

# The Impacts of Text-to-Image Generative AI on Creative Professionals According to Prospective Generative AI Researchers: Insights from Japan

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## Abstract

The growing interest in Japan to implement text-to-image (T2I) generative artificial intelligence (GenAI) technologies in creative workflows has raised concern over what ethical and social implications these technologies will have on creative professionals. Our pilot study is the first to discuss what social and ethical oversights may emerge regarding such issues from prospective Japanese researchers – computer science (CS) graduate students studying in Japan. Given that these students are the primary demographic hired to work at research and development (R&D) labs at the forefront of such innovations in Japan, any social and ethical oversight on such issues may unequip them as future knowledge experts who will play a pivotal role in helping shape Japan’s policies regarding image generating AI technologies.

## Introduction

With recent advancements in natural language processing and diffusion models, text-to-image (T2I) generative artificial intelligence (GenAI) models can produce outputs similar in quality to hand-drawn art (Oppenlaender 2022). Notable state-of-the-art implementations of T2I GenAI models are OpenAI’s DALL-E (Ramesh et. al. 2022), Midjourney<sup>1</sup>, and Stability AI’s Stable Diffusion (Rombach et. al. 2022). T2I GenAI’s ability to produce images that are almost indistinguishable from human-made artworks has sparked numerous discussions around the globe. Many individuals have taken issue with the legal but unethical practice of scraping billions of copyrighted images on the internet for use as model training data (Clarke 2022). Working artists have also expressed concerns over job loss due to its capability to produce high quality images easily and efficiently as it requires only text input and no prior artistic skills or training compared to other image generating GenAI tools (Shaffi 2023).

Given T2I GenAI’s ease of use and efficiency in producing manga (Japanese comics) and anime (Japanese animation) styled images, there is growing interest within Japan to

incorporate these tools into the creative workflows of both industry (Deck 2023; Osaki 2023) and hobby-based artworks (Deck 2022). Such practices have also placed Japan in a unique position as an early testing ground on the ethics and copyright liability of GenAI art, especially when Japan has a long-established culture of creating self-published derivative works, known as doujinshi, including industry permission to reproduce copyrighted characters (Deck 2022).

In 2016, Japan’s Cabinet Office set out an agenda for science, technology, and innovation (STI) towards a Society 5.0<sup>2</sup> that aims for “a human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space” as part of its 2016 Fifth Science and Technology Basic Plan for the period of 2016-2021 (Fukuyama 2018) and in its subsequent 2021 Sixth Science and Technology Basic Plan set for the period of 2021-2026 (Government of Japan 2021). While this shows that Japan is interested in developing a more equitable society alongside technological and economic development, the introduction of social and ethical issues due to the incorporation of T2I GenAI tools into Japan’s creative industries may thwart such efforts.

To address social and ethical issues stemming from GenAI technologies, experts involved in policymaking will consist of current and future AI practitioners, such as AI developers and researchers, especially those at the forefront of such innovations at R&D labs. This is because expert knowledge is fundamental when developing policy proposals in Japan for social innovation (Ghinoi and Omori 2023). An interdisciplinary understanding on the ethical and social implications of these technologies, that combines both technical knowledge and awareness of its impacts in society, will allow these AI practitioners to better inform policymakers on how to properly mitigate potential harm caused by the usage and distribution of T2I GenAI technologies, especially towards creative professionals and creative industries within Japan.

Therefore, **our pilot study is the first to understand what prospective researchers of GenAI technologies see as social and ethical challenges for creative professionals and creative industries when using or integrating T2I GenAI systems in creative processes in Japan.** This can allow us to identify potential gaps in their understanding of what impacts T2I GenAI can have on Japan’s creative professionals and creative industries. These gaps can highlight critical areas of social and ethical oversight that could unequip prospective T2I GenAI researchers as knowledge experts, which could jeopardize Japan’s goals towards a fair and inclusive Society 5.0.

## Methodology

From June 2023 to August 2023, the first author conducted twelve semi-structured interviews with 1) computer science graduate students studying in Japan (i.e., prospective GenAI researchers), and with 2) Japanese industry professionals and experts. Interviews with the latter group were conducted as complementary data on the ethical considerations that may be seen from the perspective of Japanese creative professionals towards T2I GenAI technologies.

Nine semi-structured in-person interviews were held with domestic and international computer science graduate students (8 men and 1 woman) studying at a highly esteemed Japanese university in Tokyo, consisting of 5 master’s students, 3 PhD students, and 1 Postdoctoral researcher. All interviews were conducted in English, except for one in Japanese that was later transcribed and translated to English for analysis. In these interviews, students shared individual experiences and opinions on the social and technical challenges of T2I GenAI technologies.

Three semi-structured interviews with Japanese industry professionals and experts were held with the following individuals: 1) an AI-focused Japanese lawyer, 2) two representatives from Arts Workers Japan (AWJ) which is an association of freelance artists and entertainment workers in Japan, and 3) a professor in media industry studies at a Japanese university. After discussing potential interview candidates, the authors agreed on those that were chosen as they represent key expertise regarding the legal, social, and cultural aspects of Japanese creative industries, respectively. They have also been previously interviewed by established media outlets in Japan on the effects of image generating AI. Interviews with the lawyer and AWJ were conducted via teleconferencing in Japanese, which were later transcribed and translated to English for analysis. The interview with the professor was conducted in-person in English.

So far, all interviews have been individually analyzed by one member of the team through an inductive thematic analysis approach (Braun and Clarke 2006), so that high-level themes could be extracted from the two participant groups

on a first pass basis. These themes have yet to be reanalyzed for detailed subthemes. Further analysis is currently in progress and will be detailed in a future report.

## Key Findings

In this section, we share select insights and concerns brought forward by our interview participants regarding the use or integration of T2I GenAI systems in creative processes in Japan.

### Insights from Prospective GenAI Researchers

During our interviews with prospective GenAI researchers (i.e., computer science graduate students studying in Japan), many associated the quality of the generated outputs with their social and artistic value, such that high quality generations by T2I GenAI tools were seen as beneficial to creators because it could efficiently automate simple illustrative tasks or help with prototyping and brainstorming. They also noted the technology’s ability to allow non-artists to create illustrations despite their lack of artistic skills. In general, most students found that using the technology was fine if the generated outputs or using the technology itself depicted legal subject matter or provided high quality results. Although some of the interview participants valued human art greater than GenAI art, they noted that it was mostly due to the artistic inferiority of the outputs at the technology’s current stage when compared to human-made art.

Students deemed the immense number of publicly scraped images for training as necessary when training such models. Because the data is publicly sourced, most found no issue with learning from such material and viewed this practice similarly to how humans learn visually. However, if the author of an image prohibits its usage for AI training, they believed that artists should have the right to opt-out of datasets. Major limitations brought forward on T2I GenAI primarily revolved around the training data. Problematic image data can allow the generations to depict harmful stereotypes and subject matter. Students also remarked how the dataset limits what “upper bound” the model can reach aesthetically in terms of the quality and creativity of its generated outputs. Additionally, comments were made on the user’s limited control over the generated outputs using the base technology as-is. Despite these limitations, students overall viewed the technology positively such that it would have a positive impact on society and/or industry in the long term, especially if there were regulations in place to restrict and regulate the production of harmful and illegal content.

Although all students interviewed did not see the tool as a threat in the long term to working creative professionals, some did suggest that artists in the future may have to create unique works to stand out as T2I GenAI tools improve. Interestingly, several interview participants expressed that

their positive outlook on T2I GenAI may be influenced by the fact that they are AI researchers, such that they may feel differently towards the technology if they were artists themselves. Students also suggested that while thinking of ethical and social implications of their own AI research was seldom, given that they were not experts in such issues, thinking of these topics too deeply would prevent innovative research from happening. Regardless, they expressed openness to the development and application of ethical guidelines in AI research and believe that ethical and societal concerns are important, such that public consultation with artists and risks assessments should be done on T2I GenAI issues.

### **Legal Implications with T2I GenAI Works**

In 2018, Japan's legislative body, the National Diet, amended national copyright law to allow machine-learning AI models to scrape copyrighted data from the internet without permission for training purposes (Deck 2022). Because the country has an active stance on developing and using AI technologies, there are almost no restrictions on AI data mining and learning. Therefore, the AI-focused lawyer we interviewed notes that copyright infringement typically applies to the generation and usage stage in Japan. So far, there has been few discussions in Japan on legally restricting T2I GenAI learning, although there are discussions that it should be limited to guidelines or datasets curated through voluntary effort.

Rather than regulating everything regarding T2I GenAI technologies in Japan, the lawyer suggests that there should be efforts to understand how they may affect the fundamental values of human being and that GenAI model and tool providers should have a responsibility to develop a system that allows users to use their products with peace of mind without potential copyright infringement. Therefore, changes to Japan's legal system such as making the process easier to prove damages from copyright infringement or shifting part of the burden of proving reliance from the plaintiff to the defendant, could help mitigate concerns from potential copyright infringement at the usage and generation stage. It may also be helpful to encourage the practice of disclosing the model learning dataset in advance so that generated images can be easily compared with the training dataset in cases of suspected copyright infringement.

### **Social Implications for Creative Workers**

The representatives interviewed from Arts Workers Japan shared that there are individuals in Japan's creative industries who currently feel a lack of consideration for those working in arts and entertainment given the potential for GenAI to take away human-centric and fulfilling work instead of only mundane and unpleasant tasks. There is also the potential for these individuals to be deprived of work

when GenAI systems can easily imitate their style. The AWJ representatives mentioned how some of the artists they surveyed felt that having AI use their creative work without permission as training data feels akin to stealing the results of many years of honed craftsmanship. Many are also concerned about being associated with content generated by others that depict their artistic style or likeness, especially if the subject matter is illegal.

AWJ suggests that there is a dire need for better channels in Japan through which people working in the arts and entertainment industry can receive an understanding of the situation and raise their voices. Currently there are still workers in vulnerable positions who are forced to sign contracts with unfairly low remuneration in the country. There are also artists who are suffering from damage caused by GenAI. Additionally, accessing litigation to prove damages is too costly and difficult for most creative professionals. Therefore, they are urging the Japanese government to understand the situation of these individuals and listen to their concerns by setting up consultation desks and holding interviews with various organizations. They would also like Japanese policy researchers to have a better understanding of the living situations of Japanese creative workers.

### **Cultural Implications for Creative Industries**

Manga and anime industries in Japan may suffer the most from the use of image generating AI. The professor we interviewed in media industry studies notes that GenAI tools are unlikely to replace mangakas, the Japanese word for comic artist, given its "star-centered" system surrounding the creator. However, backgrounds, tracing, and coloring are usually delegated to a team of typically uncredited assistants which could become automated with the use of image generating AI tools. Even if using such tools may be helpful for mangakas themselves, it might not be positive for the industry at large. This is because many manga creators get their start in the industry doing assistant work for other mangakas who are more experienced in the field. This practice of learning the "ins-and-outs" of keeping a production schedule and transmitting a craft from one generation to another may disappear with the use of GenAI that can automate assistant work, and thus underprepare future creators with the necessary skills and knowledge to become artisans themselves.

The animation industry may also be impacted given the similar "star power" that notable key animators have. Those who can innovate expressions and animation styles will be difficult to replace, but other jobs in the industry are amenable to AI automation. For example, those responsible for in-between animation. Many of these workers quit the industry due to the culture of severely underpaying below-the-line animators resulting in its current labor shortage. These workers are also struggling to meet ends needs, so they lack

the time or money to access litigation to prove stolen work. The professor notes that turning to automation will not resolve labor problems but would rather reduce the necessary training for young animators to develop skills at the workplace within the industry to become seasoned key animators or animation directors, which may stagnate the production of animation talent.

Therefore, one of the professor's suggestions is for companies in Japan's creative industries that want to use GenAI tools for creative work should look at how it can be implemented properly such that it can respectfully account for good welfare and working conditions that can foster positive relationships amongst employees, rather than actively replacing humans with automated technology to cut costs.

### **Limitations and Future Work**

Limitations of our work are the small sample size and diversity of our participants. We selectively recruited only computer science graduate students from one university in Japan, which does not generalize all viewpoints on the issue from students at other institutions in the country. In addition, we were only able to interview one female participant, which reflects a general lack of gender diversity in this field. Moreover, there are also experts and industry professionals in other domains who can provide different perspectives on how T2I GenAI technologies can impact creative professionals and industries in Japan. These could include those in advertising and video games. Further insights into this topic could be provided by interviewing individual creative professionals and other groups. This will help gather more diverse opinions on other types of social and ethical implications which may arise with the use of T2I GenAI technologies in their own respective fields. We also suspect that other image based GenAI tools may cause similar social and ethical problems when used for creative purposes.

Because a thorough analysis of our interview data is currently in progress, we plan to produce a more detailed account of the social and ethical implications that were shared by the interview participants in a future report. Future work will also build on this pilot study and will include recruiting a larger and more diverse sample size across Japan. Furthermore, we plan to include other countries and regions in the world that have different work cultures or perspectives in our dataset where T2I GenAI technologies may impact creative professionals and creative industries in differing ways. A comparative analysis between various cultures and regions on such issues could help develop a more comprehensive understanding of the situation on a global scale.

### **Conclusion**

Our preliminary findings suggests that Japanese CS graduate students perceive T2I GenAI optimistically as a tool that can enhance productivity and foster creativity. In contrast, Japanese creative professionals and creative industries fear its potential to replace fulfilling work and its ability to jeopardize necessary workplace pedagogy, such as skills passed via mentorship within Japan's creative industries, namely those of manga and anime. T2I GenAI models are also trained on an exorbitant number of images found on the internet, which affects data privacy and intellectual property globally. It would be beneficial for other countries to learn from the insights found by our study which may apply to their own creative industries.

Through interviews with Japanese CS graduate students, we notice a tendency to view creative industries consisting of independent workers. Based on the interviews we conducted with Japanese industry professionals and experts, our findings suggest that it would be important to instead view such industries as a symbiotic network of workers collectively improving their artisanal skills through the workplace. These workers also usually choose their careers because they enjoy the process of making art. In addition, it is worth noting that optimism towards T2I GenAI from AI researchers could also lead to ethical issues. The lack of consideration for creators and the tendency to view their works merely as training data in AI might undermine an artist's right to privacy and dignity. Understanding such nuances can help AI researchers become more mindful when developing T2I GenAI technologies that avoid jeopardizing the pedagogical and individual well-being of creative professionals. These could also help identify what gaps in Japanese computer science higher education could underprepare students with skills to assess and critique technologies used to produce T2I GenAI art. Through such efforts, these researchers may then become better equipped as knowledge experts who will lead Japan towards the realization of an equitable and sustainable Society 5.0.

### **Acknowledgements**

S.H. and A.E. acknowledge funding by the JSPS Summer Program 2023. S.H. and T.T. acknowledge support from the NSERC CREATE SE4AI program. We would like to thank Jun Kuribayashi for his contributions towards the data collection and analysis of interviews conducted in Japanese, and our interview participants for their invaluable insights. This pilot study is part of S.H.'s master's thesis that is co-supervised by T.T. and Emad Shihab at Concordia University.

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