops and laboratories during which artists can interact with the public, encouraging them to engage in digital art;
- running educational programmes that promote and teach not only artistic but, more importantly, technological skills to groups of people of different ages and backgrounds.

As further evidence of this, the centres aim to create a true community able to include anyone who is interested in being part of it, offering a packed programme of initiatives that can meet the needs of everyone: from artists looking for a place where they can be supported and nurtured, to visitors who want to learn more about digital art and deepen their interests, to the curious who want to acquire new skills.

11.4 Interviews with artists: nowadays' needs

From the 41 centres mapped, only 18 are engaged in production by offering spaces for creation, artistic residency programmes, support for artists, and initiatives for the public such as workshops and educational programmes.

To understand more about the importance of these places and how, through their offerings, they help to create an inclusive community that promotes free and accessible sharing, we wanted to conduct a series of interviews to investigate how artists and figures involved in distribution, exhibition and conservation experience these spaces, examining their research, work and creation methods, and understanding their ideas and needs.

The interviews reinforced the importance of having spaces for production, understood as places where a physical community can be formed, beyond the online opportunities.

Based on their own experiences, the interviewed artists identified three functional macro-areas:

- *communal spaces:* to encourage artists and visitors to meet

Interviewed	Profile	Comment
A. Rubini	Education and Cultural Innovation Manager of MEET	"Having spaces for arts production is essential; it's necessary to have a system where the state, public and private entities are involved".
M. Mancuso	Founder of Digicult	"There's a need for creative spaces for artists in Milan, where ample human and professional resources are available".
L. Lamonea	Artistic director of Video Sound Art	"In addiction to a lack of working spaces, there's also a lack of professional networks that support artists in technical and curatorial aspects".
A. Crespi	Artist	"Working in a shared environment that allowes collaboration with other artsits is truly inspiring. Having a space to discuss and support each other is fundamental to creativity and work".
M. Cadioli	Artist	"As artist, we're not given the support needed to deal with what happens between the end of a work and its exhibition. This support would be important and critical".
C. Zanni	Artist	"Working in a shared space allows artists to implement a sustainable circular system: if I'm experimenting with a tool, and I know that an artist working in the same space as me has it, then I can establish a dynamic of mutual exchange, where I don't buy but borrow".
F. Lattanzi Antinori	Artist	"Working with most of my colleagues, whom I met during art residences and studio-visits, I created important synergies. Having a shared workspace is a useful resource for everyone".
D. Quayola	Artist	"Despite my being a hermit, I think it is crucial for artists, especially emerging ones, to create their network and work in a shared space with other artists. This allows them to take a first step to connect with different figures".
A. Bonaceto	Artist	"Sharing in the sense of being together with other human beings is the essence of art, and so having a space where this can happen, I think is very important".

Table 1.
Interviews with digital art insiders and artists.

and interact, these are places where what happens inside and what comes from the outside are connected;
- *shared workspaces:* understood as places where tools, machinery, equipment and materials are available to all, creating a circular system;
- *individual workspaces:* although there is a desire for shared working spaces, it is important to have more personal spaces available that do not, nevertheless, restrict artists in their ability to work with others.

Building on the findings of the production centre map and the interviews carried out, it is possible to identify a number of useful functions to promote inclusive and sharing spaces:

- *hybrid spaces:* places that can be adapted to meet different needs, in order to host exhibitions, conferences, themed workshops and educational programmes that can bring artists and the public together;
- *physical archives:* to support artists' research, which is open to the community, in order to increase and expand the cultural heritage of digital art;
- *workstations:* ensuring a personal space where an artist can individually develop their research, and present it to colleagues, gallerists, and the public by opening these spaces for organized studio-visits;
- *digital laboratories:* shared spaces that provide digital tools used both by artists to further their research, and by the public during the workshops and laboratories organized by the centre;
- *manufacturing laboratories:* shared spaces that provide machinery, equipment and materials;
- *set-up spaces:* places where the artist can be accompanied, supported and guided during the creation phase of the installation that follows the work.

These venues are a real resource for artists, not only professionally but also in personal terms: they can meet other artists, network, form collaborations and promote an ongoing exchange on many levels.

11.5 Conclusion

Providing these spaces and activities within centres that encourage digital creation, involving artists and the public, contributes to the growth of a vast community, boosting interest in art and technology.

The needs of the users must be central to the organization of the promoted services, initiatives and activities, with the aim of building and consolidating an inclusive, active and participatory community.

Public involvement is central in the arts and culture sector specifically, because the need to interact with visitors in a more conscious, dynamic, stimulating and interactive way has grown in recent years (Simon, 2010).

Promoting the diversity of offerings and the inclusion of artists and audiences demands an ongoing commitment and a willingness to adapt to the changing needs of communities.

Adopting a participatory approach makes it possible to interface with an audience that is as broad and diverse as possible, to establish a close relationship with citizens (Simon, 2010) and to strengthen cultural, social and creative capital.

Being a dynamic and inclusive centre of digital creation, promoting open sharing accessible to all, involves providing to the public a viable cultural and educational programme and initiatives that the community really needs.

By adopting a participatory approach, driven by collaborative and co-creative activities, the centres may be able to reach an audience with whom they can share their thoughts, desires and, most importantly, their needs.

In doing so, these spaces are able to establish and develop new partnerships, modernizing their programmes and offerings while also keeping pace with changes in society, through a participative and engaging approach that can bring an ever-widening public closer to the world of art and technology.

The aim of the production centres is, of course, to increase their social and cultural value and to establish themselves as creative places, where new ideas are born, developed and circulated, yet not only among artists. The initiatives also seek to involve local people, the surrounding area and categories of users such as young adults,

so that the centres become inclusive places of cultural participation, an intersection of creativity, art, innovation and technology for the benefit of the local community.

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