

AI and Quantum Computing— The Next Revolution in the Arts?

Wahab Yusoff

Co-Founder, Rekanext Capital VC

Technopreneur and veteran in the IT industry, Wahab Yusoff examines the dynamic intersection of culture and technology, weighing the limitless opportunities against the risks and challenges.

The intersection of artificial intelligence (AI) and quantum computing is poised to revolutionise various sectors. The arts and culture sector will not be spared its impact. These technologies promise to bring about significant transformations in creative processes, job landscapes, and the very nature of artistic production.

In this article, we examine the short-term, mid-term, and long-term impact of AI and quantum computing on the arts, highlighting the latest insights and projections from a scan of authoritative sources. We also consider what Singapore's cultural sector can do in response, and how technology can attract new audiences and foster innovation.

Short-Term Impact

We can already see the impact of AI in many aspects of our daily lives.

In the creative sector, AI is already enhancing artistic workflows by automating repetitive tasks such as colour correction, animation, and basic music composition. For instance, tools like Amper Music and AIVA (Artificial Intelligence Virtual

Artist) enable users to compose original music by using AI algorithms that generate music based on input parameters set by the user. Similarly, Adobe Premiere Pro leverages AI through its Adobe Sensei technology to offer intelligent video editing features, such as auto-reframing and scene detection, which significantly speed up the editing process. These tools not only increase efficiency but also expand the creative potential for artists by offering advanced capabilities.

However, this automation has a dual impact on the job market. While some technical roles may face displacement, new job categories such as AI operators and data curators are emerging, necessitating a shift in skillsets.

Quantum computing, on the other hand, is still in its nascent stages, and its immediate impact on the arts is limited. Currently, quantum computing is being explored in experimental applications and theoretical models that could eventually transform creative processes. However, its widespread practical application in the arts is yet to be realised.

Mid-Term Impact

As AI technology continues to evolve, it will become more deeply integrated into creative processes. This integration will enable the creation of hybrid art forms and personalised art experiences tailored to individual preferences. The mid-term impact will see a significant shift in the job market, with increased demand for tech-savvy artists and professionals skilled in AI ethics, programming, and creative AI

development. The role of artists will increasingly involve collaborating with AI to produce innovative works, thus blending traditional artistry with cutting-edge technology.

In the performing arts, AI can enhance live performances through real-time audience engagement analytics, enabling performers to adjust their acts based on audience reactions. This technological integration can create roles for performance analysts and AI-driven directors who interpret data and make on-the-fly adjustments to enhance audience experience.

Quantum computing will start to make its presence felt more significantly in the mid-term. Its enhanced processing power will be utilised for complex rendering tasks, simulations, and real-time data processing, enabling more intricate and interactive art projects. This period will also see the creation of new job roles in quantum programming and algorithm development tailored for artistic applications.

Long-Term Impact

In the long term, AI may reach a stage where it can create original artworks independently, raising profound questions about authorship, intellectual property, and the nature of creativity. AI-driven platforms will facilitate global collaboration among artists, breaking down geographical barriers and fostering a new era of interconnected creativity. The job landscape will undergo a significant transformation, with a focus on interdisciplinary roles that combine expertise in art, technology, and

ethics. Continuous learning and adaptation to new tools and methodologies will be essential for artists to thrive in this evolving environment.

Quantum computing will revolutionise the arts by introducing entirely new artistic mediums and experiences. The development of immersive quantum-generated virtual realities and interactive installations will redefine the boundaries of artistic expression. Advanced real-time simulations will allow for unprecedented levels of interactivity and realism in digital art. The demand for quantum computing expertise in the arts will rise, leading to specialised educational programs and training initiatives. Artists will need to understand quantum principles to fully leverage this technology in their creative processes.

What Does this Mean for Jobs in the Cultural Sector?

There is no doubt that some traditional roles in the sector will be affected. Jobs such as traditional animators, session musicians, and manual video editors may see a decline as AI takes over repetitive tasks. Other roles will require new skills and undergo dramatic transformation; for instance, a composer might need to understand AI tools for music composition.

While some jobs may disappear, there will be opportunities as well, including these new roles:

- ◇ **AI Operators:** Professionals who manage and operate AI tools.

- ◇ **Data Curators:** Specialists who prepare and manage data for AI systems.
- ◇ **Performance Analysts:** Experts who use real-time data to enhance live performances.
- ◇ **AI-Assisted Choreographers:** Choreographers who design dance routines using AI.
- ◇ **Digital Stage Managers:** Managers who use AI to control stage lighting and effects dynamically.
- ◇ **Quantum Effects Artists:** Artists who use quantum computing for visual effects and animation.
- ◇ **Interactive Installation Designers:** Designers who create interactive art installations leveraging quantum computing and AI.

How Can the Sector Rise to the Challenges and Opportunities?

Clearly, significant investment will be required in digital infrastructure and training to help artists and institutions stay abreast of technological advancements and potential job disruptions. Funders need to understand the real risk that the rapid pace of technological change could outstrip the ability of some artists to adapt, potentially widening the gap between those who can leverage these tools and those

who cannot. At the same time, we need to leverage the opportunities that technology will present.

Legislation and government policy will also need to keep pace to ensure that technology enhances rather than diminishes the human element in culture. As digital platforms become more integral to the arts, issues of digital security and intellectual property protection will need to be addressed to safeguard artists' rights and works. This will demand a new level of technical understanding among policy makers, even as it prepares the populace for the integration of groundbreaking technology in our day-to-day lives.

More immediately, technology adoption must include the issue of digital security and privacy. As artists increasingly adopt digital tools and platforms, there will be a pressing need to address cybersecurity concerns. The digitisation of art and the proliferation of online platforms expose artists to risks such as unauthorised reproductions, intellectual property theft, and other forms of digital exploitation. An insidious example of this is the proliferation of deepfakes. Deepfakes, which use AI to create highly realistic but fabricated images, audio, and videos, blur the line between authenticity and manipulation. This technology can be misused to create counterfeit works, misattribute creations to famous artists, or produce unauthorised reproductions that undermine the value of original works.

Additionally, deepfakes can manipulate performances and create misleading or harmful content, tarnishing the reputations of artists and performers. Thus we need robust ethical guidelines and advanced detection methods to protect the integrity of artistic expression and prevent the erosion of trust. Addressing these challenges for the cultural sector requires a concerted effort from artists, institutions,



Figure 1. A member from Tusitala wearing the Microsoft HoloLens 2 to demonstrate projection mapping and immersive audio functions of *The Colonel and the Hantu*, a project supported under the Arts x Tech Lab 2021/22. The screen on the laptop shows the view from the HoloLens 2, which presented scenes from Singapore's history in a panoramic format. Image courtesy of The National Arts Council (Singapore).

and technology providers to ensure that the benefits of digital innovation do not come at the cost of authenticity and ethical standards.

The impact of technology on traditional arts is another area of concern. These are older forms of artistic expression, tied to our ethnic identities and less likely to be taught in modern art schools. Traditional artists might find it challenging to compete with digital mediums, which can offer more immediate and immersive experiences. However, technology can also become a means of preserving and revitalising traditional arts. For example, digital archives and virtual reality can bring these older art forms to a global audience, ensuring their continued relevance.

Agencies like the National Arts Council (NAC) in Singapore play an expanded role as an aggregator, platform provider, and broker for self-employed artists, and arts companies, facilitating their integration into the digital age. As a sector lead for the arts, the NAC provides essential support and resources, bridging gaps between artists and technological advancements. Self-employed artists, often operating without the institutional backing that larger organisations enjoy, face significant challenges in adopting technology. The high cost of digital tools and software can be prohibitive, especially for those already managing tight budgets. Additionally, the steep learning curve associated with mastering new technologies poses a barrier, requiring time and effort that could otherwise be spent on creative endeavours.

The Critical Role of the Government

To address these challenges, the NAC offers grants, workshops, access to cutting-edge technology, and a comprehensive digital platform for collaboration and exposure. By doing so, the NAC empowers these interested artists to overcome financial and educational constraints, ensuring they remain



Figure 2. Dancers from Bhaskar's Arts Academy being featured through holomesh projection at *Routes: A Multi-Perspective Exploration of Traditional Arts* in Singapore, an immersive exhibition about Singapore's dance pioneers and practitioners presented at Stamford Arts Centre from 1 July to 12 September 2021. Image courtesy of The National Arts Council (Singapore).

competitive and innovative in a rapidly evolving digital landscape. The rapid pace of technological change and the constant influx of new information make this a highly dynamic and challenging environment. Providing continuous support and updated training programs will be crucial for artists to keep pace with technological advancements.

NAC's current strategic roadmap *Our SG Arts Plan (2023-2027)* emphasises digitalisation as a key strategy. This plan outlines initiatives and funding opportunities designed to help artists and arts organisations leverage digital technology for artistic creation, audience engagement, and operational efficiency. Additionally, the NAC's offers capability development funding which can support the upskilling of artists and arts professionals in digital competencies.

The NAC also collaborates with other agencies such as the Cyber Security Agency of Singapore (CSA) to play a vital role in mitigating cyber risks by providing cybersecurity guidelines, resources, and support to help artists safeguard their work and maintain the

integrity of their digital creations. By prioritising cybersecurity, the NAC ensures that artists feel confident in using digital tools and platforms, fostering trust and innovation in the arts community.

In addition to the NAC, other government agencies and institutions contribute to the digital transformation of the cultural landscape in Singapore. For instance, the Infocomm Media Development Authority (IMDA) provides digital literacy programs and technological resources that artists can leverage. Collaborations between the IMDA and cultural organisations can lead to the development of innovative projects that integrate technology and the arts, further enriching the way Singaporeans live, work and play.

Educational institutions, too, have a significant role to play in equipping the next generation of artists and cultural workers with the necessary skills to navigate the digital world. By incorporating technology-focused curricula and providing access to state-of-the-art facilities, schools and universities prepare students for the demands of a digitally-integrated

cultural industry. There can be more partnerships between educational institutions and tech companies facilitating internships and mentorship programs, while offering students practical experience and exposure to the latest technological trends.

The role of government and relevant agencies in technology adoption and digitalisation in the arts is multifaceted. By providing financial support, educational resources, cybersecurity measures, and fostering collaborations, they can help artists overcome the barriers to digital integration. This concerted effort ensures that Singapore's cultural scene remains vibrant, innovative, and globally competitive in the digital age.

planning for the long-term, Singapore can fully embrace the transformative power of technology in the arts, and aspire to become a global benchmark for innovation, creativity, and cultural enrichment in the digital age. □

Looking to the Future

Without doubt, the advent of AI and quantum computing heralds a new era for the arts, characterised by enhanced creativity, efficiency, and innovation. These technologies will transform artistic practices and the job market. Artists and professionals must navigate these changes by embracing continuous learning and interdisciplinary collaboration.

The future of the arts lies at the confluence of traditional creativity and cutting-edge technology, promising a rich tapestry of new possibilities and experiences. This fusion of technology and the arts in Singapore is poised to elevate the nation's cultural landscape to new heights, but we all have the collective responsibility to be cognizant of its inherent issues and risks. By addressing the challenges of digital infrastructure, skill development, artistic authenticity, and intellectual property, and

About the Author



Wahab Yusoff is the Founding Member of Rekanext Capital, an early stage VC fund that invests in Tech Startups in ASEAN. He has over 36 years of experience in technology and held the post of Senior Vice President of companies such as Delinea, Forescout, Palo Alto Networks and McAfee. He is also currently a Board member of Energy Market Authority, National Art Council, Civil Service College and EZ-Link. He is executive Director of Changi Airport Group and previously served on Singapore's Future Economy Council. Wahab holds a Bachelor of Engineering Degree (EEE) from National University of Singapore and Post Graduate Diploma from Herriott Watt and Babson College.

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