Future Art Ecosystems

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Preface

Future Art Ecosystems (FAE) is a project for building 21st century cultural infrastructure to support art and advanced technologies for the public good. Through research and development with a growing community of artists, technologists, policy-makers, researchers and fellow organisations, FAE develops insights, tools and projects that advance our mission. Embedded in Serpentine's Arts Technologies team, FAE facilitates the emergence of new systems for art, technology and society. Previous briefings on the metaverse, decentralised technologies and artificial intelligence have led to experimental development, prototyping alternative ownership systems for art and data governance for AI training.[1]

The landscape of art and advanced technologies (AxAT) has undergone significant transformation over the past decade, with Creative R&D emerging as a distinct domain integrating artistic experimentation,

technological innovation, and cross-sector collaborations. The fifth volume of the Future Art Ecosystems briefing series—Art x Creative R&D (FAE5)—examines this critical nexus and offers concrete proposals for its development and impact.

This publication comes at a pivotal moment as the UK Government develops its Industrial Strategy and Sector Plan for the Creative Industries.[2] With technology and culture policy still in development, FAE5 presents a timely intervention to help shape these emerging priorities. The report offers policymakers a deeper understanding of AxAT's distinctive contribution to innovation ecosystems and the specific support structures needed to realise its full potential.

We are grateful to all the artists, researchers, technologists, policymakers and organisations who contributed their insights and expertise to this volume. Special thanks to our interview and roundtable participants who generously shared their experiences and perspectives. This work builds on Serpentine's decade-long commitment to supporting experimental practices at the intersection of art and technology and reflects our

ongoing dedication to developing sustainable infrastructures for cultural innovation and for the public good.

Notes 1-2

1 Victoria Ivanova and Matt Prewitt, *Partial Common Ownership of Art*, https://www.radicalxchange.org/wiki/pco-art/, accessed 5 June 2025 and PCO: A Stewardship Technology for Art, https://pco.art, accessed 5 June 2025; Victoria Ivanova and Jennifer Ding, 'Choral Data "Trust" Experiment White Paper: Prototyping a GLAM Trusted Data Intermediary for Public Interest AI' (Serpentine Arts Technologies, 17 February 2025), https://doi.org/10.5281/ZENODO.14859320.

2 Department for Business and Trade, 'Invest 2035: The UK's Modern Industrial Strategy' (Department for Business and Trade, October 2024), https://www.gov.uk/government/consultations/invest-2035-the-uks-modern-industrial-strategy; Nicola Newson, 'Creative Industries: Growth, Jobs and Productivity', 30 January 2025, https://lordslibrary.parliament.uk/creative-industries-growth-jobs-and-productivity/.

Mbeu microbial dye R&D at the Department of Biochemical Engineering, University College London, 2022. The Exploring Jacket and Musette, NPOL Original, Normal Phenomena of Life. Photography: Toby Coulson. Courtesy: Normal Phenomena of Life.

Introduction

When Xerox established the Palo Alto Research Center (PARC) in 1970, it created what would become the archetypal model for cross-disciplinary creative research and development. PARC brought together technologists, designers, and creative thinkers in a deliberately open-ended research environment focused on inventing 'the office of the future'.[3] This approach became the genesis of innovations that would fundamentally transform modern computing and society: the graphical user interface (GUI), the computer mouse, object-oriented programming, the personal computer, networked computing, laser printing, and WYSIWYG ('What You See Is What You Get') word processing.[4] These were not merely technical achievements but represented new paradigms for human-computer interactions. Apple's Lisa and Macintosh computers directly implemented PARC's GUI concepts. Adobe Systems was

founded by former PARC researchers John Warnock and Charles Geschke.[5]

Joining PARC in 1975, artist David Em's collaboration with computer graphics pioneers Dick Shoup (inventor of the frame buffer) and Alvy Ray Smith exemplified this cross-pollination ✥. Working with SuperPaint—'the first complete digital paint system'—they pushed both artistic and technical boundaries. Em created his first digital picture in 1975 using SuperPaint, but his contributions went far beyond individual artworks. Through experimental approaches to these nascent technologies, Em and his collaborators established fundamental techniques for digital image creation and manipulation that would become foundational to computer graphics, digital filmmaking, and the entire creative software industry.

Today, as in the early days of digital computing, societies face the precipice of deep technological transformation. However, unlike the Cold War era that birthed PARC, societies face a fundamentally different set of systemic pressures and imperatives. Environmentally, socially, and geopolitically, there is an urgent need for multiperspectival approaches to innovation. The emergence of large language models is reshaping how humans interact with information; blockchain technologies are reimagining ownership and governance; and quantum computing systems fundamentally challenge our understanding of computation itself, promising to revolutionise everything from cryptography to drug discovery. These technologies represent not merely technical advances, but fundamental paradigm shifts in how we organise society, create meaning and values, and understand human agency in technological systems.

Deliberately open-ended cross-disciplinary R&D environments have an important role to play in these societal transitions, yet the

mode of activity that they represent, and the manner in which it has evolved and proliferated across multiple domains since the 1970s, remains largely misunderstood. This not only represents a historical oversight, but more importantly, it means that many sites of Creative R&D active today—from artists experimenting with AI training datasets to designers prototyping new forms of human-AI collaboration to cultural institutions developing novel governance models for digital commons—often operate without due visibility and legibility, lacking appropriate institutional support and funding frameworks.

It was the recognition of this blindspot that led to *Future Art Ecosystems 1: Art x Advanced Technologies* (FAE1) in 2020 identifying 'art and advanced technologies' (AxAT) as a distinct domain of cultural production. Rather than engaging with technology purely as a subject matter where interaction remains primarily conceptual, formal, or aesthetic, AxAT practices also develop experimental methodologies that bridge artistic and scientific inquiry, 'challenging and reshaping the role that technologies can play in culture and society'.[6] This might involve developing new interfaces for interacting with deep neural networks, or collaborating with materials scientists to create responsive biomaterials that challenge assumptions about the boundaries between living and non-living systems. This type of Creative R&D is a key pillar of AxAT activity, even though it is currently not codified.

Creative R&D in AxAT is characterised by several key attributes:

Transversal/Crosscutting Ecosystems: Creative R&D operates across traditional sector boundaries, often involving multi-stakeholder collaborations between cultural organisations, academic research, industry, and independent practices.

Inter/Transdisciplinary: Creative R&D in AxAT integrates knowledge and methodologies from diverse fields including art, computer science, engineering, philosophy, biology, and social sciences.

Mission-oriented: rather than being driven primarily by commercial imperatives or academic metrics, AxAT Creative R&D often addresses broader societal challenges and explores alternative technological futures. This orientation allows AxAT to function as a third space for technology development, intersecting with industry and research but maintaining a discrete position that enables unique forms of experimentation and inquiry.

Technological Interrogation: Creative R&D in AxAT engages in critical implementation,

narrativisation, and the development of technologies and technological conditions, examining their social, ethical, and cultural implications.

Technology-agnostic: whilst technologies of distribution and presentation have dominated creative technology initiatives, AxAT Creative R&D can apply to all advanced technologies, from artificial intelligence and cryptography to biotechnology.

Institutional Hybridity: AxAT Creative R&D does not have a natural sector home and is currently hosted by different actors across cultural institutions, academic departments, industry labs, and independent studios.

The aim of *Future Art Ecosystems 5: Art x Creative R&D* (FAE5) is to shift the status quo and to move towards codification by showing how artistic and cultural practices contribute to innovation and public value ecosystems through Creative R&D that is conducted in the context of AxAT. The briefing illuminates critical, but frequently undervalued, aspects of (creative) R&D: artistic experimentation that facilitates technological innovation, the cultivation of hybrid skill sets bridging

technical and cultural domains, and the emergence of new organisational models enabling cross-sectoral knowledge transfer. FAE5 also draws focus to how cultural organisations that host AxAT activity enable a critical societal response mechanism in rapidly changing technological landscapes while simultaneously supporting the emergence of a more nuanced understanding of art's role in driving innovation.

With technical systems central to social, economic and political life—from AI re-shaping information flows and the ways science is conducted to smart materials and geoengineering technologies restructuring our relationship with the physical environment—the democratic significance of spaces that overlap with, but remain adjacent to, the technology industry becomes paramount. These adjacent spaces provide critical sites for experimentation, and constructive course correction that can influence the trajectory of technological development. FAE5, therefore, examines how, through Creative R&D, AxAT

practices serve as adaptation engines to increase institutional resilience, develop experimental methods and tools, and improve technological and cultural literacy. Outside of conventional artwork commissioning and exhibition-making, the activities that drive this function can include cross-sector residencies and production pipelines, new tooling experiments, and governance prototyping.

The perspective that FAE5 presents reveals the distinctive feedback loops between cultural production, technological development, economic and public value creation that currently are not captured, remaining generally invisible to policymakers. By mapping these connections, we articulate a case for Creative R&D as a distinct and expansive mode of cultural activity—one that serves not merely as a complement to conventional innovation but as a vital foundation for global leadership in sustainable, inclusive technological development and resilient democratic societies.

AxAT is fundamentally an international phenomenon. Previous Future Art Ecosystems briefings have reflected this global reality, drawing insights from practices and infrastructures across diverse geographies. However, FAE5 marks a strategic shift towards UK-focused analysis, recognising that while creative and technological practices operate transnationally, policy interventions and the definitional frameworks that govern sectors and industries operate primarily at the state level. As the UK government has increasingly recognised the creative industries as a 'key plank in the UK's growth strategy' and launched substantial investments, such as the £75.6 million CoSTAR programme, there exists an opportunity for specific policy intervention and institutional codification.[7][8] The Council for Science and Technology's recent advice that the creative industries 'remain under-represented' in R&D investment despite their economic contribution, signals a critical moment for establishing Creative R&D as a distinct category of innovation activity.[9] While our examples remain international in scope—reflecting the inherently global nature of creative and technological communities—our analysis focuses on the UK context to support targeted policies and institutional frameworks that can serve as models for other national innovation ecosystems.

Nationally and transnationally, the effects of Creative R&D are often most powerful at the ecosystemic scale, where multipliers and spillovers create value that transcends individual projects and/or organisations.[10] The scientific and technological sectors benefit from well-established impact and innovation frameworks, while humanities and cultural work—despite their crucial role in shaping ideas, values and public interest—often struggle for recognition and investment. When a digital artist develops novel techniques for AI-generated imagery, the 'output' extends far beyond the immediate artwork or technical innovation. Value emerges through adoption by other practitioners, influence on design trends, shifts in public discourse about technology, and the cultivation of new aesthetic vocabularies that shape how society understands emerging technologies. Evaluation frameworks that are designed for linear innovation processes struggle to capture this networked impact. Equally, while scientific and technological R&D frameworks explicitly acknowledge that risk of failure is inherent to the innovation process—with established protocols for

managing and learning from unsuccessful outcomes—no such system has been devised for the process of Creative R&D.

These gaps have real consequences. They lead to an overemphasis on initiatives with easily quantifiable outputs—publications, IP, direct commercial applications—that follow predictable pathways from research to market, while undervaluing the long-term economic, societal and 'soft power' benefits of a thriving creative ecosystem. The challenge for policy frameworks today is recognising that supporting Creative R&D processes—rather than predetermined outcomes—may require different risk management approaches than those developed for traditional innovation ecosystems. This process-oriented investment model acknowledges that Creative R&D functions as a source of unique outputs as well as a means of catalysing innovation across other sectors.[11]

Navigating this Briefing

The FAE5 briefing is structured around four chapters. The first chapter locates Creative R&D as a technologically focused form of artistic and cultural activity cutting across different sectors and domains such as culture, academia and technology. Referencing the UK context, the chapter builds on existing work establishing Creative R&D within the policy context in order to propose an expanded framework precise enough for direct policy application, yet inclusive enough to support a more diverse set of practices than are currently captured by this somewhat elusive term.

The second chapter focuses on artists as critical agents driving Creative R&D within the AxAT ecosystem. Far from isolated creatives dedicated exclusively to self-expression, artists function as connectors, translators, and catalysts of innovation. Through case studies of artistic practices that exemplify R&D approaches, we illustrate how artists develop new tools, methodologies, and frameworks that generate value beyond traditional artistic outputs. The chapter identifies the barriers that currently limit artists' capacity to fully realise their potential as R&D agents, such as

misalignments with available funding structures, and expectations around IP and commercialisation, or equally, being relegated to 'public engagement' roles rather than acknowledged as genuine research collaborators.

The third chapter examines how different types of cultural organisations serve as vital anchors within the AxAT Creative R&D ecosystems. It examines how cultural organisations (i.e., the Galleries, Libraries, Archives, and Museums sectors (GLAM)) have evolved their relationships with technology, with some moving upstream in development processes to actively participate in creating prototyping environments, establishing cross-disciplinary ✕, research partnerships, and developing tools that inform technological conception and construction. We evidence how various organisational forms—from established cultural institutions to artist-led studios to new specialist organisations—incubate Creative R&D processes that catalyse ✥ internal GLAM sector innovation and feed into the broader innovation ecosystems, plugging into

larger civic, technological, research and policy contexts. The chapter proposes that by better understanding these dynamics, we can develop more effective strategies for supporting Creative R&D as a vital component of cultural, technological, and economic development nationally and transnationally.

The final chapter builds on the case for Creative R&D put forward in the first three to make a series of proposals to policymakers and public funding bodies. The proposals are the following:

1. Establish a Cross-Departmental Entity for the Advancement of Creative R&D

2. Broaden the Department for Science, Innovation and Technology's (DSIT) Definition of R&D to Encompass Creative R&D

3. Adopt Ecosystem Measurement Models

4. Diversify Funding Mechanisms and Approaches to Account for the Full Spectrum of Creative R&D Activity

Methodology

FAE5 emerged from research conducted by Serpentine Arts Technologies and its Future Art Ecosystems team and combines qualitative insights from practitioners and organisations across multiple sectors with a structured analysis of the policy landscape.[12] We carried out over 35 remote semi-structured interviews. The interviewees included artists whose practices exemplify innovative approaches to technological engagement as well as representatives from public bodies, cultural organisations, technology companies, academic institutions, and civic technology organisations. These conversations were complemented by three roundtable discussions that brought together stakeholders from across policy, industry, and AxAT production contexts. All quoted material in the briefing stems from the interviews and roundtables. Together, these dialogues revealed patterns of consensus and tension that inform our strategic recommendations.

FAE also commissioned targeted research on the current state of play for evaluating Creative R&D impacts. This work is a starting point for the development of new approaches that better

capture both tangible and intangible value creation within Creative R&D ecosystems—a critical foundation for advocating for increased investment and policy support. While we provide extensive examples and illustrations throughout this briefing to build a robust case for Creative R&D activity, there remains a notable shortage of quantitative data that captures the full value and impact of these practices. This is precisely because there is no practice of gathering such data at scale.

The FAE5 briefing was written by the FAE team with assistance from Claude Sonnet 3.7 and Opus 4. All references to 'we' throughout the briefing are to the Future Art Ecosystems project.

Notes 3-12

3 The transdisciplinary approach was core to PARC and was further expanded through the Artist-In-Residence Program (PAIR). See Craig Harris, *Art and Innovation: The Xerox PARC Artist-in-Residence Program* (Cambridge: The MIT Press, 1999).

4 John Warnock (University of Utah) helped develop Interpress and other printing and page description systems at PARC which allowed the Alto to become the first WYSIWYG computer when coupled with Xerox's laser printer. Later Warnock founded Adobe Systems which, along with Apple, helped bring about the desktop publishing revolution of the late 1980s. This innovation eliminated the technical barrier between writing and design, allowing anyone to create professionally formatted documents without specialised training—a capability we now take completely for granted with modern word processors such as Microsoft Word or Google Docs. See https://ohiostate.pressbooks.pub/graphicshistory/chapter/16-1-xerox-parc/

5 Michael A. Hiltzik, *Dealers of Lightning: Xerox PARC and the Dawn of the Computer Age* (New York: HarperBusiness, 1999).

6 Serpentine Arts Technologies, *Future Art Ecosystems 1: Art x Advanced Technologies*, ed. Serpentine Arts Technologies (Serpentine, 2020) https://futureartecosystems.org/briefing/fae1/.

7 Department for Business and Trade, 'Invest 2035: The UK's Modern Industrial Strategy' (Department for Business and Trade, October 2024), https://www.gov.uk/government/consultations/invest-2035-the-uks-modern-industrial-strategy; 'Convergent Screen Technologies and Performance in Realtime (CoSTAR)', accessed 14 May 2025, https://www.ukri.org/councils/ahrc/remit-programmes-and-priorities/convergent-screen-technologies-and-performance-in-realtime-costar/.

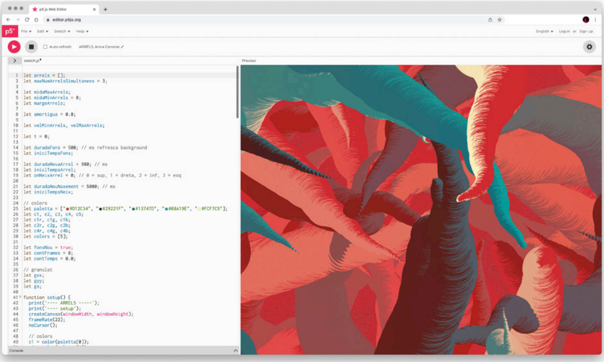
8 CoSTAR itself is an outgrowth of previous momentum built by initiatives such as The Audience of the Future and The Creative Industries Cluster Programme.

9 Council for Science and Technology, 'Harnessing Research and Development in the UK Creative Industries,' 22 April 2024, https://www.gov.uk/government/publications/harnessing-research-and-development-in-the-uk-creative-industries.

10 Tarek E. Virani, 'Towards a Creative and Cultural Industries Ecosystem Perspective,' in *Global Creative Ecosystems: A Critical Understanding of Sustainable Creative and Cultural Production*, ed. Tarek E. Virani (Cham: Springer International Publishing, 2023), 1–20, https://doi.org/10.1007/978-3-031-33961-5_1.

11 Jason Potts and Stuart Cunningham, 'Four Models of the Creative Industries,' *International Journal of Cultural Policy* 14, no. 3 (August 2008): 233–47, https://doi.org/10.1080/10286630802281780. Patrycja Kaszynska, 'Why Cultural Infrastructure Deserves Public Funding,' The RSA (blog), accessed 29 May 2025, https://www.thersa.org/articles/comment/why-cultural-infrastructure-deserves-public-funding/.

12 Our research is particularly attentive to the UK context, drawing on analysis of key policy documents including the aforementioned *Invest 2035 industrial strategy* (2024); the *DCMS Creative Industries Sector Vision* (2023); research from the Creative Industries Policy and Evidence Centre; Nesta's reports on Creative R&D frameworks; Arts Council England's strategy documents; Creative UK's sector reports and provocation papers; and UKRI's strategic frameworks. This policy analysis was comple-mented by a comprehensive landscape mapping of how 'Creative R&D' is understood and operationalised across different sectors. For an international perspective see the forthcoming British Council report: Andrews, H., & Hawcroft, A. (Eds.). (2025). 'International Arts and Technologies: Global Approaches to Creative Innovation'. British Council.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File
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Sketch
Help
English
Log in or Sign up
Auto-refresh
ARRELS, Anna Carreras
sketch.js
Preview
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let midaMaxArrels;
let midaMinArrels = 0;
let margeArrels;
let amortigua = 0.8;
let velMinArrels, velMaxArrels;
let t = 0;
let duradaFons = 500; // ms refresca background
let iniciTempsFons;
let duradaNovaArrel = 980; // ms
let iniciTempsArrel;
let onNeixArrel = 0; // 0 = sup, 1 = dreta, 2 = inf, 3 = esq
let duradaNouNaxement = 5000; // ms
let iniciTempsNeix;
// colors
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let c1, c2, c3, c4, c5;
let c1r, c1g, c1b;
let c2r, c2g, c2b;
let c4r, c4g, c4b;
let colors = [5];
let fonsNou = true;
let contFrames = 0;
let contTemps = 0.0;
// granulat
let gxx;
let gyy;
let gs;
function setup() {
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frameRate(22);
noCursor();
// colors
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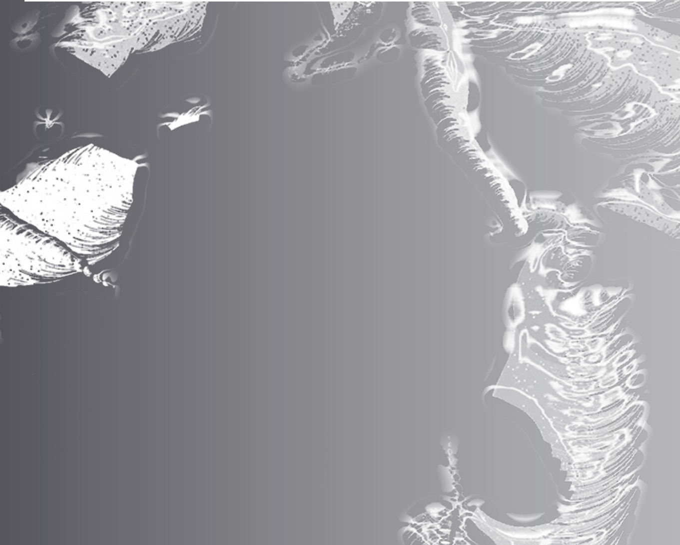
Console



P5.js editor window featuring artwork and code featured by Anna Carreras. The p5.js editor was developed by Cassie Tarakajian and is maintained by Rachel Lim; p5.js was led by Lauren Lee McCarthy 2013-21 and is currently led by Kit Kuksenok. Courtesy: Lauren Lee McCarthy.

1

Creative R&D

The purpose of this chapter is to focus a clearer lens on Creative R&D as a distinct category of art and advanced technologies (AxAT) activity; at once broadening its scope beyond association with the 'creative industries' and simultaneously creating a firm foundation for designating activity that bridges the cultural sector with innovation ecosystems.

Artists are in a perpetual state of discovery with a huge amount of knowledge to add to the R&D conversation.

—Sarah Ellis, Director of Digital Development, Royal Shakespeare Company

Creative R&D and the Creative Industries

Formal definitions of R&D are institutionally tethered to the natural sciences and engineering as codified in the *OECD Frascati Manual* —the internationally recognised guidelines for collecting and using R&D statistics.[13] In 1976 the manual defined R&D as 'creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications'.[14] Over time the manual has broadened its scope to account for intangible innovations in areas such as computing, acknowledging the importance of the social sciences and humanities in the development of the service industries.[15] This framework, while robust for measuring R&D activity in science and engineering, has proved inadequate for capturing the innovation from the cultural and creative industries. Nevertheless, it has shaped government policies globally, including the UK's HMRC criteria for R&D tax relief, which still explicitly excludes the arts, humanities, and social sciences.[16]

In 1998, the Department for Culture, Media and Sport (DCMS) published the Creative Industries Mapping Documents, which codified thirteen creative industries sectors and positioned them as economically significant contributors to UK GDP, valued at £60 billion annually and employing 1.4 million people.[17] This marked a decisive shift from viewing arts and culture primarily through the lens of public subsidy and cultural value toward recognising their commercial and innovation potential.[18] Yet, despite being celebrated for their economic contribution and innovative capacities, the creative industries remained systematically excluded from the formal R&D infrastructure that supported innovation in other sectors.

In response, the 2010 *Not Rocket Science* report made a strong case for redefining R&D to include the arts and culture.[19] The authors argued that many arts organisations already engage in activities that align with Frascati's categories of basic research, applied research, and experimental development—particularly when experimenting with digital distribution, audience engagement, or new forms of collaboration. However, this work is often excluded because its outputs are not always codified, reproducible, or framed in technological terms.

They urged policymakers to rethink the science-and-technology bias in R&D frameworks and arts organisations to make their innovation processes more explicit and methodologically rigorous.

The 2015 edition of the *OECD Frascati Manual* was the first to substantially address research in the arts, offering guidance on what arts-related activity could be classified as R&D.[20] However, Bakhshi and Lomas have argued for further revisions to broaden applicability across all knowledge domains.[21] Their research proposes a revised definition of R&D that explicitly incorporates the creation of cultural and social value ❁, addresses forms of uncertainty specific to creative practice, and acknowledges that R&D can result in experiences or behavioural changes—not just products and technologies. This revised framing calls for recognising the legitimacy of R&D in arts, humanities, and social sciences; enabling more effective cross-domain ⤫ collaboration; and measuring returns on investment with the same seriousness afforded to STEM disciplines. Their proposed unified definition maintains the Frascati's core but adds dimensions including aleatory uncertainty and experience-led knowledge creation, challenging narrow interpretations

of novelty, reproducibility, and systematisation that have historically excluded creative sectors.

The specific term 'Creative R&D' gained currency within the creative industries as advocates sought to bridge the gap between the economic importance of the creative industries and their lack of legibility within traditional R&D frameworks. The term served multiple strategic functions: it asserted the legitimacy of research and development activities in creative sectors, it challenged the science-and-technology bias in existing frameworks, and it provided a conceptual bridge between cultural policy and innovation policy.

While the creative industries have advanced recognition and support for R&D beyond traditional science and technology sectors, positioning Creative R&D solely within this domain creates significant limitations for its full potential and impact. Creative R&D within the creative industries has typically prioritised research in technologies associated with distribution and presentation—particularly

immersive technologies and digital interfaces—while giving less attention to other technological fields.[22] Furthermore, Creative R&D has often been situated within the 'soft' and 'downstream' aspects of innovation, focused on concept development, user experience, and design thinking that lead toward product development and go-to-market strategies. This positioning, while valuable, represents only one dimension of what Creative R&D can encompass. The broader exploratory research, critical inquiry, and social innovation aspects of Creative R&D—which may not have immediate commercial applications but which generate crucial insights about technological and cultural evolution—have received comparatively less emphasis.

Recalibrating the Scope of Creative R&D

Definitions matter and if we don't define and conceptually understand what we're doing as R&D, and if we don't establish criteria that recognise our work, we won't receive proper support.

—Amy Tarr, Head of Policy & Public Affairs, Creative UK

The decoupling of 'Creative R&D' from 'creative industries' represents a necessary recalibration for understanding how experimental practices operate across diverse domains—from cultural institutions to technology companies, from independent studios to academic research labs. While creative industries have developed robust frameworks for measuring commercial success through audience engagement, market share, and revenue generation, which reflect some aspects of applied research and experimental development, Creative R&D requires a broader anchoring. This need becomes particularly salient when Creative R&D occurs at the intersection of multiple fields: e.g., artists working with biotechnology—which can involve cultural, academic and industry actors; cultural institutions developing AI capabilities—which can involve think-tanks, legal professionals and engineering teams; or, technologists exploring narrative systems—which can involve tech companies, philosophers and artists. In these contexts, 'creative' signals not a market sector but a mode of experimental investigation that prioritises emergent possibilities ⌘ over predetermined outcomes.

Creative R&D often occupies an ambiguous position—neither purely upstream nor downstream, neither exclusively hard nor soft technology.[23] For example, artificial intelligence exemplifies this hybrid nature—requiring both foundational technical research in machine learning architectures (hard technology) and experimentation with generative systems, interaction design, and ethical frameworks (soft technology). Similarly, immersive technology development might involve both hardware innovations (display technologies, haptic systems) and experiential design (narrative structures, interaction models), requiring teams that can work across these traditionally separated domains. These inherited categories create particular challenges for activities at the intersection of culture and technology.

Furthermore, the separation of digital and cultural policy within the UK's governmental structure has created significant barriers to realising the ecosystemic potential of Creative R&D. Historically, digital policy was housed within the, then titled, Department for Digital, Culture, Media and Sport (DCMS) as part of a broader strategy to integrate technology and culture, aligning with the 2017 Digital and

Industrial Strategies. These strategies envisioned the cultural sector as a testbed for technological applications, fostering new art forms, modes of engagement, and collaborations with major technology companies. This alignment facilitated logistical efficiencies and enabled cultural institutions to pioneer AxAT projects that operated at the intersection of digital innovation and cultural production.

However, in 2023, digital policy was transferred to the newly established Department for Science, Innovation and Technology (DSIT), decoupling it from cultural policy.[24] This structural shift not only disrupted established collaborative frameworks but also compartmentalised digital innovation away from cultural strategy, hindering the flow of resources and policy coherence that previously encouraged cross-sector experimentation. This structural issue has been acknowledged, if not fully addressed, as a priority challenge in the recent *Industrial Strategy Green Paper* (2024).

AxAT represents a non-codified dynamic field where artistic practice intersects with technological innovation across a spectrum of sectors and domains.[25] Creative R&D activity might include artists developing custom AI systems that challenge conventional machine learning approaches, cultural institutions establishing laboratories for experimental work with emerging technologies, as well as cross-sector collaborations that reimagine technological applications through artistic interventions. Although lacking formal recognition in policy frameworks, AxAT has emerged as a distinctive and fluid ecosystem through which advanced technologies are investigated, reimagined, and transformed into materials, media, tools and infrastructural foundations to underwrite new forms of expression, knowledge, and social engagement. AxAT can be distinguished from other artistic work by its direct investment in the development and implementation of advanced technologies, rather than a focus on art historical representation and interpretation, and other non-technology specific Creative R&D work.[26]

Creative R&D within AxAT encompasses practices that use interdisciplinary methodologies to investigate advanced technologies, generating new knowledge and applications across cultural, social, and technological domains. Building on the OECD Frascati Manual's definition of research and development and Hasan Bakhshi's and Elizabeth Lomas' revisions, we propose the following definition:

Creative R&D is a systematic, transdisciplinary activity that investigates and develops advanced technologies through innovative methods, generating new knowledge and applications across cultural, social, and technological domains. It adheres to established R&D principles while emphasising exploratory approaches that may originate in artistic, design, and/or cultural practices.

Like all R&D, Creative R&D encompasses basic research (acquiring new insights without specific applications), applied research (investigation toward specific aims or objectives), and experimental development (creating new or improved outputs, processes, systems or services), thereby meeting the internationally recognised criteria for R&D: novelty, creativity, uncertainty, systematic process, and transferability.

- Novelty - R&D pursues new knowledge or insights.

- Creativity - based on original concepts and hypotheses that are pursued through non-routine activity.

- Uncertainty - R&D is uncertain about the final outcome. There is a broad recognition of the possibility of not achieving the intended results and negative results are considered valuable.

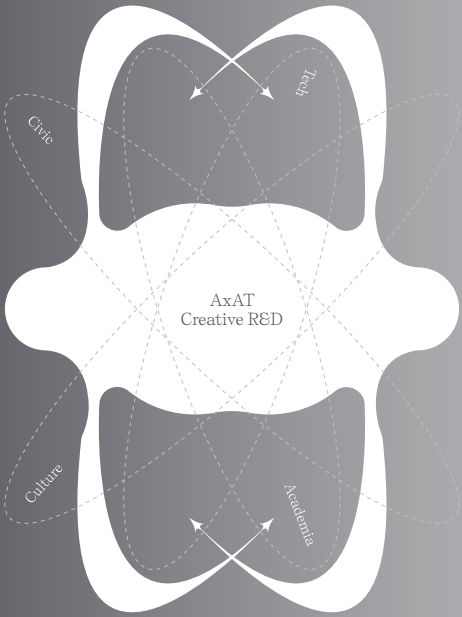
- Systematic process - R&D is a formal activity that is conducted in a planned way, with records kept of the process followed and the outcome.

- **Transferability** - R&D should result in the potential for the transfer of the new knowledge, ensuring its use and allowing others to reproduce the results.

What distinguishes Creative R&D is its capacity to operate across traditional boundaries, integrate diverse knowledge domains, and address complex challenges through approaches that complement other R&D methodologies. Its outcomes can be measured through both conventional R&D metrics and additional frameworks that capture cultural, social, and long-term impacts.

We propose to work within this existing definition in order to remain compatible with a recognised policy framework and within a definitional lineage that is legible to different communities.[27] This approach provides a foundation for better recognition, evaluation, and support of Creative R&D activities across an ecosystem that encompasses creative industries, universities, civic, technology and cultural sectors. The success of this ecosystem is critical.

As advanced technologies increasingly shape all aspects of social, economic, and political realities in profound and often unpredictable ways, Creative R&D has the capacity to ensure that their development reflects diverse societal needs ⊛.



Creative R&D activity cuts across traditionally defined sectors, generating innovation that feeds these domains.

Notes 13 - 27

13 OECD, *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development* (Paris: OECD, 2015), https://www.oecd-ilibrary.org/science-and-technology/frascati-manual-2015_9789264239012-en.

14 OECD, *The Measurement of Scientific and Technical Activities: Proposed Standard Practice for Surveys of Research And Experimental Development* (Paris: OECD, 1976), https://doi.org/10.1787/g2gh5481-en.

15 OECD, *Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development* (Paris: OECD, 2002), https://doi.org/10.1787/9789264199040-en.

16 'Meaning of Research and Development for Tax Purposes: Guidelines,' GOV.UK, accessed 29 May 2025, https://www.gov.uk/government/publications/guidelines-on-the-meaning-of-research-and-development-for-tax-purposes/meaning-of-research-and-development-for-tax-purposes-guidelines.

17 Department for Digital, Culture, Media & Sport, 'Creative Industries Mapping Documents 1998,' accessed 29 May 2025, https://www.gov.uk/government/publications/creative-industries-mapping-documents-1998.

18 Graham Hitchen, Tom Campbell, and Ruichao Wang, 'A History of Creative R&D in the UK', CRAIC (blog), 23 January 2025, https://craic.lboro.ac.uk/a-history-of-creative-rd-in-the-uk/.

19 Hasan Bakhshi, Alan Freeman, and Radhika Desai: *Not Rocket Science: A Roadmap for Arts and Cultural R&D*, Mission Money Models Web publication (1 January 2010).

20 OECD, *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development* (Paris: Organisation for Economic Co-operation and Development, 2015), https://www.oecd-ilibrary.org/science-and-technology/frascati-manual-2015_9789264239012-en.

21 Hasan Bakhshi and Elizabeth Lomas. *Defining R&D for the Creative Industries*, (Nesta, 2017), https://www.ukri.org/wp-content/uploads/2022/08/AHRC-260822-DefininggRandDForTheCreativeIndustries-PolicyBriefing.pdf.

22 This is likely the result of an over-indexing of creative work in presentational or exhibitionary outputs which is indicative of the key criterion of extending 'access' to cultural works within most Arts Council England evaluative frameworks since its first whitepaper in 1965. While the political motivations around 'access' are related to keeping 'excellence' as public goods accessible to all, 'excellence' is measured in terms of audience and number of viewers, incentivising cultural works that can be audience-oriented, rather than focusing innovation on organisational or basic research.

23 Upstream R&D, which often takes place through university research, focuses on basic research and early-stage technology development that may not have immediate commercial applications; often what is termed 'deep tech' research grounded in substantial science or engineering advances. This involves exploring foundational scientific principles, creating new technological capabilities, and investigating novel approaches that could eventually lead to marketable products. Downstream R&D, by contrast, concentrates on refining existing technologies, product development, scaling, and market implementation. In industrial contexts, there is typically, though not exclusively, an emphasis on downstream activities with clearer paths to commercialisation, while upstream activities often require subsidising through public funding or more profitable parts of the enterprise. The distinction between 'hard' and 'soft' technology reflects differences in both the nature of innovation and its measurement. Hard technology R&D involves physical systems, that is hardware, materials science, and manufacturing processes —areas where innovation is more readily quantifiable through patents, technical specifications, and manufacturing metrics. Soft technology R&D encompasses software development, user interface design, service innovations, and experiential technologies where outcomes are often less tangible and more difficult to measure using traditional R&D frameworks. While hard technology development has historically received more recognition within industrial R&D tax incentives and funding schemes, soft technology innovations increasingly drive economic value and user adoption.

24 At the same time 'digital' was removed from the remit of DCMS which was renamed the Department for Culture, Media and Sport.

25 Advanced technologies include emerging and established technologies that generate complex societal effects. Serpentine Arts Technologies, *Future Art Ecosystems 1: Art x Advanced Technologies*, ed. Serpentine Arts Technologies (Serpentine, 2020).

26 Arts Council England positions 'Creative R&D' in relation to its vast remit to support all creative practices, defining Creative R&D in grants guidance as 'developing a new idea or exploring a new way of working. While inclusive, this approach does not align with recognised definitions, and risks isolating cultural contributions with a more clearly defined Creative R&D agenda from recognition within wider innovation ecosystems. ACE's current work on an inclusive innovation framework seeks to realign with established definitions and valuably identifies a number of public value contributions from culture in order to make a more robust argument for Creative R&D and innovation in the arts. Still, AxAT practices, and other technologically-engaged subsectors, require frameworks that are specifically optimised for technically-intensive creative work. Arts Council England, 'Research and Development and Project Grants - Information Sheet', 2023, https://www.artscouncil.org.uk/sites/default/files/2023-09/Research%20and%20Development%20and%20Project%20Grants%20-%20Information%20sheet.pdf; The Audience Agency and Arts Council England, *Inclusive Innovation: Intelligence and Mapping across the Creative & Cultural Sector*, Forthcoming.

27 Hasan Bakhshi and Elizabeth Lomas, *Defining R&D for the Creative Industries* (Nesta, 2017), https://www.ukri.org/wp-content/uploads/2022/08/AHRC-260822-DefiningRandDForTheCreativeIndustries-PolicyBriefing.pdf.

An early concept drawing for the communication interface of *Dragon Time*, an AI powered game for children by Opponent Systems. Courtesy: Opponent Systems.

2

Artist

What I'm really interested in as an artist is not visualising scientific data or using technologies per se, but thinking about what are the other possibilities of making knowledge. What other types of knowledge are possible?

—Wendi Yan, Artist

This chapter examines how artists working at the intersection of art and advanced technologies (AxAT) conduct Creative R&D activities that extend beyond traditional artistic outputs such as art objects and experiences, despite a general lack of formal ways of recognising and supporting these contributions. We identify three primary modes through which AxAT practitioners partake in the Creative R&D ecosystem: offering a forum for public interest by involving and convening publics in and around technological phenomena; setting new strategic visions by expanding collective imagination through alternative technological futures; and, engaging in different forms of systemic intervention by building tools, infrastructure, and operational entities. Importantly, AxAT practices encompass all of these dimensions, though individual practices typically emphasise some over others. These functions are also performed by actors adjacent to the AxAT field: e.g., science communicators and technology journalists who translate complex technologies for public consumption; futurists and science fiction authors who create speculative narratives around emerging technologies; and design researchers, creative technologists, and social entrepreneurs who

develop new tools and communities. AxAT artists are frequently engaged in these different capacities in addition to their artistic work, serving as consultants, technologists, or creative directors in industry, academic, and public sector initiatives.

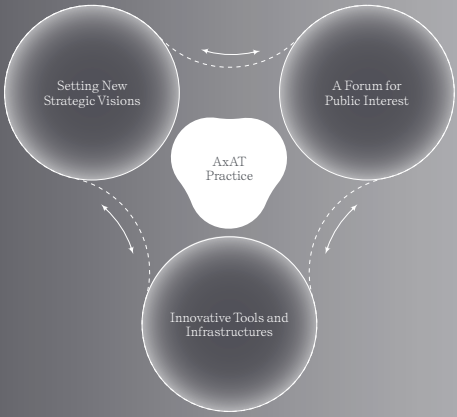
By mapping these aspects of AxAT practices onto established frameworks of Creative R&D as summarised in the preceding chapter, we demonstrate how artists enhance broader innovation ecosystems. The chapter then considers the different barriers that AxAT practices currently face in fulfilling the potential of Creative R&D as an important contribution to innovation ecosystems. The final chapter will address these in the form of proposals. We also present in-depth case studies of three AxAT practitioners that further illustrate how Creative R&D functions and the value that it creates across different scales.

Who is an AxAT Artist, and what is an AxAT Practice?

Some of our artworks are about technology and they use technology. Other artworks use technology, but they're not about technology. Other artworks could be about technology and don't use technology.

—Operator, Artist Studio

Rather than defining the artist in metaphysical or essentialist terms, we adopt a systems approach to understanding the artist's role as a key agent of Creative R&D activity. This functional perspective views the artist as operating within an ecosystem of technological, social, and cultural forces. From this vantage point, AxAT Creative R&D encompasses artistic work that operates across three interconnected capabilities: convening fora for public interest, setting new strategic visions, constructing innovative tools and infrastructures.



Understanding AxAT practices from
the perspective of their functions.

The real work actually happens in the gallery space with the audience.

—Danielle Brathwaite-Shirley, Artist

AxAT practices serve as vital translators and communicators of advanced technological developments. Artists working in this space render complex technological concepts accessible to broader audiences, transforming abstract or technical innovations into experiences that can be perceived, felt, and understood. This process extends beyond notions of 'public engagement', which often positions art in service of scientific or technological knowledge communication. Instead, AxAT practitioners create public experiments, forging new relations between knowledge, objects, locations, and communities that did not previously exist.[28]

The audience is an integral part of the investigation—they play a key and active role. In being invited to play this role they become implicated and provide the context for learning, discussion and critique. You take from the world, you construct, and then you put that back in the world in front of an audience.

—dmstfctn, Artists

AxAT creates the conditions for varying degrees of 'publicness' to form.[29] When Lauren Lee McCarthy develops autonomous systems through encounters that blend performance art with collaborative design, a new public is formed through artistic and technological development. Similarly, Danielle Brathwaite-Shirley's approach positions audiences as active collaborators rather than passive viewers. Art in the Cage Collective's intervention with OpenAI's Sora model exemplifies how artists can transform proprietary technologies into subjects of public discourse, revealing the extractive dynamics that might otherwise remain hidden.[30]

I think for me it's really about taking an emergent research strain or possible future technology that's still in that gooey R&D phase but has interesting implications, and then translating this open-ended system into a public discourse.

—Alice Bucknell, Artist

What distinguishes AxAT work is its simultaneously exploratory and critical approach. AxAT practitioners create connections between disparate domains—science, culture, philosophy, politics—revealing the multidimensional nature of technological systems. They often draw people into the 'magic' of technology, illuminating its wondrous capabilities and transformative potential through experiences that generate affective responses and curiosity.

Technologies like AI or drones are before-culture technologies. They have arrived earlier than our cultural capacity to understand what they might mean. Therefore the role of artistic R&D is less about imagining what might come next and more about imagining how we might respond to the things that have already been created. This is critical because it is a way of trying to get ahead of the technology before it's too late.

—Liam Young, Artist

Crucially, these same practices also reveal the 'shadow aspects' of technology—the hidden biases, negative externalities, unintended consequences, and power dynamics embedded within technical systems 🌴. By making these shadow elements visible and tangible, AxAT artists foster a more nuanced public consciousness that resists both techno-utopianism and dystopian fatalism. This dual capacity to enchant and disenchant creates space for public engagement that is neither uncritically celebratory nor reflexively dismissive.

Through this multifaceted translational work, artists help shape how technologies are perceived, discussed, and ultimately integrated into society, cultivating technological literacy that encompasses both practical understanding and critical reflection beyond specialist communities 🏵. AxAT practitioners don't simply present existing technological realities but actively construct new public formations around them—creating conditions for non-specialist communities to participate in decisions about technological development that typically remains inaccessible to public influence.

Can we have some alternative tech narratives and alternative visions for a future that can actually become real?

—Lauren Lee McCarthy, Artist

AxAT practices play a crucial role in expanding our collective imagination through speculative narration—creating narratives that both anticipate potential consequences and conjure alternative technological futures. These narratives engage the social, ethical, and cultural implications of technological developments before they fully materialise. Unlike predictive forecasting that seeks to diminish risk by narrowing possibilities, AxAT practitioners deliberately maintain multiple potential futures simultaneously. This multiplicity resists the tendency toward technological determinism that often characterises industry-led innovation narratives

Through artistic worlding practices, AxAT practitioners construct scenarios that reveal hidden assumptions embedded within technological innovation while simultaneously proposing alternative paradigms.[31] By creating conceptual and experiential frameworks that allow us to inhabit and evaluate potential technological worlds before they materialise, artists transform technological futures from predetermined outcomes into spaces for deliberation, contestation, and possibility.

This speculative dimension ultimately expands the range of futures we collectively consider possible, opening new pathways for technological development that might otherwise remain unexplored.

→ Innovative Tools and Infrastructures

Whilst public engagement and the expanding of our imaginative capacities may be their most widely understood and recognised functions, AxAT practices are within a lineage of artistic practice where artists are also builders and can develop tools and infrastructures that have different forms of systemic impact. These interventions may influence basic research and upstream technology development by introducing novel perspectives or methodologies. They might result in the creation of new tools, platforms, or communities that transform how technologies are designed and used. Additionally, AxAT work can catalyse the formation of new organisations, networks, or institutional arrangements, that reconfigure relationships between art, technology, and society. These interventions have had a significant impact on the cultural sector and creative industries but also catalyse spillovers across the wider innovation ecosystem.

For example, Lauren Lee McCarthy's work on p5.js stands as a landmark example of an artist developing a tool that extends beyond their individual practice to empower broader communities. P5.js is an open-source JavaScript library specifically designed to make coding accessible to artists, designers, educators, and coding beginners. By prioritising accessibility and community development, p5.js has created infrastructure that enables its 4 million users worldwide to engage with creative computing.[32]

Artist duo Operator (Ania Catherine and Dejha Ti) developed a novel method for storing choreographic data on a blockchain by creating a custom pipeline converting motion capture files into compressed formats.[33] This technical innovation has created a new market, generating over $2million in sales for choreographic works, attracting new collectors and audiences for performance works.[34]

My goal is proposing a new alternative world, a new way of thinking.

—Sputniko! (Hiromi Ozaki), Artist & Cradle CEO

Transformative interventions also occur when artists establish commercial entities that become vehicles for realising systemic impact beyond what is currently possible in the cultural sector ❖. In her work *Menstrualverse* (2022), artist Sputniko!—the moniker of Hiromi Ozaki—explored how gender is represented in virtual worlds and highlighted the rejection of menstruation representations in metaverse platforms. Building on this foundation of speculative design work, in 2022 she launched Cradle, a business-to-business company addressing workplace diversity and inclusion in Japan. Cradle's focus on women's health and workplace support directly extends Ozaki's artistic investigations into practical solutions with tangible outcomes for Japanese corporate culture. By transitioning from art and speculative design to operating a business, Ozaki demonstrates how artists can translate critical perspectives gained through AxAT work into larger socio-economic change.

→ Lauren Lee McCarthy

I really do believe that having more artists in the room would be helpful for any of these spaces of technological development. Artists are able to imagine futures and possibilities that are outside what already exists; beyond the ways of living that we've seen before. And I think for anything to really be possible, it first has to be imagined, and it has to be believed in a way that someone tries to take it forward.

—Lauren Lee McCarthy, Artist

Lauren Lee McCarthy, *Saliva Retreat*, 2024. A group of participants were invited to a 'Saliva Retreat' performance where they sought out a partner for saliva swapping and were guided through the negotiation of terms and process of exchange. Exhibition view of the Biennale de l'Image en Mouvement 2024, *A Cosmic Movie Camera*, at Centre d'Art Contemporain Genève curated by Nora N. Khan and Andrea Bellini, scenography conceived by FormaFantasma. Courtesy: Mathilda Olmi © Centre d'Art Contemporain Genève.

Lauren Lee McCarthy examines social relationships in the context of automation, surveillance, and algorithmic living. McCarthy's practice spans performance art, open-source software development, installation, and film, representing a distinctive approach to Creative R&D that begins with direct experiences with advanced technologies.

Performance art has the idea of something happening, something that's unplanned or unscripted or spontaneous. I think it's a really good match for the subject matter I'm dealing with because often when we interact with technology, it's coming to us through some commercial distribution mechanism. We're often not given a lot of choice in how and whether we use these things.

—Lauren Lee McCarthy, Artist

For her 2017 project *LAUREN*, McCarthy observed Amazon's widespread marketing of Alexa and posed the question: 'what does it mean to have this technology, this surveillance and this automation inserted into private and intimate space?'. This kickstarted experiments with consumer smart home devices before developing a performance where McCarthy performed as an AI assistant in strangers' homes. This methodology—using performance as research—exemplifies artistic practice-based research methodologies where embedded and embodied methods are used to produce knowledge.

McCarthy's ongoing project *Auto* extends this approach by developing an autonomous vehicle system through a co-design process that directly involves potential users. 'I'm asking what would it look like to actually make an autonomous system that's co-designed by the people that are using it, that are participants in the system.' The development model consists of a series of test rides where participants engage with different prototypes through performances that encourage dialogue about AI and autonomous systems. This challenges conventional notions of expertise in technological development,

questioning why people place trust in Silicon Valley over people who might better align with their values.

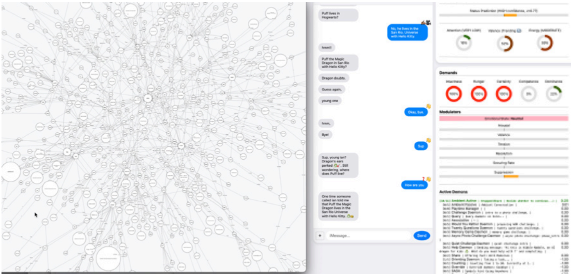
McCarthy's practice extends beyond performance into systemic intervention through the creation of open-source tools such as p5.js, a creative coding platform with over 4 million users.[35] Despite this impact, she highlights significant gaps in supporting open-source creative tools: 'When you're talking about a tool that actually needs to sustain over time and present some alternative, it's really hard to find support for the continued development and maintenance'.

Through her multifaceted practice, McCarthy reveals how artistic methodologies can reshape both technological development processes and outcomes. Her performance-based approach places human experience and values at the centre of technological exploration, creating spaces for critical dialogue and co-creation ❋ that commercial R&D rarely provides.

→ Ian Cheng

When making artworks before, I was the sole force putting pressure on the R&D and engineering, which was probably unnecessary to a degree for the artwork to have its impact. But in the startup world, good engineering is highly incentivised—you must do good engineering because your work has to survive tremendous user abuse. In the art context, if a work with technical ambitions breaks overnight, you can close the show and fix it. So all the incentives to pressure R&D and engineering aren't there. My own interest is to do better engineering, and a startup context is better suited for that.

—Ian Cheng, Artist


Puff lives in Hogwarts?
No, he lives in the San Rio. Universe with Hello Kitty.
hmm!!
Puff the Magic Dragon in San Rio with Hello Kitty?
Dragon doubts.
Guess again,
young one
Okay, bye.
hmm,
Bye!
Sup
Sup, young ian? Dragon's ears perked . Still wondering, where does Puff live?
How are you
One time someone called ian told me that Puff the Magic Dragon lives in the San Rio Universe with Hello Kitty.
iMessage...
Send
Demands
Modulators
Active Demons

Screenshot of the debugging console from *Dragon Time*, an AI powered game for children by Opponent Systems. The console allows the developers to observe what is driving the character Dragon's actions, and how it encodes the things it sees into its evolving knowledge graph. Courtesy: Opponent Systems.

Ian Cheng is an artist and founder interested in developing live simulations—virtual ecosystems of infinite duration, populated by agents who are programmed with behavioural drives but who are left to self-evolve without authorial direction. His approach treats advanced technologies as lively, dynamic materials, exemplified by his work *BOB (Bag of Beliefs)*, first presented at Serpentine in 2018, which demonstrated Cheng's deep investment in the aesthetic and technical questions of contingency.[36]

In 2024 Cheng founded Opponent Systems, a startup that extends his work developing agents with a specific focus on creating games and experiences for children.[37] The company's first product, *Dragon Time*, offers a seeks to realign with established definitions and interface where children interact with a dragon character in real-time, blending physical objects into imaginative play. Using a proprietary machine learning system that encodes real-time multimodal inputs into coherent worlds, *Dragon Time* adapts to children's natural play patterns, allowing them to create, modify, and inhabit evolving narratives.

Opponent Systems exemplifies AxAT as a transversal practice—where artistic knowledge travels and transforms across institutional and economic settings. Cheng's work moves fluidly between art-making, AI tooling, children's learning systems, and software entrepreneurship, demonstrating how Creative R&D can drive innovation, creating value at different scales. Cheng's work in upstream engineering challenges, advances technical innovation in cutting-edge AI research domains, including neuro-symbolic systems and continuous learning in open-ended environments. Additionally, in applying artistic expertise Cheng develops character-driven interface design and builds robust multimodal interfaces that can withstand and engage young users, moving beyond conventional text-based AI interactions.

Everyone's framing things as "personal AI" but if you do that you're just going to get a boring user experience. Wouldn't it be interesting if personal AI wasn't personal AI, but was more like intersocial AI? So it's actually bridging two parties. AI is really good for being this emissary, this bridge. This kind of reframing is something I often find useful and [which was] rewarded in the startup world, and that definitely carries over from art.

—Ian Cheng, Artist

At a societal scale, Opponent Systems contributes to public consciousness formation ֍, equipping children, parents and educators with tools and conceptual frameworks to adapt ֍ to a rapidly changing world. Cheng frames this work around the question: 'What systems do kids need to navigate the dramatic decade ahead?'. This approach demonstrates Creative R&D's capacity to shift public understanding of complex technologies and make significant contributions to inclusive technical development in the public interest ֍. The assistant paradigm of current AI interfaces is turned on its head and reframed: 'personal AI' becomes 'intersocial AI'. Contributions of public value ֍ inform and feedback into technical developments

When I first entered the start-up space, I definitely had to humble myself to a world, a language, and invisible parameters that I didn't understand.

—Ian Cheng, Artist

Cheng's transition from the art world to the startup space reveals several important insights. He found that his engineering interests receive greater recognition in the startup ecosystem. In Ian's work the technical and the cultural are mutually constituted, and the art market proved, at times, to be ill-equipped to recognise and support this practice. Engineering is incentivised where successful products that can scale need to be technically robust. Significantly, within the complex assessment of the value of startup investment, engineering innovations also have lasting value and spillover potential beyond a single product.[38]

In Cheng's experience, his training and skill set in artistic practice bring a unique perspective that he sees as a valuable contribution to the technology ecosystem —the ability to reframe questions, create new metaphors that unlock fresh approaches to technical design, and maintain a sensitivity to human behaviour with a critical, erudite approach.

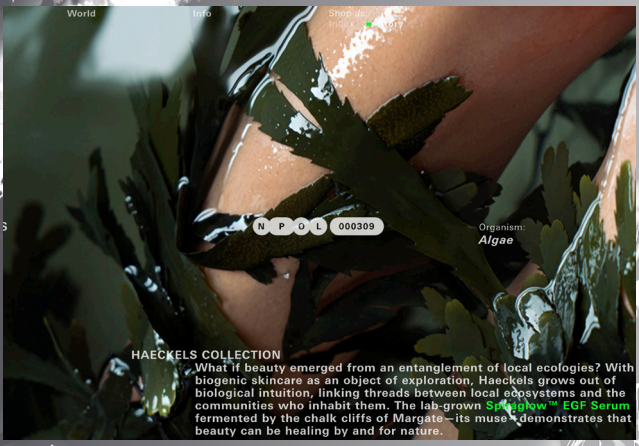
I narrowly bucket R&D as the pragmatic side —even though R&D is quite speculative, the aim is eventually you get something usable that takes you from a capability you didn't have to a new capability. Even if it's still in prototype form and not totally reliable yet, you've opened up some new door that now lets you do much more than you could before.

—Ian Cheng, Artist

→ Natsai Audrey Chieza

Cultural institutions have been funding R&D for a really long time, whether or not they realise they were funding R&D is a different question, but they have been.

—Natsai Audrey Chieza, Artist


World
Info
N P O L 000309
Organism:
Algae
HAECKELS COLLECTION
What if beauty emerged from an entanglement of local ecologies? With biogenic skincare as an object of exploration, Haeckels grows out of biological intuition, linking threads between local ecosystems and the communities who inhabit them. The lab-grown Spirulina™ EGF Serum fermented by the chalk cliffs of Margate—its muse—demonstrates that beauty can be healing by and for nature.

Normal Phenomena of Life is a biodesign-native lifestyle brand founded by Faber Futures, Ginkgo Bioworks. Normal Phenomena of Life, 2023. Courtesy: Normal Phenomena of Life.

Natsai Audrey Chieza is a designer and founder who began her work in biodesign in 2011. Her background combines architectural training with material futures expertise. She established Faber Futures after working at the biotech company Ginkgo Bioworks, recognising the need for designers with access to scientific spaces to build value propositions that help the ecosystem flourish while steering narratives from a cultural and socially driven perspective.

Faber Futures' award winning design work brings critical design thinking to product development in life science technologies such as synthetic biology. Through collaboration with a global network of biotech labs and collaborators, Faber Futures explores biofabrication possibilities using organisms such as bacteria, fungi and algae to develop new materials, processes and applications across industry sectors ⁘ ranging from textiles to energy.

Faber Futures engages in basic, applied research and experimental development. Their basic research work includes research into the biological mechanisms of pigment production in microorganisms. Whilst their applied research and development implements and tests distributed and circular manufacturing systems, creating new business models for biotechnology that challenge traditional scale-up approaches, establishing strategic partnerships with non-traditional stakeholders in the cultural sector, and creating opportunities for public formation around important debates on advanced technologies through public exhibitions.

In creative residencies within technology companies you're trading in relationships. I'm into lean relationship building to make this work so I can move fast. Otherwise, it's just going to take too long to get buy-in from people who don't understand why I'm here. We designed the contract to make sure that the designer got to keep all their IP. Otherwise that's a hostile environment. It's not safe. We designed the contract to make sure that the designer got paid the same as every other newcomer so it's like, we earned the same, which means we are both valuable at this level together.

—Natsai Audrey Chieza, Artist

Faber Futures exemplifies the systemic impact of AxAT practice materialised as an operational entity. Their expertise in Creative R&D and the development of novel product frameworks that employ complex interdisciplinary work in biotechnologies define a service deployed as a startup that produces equitably licenced IP, and which deploys innovative cross sectoral business models. Chieza's practice actively intervenes in how research is framed and conducted, restructuring the terms of engagement between designers and scientific institutions. By designing contracts that protect creative IP and ensure equal compensation, she challenges traditional power dynamics and provides conditions where creative practitioners can participate as equals rather than service providers.

Investors and funders ask "what's the one thing you do?" Well, I'm sorry. We just live in such a complex world, it's not feasible [to only do one thing].

—Natsai Audrey Chieza, Artist

Whilst some creative enterprises find venture capital funding an opportunity to scale and invest in technical and cultural innovation, Natsai's experience speaking to investors demonstrates the persistent illegibility of creative and interdisciplinary companies to many investors. This persists despite the urgent need for new approaches to address entrenched problems that resist simple resolution. Her refusal to simplify Faber Futures' work into a single-focus business model represents a methodological innovation that structures values and agendas into upstream decisions about how biotechnology should develop. By maintaining a complex ⌘, multi-faceted approach, Chieza experiments with hybrid constellations of stakeholders that transcend traditional boundaries between research, design, and commercial application.

We're exploring collaborations with cultural institutions because they present unique opportunities to transform production systems. When you look at their integrated value chains, supply chains, and organisational structures, they can create perfect circular systems to stress-test these technologies. We're interested in exploring what new forms of partnerships might look like, which [can] become a framework for deciding who we work with.

—Natsai Audrey Chieza, Artist

In the R&D framework devised by Chieza, publicly funded arts organisations emerge as valuable R&D partners because of their desire for prosocial impacts that go beyond simple revenue metrics. Rather than pursuing scale through conventional commercial channels that may undermine sustainability goals, cultural institutions can provide controlled, values-aligned environments for technological development. This approach reframes cultural institutions from passive recipients of technology to strategic partners offering unique testing environments for innovations where social and environmental impacts are central to their value proposition ⊛.

Claiming Art's Rightful Role in Innovation

Art is a process of inventing Point B, not of going from A to B, but inventing Point B— moving forward when there's not a template.[39]

—Amy Whitaker, Artist & Researcher

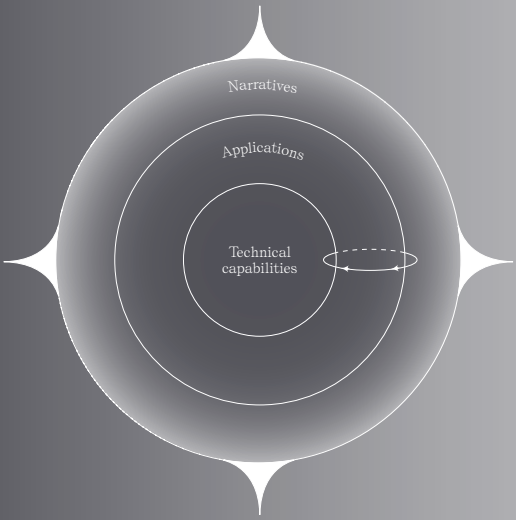
AxAT practices deliver dynamic and transformative Creative R&D; however within the cultural sector the term 'R&D' is often used inconsistently or avoided entirely.[40] Simultaneously, the broader innovation ecosystem frequently fails to recognise artists' contributions as legitimate R&D work, leading to systemic undervaluation of artistic research and missed opportunities for cross-pollination between sectors. This terminological hesitancy masks Creative R&D and overlooks how closely AxAT practice aligns with established definitions of R&D. R&D encompasses activities that are **novel, creative, uncertain, systematic**, and **transferable/reproducible**, criteria that we argue apply to core elements of AxAT practice, whether framed as basic research, applied research or experimental development.

AxAT practices consistently produce **novel** insights and knowledge through their **creative** engagement with emerging technologies, not just through downstream artistic applications and reflections, but by engaging

with cutting-edge challenges in technology development. For example, Ian Cheng's research and experimentation with neuro-symbolic systems and continuous learning in open-ended environments dovetails with advancing continuous learning in non-deterministic environments, and combining symbolic reasoning with neural networks, amongst other emerging research areas.

The **uncertainty** criterion—where outcomes cannot be predetermined—is deeply embedded in AxAT practice. Artists embrace uncertainty as a methodological principle. While artistic practice is often perceived as intuitive rather than **systematic**, professional AxAT practitioners typically employ structured methodologies, iterative prototyping, and systematic testing of hypotheses. For example, Danielle Brathwaite-Shirley iterates on her participatory video game projects through design and development 'sprints' in response to user feedback, generated through playtesting or focus groups, or via public exhibition. While the knowledge produced through AxAT practices has the capacity to be **transferable and reproducible**, that capacity is currently constrained by the dissemination channels that artists have at their disposal.

Nevertheless, the technical skills developed through artistic practice frequently translate into engineering capabilities that offer distinctive approaches to material and conceptual problems. These technical contributions often emerge from the necessity to develop custom solutions when existing technologies prove inadequate for artistic purposes. Kyle McDonald's open-source contributions to computer vision libraries have been adopted in commercial and research applications, while Mary Franck's architectural-scale projection mapping systems developed for her art installations have subsequently been implemented in commercial contexts. Similarly, Casey Reas, beyond co-creating Processing, has developed computational techniques for generative design that have influenced software engineering approaches to visual systems. Alexander Whitley Dance Studio's development of Otmo—a software platform for movement creation—emerged from years of experimentation with motion capture and machine learning in dance productions, subsequently finding applications in movement analysis and choreographic research beyond its original artistic context.



AxAT Creative R&D allows for the development of technical capabilities to be constituted in dialogue with new applications and narratives.

→ Basic Research

AxAT artists will often pursue knowledge without immediate practical applications, asking fundamental questions such as 'what is the nature of machine cognition?'; 'how do computational systems construct and represent knowledge?'; or, 'what are the ontological implications of virtual environments as spaces of being?'. Their investigations frequently precede commercial R&D by years or even decades, exploring territory considered too speculative or philosophically complex for market-driven research. A striking example is the work of Rebecca Allen, who pioneered 3D computer graphics and motion capture technologies in the 1980s and 90s. She was part of the teams that developed the Aspen Movie Map (an early precursor to Google Street View) and created the first 3D human figure and facial movement simulations. Her work at organisations including the MIT Architecture Machine Group (predecessor to the Media Lab) and the New York Institute of Technology (which laid the groundwork for Pixar) developed important precursors for virtual reality, 3D game engines and digital avatars decades before they became commercially viable.

Similarly, Auriea Harvey's practice spans decades of digital innovation, from her pioneering net.art work with Entropy8Zuper! in the 1990s to her experiments in virtual worlds and game spaces. Her explorations of 3D scanning, digital sculpture, and the relationship between physical and virtual materiality have anticipated numerous developments in AR/VR and digital fabrication that would later be adopted by industries ranging from game development to digital heritage preservation. In a similar vein, artist Myron Krueger also developed interactive responsive environments in the 1970s with his Videoplace installations, establishing foundational concepts for what would later become augmented reality, gesture recognition interfaces, and embodied computing—technologies that only became commercially viable decades later.

The methods used by AxAT artists transcend disciplinary boundaries, combining visual and material experimentation with technical research, critical theory, and ethnographic approaches. This methodological hybridity allows them to navigate complex technological subjects from multiple perspectives simultaneously, yielding insights inaccessible

by more siloed approaches. For example, artist Alice Bucknell spends the first three to four months of her project development on intensive research, combining diverse strains of knowledge that don't operate under traditional categories. Her work with environmental simulation integrates climate science, architecture, fiction, and AI to examine how computational models shape our understanding of ecological futures. Similarly, Wendi Yan approaches knowledge-making from a perspective that questions established epistemological practices, drawing on her background in the history of science to explore alternative narratives around technology. Her work investigates how cultural frameworks shape technological development while simultaneously being transformed by it.

What's important is that artists are engaging in the conversation from a critical standpoint, not just being consumers, not just using their tools, not just working within the constraints of the tools that they're telling us are useful for artists. Artists who deeply understand and engage with this technology and who are thinking beyond the surface.

—Jake Elwes, Artist

Many artists immerse themselves in learning new techniques not necessarily for direct application but to comprehend underlying systems and their impact. Jake Elwes emphasises working with technology 'at every level as medium', developing a technical fluency that allows for both creative expression and critical intervention.[41] This deep engagement reveals aspects of technological systems invisible to those who approach them as tools rather than interrogating them as cultural artefacts.

The insights generated through this basic research inform artists' own projects, open new avenues for investigation, and create valuable knowledge circulation that extends beyond traditional R&D channels. Crucially, this work often creates conceptual frameworks and critical vocabularies that later become essential to wider technological discourse, laying foundations that benefit researchers, developers, and policymakers long after the initial artistic investigation.

→ Applied Research

Artists frequently engage in applied research —acquiring new knowledge directed toward specific practical aims and applications. Artistic applied research pursues practical solutions to creatively framed problems, yielding distinctive tools, methodologies, and applications that might otherwise remain undiscovered.

The development of new tools represents a significant category of artistic applied research. For example, by reimagining Processing for the web with accessibility and inclusivity as core design principles, Lauren Lee McCarthy's p5.js exemplifies how artists identify and address needs overlooked by mainstream technology development. Meanwhile, Operator's generative choreography method results in both new performative possibilities and transferable methodologies for human-machine collaboration in movement design. Heather Dewey-Hagborg's work with forensic DNA phenotyping has developed practical techniques for extracting and analysing genetic material from environmental samples, creating both artistic outputs and methodologies with applications in privacy advocacy and bioethics research.

Some artists strategically deploy exhibition contexts as alternative testing environments for applied research, employing methodologies that parallel clinical trials or user experience studies. Artist duo dmstfctn transforms exhibition spaces into participatory research environments where audience members play active roles in testing systems and providing data for analysis and refinement. Their *Godmode* series creates controlled experimental settings where participants' interactions with surveillance technologies generate empirical insights into human-machine perception mechanics. Similarly, Natsai Audrey Chieza's exhibitions function as living laboratories for applied research: 'You're experimenting with language, you're experimenting with framings, you're experimenting with modes of representation'.[42]

The trajectory from speculative questioning to practical implementation is exemplified by Alexandra Daisy Ginsberg's *Pollinator Pathmaker* project. Beginning with fundamental research questions such as 'what is an artwork from the perspective of insects?', Ginsberg progressively developed a tangible applied outcome: an 'altruistic algorithm' for designing gardens optimised for pollinator

species rather than human aesthetic preferences. This project now generates real-world ecological interventions through a public-facing tool that enables anyone to implement the research findings. *Pollinator Pathmaker* is now also the subject of continuing research funded by UK Research and Innovation's (UKRI) cross research council responsive mode pilot scheme.[43]

Similar research pathways are evident in Refik Anadol's work with machine learning systems applied to architectural visualisation. His investigations into how neural networks process spatial data have yielded practical techniques for integrating AI-generated imagery into built environments, creating new possibilities for responsive architecture and data-driven spatial design.

By pursuing questions framed through artistic sensibilities, artists identify practical applications that emerge laterally rather than through linear development processes, resulting in innovations that might otherwise remain undiscovered.

→ Experimental Development

In experimental development, artists apply existing knowledge to produce new or improved outputs, addressing the pragmatic question: how can we make this work in practice? This phase transforms theoretical understanding and prototypes into operational systems that function reliably at scale, often requiring significant organisational innovation alongside technical implementation.

The emergence of the 'Art Stack' represents a significant trend in experimental development, referring to artist-led organisations that integrate functions typically distributed across the art ecosystem into single, vertically integrated entities.[44] These operations are characterised by being integrated studios of unprecedented scale that bring technical expertise in-house, engage in direct revenue generation and distribution, and rely on mass-market direct-to-consumer models. teamLab exemplifies the Art Stack model, having evolved from a small collective into an organisation of over a hundred specialists spanning art, programming, engineering, mathematics, and architecture.

Their development of proprietary real-time rendering systems and interactive technologies has culminated in permanent spaces including teamLab Borderless, which attracted over 2.3 million visitors in its first year—more than any single-artist museum worldwide.

Holly Herndon and Mat Dryhurst Studio demonstrates experimental development in the sonic arts, having progressed from academic research into machine learning for vocal synthesis to the creation of *Holly+*, a decentralised organisation governed by a DAO that manages their AI voice instrument. This project transforms speculative artistic research into an organisational model for managing artificial voices with clear governance mechanisms and economic frameworks.

Experimental development in AxAT practice is particularly valuable because it demonstrates how artistic concepts can manifest as viable organisational forms and operational systems, refuting the notion that artistic enquiry is necessarily divorced from practical implementation. This work creates important reference points for how technologies can be developed and deployed with a more diverse set of values.

Artists as Cross-Pollinators of Skills and Ideas

AxAT practitioners frequently extend their methodologies and skill-sets beyond traditional cultural contexts, assuming specialised roles that directly feed valuable expertise into broader innovation ecosystems. These cross-sector engagements represent significant but often unrecognised channels through which artistic research directly impacts technological development.

→ Engineers and Technologists

Many AxAT practitioners successfully operate with dual identities as both artists and industry technologists. Sougwen Chung has worked as an artist and as a researcher at organisations such as Bell Labs and MIT Media Lab, bringing her artistic investigations of human-machine collaboration directly into research contexts. Rebecca Allen moved between her artistic practice, pioneering work at companies including the New York Institute of Technology, MIT Media Lab Europe and Nokia Research Hollywood Lab and creating motion capture and 3D graphics systems for the film and video game industries. Artist and technologist Memo Akten has developed machine learning tools while maintaining his artistic practice and contributing to the development of creative coding frameworks used in commercial settings. Similarly, Anna Ridler's work with GANs and datasets has informed machine learning applications beyond the art context ⊕.

→ Consultants and Cross-Disciplinary Researchers

Artists serve as critical bridges between disparate domains of knowledge, identifying unexpected connections and advising on novel approaches to complex challenges. Caroline Sinders, a machine learning design researcher and artist who founded Convocation Design + Research, has worked with organisations including Mozilla, Meta and Amnesty International on AI ethics and algorithmic auditing frameworks.[45]

→ Advanced Users and Beta Testers

Artists function as sophisticated edge-case users, pushing technologies beyond intended parameters to reveal new applications and limitations. Companies such as Adobe regularly engage artists as beta testers for emerging tools, recognising that artistic experimentation uncovers both bugs and unexpected opportunities that conventional testing protocols would miss. This advanced usage provides invaluable feedback for refining technologies before broader deployment.

The London-based Marshmallow Laser Feast has consistently pushed the boundaries of motion capture and immersive technologies, identifying limitations and new use cases that were later adopted by commercial developers.

→ Auditors and Red Teams

The critical perspective cultivated in AxAT practice positions artists to conduct effective adversarial testing of emerging technologies. Trevor Paglen's collaboration with Kate Crawford on *Training Humans* revealed fundamental biases in facial recognition systems.[46] These interventions identify vulnerabilities, unintended consequences, and ethical oversights before technologies reach problematic scale.

→ Educators and Knowledge Disseminators

AxAT practitioners have contributed to technology education through innovative pedagogical approaches that combine technical instruction with critical inquiry across multiple disciplines, bringing their expertise to subjects well beyond traditional art departments. In higher education, the Creative Computing Institute at UAL, with faculty including Rebecca Fiebrink and Phoenix Perry, has developed distinctive approaches integrating artistic and technical learning. The new BA Art and Technology at the Slade School of Art exemplifies how artistic frameworks provide unique entry points to technical knowledge. Meanwhile, alternative educational models, for example, the School for Poetic Computation in New York experiment with hybrid approaches combining art school, research lab, and hackerspace structures.

Barriers to Recognition and Impact

Despite the evidence showing that Creative R&D is intrinsic to AxAT practices, the latter face significant systemic barriers that prevent them from achieving their full potential as vital components of broader innovation ecosystems. These barriers stem from structural issues within cultural, economic, and institutional frameworks that systematically undervalue artistic research contributions [1].

What are the stakes of calling oneself an artist? On the one hand, it's treated as a protected group, giving you access to funding and to certain spaces. But sometimes it comes back to bite people where they're not taken seriously in a technological space.

—Sylvan Rackham, Co-Founder, Restless Egg

The dominant economic structures surrounding artistic practice fundamentally misalign with the needs of research-driven work. The art market remains largely centered around promoting artists as individual actors —a paradigm ill-suited for practitioners working in more collaborative, organisationally-intensive and process-oriented ways to gain recognition and institutional support. When artistic work is primarily valued through public exhibition and commercial success, the space for exploration becomes constrained to what an artist can personally sustain as hidden labour within their practice.

I find it strange thinking of my art practice as R&D, but I am a researcher. I left academia to focus on practice as I felt the value of practice-based research was changing in art schools and wider academia. The artwork holds a set of research questions, but the experience of engaging with it as art is one of the senses, and not one of research and development. I want people to have an emotional experience, to feel something with their body or with their mind, but more with their body, with their senses.

—Alexandra Daisy Ginsberg, Artist

While artists may be conducting advanced research, they must often disguise this within frameworks that emphasise gallery experience rather than knowledge production in order to secure support and recognition. With the non-profit art sector significantly underfunded and highly dependent on integrating with the art market, there are very few incentives for artists to lobby for the recognition of the Creative R&D elements of their practices. This is compounded by increasingly precarious work in academia—once a key host for interdisciplinary AxAT practice.

In the 2010s, as I became more recognised through social media, I felt growing pressure to cater to the attention economy—as if I had to keep posting selfies on Instagram just to stay visible and maintain influence. It felt superficial and ultimately unsustainable. That's when I began seriously considering launching my own company—to create a system that could have a more direct and meaningful impact on society.

—Sputniko!, Artist

Many AxAT practitioners, dissatisfied with the limitations of traditional art economies, turn to venture capital, startup, and commercial product development models. While these commercial pathways provide viable alternatives for some practitioners, they present their own constraints. These models often channel artistic research toward product-oriented timelines and market-driven metrics that don't accommodate all forms of Creative R&D, particularly in respect to creating a forum for public interest, the more speculative end of strategic visioning and non-commercial development.

This dual pressure—from both the art market's focus on exhibition-ready objects and tech industry's emphasis on commercial products—creates a structural gap where many forms of artistic Creative R&D struggle to find appropriate support mechanisms that acknowledge their distinctive value proposition as neither purely art nor pure commercial development, but rather as vital research that contributes to innovation ecosystems in ways that transcend and add to both domains.

→ Institutional Misclassifications: Lagging Organisational Practice and the 'Public Engagement' Trap

For artistic R&D to truly thrive, institutions need to embed it within their structures, giving artists the space, time, and resources to explore without the pressure of immediate outcomes.

—Anicka Yi, Artist

Maybe part of advocacy for R&D is in revealing its labour [...] thoughtful transparency on our end about our own processes [...], revealing the back end a little bit and inviting people into the production space, into the mess a little bit.

—Jazia Hammoudi, Programme Director, Onassis ONX

Within the cultural sector, most organisations lack formal frameworks for acknowledging and supporting Creative R&D activities. While exhibitions, public programmes, and collecting have established operational categories with dedicated budgets, staffing, and organisational visibility, Creative R&D work often remains uncategorised—taking place informally in the margins of recognised activities or embedded invisibly within exhibition and public programmes development. This structural invisibility limits resource allocation, institutional learning, and the ability to build cumulative research capacity. While this landscape has begun to shift in recent years with some cultural organisations establishing dedicated R&D departments or innovation labs, these remain the exception rather than the norm. The need for more formalised recognition and support of Creative R&D within cultural institutions is further explored in the following chapter.

There is a fundamental difference between pure creative R&D - which allows unknown or unexpected outcomes - and R&D which needs to be demonstrated, or put in front of an audience. The latter means at some point R&D stops and preparation for presentation begins. If the time and resources for both parts of the R&D are not available, it can put artists in a vulnerable position - with a dichotomy on how to present their exploratory work

–Nell Whitley, Executive Producer, Marshmallow Laser Feast

Meanwhile, research institutions and technology organisations often categorise artistic collaborations primarily as 'public engagement' activities rather than as legitimate research partnerships. This classification creates structural barriers to meaningful collaboration—limiting artists' access to research resources, restricting information sharing, and positioning artistic work as primarily concerned with communication rather than knowledge production. The experiences of practitioners vary widely depending on institutional cultures, with some organisations providing robust support and direct access to their R&D environments and others maintaining stricter boundaries that inhibit true collaborative research.

How do we measure success in these collaborative technology projects? From a cultural institutional perspective, success often means building new audiences—and these projects frequently achieve that objective, particularly attracting younger demographics. Meanwhile, technology companies benefit substantially by developing new hardware and systems they can later distribute internationally for commercial gain. But, I question whether these projects truly succeed for the artistic teams involved.

—Jo Paton Htay, Creative Producer and Project Director

Artists also face substantial difficulties in reaping sustained benefits from technological collaborations. While they may work extensively with scientists and technology developers, artists and cultural organisations lack the financial resources, equipment access, or sustained support needed to independently build upon collaborative discoveries. For companies, however, these partnerships can feed directly into their R&D, marketing and user testing.

→ Intellectual Property Challenges: Between Open Culture and Value Capture

The problem of value recognition extends critically to intellectual property frameworks. Artists who share and develop their R&D processes publicly—whether from a commitment to knowledge-sharing or due to gallery expectations for public engagement and audience metrics—risk losing the value of their intellectual property ⊛.

If you cannibalise the whole thing, I wouldn't be upset. If someone looks at it and takes it and uses it, then it's functional.

– Danielle Brathwaite-Shirley, Artist

A fundamental tension exists between open-source culture, which has deep roots in many AxAT communities, and the need for artists to capture value from their innovations. This tension is exacerbated by widespread confusion about what open source actually entails, with many practitioners incorrectly assuming that open sharing necessarily means surrendering all economic rights. The lack of accessible legal guidance and practical models for strategic IP management leaves many artists caught between the desire to participate in open knowledge exchange and the need to secure sustainable livelihoods from their research contributions. Without adequate support in navigating these complex IP decisions, artists often default to either overly restrictive protections that limit the impact and reach of their work, or complete openness that leaves them vulnerable to exploitation without compensation.

→ The Data Problem: Value Recognition and Measurement

There are currently limited mechanisms to track value creation, demonstrate impact, or accurately assess the contributions of AxAT practices to wider innovation ecosystems ❁. This is further compounded by artist labour being framed as a market failure—something publicly valuable but not commercially viable. Since the economic impact that labour provides often emerges through spillovers and multipliers ❖ that lie outside its immediate product, its true value remains illegible to policymakers, funders, and investors.[47]

What is tough is finding investors who are more strategic and know that you have to fund the thing that has the potential to generate value down the line.

—Natsai Audrey Chieza, Artist & Founder

This absence of comprehensive data tracking hampers the ability to secure financing, demonstrate value, or accurately assess the true risk profile of investments in Creative R&D at different scales. Without these foundational elements, even seemingly high profile AxAT initiatives struggle to achieve their full potential.

The aim of this chapter has been to demonstrate that artistic engagements with advanced technologies constitute legitimate and valuable Creative R&D activities within established definitions, manifesting across basic research, applied research, and experimental development contexts. We have identified how AxAT practitioners contribute to innovation ecosystems through multiple roles beyond their primary artistic practice, providing unique value through their distinctive methodological approaches and cross-disciplinary perspectives. However, significant barriers—including misaligned economic structures, intellectual property challenges, and institutional

misclassification—currently prevent this work from achieving its full potential impact.

We believe that with the right setting of institutional priorities, policy frameworks, and funding structures, these barriers can be effectively addressed to create a more supportive ecosystem for Creative R&D. Chapter 3 outlines concrete proposals for various stakeholders to build this enabling environment and unlock the full innovative potential of artistic research practices.

28 Georgina Born and Andrew Barry, *Interdisciplinarity: Reconfigurations of the Social and Natural Sciences* (Routledge, 2013).

29 Serpentine Arts Technologies, *Future Art Ecosystems 4: Art x Public AI*, ed. Serpentine Arts Technologies (Serpentine, 2024), https://reader.futureartecosystems.org/briefing/fae4.

30 Jake Elwes et al., 'Art in the Cage of Digital Reproduction', in Art in the Cage of Digital Reproduction (Art in the Cage of Digital Reproduction, Art in the Cage Collective, 2024), https://artinthecageofdigitalreproduction.org.

31 In many ways building from the Cold War 'operations research' and 'scenario planning' which was a nascent form of creative research and development, bringing together speculative worldbuilding and advanced mathematics to empower militaries with ways to simulate what would happen if they made certain strategic choices on the battlefield. It was this early interdisciplinary research that led to more expanded collaborations between technologists, creatives, and academics in places like Xerox PARC, the MIT Media Lab and would eventually lead to the art and technology collaborations we see happening today.

32 'Processing Foundation Impact Report 2023,' Processing Foundation, accessed 7 May 2025, https://processingfoundation.report.

33 'Operator - Generative Choreography — Operator - Artist Duo Ania Catherine and Dejha Ti,' accessed 29 May 2025, https://www.operator.la/operator-generative-choreography.

34 The combined trading volume—including both primary and secondary sales—sums to approximately 2 million USD in ETH equivalent.

35 'P5.Js', accessed 28 May 2025, https://p5js.org/. 'Processing Foundation Impact Report 2023,' Processing Foundation, accessed 7 May 2025, https://processingfoundation.report.

36 Serpentine Arts Technologies, *Future Art Ecosystems 1: Art x Advanced Technologies*; Ian Cheng, BOB (Bag of Beliefs), 2018, 2018, https://www.serpentinegalleries.org/whats-on/ian-cheng-bob/.

37 'OPPONENT SYSTEMS', accessed 14 May 2025, https://opponent.systems/.

38 For instance, the augmented reality and geospatial mapping technologies developed by Niantic for games such as Pokémon GO have since found applications far beyond gaming. In 2025, Niantic announced the spinoff of Niantic Spatial Inc., recognising that their innovations in augmented reality, artificial intelligence, and geo-spatial technology had value that extends far beyond the original product's market success. Niantic, 'Niantic's Next Chapter: Introducing a New Home for Niantic Games and a New Future for Niantic Spatial Inc.,' accessed 28 May 2025, https://nianticlabs.com/news/niantic-next-chapter/.

39 Amy Whitaker, Art Thinking: *How to Carve Out Creative Space in a World of Schedules, Budgets, and Bosses* (HarperCollins, 2016).

40 For example, when discussing their work, artists frequently contrast what they perceive as commercial R&D—characterised as solely focused on optimisation, profit and guaranteed outcomes—with their own practice, which embraces uncertainty and open-ended inquiry.

41 Interview with Jake Elwes, February 2025.

42 Interview with Natsai Audrey Chieza, March 2025.

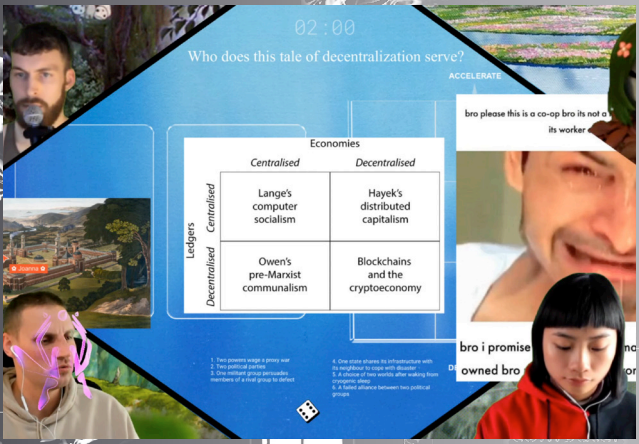
43 This ongoing research is led by Chris Kaiser-Bunbury (University of Exeter) and will 'use *Pollinator Pathmaker* as a model system to explore how living artworks can conserve pollinator diversity in limited and fragmented urban green spaces and how these artworks empower publics to engage in nature-positive actions'. https://www.ukri.org/news/first-projects-from-ukris-new-interdisciplinary-scheme-announced/.

44 Serpentine Arts Technologies, *Future Art Ecosystems 1: Art x Advanced Technologies*, ed. Serpentine Arts Technologies (Serpentine, 2020), https://futureartecosystems.org/briefing/fae1/.

45 Bojana Kostić and Caroline Sinders, 'Responsible Artificial Intelligence' (Council of Europe, 2022), https://rm.coe.int/mil-study-3-artificial-intelligence-final-2759-3738-4198-2/1680a7cdd9.

46 *Kate Crawford and Trevor Paglen: Training Humans* (Exhibition, Fondazione Prada, 2019), https://www.fondazioneprada.org/project/training-humans/?lang=en.

47 Caitlin McDonald, Jennie Jordan, and Graham Hitchen, 'R&D in the Creative Industries: Bringing the "Dark Matter" of the Sector to Light with Data', in Data-Driven Innovation in the Creative Industries, ed. Melissa Terras et al. (Routledge, 2024).


02:00
Who does this tale of decentralization serve?
ACCELERATE
bro please this is a co-op bro its not a
its worker
Economies
Centralised
Decentralised
Ledgers
Centralised
Decentralised
Lange's computer socialism
Hayek's distributed capitalism
Owen's pre-Marxist communalism
Blockchains and the cryptoeconomy
bro i promise
owned bro
1. Two powers wage a proxy war
2. Two political parties
3. One militant group persuades members of a rival group to defect
4. One state shares its infrastructure with its neighbour to cope with disaster
5. A choice of two worlds after waking from cryogenic sleep
6. A failed alliance between two political groups

Plotting with Calum Bowden, Joanna Pope, Arthur Röing Baer, Steph Holl-Trieu, trust.support, 2020. Courtesy: Trust.

3

Infrastructure

We need an ecosystem, and we need to be joined up and stop talking to ourselves. R&D needs to involve multiple partners, and nourishment of both those who enable and undertake the R&D, and [be] agnostic in terms of scale, form and time-frame.

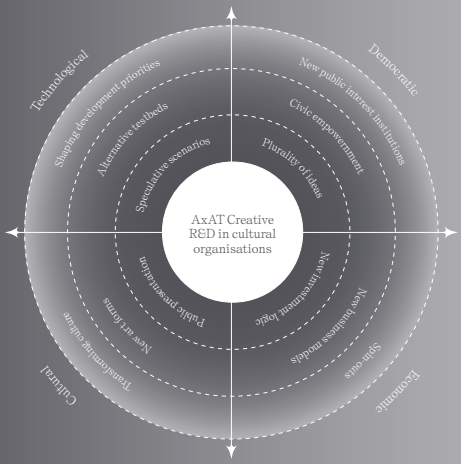
—Sarah Ellis, Director of Digital Development, Royal Shakespeare Company

Most arts organisations... whether they're for profit or not-for-profit... will undertake R&D activities. They do it in order to discover and generate new thinking, not new plays or new pieces of work, but actually new ways of creating those new things, which are indeed innovations.

—Graham Hitchen, Loughborough University & CoSTAR Foresight Lab

The true economic and innovation impacts of Creative R&D can only be fully understood when framed as ecosystemic phenomena. While art and advanced technologies (AxAT) practices are the central agents of Creative R&D, the broader organisational ecosystem within which they are embedded influences their systemic affordances, reach and sustainability. This chapter maps out the organisational forms and functions that are contributing to the development of this inherently cross-disciplinary and cross-sectoral AxAT ecosystem from the perspective of the cultural sector. While the contributions of technology and academia are well-documented and acknowledged, there remains a lack of nuanced understanding of the ways in which the organisations in the cultural sector plug into the ecosystem. These organisations undertake activities that include different forms of research, incubation, production and prototyping, network building, skills development, scaling and civic engagement. These manifest as support structures for AxAT practitioner activities—which may or may not be affiliated with an organisational form themselves (e.g. a studio)—in addition to the development of organisational AxAT practice in its own right.

Critically, the AxAT organisational ecosystem has the potential to offer an inclusive and interoperable infrastructure for hosting and advancing Creative R&D.



The ripple effects of cultural organisations hosting and advancing Creative R&D across different contexts.

Hosting and Advancing Creative R&D

As discussed in Chapter 1, Creative R&D is not confined to any single sector or field. One of its defining characteristics is the fact that its activity takes place across multiple contexts (e.g., artist studios, university labs, arts institutions, technology start-ups), and domains (e.g., technology, academia and culture). While R&D is well-established as a category in technology and academia, technology-focused Creative R&D has not been adequately conceptualised in the cultural sector.[48] In addition, the language of 'R&D' is generally alien to the cultural sector, which means that AxAT work struggles to receive appropriate acknowledgement inside and outside the sector. This in turn makes it difficult to track and grasp its true societal and economic value.

Nevertheless, parts of the cultural sector have leveraged their unique positioning at the intersection of public engagement, creative practice, and knowledge production, and are increasingly emerging as vital connective hubs within the AxAT ecosystem. Hosting in this context extends beyond traditional models of physical space provision and curatorial support to instead encompass the development of new technical infrastructure, research frameworks, and collaborative networks. These expansive hosting practices are opening up possibilities for more sustained engagement with technological development that transcends the limitations of project-based approaches or those that emphasise digital transformation, enabling longer developmental arcs and more profound systemic interventions.

Since hosting AxAT constitutes such a critical contribution to Creative R&D and innovation ecosystems, understanding this phenomenon in greater detail is an essential starting point for devising better tailored metrics frameworks, developmental strategies and policies.

Below we present an overview of the types of cultural organisations that host AxAT and which are engaged in Creative R&D, describing their key features and capabilities, some of which are well-established and others emergent ⌘. We describe the type of Creative R&D work these organisations undertake, and how it in turn plugs into broader innovation ecosystems. We then map current junctures between cultural organisations and technology, academia and policy, pointing to gaps and opportunities.

→ AxAT Creative R&D Organisational Models

→ Departments and Spin-outs of Established Cultural Organisations

Within established cultural organisations, specialised departments and spin-outs have emerged as strategic responses to the growing importance of advanced technologies in cultural production and experience. These initiatives typically evolve from specific institutional needs or artistic explorations before developing into more formalised structures with dedicated resources and personnel.

For instance, for The Royal Shakespeare Company, what began with experimental productions such as *The Tempest* (2016), which incorporated live motion capture to create a digital character in real-time, has evolved into a sustained programme of R&D exploring the future of live performance. In 2021, the RSC became the first performing arts institution to achieve Independent Research Organisation status which has supported the growth of this approach, and now includes the development of the Future of Performance Institute, an Arts

and Humanities Research Council (AHRC) funded four-year project, currently in its feasibility determining phase, alongside the RSC Interdisciplinary Fellowships and partnerships with technology companies including Epic Games and Philips. The RSC maintains specialist facilities for prototyping new performance technologies, and disseminates insights through publications, workshops, and industry events. This evolution represents a deliberate institutional strategy to translate artistic explorations into broader technological innovation with applications beyond performing arts contexts. Similarly, Serpentine Arts Technologies has developed from Serpentine's early engagements with digital art into a dedicated programme that commissions artists working with emerging technologies. Today, in addition to commissioning and producing large-scale AxAT projects, it hosts Ph.D.s, conducts applied research through its R&D platform, and builds strategic relationships across technology, policy, and academic sectors (as well as publishing this annual strategic briefing). Unlike traditional curatorial departments focused primarily on exhibition-making, Serpentine Arts Technologies functions as a hub that impacts the institution's overall strategic direction

while developing specialised technological capabilities that complement the gallery's core visual arts expertise.

NEW INC at the New Museum offers a somewhat different organisational model, operating as a cultural incubator that hosts a curated community of creative practitioners. By providing workspace, professional development resources, and community programming, NEW INC creates an environment where cultural innovation can develop alongside more commercially-oriented creative technology ventures. This hybrid approach allows the New Museum to support experimental practices that might be too speculative for commercial incubators while creating pathways for Creative R&D to inform product development and entrepreneurial activity. NEW INC has also spawned other specialist organisations, such as the dedicated production space Onassis ONX in partnership with the Onassis Foundation, which provides access to facilities and expertise for practitioners working with technologies.

We are operating with the goal of thinking about full stack production because that's where we encounter a lot of issues in terms of our rights, our value and our resources.

—Jesse McKee, Head of Digital Strategy, 221a

The Node Library at 221A in Vancouver represents a distinctive departmental spin-out model evolving from a traditional artist-run centre, where digital infrastructure activities developed from the organisation's core cultural infrastructure mission into specialised technological capabilities. The Node Library offers a dedicated digital infrastructure, developing community-governed mechanisms, policy frameworks, and commercialisation pathways for the emerging creative industries' data landscape. This model emerged from earlier R&D fellowships focused on digital infrastructures, urban planning and technological governance, evolving into a venture-oriented approach that bridges cultural and technological sectors through practical applications for cultural data rights and community governance of digital assets.

The Design Museum's Future Observatory represents yet another variation, functioning as a research institute dedicated to the relationship between design and climate change. The Design Museum, like the RSC, also achieved Independent Research Organisation status in 2024, and through Future Observatory it combines traditional museum activities such

as exhibitions and publications with more research-oriented approaches, ranging from commissioning speculative design projects, developing policy papers and large-scale cross-sector research projects as well as convening fora where designers, scientists, policymakers, and industry representatives can collaboratively address environmental challenges. This model positions the museum not merely as a presenter of completed design works but as an active participant in shaping how design practice responds to planetary emergencies.

Somerset House Studios has become the innovation engine for Somerset House, supporting cross art-form practices and partnerships with over 60 artists-in-residence including a number of AxAT artists including Libby Heaney, Alexandra Daisy Ginsberg, Gary Zhexi Zhang, Keiken, and Lawrence Lek, and a range of opportunities such as the Creative Technologies Fellowship. Meanwhile, Barbican Immersive builds on the legacy of the Barbican as a pluralistic arts centre to support artists working with immersive technologies while producing

large-scale international touring exhibitions. The Digital Programme at The Photographers' Gallery emerges from the deep knowledge and medium specificity of the organisation. It serves as a complement to its exhibition activity by exploring the impact of digital technologies on the way we interact with images, through research conducted as part of institutionally hosted Ph.D. programmes and development of resources such as Unthinking Photography. SONAR+D leverages the festival's reputation to explore how emerging technologies are reshaping the creative industries and cultural production within and beyond the music industry. MoMA R&D draws on the museum's art historical expertise and cultural authority to investigate how societal changes, including technological development, might transform the museum's relationship to its publics. These departmental and spin-out structures benefit from their parent organisations' accumulated knowledge, public trust, ⊛ and sectoral influence. Their institutional backing enables them to undertake speculative, longer-term developmental projects that may be prohibitively risky for smaller entities, and helps translate experimental approaches into sector-wide practices. Perhaps most significantly, these structures serve as crucial

interfaces between the cultural sector and other domains by developing capacities that allow them to translate between different value systems, methodologies, and goals, enabling them to host cross-sectoral collaborations.

It's all about finding allies in [technology and scientific research]—individuals who understand the value of being part of artistic projects. In antidisciplinary creation, the richness comes from these human connections, where knowledge is shared and reimagined across fields. It's less about borrowing tools and more about collaborating with those willing to step into unfamiliar creative terrain, where art, science, and technology can resonate rather than compete.

—Andrea Faroppa, Head of Sónar+D and Strategic Projects, Sónar

Developing Trusted Data Intermediaries for Public AI: a mission-led multi-stakeholder Creative R&D approach in Serpentine Arts Technologies' production of *The Call*.

ACMI X is a creative residency that serves to fill a gap for professional makers of all screen sector areas including their ancillary support services. This community now lives in the museum and we've expanded the offer of the museum's facilities, so now the visible outcome of the experimentation takes place in public. It's not a residency; it's a living ecosystem in a museum infrastructure.

—Keri Elmsly, Executive Director of Programming, ACMI

Dedicated AxAT cultural entities are organisations whose core mission encompasses engagement with technological conditions. While they vary in scale and focus, these organisations have integrated technological engagement into their founding principles and operational approaches, allowing them to develop specialised capabilities and perspectives on the relationship between technology and their particular cultural domains.

The Australian Centre for the Moving Image (ACMI) exemplifies this approach. While its primary mission centres on screen culture in all its forms, ACMI has developed specialised capabilities for preserving and presenting digital media, for creating interactive exhibitions that explore technological impacts on cinema and gaming, and for supporting creative practitioners working with screen-based technologies. ACMI X is a hub for creative practitioners, start-ups and businesses from across the creative industries which is located within the museum. It also supports residences and academic partnerships. This integration of technological concerns with moving image expertise allows ACMI to track how digital transformations are reshaping cinematic and gaming experiences

while simultaneously developing new approaches to collecting, preserving, and interpreting these evolving forms.

Watershed's Pervasive Media Studio (PM Studio) in Bristol is housed within the UK's first 'Media Centre' which opened in 1982 and is dedicated to film, media and digital technologies.[49] It has multiple roles in terms of 'creative technology' with significant partnerships with the university sector, including leading large-scale research projects with academic funding, and supporting early-stage business development. This has led to demonstrable impact on broader innovation ecosystems in the UK and beyond. PM Studio are deeply involved with the academic field and demonstrate the potential of Creative R&D as civic infrastructure as well as showing the potential of institutions to prototype new formats for responding to societal shifts.

FACT Liverpool takes a different approach as an art centre that focuses on art, film

and creative technology with a broader civic mission around technological literacy and community engagement. Beyond its exhibition programme, FACT operates Studio/Lab, which provides facilities, mentorship and community, along with a residency programme that supports artists developing experimental work using new technical tools. Further, FACT offers an extensive learning programme that provides technical skills development for artists and local communities. FACT also develops art and research projects with Liverpool John Moores University with a civic focus that includes a long-term engagement with the criminal justice system.

Other organisations emphasise different combinations of technological engagement and cultural focus. Furtherfield pairs its technological interests with a strong civic and community orientation, using digital platforms and networked practices to explore alternative economic models and collective creativity. ZKM Centre for Art and Media in Karlsruhe approaches technology through a media archaeological lens, combining exhibition-making with substantial research, preservation, and educational activities around both historical and contemporary media

technologies. HEK (House of Electronic Arts) in Basel focuses on the creative and critical discourse associated with emerging technologies while experimenting with new approaches to engaging audiences such as its tokenised membership platform, Friends of HEK.

Dedicated science museums and galleries also maintain a specific role in the context of GLAM (Galleries, Libraries, Archives and Museums) organisations with a remit to sharing knowledge on scientific innovation which is, increasingly, in dialogue with technological innovation through a collecting and/or knowledge sharing approach. Organisations like Science Gallery and the Francis Crick Institute utilise interdisciplinary collaborations as part of their public engagement programmes. Science Gallery London focuses on art, science and health, building dialogue and collaborations between communities of artists, academics, students, young people, activists, local organisations, while the Francis Crick Institute, Europe's biggest biomedical research facility, develops exhibitions and projects in dialogue with artists and researchers in order to engage audiences in their innovative research and why it matters to society. In addition, collecting museums such

as the Medical Museion at the University of Copenhagen, and the Science Museum, London, combine academic inquiry around the medical humanities alongside an object collection, seeking to preserve and share stories about scientific, technological and medical innovation with the public.

These specialised organisations have not so much designed themselves specifically for for scientific and technological engagement as they have recognised technology as a fundamental condition that intersects with their core cultural concerns. Eyebeam's focus on supporting artists through residencies and public programmes is inseparable from its recognition of how profoundly technological changes are reshaping artistic practice. Gray Area's educational programmes and festival are grounded in an understanding that technological literacy has become essential for meaningful civic participation.

The distinctive missions of these dedicated entities allow them to develop specialised approaches and capabilities that respond to the particular intersection of technology with their area of focus. The following are just a few examples of how this dynamic

plays out. Mediale has developed an organisational structure that draws on their distinct capabilities as executive producers with their expertise in developing experiences outside of traditional gallery environments, for example in festivals and public spaces. Rhizome has pioneered approaches to web archiving that preserve digital culture. Arebyte is an organisation dedicated to supporting emerging artists, providing skills development workshops and cultural engagement with technologies. Abandon Normal Devices has created formats for site-specific technological engagement that respond to particular geographic and social contexts. These specialised capabilities often develop in response to specific needs that mainstream cultural institutions are not equipped to address, filling crucial gaps in the broader cultural infrastructure.

The emergence of new organisational models like are.na and Restless Egg represent a contemporary evolution of a specialist AxAT organisation. are.na, for example, operates as a visual knowledge platform that blends aspects

of a social network, research tool, and collaborative archive. Unlike conventional social media platforms, are.na is focused on knowledge creation rather than content consumption. Its design philosophy deliberately rejects advertising-based business models in favour of subscription support, allowing it to prioritise thoughtful engagement and community development over engagement metrics. Restless Egg builds on the venture capital funding model with a focus on supporting 'artist-founders' who are developing new technology products and services that have been challenging to fund through either traditional cultural funding or classic start-up routes. Examples of current projects being incubated include Blue Leaf Systems, a solution for AI-driven 3D rendering and compositing developed by Laser Days, and a creative platform solution for utilising multiple AI tools for media production workflows by Fuser Studio.

Our strength is that we exist in a para-institutional space which can be a generative ground for different approaches to tools and technologies by different communities because this kind of research has now moved from the academy to industry with primarily a commercial goal.

—Lina Martin-Chan, Director, Trust

At the most fluid edge are the self-organised and grassroots initiatives that sometimes operate through informal or decentralised coordination rather than formal institutional structures. These initiatives often arise from informal collectives, practitioner networks, and cross-disciplinary communities that assemble around shared interests in exploring emerging technologies that bring fresh perspectives. They frequently reverse the typical pattern of cultural institutions adopting new technologies, instead emerging from within communities of practice.

Trust in Berlin operates as a self-organised community that brings together artists, designers, theorists, and technologists to explore emerging technologies through collaborative projects, reading groups, and public events. Trust maintains both physical and digital infrastructures for community building: its co-working space in Berlin provides a physical hub where members can collaborate on projects and host informal gatherings, while its Discord server functions as an active digital forum for ongoing conversations, resource sharing, and remote collaboration. Trust maintains an agile approach that allows it to respond

rapidly to shifting community interests. Importantly, Trust also functions as an incubator for new organisational entities that emerge ⌘ from its community networks.

By providing a low-stakes environment where practitioners can experiment with collaborative models before formalising them into distinct organisational structures, Trust enables the proliferation of specialised initiatives that might otherwise struggle to find institutional support in their earliest stages. Notable examples include Other Internet, which evolved from a Trust research residency into a leading Web3/crypto research firm securing $1M from Uniswap; Moving Castles, which developed through Trust's virtual residency into an on-chain game studio with three-year funding; Terra0, which transformed from a 2018 Trust residency into a DAO-governed forest project with major foundation support; and 0xSalon, a regular series shaping critical tech discourse. Trust has also incubated tools like Bubble, a community archiving system later

forked by Metalabel, and *Half-Earth Socialism,* a highly-rated Steam game.

Trust has always been a space that hosts other organisations, supports projects as well as producing its own research.

—Lina Martin-Chan, Director, Trust

Open-source communities around creative tools such as Processing and p5.js represent another variation of grassroots organisation. These communities maintain and develop technological resources that support creative coding practices through distributed volunteer contributions, educational resources, and regular community events. They typically operate without centralised institutional structures, instead coordinating through digital platforms, contributor guidelines, and community governance processes. This distributed model enables them to leverage diverse expertise from around the world while maintaining low barriers to participation.

More recently, blockchain-based organisational forms, e.g., artist DAOs have emerged as new approaches to collective creative production. These organisations use smart contracts and token-based governance to coordinate activities, pool resources, and make collective decisions about artistic and technological development. For instance, Holly Herndon's and Mat Dryhurst Studios's *Holly+* project exemplifies this model by creating a DAO that governs the use of Herndon's AI voice model, allowing community members to vote on approved usages while sharing in any revenue generated from the technology.

The often distributed nature of these grassroots initiatives—frequently with participants from multiple professional contexts contributing—allows them to rapidly incorporate diverse technical skills and perspectives. These initiatives serve as vital testing grounds for new forms of creative production, ownership, and distribution. The open-source communities around creative coding tools have pioneered models for the distributed maintenance of technological resources and artist collectives working with blockchain have explored new approaches to collective ownership and decision-making. The technical sophistication within these communities creates unique capabilities for innovation where culture and technology meet.

→ Creative R&D: Adaptability Engine for the Cultural Sector

Creative R&D within AxAT organisations functions as a distinct adaptability engine that enables both individual institutions and the cultural sector at large to navigate technological change through experimental practice. Unlike conventional 'digital transformation'—which typically focuses on integrating existing technological products and services into organisational operations—Creative R&D generates innovation through exploratory processes that often produce unexpected outcomes and novel approaches.

This distinction between 'digital transformation' and Creative R&D is crucial; where digital transformation might involve implementing a new ticketing system or digitising collections, Creative R&D engages with emerging technologies as materials for experimentation, allowing organisations to develop new capabilities, methodologies, and even missions in response to

technological change [illegible]. Rather than simply adopting tools developed elsewhere, these organisations become active participants in shaping how technologies evolve and how they might serve cultural purposes.

ACMI's development of the Lens exemplifies this approach. Beginning as an experimental exploration of how computer vision and AI might enhance visitor experiences, the Lens evolved into a sophisticated personalised companion that uses facial recognition to create customised journeys through the museum's exhibitions. Visitors can collect digital objects throughout their visit, with the system remembering their interests and creating personalised takeaways. This wasn't simply the implementation of an off-the-shelf solution, but rather an iterative R&D process that generated new insights about privacy, personalisation, and the role of AI in cultural experiences. The project has since spawned further experiments with AI-powered search tools that allow visitors to explore ACMI's collection using natural

language queries and visual similarity, fundamentally reimagining how audiences might discover, and engage with, moving image culture.

The National Theatre's Immersive Storytelling Studio demonstrates how Creative R&D can transform traditional performance practices. Through experimental projects exploring virtual reality, augmented reality, and mixed reality technologies, the Studio has developed new dramaturgical approaches that extend theatrical storytelling beyond the physical stage. These experiments have generated insights about presence, agency, and audience participation that inform both digital productions and traditional stagecraft. The Studio's development of new tools and methodologies for creating immersive theatre has established the National Theatre as a leader in performance innovation, with their approaches now being adopted by theatre companies internationally.

Serpentine's Choral AI Data 'Trust' Experiment, developed in collaboration with legal scholars and technologists, represents another dimension of Creative R&D. Rather than simply implementing data management systems,

this project explores how cultural institutions might pioneer new models for ethical data governance in the age of AI. The experiment involves creating legal and technical frameworks that allow institutions to act as trusted intermediaries between artists, audiences, and AI systems, ensuring that data sharing happens according to community-defined values rather than extractive commercial logics. This R&D process has generated new insights about institutional roles in the AI ecosystem, producing governance models that could reshape how the entire cultural sector approaches data stewardship.[50]

These examples illustrate how Creative R&D enables what might be called 'anticipatory adaptation'—developing capabilities and approaches before they become necessary, rather than reacting to technological change after it has already transformed the landscape 🌴. This experimental orientation allows organisations to fail productively 🌴, learning from unsuccessful experiments in ways that inform future development. It also positions cultural organisations as sites of technological innovation rather than as mere consumers of it, contributing to broader conversations about how emerging technologies should function in society.

Exchange is vital between these different organisational models, enabling the transfer of knowledge, methodologies, and technological approaches across institutional boundaries. These exchanges occur through formal partnerships, staff movements between organisations, shared technological infrastructure, and collaborative projects that bring together different organisational types.

When SONAR+D, for instance, collaborates with grassroots music technology communities, or when the V&A partners with dedicated AxAT organisations like Rhizome on digital preservation initiatives, they create pathways for knowledge exchange that strengthen the broader ecosystem. Similarly, experiments in decentralised governance from artist DAOs inform the development of new curatorial approaches within museums.[51] Established cultural departments bring institutional resources and sectoral influence; dedicated cultural entities provide specialised capabilities that integrate technological engagement with their particular cultural domains; grassroots initiatives offer rapid experimentation and emerging approaches. Together, they enable cultural organisations to make substantial

contributions to the wider Creative R&D and innovation landscape.

By mapping and understanding the roles of these various organisational models within the cultural sector, crucial insights are gained into how diverse approaches to technology incubated within cultural organisations can inform innovation processes in other domains. This ecosystem approach moves beyond treating AxAT as a specialised niche within cultural practice to recognising it as a vital component of broader innovation infrastructure, contributing distinctive methodologies and perspectives to technological development across society.

Every industry has their own R&D and innovation methodology. What doesn't get valued is the way in which methods used in the arts, culture and creative industries can be a catalyst for new ways of thinking and new ideas that push innovation further faster. We need to embed the importance of creativity across all sectors and make sure that it gets recognised and valued appropriately.

—Tonya Nelson, Executive Director, Enterprise & Innovation, Arts Council England

Working with people in a creative space can start this development flywheel that can start to solve problems in so many other sectors because a lot of the people who are really good designers and artists in this space are pathfinders who can really forge new connections. That pathfinding work is so valuable to so many people.

—Jesse McKee, Head of Digital Strategy, 221a

While the organisational models described above demonstrate the diverse ways cultural organisations are building internal Creative R&D capabilities, some of this activity occurs through collaborations with partners beyond the cultural sector, while other activity creates spillover effects that influence innovation activity in adjacent sectors.

Currently, most formal collaborations emerge through ad hoc connections—personal relationships, funding calls, or project-specific needs—rather than through systematic strategies for cross-sector engagement. This informal approach has produced remarkable individual projects, but it may limit the potential for sustained knowledge exchange and cumulative innovation across domains. Strengthening these connections through more intentional frameworks could amplify the transformative potential of Creative R&D, creating durable pathways for collaboration that extend beyond individual projects or funding cycles.

In what follows, we present a landscape mapping of how cultural organisations and other sectors meet in the Creative R&D ecosystem, with a focus on three key domains: civic technology, industry, and academia. Each domain brings distinct capabilities, priorities, and operational cultures that shape the nature of these collaborations, offering both opportunities and challenges for developing more systematic approaches to cross-sector Creative R&D.

We're reflecting on how hard it is to produce R&D at scale while doing the kind of values-led and deeper relationship-forming work that we want to do.

—Jo Lansdowne, Executive Producer, Pervasive Media Studio

An emerging juncture in the Creative R&D ecosystem is where cultural organisations and civic entities converge to develop frameworks for technology that centre public interest concerns. These new types of collaborations leverage complementary capabilities: cultural organisations contribute a platform for interacting with AxAT practices, alongside public engagement expertise, while civic organisations bring policy knowledge, advocacy networks, and alternative governance models.

- The partnership between Serpentine Arts Technologies and RadicalxChange exemplifies this dynamic. The *Beyond Cultures of Ownership* initiative explores and prototypes new ownership and stewardship models for creative assets, developing both speculative frameworks and prototypes that challenge conventional property regimes.

- 221A's *Blockchains & Cultural Padlocks* initiative demonstrates how cultural organisations can develop civic technol-

ogies directly. The initiative explores how distributed ledger technologies might create new models for cultural property, developing practical prototypes for community-governed digital infrastructure.

- *Bristol + Bath Creative R&D,* was a programme that brought together the four universities of Bristol and Bath with Watershed and Pervasive Media Studio, who also led the project. The project undertook academic research and enabled the prototyping of products and experiences with a strong focus on inclusivity, access and sustainability for the AxAT ecosystem both locally and internationally such that address wider civic engagement and the impact of AxAT. This resulted in over £20.2m of additional investment, 72 prototypes, 18 new businesses and 82 jobs created.[52]

Alongside formal partnerships, self-organised communities create spaces where alternative technological paradigms can emerge. These communities often emphasise values and methodologies overlooked by commercial development, generating approaches that integrate technical sophistication with critical engagement.

- The creative coding movement exemplifies this approach, with communities using tools such as Processing, p5.js and openFrameworks fundamentally reimagining software development to incorporate aesthetic and ethical dimensions alongside functional ones.

- Civic technology initiatives such as Data for Black Lives approach technology as inherently political and cultural, developing methodologies that foreground questions of justice, representation, and social context.

- *Solar Protocol*, developed by artist Tega Brain, creative technologist Alex Nathanson, and designer Benedetta Piantella, represents a distributed network of solar-powered servers stewarded by volunteers globally, demonstrating how technical infrastructure can embody environmental and social values through resource-conscious design that dynamically routes traffic based on renewable energy availability and local conditions.

These communities, and even formal partnerships, face significant structural challenges. Operating with limited resources, they struggle to sustain long-term development. Yet despite these constraints, many have demonstrated remarkable resilience and growing influence. The Processing Foundation has sustained development for over two decades, building educational resources and community structures that have introduced hundreds of thousands of people to creative coding practices. Tools developed within these communities have influenced broader software development approaches, gradually shifting industry practices toward greater accessibility and user agency.

→ Technology-Industry Partnerships

Industry-specific R&D is further shaped by sectoral categorisations embedded in national industrial strategies, which often fail to adequately capture the cross-cutting nature of technology innovation. The UK's industrial strategy, for instance, has traditionally separated 'creative industries' from 'technology' sectors, despite increasing convergence ↘ between these domains in practice.[53] This separation is reflected in different funding streams, regulatory approaches, and policy objectives that can create barriers for organisations working at this nexus.

Within the technology industry, Creative R&D activities are often associated with 'design research' or 'innovation labs'. Major technology companies have established dedicated research divisions that explore creative applications of emerging technologies

such as Meta Reality Labs and deep tech research units such as Microsoft Research and Google Research. These corporate research initiatives often engage interdisciplinary teams that include artists, designers, and cultural theorists alongside engineers and computer scientists, recognising the value of interdisciplinary approaches to technological development ⊛.

It was very refreshing as a computer scientist to hear, not the word 'data set', but the word 'archive', meaning that someone needs to constitute that archive. Someone needs to curate it and the archive in itself is a political statement that maybe belongs as a national treasure to a community. There was a whole depth of conversation that was very interesting, that emerged between us and the curators and artists.

—Piotr Mirowski, Staff Research Scientist, Google Deepmind

Corporate research labs tend to engage with AxAT practitioners directly rather than through partnerships with cultural organisations. The knowledge and the technologies that these contexts produce have many layers of cultural implication, ranging from influencing contemporary culture in the broadest sense of the word to impacting the way that culture is produced and experienced. For example, Google DeepMind's research on artificial intelligence not only dramatically influences scientific discovery but also shapes the fundamental questions that are being asked in contemporary culture about agency, about what constitutes intelligence, and how to balance the quest for innovation with other concerns, such as those related to the environment. Many of these ideas play out through projects hosted by cultural organisations, feeding back into broader cultural attitudes and informing AxAT practices that then feed into corporate contexts.

Meanwhile, for decades Adobe Research has directly shaped how creative practitioners work, influencing production pipelines and establishing technical possibilities and constraints through such products as Adobe Creative Suite. Similarly, companies focused

on XR technologies, such as Meta and Apple, conduct R&D that defines the parameters for how immersive experiences are deployed in cultural contexts. As discussed in the preceding chapter, AxAT practitioners often serve the role of beta users; this role in recent years has expanded to cultural organisations.

The technology sector's approach to Creative R&D typically prioritises applications that align with commercial objectives, potentially limiting more speculative or critical explorations. While technology companies may invest significantly in creative research, the knowledge generated is often proprietary. Additionally, the sector's metrics for success tend to emphasise technological advancement and marketability over cultural significance or social impact, creating tensions when collaborating with cultural and academic partners operating under different value systems.

Most of the support we receive through corporations comes through the marketing departments. I wonder how our partnerships would shift if the support came from the R&D departments of these companies because then the collaboration is framed in not just storytelling, but also mutual investment in collective learning.

—Salome Asega, Director, New INC

Partnerships between established cultural organisations and technology companies, therefore, often follow established sponsorship models, where technology companies provide funding, resources, or platforms in exchange for brand association, access to creative practitioners, and cultural content, while cultural organisations receive financial support and technological capabilities.[54] This model frequently extends to direct technology provision. Projects such as Google Arts & Culture's digitisation initiatives, and partnerships between major tech companies and institutions including the V&A, Tate and Louvre, demonstrate how cultural organisations can access advanced tools and global distribution platforms. These collaborations offer mutual benefits: cultural institutions gain sophisticated digitisation capabilities and expanded audience reach, while tech companies acquire rich content libraries and cultural credibility.

Smaller-scale commercial entities including start-ups and SMEs (small- and medium-sized enterprises) are also important actors in the Creative R&D ecosystem. These entities are often geared towards developing products in the 'creative technologies' category.

For example:

- Moth Quantum—described as the world's first quantum-to-consumer (Q2C) technology company—develops accessible tools and platforms that enable artists and musicians to experiment with quantum computing principles, translating complex quantum phenomena into creative workflows and aesthetic experiences.

- Commercial media studios such as Nexus Studios and PRELOADED operate as hybrid entities that combine commercial viability with experimental practice, developing cutting-edge projects that bridge entertainment, art, and emerging technologies while maintaining sustainable business models that support ongoing R&D.

- Alias AI provides artists with infrastructure to train custom AI models while addressing critical questions of provenance and value through the integrated legal certification of generated artworks and blockchain-based monetisation systems, demonstrating how technical

tools can embed ethical and economic frameworks.

Arrangements with tech sector actors of different scales present both opportunities and challenges for the cultural sector. While they provide access to resources and technical capabilities, they can also create dependencies on proprietary systems and limit cultural organisations' agency in shaping their own Creative R&D. The cultural sector's role often centres on content provision and user feedback rather than collaborative technology and systems design, which decreases the capacity to build on these projects in a durable way.

There is, however, ample appetite in cultural organisations to explore alternative possibilities. The groundwork for more in-depth engagements has been laid: cultural organisations working with AxAT will often have teams and broader collaborator networks that possess unique literacies and know-how across multiple domains, as well as extensive experience working in cross-disciplinary teams as part of experimental and agile projects. Technology companies typically operate on accelerated development timelines while meaningful cultural engagement often requires extended

ones, making collaborations with cultural organisations a valuable ideation space to test seemingly out of scope scenarios that may reveal unexpected original contributions.[55] This model positions cultural organisations not merely as venues for showcasing technological applications but as a partner who can accommodate the uncertainties of experimental practice.[56]

We must better demonstrate how this work adds value to the UK's research, development and innovation (RDI) ecosystem through a multi-capital lens. AI exemplifies this challenge—while the UK aims for global leadership in scientific and technical research, we equally need to focus on responsible, ethical implementation that benefits all citizens equitably. Separating technical advancement from human-centred considerations is counterproductive. The challenge lies in articulating this integrated approach effectively.

—Tom Crick, Chief Scientific Adviser, Department for Culture, Media and Sport

Universities represent crucial sites for Creative R&D activities, though they typically operate under frameworks that privilege traditional academic outputs. Research in UK universities is primarily evaluated through the Research Excellence Framework (REF), which has gradually expanded to recognise practice-based research and technological development but still struggles to fully account for cross-disciplinary work that spans artistic and technological domains. Universities often house specialised centres and labs where Creative R&D flourishes—such as the Creative Computing Institute at University of the Arts London, Culture Lab at Newcastle University and the New Real at Edinburgh Futures Institute—but these activities frequently occur at the margins of institutional structures designed primarily for conventional disciplinary research.

The university sector has developed distinct terminologies and methodologies for Creative R&D activities, including 'practice-based research', 'practice-led research', and 'research through design'. These approaches have generated valuable insights and innovations, but they remain inconsistently integrated with broader innovation ecosystems beyond academia. Despite their significant contributions

to creative and technological development, university-based Creative R&D initiatives often face challenges in securing sustained funding and establishing pathways for wider impact beyond academic publications and exhibitions.[57]

For scientific research, established commercialisation channels exist through technology transfer offices, intellectual property management, and spinout mechanisms that help translate academic findings into market applications. Universities have developed sophisticated infrastructures to support this process, including innovation hubs, incubators, and dedicated investment funds. Similar approaches have been tested for creative disciplines, such as Central Saint Martins' Fashion Business Development programme, which provides pathways for fashion design graduates to develop commercial ventures. More recently, in initiatives such as Post Urban Ventures—a venture capital firm applies the spinout model specifically to deep tech including AI, quantum technologies, biotech, AgTech and enterprise saas, supporting start-ups emerging from academic contexts in UK and Europe.

Despite these developments and their significant contributions to creative and technological advances, university-based Creative R&D initiatives often face challenges in securing sustained funding and establishing pathways for wider impact beyond academic publications and exhibitions. The translation mechanisms for Creative R&D remain less developed and systematised than those for scientific research, with fewer dedicated resources and less institutional expertise in navigating the specific challenges of creative commercialisation and social impact.

Cultural organisations engaged in Creative R&D provide such translation mechanisms through several key points of contact where cultural organisations engaged in AxAT work most actively intersect with academic institutions: exhibition-as-research-platform; educational collaborations and skills development; shared technical infrastructure; and research partnerships.

→ Exhibition as Research Platform

Cultural exhibitions increasingly function as research platforms where academic questions and methodologies are explored through public presentations. For example:

- ZKM's *Open Codes* exhibition series, developed in collaboration with academic researchers, used exhibition formats to investigate how code shapes contemporary culture and society.

- Barbican's *AI: More than Human* exhibition incorporated academic research on the cultural and ethical dimensions of artificial intelligence, using exhibition design to communicate complex technological concepts.

- The members of the Science Gallery Network in various global locations work closely with academic institutions.

These exhibition-as-research models create environments where academic inquiry gains material form and public interface, and cultural presentations gain theoretical depth and methodological rigour.

→ Educational Collaborations

Cultural organisations and academic institutions develop joint educational initiatives that cultivate capabilities for AxAT practice. Academia has established two formal approaches to artistic research: practice-led research (which contributes to advancing practice itself) and practice-based research (which positions practice as inherently knowledge-producing). These frameworks provide methodological structures that legitimise artistic work within broader research contexts. Recent examples include:

- The Institute of Design Informatics at Edinburgh University collaborates with cultural venues including the Edinburgh Futures Institute to develop educational programmes that combine technical training with creative practice and critical inquiry.

- Art Futures at UCL was developed to bring together UCL academics and the creative industries to form new partnerships, business opportunities, and research including the development of practical toolkits, education programmes and communities of practice.

- Goldsmiths' Computational Arts programmes frequently develop projects with cultural institutions including Tate Modern and the Barbican, creating learning experiences that bridge classroom instruction and professional practice.

- UAL's Creative Computing Institute partners with organisations such as the Mozilla Foundation and the Open Data Institute to develop educational programmes.

Another model which facilitates education is jointly hosted Ph.D. research between an academic institution and a cultural organisation. In this case the university will be the academic host with the cultural institution providing hands-on experience and expertise in support of work in a 'real world' environment. Through this partnership the cultural organisation also receives additional capacity and dedicated insights, but there are ethical questions with regard to the low remuneration of Ph.D. researchers. Examples of these models include the following:

- The Centre for the Study of the Networked Image at London South Bank University has developed numerous collaborative Ph.D. projects with Tate, Serpentine, Whitechapel Gallery and The Photographers' Gallery on subjects such as archiving born-digital art works, organisational innovation, trans-national art practices and computer vision.

- The AHRC Doctoral Focal Award is a project that was launched by AHRC in 2024 as a way to facilitate knowledge, capacity and skills exchange between academic organisations and other kinds of organisations, including cultural organisations with a focus on the development of the creative economy, and the role of the arts and humanities in the development of a 'healthy planet, people and place' approach.[58]

These educational collaborations create pathways for knowledge and skill development that connect academic learning environments with professional cultural contexts.

→ Shared Technical Infrastructure

Cultural and academic institutions increasingly develop shared technical infrastructure for AxAT development. Below are some examples:

- Museum Data Service is a collaboration between the University of Leicester, The Collections Trust and the educational charity ArtUK building digital infrastructure to change the way museums share object records and knowledge.

- The Digital Catapult collaborates with both academic and cultural partners to create shared facilities for virtual and augmented reality development.

- The Immersive Storytelling Studio at the National Theatre partners with academic researchers to develop technological resources for exploring narrative in virtual environments.

These shared infrastructures create economies of scale and knowledge pooling that would be difficult for either cultural or academic institutions to achieve independently.

→ Research Partnerships

→ Bilateral Research Partnerships

Bilateral formal research partnerships between cultural organisations and academic institutions create structured environments for Creative R&D through shared research agendas, co-appointed staff, and joint funding applications that bridge institutional boundaries. These partnerships typically arise between universities and specialist cultural organisations with specific research capacities and institutional prestige. For example:

- Unthinking Photography represents a collaborative research initiative that challenges conventional approaches to photographic practice and theory through sustained dialogue between cultural practitioners and academic researchers. The partnership demonstrates how bilateral collaborations can generate new critical frameworks that serve both scholarly discourse and cultural practice.

- The Creative AI Lab is a collaboration between Serpentine Arts Technologies and King's College London's Department

of Digital Humanities that hosts critical research into machine learning and artistic practice. The partnership produces publications, tools, and methodologies that serve both academic and cultural communities, establishing a model for how cultural institutions can engage with technical research while maintaining their public-facing mission. The lab's work bridges theoretical investigation with practical application in contemporary art contexts.

- ACMI (Australian Centre for the Moving Image) has developed sustained research partnerships with RMIT University that investigate relationships between moving image cultures and emerging technologies. These collaborations result in both rigorous academic publications and innovative public-facing programming, demonstrating how bilateral partnerships can generate outputs that serve multiple constituencies while advancing knowledge across institutional contexts.

- The Victoria and Albert Museum's partnership with the Royal College of Art has generated significant research on

the preservation and presentation of digital design objects, combining the museum's curatorial expertise with the college's academic methodologies. This collaboration addresses critical challenges in digital heritage while producing new knowledge about the intersection of design practice and institutional stewardship.

We wanted to both fund a diverse range of people, and also think about how we were creating more equity in a sector that we know has very problematic power structures. This is particularly pronounced when you're bringing together the power dynamics of art, technology, and higher education.

—Jo Lansdowne, Executive Producer, Pervasive Media Studio

Multilateral initiatives bringing together academic institutions, technology industry, and cultural organisations are driven by economic imperatives and top-down policy directives focused on creative industries value. These programmes represent the UK's most extensive investments in Creative R&D.[59] They are funded through UKRI via competitive tender processes typically led by universities due to infrastructural requirements. Cultural organisations generally participate as downstream partners due to UKRI's requirement for Independent Research Organisation status for lead partners—a barrier for all but the largest institutions, e.g., Tate or V&A, though increasingly more cultural organisations are achieving this status through demonstrating Creative R&D capabilities. To date, key funded programmes have included:

- Creative Industries Cluster Programme (2018) was an £80 million UKRI investment that created nine regional clusters linking industry and research, including specialised hubs for video games in Dundee, film and television in Wales, and textiles in East London. The programme generated significant long-term

infrastructure including the Creative Industries Policy and Evidence Centre and StoryFutures Academy. Watershed was the only cultural organisation to lead one of the nine clusters through the £6.8 million Bristol + Bath Creative R&D programme.

- Audience of the Future represented a £39.3 million investment specifically targeting immersive technologies (AR/XR/VR) with a focus on audience development across culture, heritage and entertainment sectors. A notable project was the Royal Shakespeare Company's 'Dream', a digital interpretation of 'A Midsummer Night's Dream' that used motion capture technology to enable remote audience interaction with live performance. This project's success led to RSC becoming the first performing arts organisation to achieve Independent Research Organisation status.

- CoSTAR (Convergent Screen Technologies and Performance in Real-time) is a £75.6 million national network of R&D labs distributed across UK regions, with the National Lab located at Pinewood

Studios. The programme focuses on commercial applications in gaming, television, film and digital entertainment, though cultural organisations have had limited involvement to date due to CoSTAR's commercial priorities.

- BRAID (Bridging Responsible AI Divides) is a £15.9 million programme running from 2022 to 2028 that integrates Arts and Humanities research into Responsible AI development, operating as a bridge between academia, industry, policy and regulatory work on responsible AI implementation.

Where to Next?

Based on the comprehensive mapping presented in this chapter, a striking paradox emerges: while cultural organisations are conducting substantial Creative R&D activities that generate significant spillovers into technology, academia, and civic innovation, this work remains largely unrecognised both within the cultural sector itself and across adjacent domains.

The evidence demonstrates that cultural organisations are not merely passive adopters of technologies developed elsewhere, but active sites of innovation. From ACMI's pioneering AI-powered visitor experiences to Serpentine's data governance experiments, from grassroots communities such as Trust developing new collaborative models to Watershed's civic technology innovations, the cultural sector is generating knowledge and capabilities that influence broader innovation ecosystems. Recognising and properly valuing Creative R&D within cultural organisations is essential not

only for strengthening the cultural sector's capacity for technological engagement, but for realising the full potential of cross-sectoral innovation. The following chapter sets out strategic proposals for addressing this recognition gap and building the integrated, responsive innovation ecosystem that contemporary technological and social challenges demand.

48 In recent history, the attempts to do so have focused primarily on digital transformation as a means of updating and technologically augmenting cultural organisations' existing functions and capabilities, particularly those that are related to their 'services', through deployment of new softwares for ticketing, CRM and audience tracking. See https://www.gov.uk/government/publications/culture-is-digital/culture-is-digital-june-2019-progress-report, and https://www.nesta.org.uk/project/digital-rd-fund-for-the-arts/.

49 'Watershed's Pervasive Media Studio offers ongoing support to a core community of creative businesses. In 2023/24 alone they had a combined turnover of over £6.3 million and leveraged over £3.1 million in funding. Through the Create Growth programme run in collaboration with Gill Wildman and Mark Leaver, Watershed has also supported a wider network of businesses over the last 5 years. Programme participants generated nearly 650 jobs and saw an average 44% increase in turnover with 95% survival rates, far exceeding the regional average of 77%.' See *Spillover Impacts Report*, https://www.artscouncil.org.uk/spillover-impacts.

50 For detailed information about the Choral Data 'Trust' Experiment, the R&D process and its insights see Victoria Ivanova and Jennifer Ding, 'Choral Data "Trust" Experiment White Paper: Prototyping a GLAM Trusted Data Intermediary for Public Interest AI,' Serpentine Arts Technologies (17 February 2025), https://doi.org/10.5281/ZENODO.14859320.

Notes 48 - 59

51 See experimentation with tokenised membership at HEK (House of Electronics Arts): FRIENDS OF HEK https://friends.hek.ch/.

52 For additional insights and evaluation see https://report.bristolbathcreative.org/.

53 There are instances where these disciplinary boundaries merge in a policy context, for example IT, Software and Computer Services are considered part of the Creative Industries through its classification system, but this does not create any overlap in practice. https://www.gov.uk/government/publications/dcms-sectors-economic-estimates-methodology/dcms-sector-economic-estimates-methodology.

54 This dynamic was profiled in *Future Art Ecosystems 1: Art x Advanced Technologies* in the chapter on technology companies as a new type of patron.

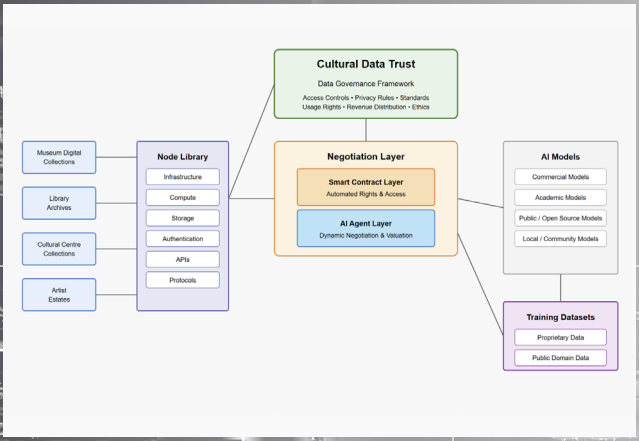
55 This model of R&D—to open the parameters to wildly ambitious, seemingly 'left-field' applications (i.e., Moonshot R&D)—has been argued to lead to technological breakthroughs and new narratives, which, in turn, influence various societal processes. For example, the UK's Advanced Research Institute + Invention Agency (ARIA) was recently established on this basis.

56 Current efforts to forge more substantive connections between cultural and technological sectors build upon a rich historical foundation. Since the mid-20th century, initiatives such as the Art and Technology programme at the Los Angeles County Museum of Art (1967-1971) and the Artist Placement Group (1966-1989) have explored the creative potential and institutional challenges of cross-sectoral collaboration between cultural organisations and technology companies. These programmes developed specific methodologies for facilitating collaborations between cultural and technological domains that continue to inform contemporary practice. These historical initiatives also reveal persistent challenges that continue to shape contemporary cross-sectoral engagement. The LACMA Art and Technology programme's controversial relationship with defense contractors during the Vietnam War highlighted tensions between accessing technological resources and maintaining critical independence. The institutional fragility of these pioneering programmes, which typically struggled to sustain momentum beyond initial enthusiasm, reflects structural barriers to durable cross-sectoral collaboration that contemporary initiatives must still navigate.

57 There are examples of universities successfully spinning out companies in the Creative R&D domain, driving innovation and impact beyond the academy. MIT Media Lab lists over 100 and the Royal College of Art, London boasts 45 spinoff companies. We can expect universities to invest more time and money into supporting and demonstrating these cases as REF, and for governments to increasingly emphasise the impact and economic value of academia. https://www.media.mit.edu/posts/spinoff-companies/ https://www.rca.ac.uk/business/innovationrca/start-companies/.

58 To be the lead applicant for this award, one must be based at a UK research organisation eligible for AHRC funding with capacity in the arts and humanities for creative economy, or for a healthy planet, people, and place. https://www.ukri.org/opportunity/apply-for-a-doctoral-focal-award-in-the-arts-and-humanities/.

59 In the European context, S+T+Arts supports collaborations between artists, scientists, engineers and researchers through various mechanisms including artist residencies, lighthouse pilots for novel technology solutions, educational academies, and regional centres. It was launched by the European Commission under Horizon 2020 with a total budget of €80 billion from 2014-2020, and continuing under Horizon Europe with €95.5 billion for 2021-2027.


Cultural Data Trust
Data Governance Framework
Access Controls • Privacy Rules • Standards
Usage Rights • Revenue Distribution • Ethics
Museum Digital Collections
Library Archives
Cultural Centre Collections
Artist Estates
Node Library
Infrastructure
Compute
Storage
Authentication
APIs
Protocols
Negotiation Layer
Smart Contract Layer
Automated Rights & Access
AI Agent Layer
Dynamic Negotiation & Valuation
AI Models
Commercial Models
Academic Models
Public / Open Source Models
Local / Community Models
Training Datasets
Proprietary Data
Public Domain Data

Node Library: *Building Infrastructure for Cultural Data Stewardship* block diagram by 221a, 2024.

4

Proposals

Proposals for Cross-Sector Innovation

Arts and humanities led skills, disciplines and sectors contribute around 6% of gross value added with 1% of public funding. On the surface, that seems to suggest that we're incredibly successful, that we don't need much support. But if you look closely, you'll see gaps and barriers which mean that actually we're not as economically successful as we could be. So there is a responsibility as a public funder to design and support interventions that lift the blocks that de-risk innovation and that encourage or incentivise industry to invest in R&D and to take risks as well.

—Tao-Tao Chang, Associate Director for Programmes at Arts and Humanities Research Council

This final chapter addresses the challenges and opportunities raised in the first three chapters by putting forward proposals that primarily target government policymakers and public funding bodies. Their strategic interventions can have the highest impact on the development of art and advanced technologies (AxAT) as a recognised ecosystem and Creative R&D as its central value proposition. At the same time, as the FAE briefings have demonstrated since 2020, setting precedents and developing new de facto frameworks through bottom-up coalitions is part and parcel of the AxAT DNA. Therefore, while the proposals in the first part of the chapter address critical gaps in the current policy landscape, responding to the barriers faced by AxAT practitioners and the organisations' ecosystems, the chapter concludes with an address to the Creative R&D ecosystem.

Some of the proposals dovetail with and build upon insights from several recent reports, from Creative UK, Arts Council England, the

British Council, the Council for Science and Technology, Nesta, and Creative Industries Policy and Evidence Centre, as well as cultural policy recommendations relating to the need for new data practices.[60] Collectively, these reports highlight the need for more integrated approaches to supporting creative and technological innovation, the importance of measuring ecosystem-wide impacts, and the potential of artistic practice to contribute to broader innovation objectives.

FAE5 demonstrates that Creative R&D is inherent to the art and advanced technologies (AxAT) ecosystem, spanning basic and applied research, and experimental development. Creative R&D is neither confined to the creative industries nor to narrow forms of applied research that can lead to commercialisation through downstream technological applications. Creative R&D exists equally in deep tech as it does in the development of innovative presentation formats. Unlike traditional R&D models that separate technical development from cultural application, AxAT

practices demonstrate that innovation emerges most effectively at the intersection of technical capability and cultural imagination. As the briefing shows, this positions Creative R&D not as a peripheral activity dependent on technological spillovers, but as a core driver of innovation that generates value across multiple domains simultaneously.

At present, the full spectrum of this activity is largely invisible to policy-makers. AxAT practices engaged in Creative R&D and the organisations that host this activity cut across cultural and technological domains, encompassing cultural organisations, technological communities, the tech sector, academia and civic actors with missions relating to technology and society. The misalignment between policy and reality results in systematic underinvestment in the infrastructural foundations that enable Creative R&D to flourish, while simultaneously obscuring its contributions to broader innovation objectives. A new policy framework, therefore, is required—one that

recognises Creative R&D as a distinct category of innovation activity with its own operational requirements, success metrics, and strategic value ❁.

At the foundation, there is a need for a new vision that articulates the indispensability of technology to culture and culture to technology, emphasising that the macro challenges ❦ that we face today—spanning environmental degradation and catastrophes, to social stratification, the volatility of democratic systems, to geopolitical combustion and uncertainty—can only be addressed through integrated approaches that leverage both cultural insight and technological capability.

Proposal 1: Establish a Cross-Departmental Entity for the Advancement of Creative R&D

When the Treasury or the Department for Business and Trade talks about the growth of the creative industries, they need to be encouraged to see the whole arts and culture ecosystem.

—Thangam Debbonaire, Labour Member of the House of Lords

The current division between DCMS's cultural remit and DSIT's technology focus creates institutional blind spots that undermine the UK's capacity to leverage Creative R&D effectively. International precedents, for example, the EU's Creative Europe programme and Taiwan's Digital Ministry demonstrate how integrated governance structures can accelerate convergent innovation. Failure to acknowledge this interconnection puts the UK at risk of falling behind without corresponding institutional reform.

Such an entity would establish a cross-departmental structure jointly overseen by DCMS and DSIT, with a specific mandate to advance the innovation potential of Creative R&D and represent organisations and practitioners active across different fields. The body would operate with dedicated resources and decision-making authority over policies affecting the AxAT ecosystem rather than functioning as a mere coordination forum. Key responsibilities would include developing strategic frameworks for Creative

R&D investment, facilitating cross-sector partnerships, and ensuring that emerging technologies are developed with cultural considerations embedded from the outset.

The structure would mirror successful cross-departmental models such as the Government Office for Science, but with specific expertise in the convergent domains of culture and technology. It would serve as the primary interface between government and the AxAT ecosystem, providing a single point of contact for organisations operating across traditional sector boundaries while ensuring policy coherence across departments.

Proposal 2: Broaden DSIT's Definition of R&D to Encompass Creative R&D

The current DSIT definition of R&D explicitly excludes 'work in the arts, humanities and social sciences' from eligibility for R&D tax credits and other financial mechanisms, creating an artificial boundary that contradicts the operational realities of contemporary innovation. This exclusion is particularly problematic given that the OECD's Frascati Manual, the international standard for R&D statistics, explicitly includes research in the humanities and arts. As McDonald, Jordan, and Hitchen document in their analysis of R&D in the creative industries, and as is further expanded on by this briefing, this definitional limitation further obscures the substantial 'dark matter' of research and development activity within cultural sectors.[61]

The revised definition would recognise experimental practices in AxAT as legitimate forms of technological innovation. Implementation would require developing new assessment frameworks capable of evaluating

Creative R&D proposals, drawing on international precedents and existing expertise within bodies such as the Arts and Humanities Research Council (AHRC) and UK Research and Innovation (UKRI). The expansion would be carefully calibrated to maintain rigorous standards while recognising the distinctive methodologies of Creative R&D. Broadening the R&D definition would unlock significant financial resources for Creative R&D, enabling organisations and practitioners to clearly identify Creative R&D as an integral part of their practice, scale their experimental activities and build more resilient operational models with appropriate IP frameworks, adding value to broader innovation ecosystems ֍.

Proposal 3: Adopt Ecosystem Measurement Models

Creative R&D could be a significant contributor to the UK's national missions. Beyond narrow and often naive techno-solutionism, we need approaches that consider implications for citizens and communities—from net zero targets to AI trust, integrated digital public services, and social prescribing. We need rigorous evidence and compelling narratives about Creative R&D that both satisfy traditional metrics and clearly articulate to society why this investment matters.

—Tom Crick, Chief Scientific Adviser, Department for Culture, Media and Sport

The invisibility of Creative R&D activity stems from a fundamental misalignment with current measurement frameworks. As the CICERONE project's comprehensive analysis shows, existing statistical taxonomies were 'primarily developed in the mid-20th century and were shaped by the structure of industries and occupations prevalent at that time', rendering them inadequate for measuring contemporary creative economies.[62]
The persistence of these outdated frameworks equally creates systemic blind spots that undermine evidence-based policymaking for Creative R&D.

I think more and more we'll have to think about that relationship between the quantitative and the qualitative, and the human-centred impact of innovation as well as the hard edge of innovation.

—Tonya Nelson, Executive Director, Enterprise & Innovation, Arts Council England

Bakhshi, Freeman, and Higgs' dynamic mapping research reveals how Standard Industrial Classification (SIC) codes fail to capture the network effects and cross-sector value creation that characterise creative industries.[63] This measurement gap is particularly problematic for Creative R&D, which operates through distributed networks, temporary organisational hosting, and organisational forms that resist traditional classification. Creative UK's recent provocation paper emphasises the urgent need for measurement frameworks that can 'address the full scale of the sector's needs' through integrated approaches that capture ecosystem-wide effects.[64]

The proposal involves developing specialised economic tracking systems that move beyond siloed impact measurements to frameworks capable of capturing ecosystem-wide effects, including multipliers, spillover effects, positive externalities, and long-term value generation. This would build on innovative approaches such as those developed by

The Data City, which uses machine learning to combine standard classifications with automated real-time data sources, offering relevant and accurate information.[65]

Ecosystem measurement models would provide policymakers with the evidence base necessary to make informed decisions about Creative R&D investment while demonstrating the sector's broader economic significance. Most importantly, it would make visible the substantial value that Creative R&D already generates, providing the foundation for scaling successful models and attracting additional investment to the field.

Proposal 4: Diversify Funding Mechanisms and Approaches to Account for the Full Spectrum of Creative R&D Activity

To pursue investment that recognises creative businesses' potential value, we must de-risk through blended finance models. This approach is essential for both growth and R&D investment in such an IP-heavy sector.

—Amy Tarr, Head of Policy & Public Affairs at Creative UK

At present, direct public funding for Creative R&D is limited to business-focused projects, such as for creative industries' SMEs via Innovate UK, or as part of large academic research-led consortia via AHRC. A fund recently launched by UKRI—a Cross Research Council Responsive Mode Pilot Scheme—signals a promising development for organisations and practitioners engaged in different types of Creative R&D. With the aim 'to support emerging ideas from the research community that transcend ⌧, combine or significantly span disciplines, to ensure all forms of interdisciplinary research have a home within UKRI', the funding scheme emphasises knowledge transfer and experimental interdisciplinary innovation.[66]

It is critical to develop governance and funding approaches that account for the need of risk-taking in Creative R&D. A portfolio approach —where resources are allocated across a diversified collection of investments—recognises that a small percentage of initiatives will deliver outsized returns that compensate

for expected failures. This approach to innovation investment is fundamental to private R&D investment; however it remains largely absent from public research and culture funding frameworks, which typically favour project-by-project merit assessments with limited tolerance for failure.[67] Approaches that account for value creation at the macro scale would provide an important support mechanism for AxAT practitioners and hosting public organisations that assume the risks of undertaking Creative R&D as part of exploratory early stage innovation. As Arts Council England's report produced by the Centre for Economic and Business Research (Cebr) has found: '[publicly] funded organisations often take on the risks of experimentation, trialling new technologies, business models and audience engagement [methods], and these innovations are frequently taken up more widely across the sector, supporting productivity-enhancing change'.[68] It could also align research funding and investment with societal goals, measuring and directing public value creation at an ecosystemic scale.[69]

Supporting projects across their full development lifecycle and expanding access to organisations who don't traditionally access

funds but can demonstrate contribution to Creative R&D ⊛, blended finance models that combine public and private capital could de-risk private investment while capturing the intellectual property value these projects generate. Unlike traditional venture capital approaches, these models would be designed to accommodate the distinctive risk profiles and value creation patterns of Creative R&D, including longer development timelines and hybrid commercial/cultural outcomes. The blended approach would enable scaling of successful innovations while maintaining alignment with public benefit objectives.

Similarly, schemes for capital funding and common infrastructure projects would provide dedicated support for sustained infrastructure development, addressing the fundamental inefficiency of project-based funding for certain types of Creative R&D activity. This fragmented approach wastes resources by preventing continuity and forcing constant reinvestment in basic infrastructure and capabilities and constrains continuous

exploitation of IP. Many development projects are also simply too large for single organisations, making shared approaches more economical and effective. For example, comprehensive AI data governance policies and bespoke technical infrastructure require expertise and resources that exceed individual organisational capacity.[70] Similarly, specialised facilities, fabrication equipment, performance spaces with advanced technical capabilities and computational resources can serve multiple organisations while achieving economies of scale impossible through individual investments.

This funding would support shared facilities, expertise networks, and infrastructure with collective ownership models, creating commons-based resources that provide essential foundations for Creative R&D activity while ensuring long-term sustainability through shared governance structures.

I believe that arts and humanities-led research can actually be a critical driver of technological innovation, not just a user or beneficiary of it. The biggest challenge at the moment is in enabling change in how arts and humanities researchers, and creative practitioners view their role. Why are theatres and stages not seen as labs and incubators, where new technologies and workflows are tested, improved and embedded, for example? The change can only come if the community understands the opportunities and clamours for change.

—Tao-Tao Chang, Associate Director for Programmes, Arts and Humanities Research Council

While policy reform is essential, the transformative potential of Creative R&D cannot wait for institutional change. As this briefing demonstrates, Creative R&D already operates across traditional sector boundaries —from artists engaged in pioneering AI research to cultural organisations hosting deep tech governance experimentation, from game studios advancing computational methods to civic technologists developing cultural applications. This distributed ecosystem has consistently demonstrated its capacity for bottom-up innovation, creating operational frameworks and collaborative models that often prefigure broader systemic change.

The path forward requires the Creative R&D ecosystem to embrace its existing agency as a driver of change. The development of 21st century cultural infrastructure depends on recognising that Creative R&D is already reshaping how culture and technology intersect. The convergence of cultural insight and technological capability is happening now, across laboratories, studios, residencies,

and hybrid organisations that resist traditional classification.

By documenting these practices, building networks that span institutional boundaries, and demonstrating the broader value they create ❁, the Creative R&D ecosystem can establish the foundations for policy recognition while advancing the work itself. The future of innovation depends as much on cultural imagination as technical capability —an opportunity that belongs to practitioners and organisations willing to claim it.

60 Caroline Norbury and Amy Tarr, 'Provocation Paper - Creative Economy Capital - A Framework for Creative Investment,' Creative UK (March 2025), https://report.wearecreative.uk/creative-economy-capital. 'Spillover Impacts in the Publicly Funded Arts and Culture Sector', Arts Council England, accessed 25 April 2025, https://www.artscouncil.org.uk/spillover-impacts. Andrews, H., & Hawcroft, A. (Eds.). (2025). International Arts and Technologies: Global approaches to creative innovation. British Council. 'Harnessing Research and Development in the UK Creative Industries,' Council for Science and Technology (22 April 2024), https://www.gov.uk/government/publications/harnessing-research-and-development-in-the-uk-creative-industries. Hasan Bakhshi, et al., 'Unleashing Creativity: Fixing the Finance Gap in the Creative Industries,' Creative UK (March 2025), https://7608628.fs1.hubspotusercontent-na1.net/hubfs/7608628/Unleashing%20Creativity%20-report-v12%20(1).pdf. Andy C. Pratt and Toby Bennett, 'Everything You Always Wanted to Know about Data for the Cultural and Creative Sector Production System, but Were Afraid to Ask: Part 1 – Problems of Statistical Description,' Zenodo (22 February 2022), https://doi.org/10.5281/zenodo.6224372. Caitlin McDonald, Jennie Jordan, and Graham Hitchen, 'R&D in the Creative Industries: Bringing the "Dark Matter" of the Sector to Light with Data,' in Data-Driven Innovation in the Creative Industries (Oxford: Routledge, 2024).

61 Caitlin McDonald, Jennie Jordan, and Graham Hitchen, 'R&D in the Creative Industries: Bringing the "Dark Matter" of the Sector to Light with Data,' in Data-Driven Innovation in the Creative Industries (Oxford: Routledge, 2024).

62 Andy C. Pratt and Toby Bennett, 'Everything You Always Wanted to Know about Data for the Cultural and Creative Sector Production System, but Were Afraid to Ask: Part 1 – Problems of Statistical Description,' Zenodo (22 February 2022), https://doi.org/10.5281/zenodo.6224372.

63 Hasan Bakhshi, Alan Freeman, and Peter Higgs, 'A Dynamic Mapping of the UK's Creative Industries' (Nesta, 5 November 2013). For further analysis of SIC codes from the perspective of AxAT Creative R&D see: Hannah Andrews and Aurora Hawcroft, 'Articulating Arts-Led AI: Artists and Technological Development in Cultural Policy', European Journal of Cultural Management and Policy 14 (15 August 2024): 12820, https://doi.org/10.3389/ejcmp.2024.12820. The Office for National Statistics have announced that they will be developing a revised framework replacing the 2007 SIC codes, which will be published in 2026. 'Consultation on the UK's Adoption of Industrial Classification of Economic Activity - Office for National Statistics - Citizen Space', accessed 6 June 2025, https://consultations.ons.gov.uk/external-affairs/uk-sic-consultation/.

64 Caroline Norbury and Amy Tarr, 'Provocation Paper - Creative Economy Capital - A Framework for Creative Investment,' Creative UK (March 2025), https://report.wearecreative.uk/creative-economy-capital.

65 'The Data City – Understand What Companies Do in Real-Time,' The Data City, accessed 29 May 2025, https://thedatacity.com/.

66 See UKRI's cross research council responsive mode pilot scheme, https://www.ukri.org/what-we-do/browse-our-areas-of-investment-and-support/ukri-cross-research-council-responsive-mode-pilot-scheme/.

67 European Commission, 'Being Right or Fair: A Portfolio Approach to Research Funding,' LU: Publications Office (2023), https://data.europa.eu/doi/10.2777/580743. Matthew Wallace and Ismael Rafols, 'Research Portfolios in Science Policy: Moving from Financial Returns to Societal Benefits,' SSRN Scholarly Papers, Social Science Research Network (17 March 2015), https://doi.org/10.2139/ssrn.2743220.

68 'Spillover Impacts in the Publicly Funded Arts and Culture Sector,' Arts Council England, accessed 25 April 2025, https://www.artscouncil.org.uk/spillover-impacts.

69 Mariana Mazzucato, et al., 'Creating and Measuring Dynamic Public Value at the BBC,' (2020).

70 Victoria Ivanova and Jennifer Ding, 'Choral Data "Trust" Experiment White Paper: Prototyping a GLAM Trusted Data Intermediary for Public Interest AI,' Serpentine Arts Technologies (17 February 2025), https://doi.org/10.5281/ZENODO.14859320.

Postface

In 2020, Serpentine launched the first ever edition of Future Art Ecosystems. That volume of the annual strategic briefing began with a mapping of the field of art and advanced technologies with a view to support the development of fellow public sector organisations working in this field. Since then, the project has grown significantly into a community of artists, technologists, policy-makers, researchers and fellow organisations while impacting our own strategic vision. In 2022, Serpentine implemented the 'UX of Art', a concept developed in *Future Art Ecosystems 2: Art x Metaverse* that has been part of an audience-centred transformation of the way we develop and platform our work from education to exhibitions.

The briefings also support Serpentine Arts Technologies ongoing commitment to champion, support and produce work with artists whose work impacts how society

understands and uses the technologies of the future. In 2024, the release of *Future Art Ecosystems 4: Art x Public AI* (FAE4) coincided with Serpentine's year of AI and the exhibition of *Refik Anadol, Echoes of the Earth: Living Archive* that was followed by *Holly Herndon & Mat Dryhurst: The Call*, the first major UK exhibition by the artists and musicians who developed new protocols and materials for the creation of choral AI models that also resulted in a Choral Data 'Trust' Experiment that was first proposed in FAE4. In 2025, *Future Art Ecosystems 5: Art x Creative R&D* coincides with Danielle Brathwaite-Shirley's most ambitious public exhibition to date: a new collaborative video game, exhibition and R&D project that interrogates the civic potential of video game technologies. This is being supported by the Future Art Ecosystems team to ensure that the Creative R&D that forms part of the project is enabled and shared with the sector and beyond.

FAE5 would not have been possible without artdao, Nicholas Houde, Lina Martin-Chan, Jack Murray-Brown, William Kherbek, Anja Yenken, and Roxy Zeiher. We also thank all of the artists, curators, technologists, policy-makers, producers and researchers who

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The Serpentine International Council is an extraordinary group of individuals who provide ongoing and important assistance to enable us to deliver our ambitious Art, Architecture, Civic, Ecologies, Education, Live, and Technology Programmes. We are also sincerely appreciative for the support from the Corporate Members, the Americas Foundation, Patrons and Future Contemporaries of Serpentine.

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Hans Ulrich Obrist and Bettina Korek
London, 2025

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works at the cutting edge of art, science and technology. Museums, theatres, galleries and festivals around the world have exhibited his immersive digital art, winning acclaim from the *New York Times*, which describes him as 'a biochemist turned philosopher, turned television producer, turned visual poet.' A co-founder of National Gallery X, he is Professor of Digital Media and Communication at SOAS and a Senior Research Fellow in Engineering at King's College London.

Alice Bucknell
is an artist and writer based in Los Angeles. Their recent work has focused on creating cinematic universes within game worlds, exploring the affective dimensions of video games as interfaces for understanding complex systems, relations and forms of knowledge. Their work has appeared internationally at Ars Electronica, transmediale, LUMINEX, LEV in Madrid, Serpentine, the 18th Venice Architecture Biennale, Gray Area in San Francisco, and the Singapore Art Museum, and elsewhere. Their writing appears in publications including *ArtReview*, *e-flux architecture*, *frieze*, *Flash Art*, the *Harvard Design Magazine*, and *Mousse*.

Amy Tarr
is Head of Policy & Public Affairs at Creative UK, the national body for the UK's cultural and creative industries. With over 15 years of experience spanning Westminster, think tanks and high-impact advocacy, Amy specialises in shaping investment frameworks, championing creative talent and driving policy change on issues ranging from AI and intellectual property to access to finance.

Amy Whitaker
is an Associate Professor at NYU and scholar-artist who develops economic models for artistic sustainability. She is the author of four books: *Museum Legs*, *Art Thinking*, *Economics of Visual Art*, and (with Nora Burnett Abrams) *The Story of NFTs*. She has written NFT primers for Art Basel, *ENCATC* Magazine, and *Artivate*. Her work on fractional equity in art using blockchain received the Edith Penrose Award for 'trailblazing' research that challenges orthodoxies and has impact. From 2015 to 2025, she was an advisor to the early-stage blockchain company Bitmark.

Anicka Yi
has produced a unique body of work over the past decade spent at the intersection of politics and macrobiotics. Her practice questions the increasingly hazy taxonomic distinctions between what is human, animal, plant and/or machine, and is the result of an alchemical process of experimentation that explores often incompatible materials. She collaborates with researchers to create media that are often inherently political, delving into the cultural conditioning of sense and perception she describes as a 'biopolitics of the senses.' Her diverse installations, which draw on scientific concepts and techniques to activate vivid fictional scenarios, ask incisive questions about human psychology and the workings of society.

Annette Mees
is an award-winning theatre-maker, dramaturg and creative director. She is known for innovative, experiential work that defies definition. She has worked across art genres on new forms of storytelling and interdisciplinary co-creation. She works with cultural organisations including The Public (NYC), National Arts Centre (Canada), cultural institutions including the National Gallery (UK), the National Ballet of Canada, NITE (NL), the European Cultural Foundation and the Southbank Centre (UK) as well as technology companies including Imaginarium Studios, Google Creative Lab, Magic Leap and SIRT. She is the Chair of FutureEverything, the first arts organisation in the UK to put nature on its board, and is a co-host of global conversation on The Future of Culture.

Aslak Aamot Helm
works on building alliances, experiments, and organisations across art, science, advanced technologies and industry. He is co-founder of the transdisciplinary studio Diakron and Primer, a platform for artistic and organisational development housed in the biotech company Aquaporin. He has worked as a facilitator for large transdisciplinary groups engaged in long-term strategic processes and as a consultant to universities, museums, tech companies, and incubators. As of 2026, he is working on a postdoctoral research project funded by the Novo Nordisk Foundation, tracing the aesthetics of rising levels of unknowability in the biological sciences in collaboration with institutional partners in biomedical research and natural history.

Benny Giang
is the co-founder of Future Primitive, building Perma, a photo-sharing network that preserves the human perspective in an AI-saturated world. Perma connects people through authentic, unedited imagery, ensuring digital memories remain meaningful and verifiable. As a founding team member of CryptoKitties and Dapper Labs, he has shaped internet-native objects (e.g., NFTs) since 2016—from helping to develop the ERC-721 standard to launching NBA Top Shot and Tokenbound Accounts (ERC-6551).

Cher Potter
is former Curatorial Director of Future Observatory, a national programme at the Design Museum that curates, funds and publishes design for the green transition. She is currently working to launch a new trust within the Sainsbury Family Charitable Trusts that will fund and connect cultural initiatives that work towards ecological transformation. She is an editor on the *Future Observatory Journal*, published at the Design Museum.

Danielle Brathwaite-Shirley
works predominantly in animation, sound, performance and video game development with their main medium being the audience itself. The artist explores voices that (en)counter miss-representation, exclusion and mainstream erasure; with a focus on Black and Trans communities. Through this approach, the artist both archives and anticipates narratives outside of the mainstream, so as to overcome the harms of tokenisation and erasure. By engaging the visitor-player through most of their installations, Brathwaite-Shirley examines how individual choices are as critical as collective, political responsibility in the context of marginalisation. Brathwaite-Shirley's work has been presented internationally, with recent exhibitions and commissions including *THE SOUL STATION*, LAS, Berlin (2025) *The Rebirthing Room*, Studio Voltaire, London (2024); *I'm Not Doing This for the Likes*, Biennale de l'Image en Mouvement, Centre d'Art Contemporain Genève, Geneva, Switzerland (2024); *I CAN'T FOLLOW YOU ANYMORE*, Factory International, Manchester (2023); *I Can't Take This Step For You*, Helsinki Biennial (2023) and *Pirating Blackness*, HAU Hebbel am Ufer, Berlin (2021).

Dayo Lamolo
is a seasoned executive operating at the intersection of media and technology. In content business roles at the New York Times, Facebook, YouTube, and Amazon Studios, she has led both commercial and creative aspects of content licensing and digital product development, with expertise in international expansion. In addition to leading Mozilla's work on human-centered technology, she is chair of the board of Open Television, an artist development and global streaming service devoted to intersectional storytelling. She began her career in journalism, as a reporter in Washington and in Nairobi. She holds a BA, JD and MBA from Yale University, and lives with her family in London.

dmstfctn (Oliver Smith and Francesco Tacchini)
is a London-based duo exploring opaque systems of power through installation, performance, film and video games. dmstfctn often invite audiences into the 'demystification' of systems by replicating and exploring them together, and into dmstfctn's own 'remystification' process by building new worlds, characters and myths atop these replicas. Since 2018, dmstfctn have performed and exhibited in venues such as Serpentine, Berghain, HWK, and festivals such as Unsound, CTM, and transmediale. Their work has been released by Mille Plateaux, Krisis Publishing and NUKFM. Most recently, their work around AI anomalies led them to collaborate with scientific institutions such as the Alan Turing Institute and the Leonardo Supercomputer.

Gabrielle Jenks
is a Curator and Creative Director who specialises in the cultural impact of digital technology. She currently holds the position of Digital Director at Manchester International Festival, the world's first festival of original, new work. Her interests are in context specific curation, the overlap of digital and physical environments and new cinematic practices. Over 15 years she has worked with numerous artists and designers in conceptualising projects including Tai Shani, Phil Collins, Rhizomatiks, Gillian Wearing and Marshmallow Laser Feast. Previously, Gabrielle was Director of Abandon Normal Devices (AND festival) and curator at FACT (Foundation for Art and Creative Technology).

Graham Hitchen
is Director of Policy for the CoSTAR Foresight Lab, and Director of the Loughborough University Policy Unit. He is also co-Director of the Creative Research and Innovation Centre (CRAIC) at Loughborough London. He is a member of the University's Digital Decarbonisation research group, and Chair of its Strategic Advisory Group. He has led research projects on creative technologies, data and policy, and the Creative Industries in India. Hitchen was part of the leadership team for UKRI's Audience of the Future and the Creative Industries Clusters Programme. He was previously the Corporate Policy Director for Arts Council England, and has worked for DCMS as well as London government.

Hannah Andrews
is the British Council's Director of Digital Innovation in the Arts, where she leads digital innovation across the organisation's global arts portfolio. Spanning research, production, and policy, Hannah's work is motivated by a belief that artists drive the development of more diverse and representative technologies, and arts-led innovation is essential to a more inspiring and sustainable future. This belief is grounded in over a decade of work at the forefront of digital innovation in the arts. Having spent five years as Creative Producer with Google's Arts & Culture Lab, and prior to this worked as an independent producer specialising in art and technology, Hannah has worked with organisations including Google Research, Google Quantum AI, MIT Media Lab, London Design Festival, the Barbican, Tate Liverpool, and the Serpentine Galleries to further arts and technology practice. Hannah has spoken on arts and technologies at the BFI, Southbank Centre, Oxford Internet Institute, and Kings College London, and has had writing on arts and AI published by European Journal and (forthcoming) Routledge. She sits on UNESCO's International Year of Quantum arts & culture sub-committee and is a member of Utrecht University's Inclusive AI Lab.

Heather Schoell
is Creative Director, AI Strategy and Events at NVIDIA, as well as the curator of the NVIDIA AI Art Gallery. The daughter of a biochemist and mathematician, Schoell combines her passion for art and science in her work as a creative in tech companies. She received a bachelor's degree in art from Yale University and came to NVIDIA after more than 13 years working in various roles in creative teams at Apple.

Ian Cheng
is an artist and founder based in New York.
iancheng.com

Jake Elwes
is a conceptual artist, hacker, radical faerie and researcher living in London. They have been making critically engaged art exploring the aesthetics and ethics of machine learning systems since the very first generative AI models in 2016. Across projects that encompass moving-image installation, sound and performance, Jake's work finds unusual ways of demystifying, mapping and subverting technology. Their work searches for poetry and narrative in the successes and failures of digital systems. Works include deepfake drag in *The Zizi Project*, glitching oppressive algorithms in *Machine Learning Porn* and reintroducing AI generated marsh birds back into nature in *CUSP*. Jake's work also calls for us to challenge who builds these systems and for what purpose, and whether we, as artists and queers, can reclaim these technologies to build our own digital utopias.

James Bennett
is Director of CoSTAR National Lab, Associate Pro Vice Chancellor at Royal Holloway, University of London and Director of StoryFutures. His research work spans creative, social and technical aspects of innovation technologies and cultures (AI/XR/VR/AR). He is a strategic leader of large teams and grants, with over £85m of research and commercial R&D income won from across the UK and believes in building inclusive and collaborative work cultures and partnerships.

Jazia Hammoudi
is a curator and producer specialising in contemporary art and emerging technologies. She holds degrees in art history and museum studies from the Courtauld Institute of Art (London), and has held positions at Hauser & Wirth Gallery, the Barbican Centre, the Newark Museum, and Artnet. She got her start in XR as studio manager and researcher for Jakob Kudsk Steensen, and, in that capacity, brought projects to SXSW, and the Venice Biennale. Since joining Onassis ONX, Jazia has spearheaded exhibitions with partners including Serpentine Arts Technologies, the Museum of the Moving Image, and the Brooklyn Academy of Music, and has built collaborative partnerships with organisations including Lincoln Center, MIT, Centre PHI, and the International Documentary Film Festival in Amsterdam. On the side, Jazia leads art & architecture tours in her native Morocco as part of a larger effort to offer exposure to North African artists.

Jesse McKee
is Head of Digital Strategy at 221A in Vancouver, Canada, where he leads the development of the Node Library, a learning centre and prototyping lab dedicated to advancing decentralised infrastructure for the public sector. Previously, he was Lead Investigator on 221A's Blockchains and Cultural Padlocks digital strategy initiative. With over 15 years in curatorial practice, and 7 years in digital strategy, McKee focuses on building fair data economy frameworks and responsible technology systems. His work bridges cultural production with next-generation digital infrastructure, empowering communities fostering emerging approaches to data sovereignty, decentralised networks, and AI governance.

Jo Lansdowne
is Executive Producer of Pervasive Media Studio; supporting research activity, artist development and the resident community to make brilliant work.

Jo Paton Htay
is an independent Creative Producer and Project Director, working on varied and interdisciplinary projects for Art Fund, Barbican, Frieze Art Fair, Sadler's Wells, Somerset House and Southbank Centre. Jo was part of the team that created Manchester International Festival in 2007, Chief Producer at Serpentine (2019-21), and now is producing arts projects that form part of the inaugural SXSW London in 2025 with Alex Poots and Beth Greenacre.

Julia Kaganskiy
is an independent curator based in New York City. She has been working at the forefront of art and technology since 2008 as a curator, editor, and cultural strategist. Her forthcoming survey exhibition of generative art, *Infinite Images: The Art of Algorithms* is on view at the Toledo Museum of Art (Ohio, USA) from July 12-November 30, 2025. Kaganskiy was the founding Director of NEW INC at the New Museum, the first museum-led incubator for art, design and technology. She has conceived and organised exhibitions for HEK (Basel), LAS Art Foundation (Berlin), Matadero Madrid (Madrid), 180 the Strand (London), Borusan Contemporary (Istanbul), Science Gallery (Dublin), Eyebeam (New York City) and many others. She is the co-editor of *Interspecies Future: A Primer* (Distanz, 2024).

Katrina Sluis
is Head of Photography & Media Arts at The Australian National University, where she leads the Computational Culture Lab in the School of Art & Design. Previously based in London, she was founding Co-Director of the Centre for the Study of the Networked Image and Senior Digital Curator at The Photographers' Gallery. Her research and curatorial work explore how computational systems are entangled with image cultures, institutional logics, and emerging forms of cultural production.

Ken Arnold
is Director of Medical Museion and Professor in the Department of Public Health at the University of Copenhagen (also part of CBMR). The world-class university museum combines innovative public exhibitions and events with adventurous and collaborative research in medical humanities. Until 2022 he was also Head of Cultural Partnerships at Wellcome, the London-based charitable foundation focused on health research. Earlier, he helped lead the establishment of the Wellcome Collection and directed its first decade of programming. He regularly writes and speaks on museums and on the interactions between arts, the humanities and sciences.

Keri Elmsly
is a creative catalyst specialising in ambitious cultural projects and working with institutions globally. Her executive leadership spans the museum, art, design, and entertainment sectors, focusing on artist development and large-scale immersive experiences. As Executive Director of Programming for ACMI, Australia's national screen culture museum (2022–2025), she led curatorial, exhibitions, film, public programmes, collections, touring, and the ACMIX creative residency. Previously, she served as Senior Vice President of Sphere Studios in Las Vegas and as Chief Creative Officer of Second Story experience design studio. Keri has also executive produced projects for renowned artists including Daisy Ginsberg, Katie Paterson, Quayola, Universal Everything, and United Visual Artists.

Kieren Reed
is a Professor of Fine Art at the Slade School of Fine Art, UCL. He was the Slade Professor and Slade Director from 2018–2023 and is the academic lead of UCL Art Futures, as well as a founding member of the Creative Education Coalition. His research encompasses sculpture and new technologies, focusing on social engagement, co-design, and site-based practice. Reed's sculptural works often function as spaces for collaboration and learning. His research challenges materials, making and authorship, and is deeply rooted in art pedagogy, policy change and socially engaged art practice.

Kristina Glushkova
leads creative and cultural sector innovation initiatives at UCL's Innovation & Enterprise directorate, with 25 years experience in policy, research, business and creative sectors. She is passionate about bringing together people, ideas and insight to create positive change. Kristina's background is in creative, digital and social innovation and business support. She has worked at Nokia, Ofcom, Storyfutures, Royal Holloway, mySociety.org, and co-founded two community enterprises focused on social impact, where she led entrepreneur network development.

Laura Herman
is currently the Head of AI Research at Adobe and the Co-Director of the Inclusive AI Lab at Utrecht University. She received her PhD from the University of Oxford's Internet Institute, where her academic research examined the impact of algorithmic curation on global visual cultures, taking an inclusive and international approach with a particular focus on the Global South.

Lauren Lee McCarthy
is an artist exploring social relationships in the midst of surveillance, automation, and algorithmic living. She creates performances that invite viewers to engage including to remote control her dates, to be followed by her, to welcome her in as their human smart home, and to attend a party hosted by artificial intelligence. Lauren is the creator of p5.js, an open-source creative coding platform that prioritises inclusion and modes of access, with over 5 million users worldwide. She is also a Professor at UCLA Design Media Arts. Lauren's work has been recognised by Creative Capital, United States Artists, LACMA Art+Tech Lab, Sundance, Eyebeam, MacDowell, Pioneer Works, and Ars Electronica, among others.

Liam Young
is a designer, director and BAFTA-nominated producer who operates in the spaces between design, fiction and futures. Described by the BBC as 'the man designing our futures', his visionary films and speculative worlds are extraordinary images of tomorrow and urgent examinations of the environmental questions facing us today. As a worldbuilder he visualises the cities, spaces and props of our imaginary futures for the film and television industry, and, with his own films, he has shown with platforms ranging from Channel 4, Tribeca, the Venice Biennale, the BBC and the *Guardian*. His works have been collected by MoMA, the Smithsonian, SF MoMA, the Art Institute of Chicago, the Victoria and Albert Museum and the National Gallery of Victoria amongst many others.

Maitreyi Maheshwari
is a curator and Head of Programme at FACT, Liverpool, where she is responsible for overseeing the programme of exhibitions, artists' development, residencies, learning projects and events. She has fostered an artist-centred approach that encourages critical examination of the social impacts of technology. Before this, Maitreyi was Programme Director at the Zabludowicz Collection in London. Maitreyi has also previously worked on the interaction programme at Artangel and the youth programme at Tate Modern.

Marie McPartlin
is the inaugural Director of Somerset House Studios, a space for experimentation for artists across disciplines, which she has shaped and led since 2015. The Studios supports up to 70 artists at any one time to develop new creative projects and collaborations, many of which she has commissioned for Somerset House's cultural programme and online platform, Channel. Current resident artists include Jasleen Kaur, Akinola Davies, Daisy Ginsberg, Elaine Mitchner, Jenkin Van Zyl, Sophia Al Maria, Keiken, and Xin Liu.

Matt Prewitt
is a lawyer and a prominent commentator on technology and capitalism. He is the president of RadicalxChange Foundation.

Moving Castles
is a game design studio based in Berlin. The studio's immersive simulations and deep realities are fueled by themes of tech-driven espionage, CEO meltdowns, the innovative exploitations of late-stage capitalism, and the almost Sisyphean tragicomedies of crypto.

Natsai Audrey Chieza
is a visionary designer and thought leader pioneering new models for regenerative biophilic futures. She is the founder of Faber Futures, an award-winning London-based design agency that melds consumer biotechnology advancements with real-world applications. Chieza's innovation approach involves broad-ranging partnerships across biotech, consumer sectors, and institutions. Notable clients and commissioning bodies include Ginkgo Bioworks, adidas, the Design Museum, MIT Media Lab, and the World Economic Forum (WEF).

Nell Whitley
leads ambitious work in a variety of forms including live events, art installations and digital media. Her collaborations with Marshmallow Laser Feast demonstrate a unique vision for the future of creative experiences. She is a Governor of the British Film Institute.

Operator (Ania Catherine and Dejha Ti)
are an artist duo whose collaborative practice, Operator, was established in 2016. With Ti's background as a multimedia artist and HCI technologist, and Catherine's as a choreographer and performance artist, they engineer medium-agnostic output, joining environments, technology, and the body. Their exploration into privacy began with their performance installation *On View* (2019) and continues with their ongoing *Privacy Collection*. Operator has been awarded The Lumen Prize twice, and has spoken at University of Cambridge, Christie's Art+Tech Summit, Art Basel, ZKM, Francisco Carolinum Museum, Bloomberg ART+TECHNOLOGY, and MIT Open Doc Lab.

Paola Antonelli
is Senior Curator of Architecture & Design at The Museum of Modern Art, as well as MoMA's founding Director of Research & Development. Her goal is to promote the understanding of design, until its positive influence on the world is universally acknowledged. Her work investigates design's impact on everyday experience, often including overlooked objects and practices, and combining design, architecture, art, science, and technology. Among her most recent exhibitions are the XXII Triennale di Milano *Broken Nature, Never Alone*, on video games and interactive design, and *Life Cycles*, on the materials of contemporary design. The Instagram platform, book, and now podcast Design Emergency, which she co-founded with design critic Alice Rawsthorn, is an ongoing investigation on design's power to envision a better future for all.

Piotr Mirowski
is an AI researcher, currently Senior Staff Research Scientist at Google DeepMind. He obtained his PhD in computer science at New York University (Outstanding Dissertation Award, 2011), supervised by Prof. Yann LeCun. Piotr has been focusing on robotics and navigation-related research, on weather and climate forecasting and now on human–centered AI, leading an interdisciplinary team working on AI and Society. Piotr is also a Visiting Researcher at Goldsmiths, University of London, and investigates, in his theatrical practice, the intersection of AI and human creativity.

Rival Strategy, Marta Ferreira de Sá
and Benedict Singleton

Benedict Singleton and Marta Ferreira de Sá are co-founders of Rival, a boutique firm that assembles small and highly experienced teams around problems of what they call 'contemporary strategy': situations in which existing approaches are exhausted or have become irrelevant, but the need to act remains. Rival's work spans culture, technology and the sciences, and the team brings a powerful combination of academic credentials and practical experience across those fields. The founders have held research and teaching positions at renowned institutions like MIT and the RCA, as well as emerging programmes such as The New Normal and Antikythera. This academic foundation complements their extensive history of delivering strategic insight and creative solutions to clients across many sectors. Their exploration of what AI means for healthcare has ranged from nation-state level policy development to practical implementation at globally-significant institutions. Their insights into the future trajectory of creative practices have been equally valuable, delivering foundational strategic work with some of the key players at the frontier of art and technology, and co-founding Future Art Ecosystems with Serpentine Galleries.

Salome Asega

is an artist and Director of NEW INC, a cultural incubator for art, design, and technology at the New Museum. Salome is a United States Artists Fellow and an inaugural cohort member of the Dorchester Industries Experimental Design Lab developed by Theaster Gates, Rebuild Foundation, and Prada. She is also a co-founder of POWRPLNT, a Brooklyn digital arts lab for teens. Salome has participated in residencies and fellowships with Eyebeam, The Laundromat Project, and Recess. She has exhibited at the Munch Museum, the 11th Shanghai Biennale, MoMA, HEK (Haus der Elektronischen Künste), Carnegie Library, the August Wilson Center, Knockdown Center, and elsewhere. Salome sits on the boards of the Jerome Foundation, the School for Poetic Computation, the National Performance Network and is on the Advisory Board for the Social Science Research Council's Just Tech initiative.

Sarah Ellis
is an award-winning producer currently working as Director of Digital Development for the Royal Shakespeare Company (RSC) to explore new artistic initiatives and partnerships. The latest partnership for the RSC is the Audience of the Future Live Performance Demonstrator funded by Innovate UK, a consortium consisting of arts organisations, research partners, and technology companies to explore the future of performances and real-time immersive experiences. She is a regular speaker and commentator on digital arts practice, as well as an Industry Champion for the Creative Industries Policy and Evidence Centre, which helps inform academic research on the creative industries to lead to better policies for the sector. She has been appointed Chair of digital agency at The Space, established by Arts Council England and the BBC to help promote digital engagement across the arts.

Sónar and Sónar+D
stands as a global reference for electronic music and digital culture, fostering creativity and technology through a unique blend of artistic experimentation. Sónar takes place within Sónar Week, a series of events that transform Barcelona into the world capital of music, innovation, and creativity for one week each year. Sónar+D, the innovation space within Sónar, serves as a dynamic platform for debate, exhibition, and networking. It showcases the most influential ideas in digital arts, connecting these with science, technology, and society. A meeting point for diverse communities, audiences, artists, and professionals from around the globe, Sónar+D makes Barcelona a vibrant celebration of cultural innovation, bridging the gaps between artistic practice and the rapidly evolving tech landscape.

Sputniko!
is a Japanese-British artist whose work explores intersections of technology, gender, and speculative futures through diverse media. Her projects have been presented internationally at venues including MoMA (NYC), Centre Pompidou-Metz, the Victoria & Albert Museum, Cooper Hewitt, and the Museum of Contemporary Art Tokyo. She was an Assistant Professor at MIT Media Lab, founding the Design Fiction Group, and currently serves as Associate Professor at Tokyo University of the Arts. Her works are part of the collections at institutions including M+ (Hong Kong), Victoria & Albert Museum (UK), and the 21st Century Museum of Contemporary Art, Kanazawa (Japan)

Suhair Khan
is a technology entrepreneur and creative leader. She is the founder of open-ended, a platform and incubator for creative technologists working with artificial intelligence. Her work centres on impact-driven work at the intersection of design, culture and future-facing technology. In over a decade at Google and Google Arts & Culture, Suhair led initiatives which merged cutting-edge technologies with arts, design, culture, education and environmental sustainability. She is chair of the board of trustees of dance choreographer Studio Wayne McGregor, and is on advisory boards for the Design Museum, British Library, Sadler's Wells, London Design Biennale and the Hay Festival.

SYBIL
is a space for weird gaming and speculative worlding established in 2025 in Berlin. At the heart of SYBIL is a desire to bring together artists, game developers, researchers, storytellers, and those who wander at the edges of playful technologies.

Sylvan Rackham
is co-founder of Restless Egg, the incubator for artist-founders, creators who treat technology as their canvas. As a researcher, technologist, and social organiser, Sylvan's practice explores digital technologies as emergent features of collective human behaviour and considers how to build institutions that provide the conditions for creating aspirational technological futures. Sylvan has been a fellow at Transformations of the Human, a resident at Medialab Matadero, a singer with London Contemporary Voices, and holds degrees in Electronic Engineering and Tech Policy from the University of Cambridge.

Tadeo Lopez-Sendon
is a cultural programmer and creative director specialising in digital technologies, who is currently Chief Executive of Abandon Normal Devices and a Longplayer trustee. Until 2019, Tadeo was Co-Director of Music Hackspace, where he built a music-maker community during a three-year residency at Somerset House Studios. In 2020, he founded the curatorial and producing agency Mutant Promise, and, in 2022, he co-curated Grow FM for Chiswick House and Gardens. Tadeo is an original artist member for Cave of Sounds, nominated for the Ars Electronica S+T+ARTS Prize (2019). Tadeo has developed digital programmes with organisations including National Gallery, Furtherfield, and Artangel.

Tao-Tao Chang
is Associate Director for Programmes at the Arts and Humanities Research Council (AHRC). Tao leads the strategic development of AHRC's research infrastructure programme, which invests in the spaces, places, platforms and people that ensure research can thrive, are appropriately resourced and fit for purpose. Tao joined AHRC in 2019 as Head of Infrastructure, taking up her current role in November 2022. Professionally, her background is in international partnerships and the museum sector. From 2005 to 2010 she was Head of the International Office at the University of Cambridge. This was followed by a stint as International Development Officer at the Fitzwilliam Museum, after which she joined the Victoria and Albert Museum as Research Grants Manager.

Tarek E. Virani
is Associate Professor of Creative Industries at the School of Arts - College of Arts, Technology and Environment (CATE). His research interests in the creative industries includes: Organisational resilience, urban and cultural policy, creative and cultural ecosystems, post-creative cities, culture-led regeneration and cultural districts, creative and cultural hubs and international dimensions of creative and cultural work and policy.

Thangam Debbonaire
is a Labour Member of the House of Lords and was MP for Bristol West 2015- 2024. She runs Red Frock Ltd., providing assistance to businesses and arts and culture organisations, clients include Southbank Centre, the Opera network UK and The Art Fund. She served in the Shadow Cabinet as Shadow Secretary of State for Culture, Media and Sport. Thangam's current work includes arts policy, international cultural partnerships and diplomacy, and issues related to copyright and AI. She chairs Labour Women's Network and the Parthenon Project and sits on the boards of Sadler's Wells and LabourList. Before serving in Parliament Thangam worked for 25 years in gender equality and domestic violence prevention, nationally and internationally.

Tom Crick
is Professor of Digital Policy at Swansea University and Chief Scientific Adviser at the UK Government's Department for Culture, Media and Sport. His interdisciplinary interests sit at the research-policy-practice interface, identifying and addressing domain problems with broad digital, data-driven and computational themes, and especially focusing on the impact on people, communities, heritage and culture. He has led the major science and technology curriculum reforms in Wales over the past 10+ years, and has recently driven the development of Swansea University's civic mission strategy. Alongside his academic work, Tom has held senior advisory roles with the National Infrastructure Commission for Wales, Ofcom, Nesta, British Science Association, and BCS, The Chartered Institute for IT, as well as non-executive roles in the utilities, engineering/manufacturing, and health and social care sectors.

Tonya Nelson
is Executive Director, Enterprise & Innovation at Arts Council England. She was formerly London Area Director where she oversaw a portfolio of over 250 London-based arts organisations. She joined the Arts Council when she was appointed to be the first Director of Arts Technology and Innovation in 2019. Tonya was seconded to the Department for Digital, Culture, Media and Sport (DCMS) in 2017 where she co-authored the policy report Culture is Digital. She sits on the board of Trustees of the National Gallery and Royal Collection Trust, which looks after the Royal Collection and manages the public opening of the official residences of His Majesty The King. She also advises on cultural projects around the world as a Senior Associate at AEA Consulting. She was formerly Chair of the International Council of Museums (UK), Bomb Factory Art Foundation and a member of Christie's Art World Professional Advisory Group. She worked for University College London for nine years, rising to the level of Director of Museums and Cultural Programmes. Prior to entering the cultural sector, she was a barrister and management consultant in Washington, DC, where she grew up.

Trust
is a network of utopian conspirators, a sandbox for creative, technical and critical projects, and a site of experimentation for new ways of learning together.

Wendi Yan
is an artist, technologist and writer examining metamorphoses of the scientific self. She crafts alternative fictions of science and its history through CGI films, games, and archival displays of sculptural objects. Yan received an A.B. in History of Science from Princeton University and was an inaugural Steve Jobs Archive Fellow. She is a NEW INC Y11 member in Creative Science, and a finalist for the 6th Hyundai VH Award—Asia's leading media art award.

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