

# “Generative AI” Usage in Macao

## 2024

(Executive Summary)



## Executive Summary

“Generative AI” has gained significant momentum globally, becoming one of the most captivating topics in technology. This technological advance has not only sparked a wave of innovation worldwide but has also opened up unparalleled opportunities for various industries. From text generation and image synthesis to process automation, “Generative AI” is gradually transforming the way we live and work. Inspired by this global trend, Macao is also embracing opportunities for the application and innovation of “Generative AI”. Tech companies and research institutions in Macao are actively exploring how to leverage this technology to enhance service quality and operational efficiency. Simultaneously, the government and business entities are actively participating, offering policy support and financial investment to promote the application and development of “Generative AI” in sectors such as education, healthcare, tourism, and entertainment.

Against this backdrop, to understand the public’s awareness, usage, and expectations of “Generative AI” in Macao, the Macao Association for Internet Research (MAIR) and eRS e-Research Lab conducted a random telephone survey in January 2024 among 731 residents aged 6-84 in Macao. The sampling error is  $\pm 3.7\%$  at the confidence level of 95%. The response rate (AAPOR-RR3) is 34% and the cooperation rate (AAPOR-CR3) is 71%. All survey results in this report are weighted by gender and age according to the officially released demographic data, in order to reduce sampling errors and increase the representativeness of the sample. This report summarizes the development and use of “Generative AI” globally and in Macao, along with relevant recommendations.

### The Global Trend and Focus of “Generative AI”

In recent years, “Generative AI” has exhibited a clear trend and set of characteristics on a global scale. Since the end of 2022, when OpenAI introduced ChatGPT, the market for “Generative AI” has continued to expand, with projections indicating that by 2032, it will surpass USD 1 trillion. The number of AI models being released has also seen a year-on-year increase, primarily open-source models, which have demonstrated formidable capabilities in areas such as natural language processing, image generation, and even video generation. With technological advancements, multimodal AI models have emerged as the latest trend in “Generative AI”, no longer constrained by a single type of input or output content.

Among the various “Generative AI” models, ChatGPT is the most popular, holding a dominant position in the global market and is particularly favored by the technology industry and populations in North America. Its applications are increasingly seen in personal, corporate, institutional, government, and various industry sectors. Research indicates that “Generative AI” can help businesses and institutions reduce costs and improve efficiency. Most large global enterprises have already deployed or are considering deploying AI technology, and government also expects “Generative AI” to reduce public administration process steps and shorten processing cycles. However, there are obstacles to the further popularization and deeper application of “Generative AI”, with many enterprises citing insufficient AI skills and knowledge among employees as a barrier to further application.

Despite the widespread application of “Generative AI”, its risks and limitations should not be overlooked. These include data risks, compliance risks, value risks, and user risks. Among these, data leaks and the generation of inaccurate information (AI Hallucination) are the most pressing concerns for corporations and institutions. These risks not only affect operational efficiency but also have the potential to severely damage reputation. Furthermore,

“Generative AI” faces challenges in the ethical and legal realms, with the responsible use of the technology becoming a focal point of concern across various sectors.

Besides, public concerns about AI replacing jobs are also prevalent, with many individuals anticipating a shift in work due to “Generative AI”. Over one-third of the public is apprehensive about their jobs being replaced by AI in the future. These concerns reflect the complex emotions and adaptation challenges that society faces in response to technological change. To alleviate these concerns, corporations and governments must enhance AI education and training to upgrade employees’ technical skills and develop policies that ensure a smooth transition in the labor market. Only through such measures can the widespread application and sustainable development of “Generative AI” technology be truly realized.

### **Regarding the Application Situation in Macao and Several Recommendations**

The data and analysis results from this report indicate that over the past two years, the awareness and usage of “Generative AI” among Macao residents have significantly increased, suggesting that efforts to promote the popularization of AI in Macao should continue. Learning and work are the primary application scenarios, with the effective use of AI technology helping to reduce costs and improve efficiency. However, the lack of usage skills has hindered further AI application, necessitating proactive learning to enhance employability. The student group shows higher enthusiasm for AI applications, while the civil servant group, due to concerns about risks, has a relatively shallow level of application. Additionally, the authenticity of generated information is a widely recognized concern. In summary, the potential for AI applications in the future is vast, and it is crucial to actively explore practical scenarios to contribute to social development. The following points elaborate on this.

#### **1. The Awareness and Usage of “Generative AI” in Macao Have Increased, Suggesting that AI Should Be Continuously Promoted for Broader Adoption**

The Internet adoption rate among Macao residents has remained stable at 93% over the past three years, laying a foundation for the future popularization and application of “Generative AI”. In this context, the awareness and usage rates of “Generative AI” among Macao netizens have shown growth trends. The awareness level (netizens: 64%, residents: 60%) and usage rate (netizens: 27%, residents: 25%) of “Generative AI” have both increased compared to 2023, indicating that Macao society’s understanding and application of “Generative AI” are gradually improving. However, there is still considerable room for growth in the usage rate. In the future, various sectors of society should continue to promote the popularization of “Generative AI” to support Macao’s smart city construction and economic diversification. Moreover, netizens who have not used “Generative AI” might consider choosing AI products that have been further developed in the market to reduce the threshold for usage and expedite the adoption of “Generative AI”.

#### **2. Learning/Work as the Main Application Scenarios, Utilizing AI for Cost Reduction and Efficiency Enhancement**

In addition to personal use, “Generative AI” can also be applied in corporate/institutional or governmental settings. The application and expectations of “Generative AI” among Macao netizens are concentrated on scenarios related to learning and work. Most large global enterprises have already deployed or are considering deploying “Generative AI”. Macao’s local enterprises and institutions can also assess how “Generative AI” can be integrated with existing business processes and systems to improve operational efficiency and innovation. For example, educational

institutions can use it for personalized teaching and the generation of learning resources, while government departments can utilize “Generative AI” to assist in document writing, analyze socio-economic data, and help in policy formulation and evaluation.

**3. Lack of Usage Skills Hinders Further Application, Advising Active Learning to Enhance Employment Competitiveness**

Macao netizens rate their ability to use “Generative AI” as moderate (0-10 scale, with an average score of 5.9). The difficulties encountered during use mainly include the generated content not matching expectations and unfamiliarity with questioning methods/prompt word settings. The lack of usage skills may affect the depth of AI applications. Moreover, some users are concerned about job displacement due to the impact of “Generative AI”. In this situation, residents can actively participate in “Generative AI”-related education and training courses to improve their understanding of AI technology and learn new skills, especially those related to AI technology. By making good use of AI, individuals can enhance their competitiveness and adapt to the rapidly changing job market.

**4. Student Groups Show High Proactivity in Use, While Civil Servants Have Concerns and Shallow Use**

Different groups have varying attitudes and applications toward “Generative AI”. The student group has a higher usage rate and a more positive evaluation of how “Generative AI” aids in learning and work. They also have a higher self-assessment of their ability to use “Generative AI” and are less concerned about the risks associated with its use. In contrast, the civil servant group has a high level of awareness but a relatively lower usage rate. They have a lower evaluation of how “Generative AI” aids in learning and work and a lower self-assessment of their ability to use it. Additionally, they have more concerns about the risks involved in using “Generative AI”.

For students, schools and society can teach them how to more effectively use “Generative AI” to assist in their learning, explore new applications of AI in academic research and creative projects, and promote innovative thinking. At the same time, they should strengthen safety awareness education to help them understand potential safety issues when using AI. For civil servants, the government and society can encourage them to participate in more related training, helping them understand the technical principles and application scenarios. They should also demonstrate the potential of “Generative AI” in improving work efficiency and decision-making quality, increasing their willingness to use it, and reduce their concerns about risks.

**5. Authenticity of Generated Information Draws Concern, Caution in Using Generated Results Required**

The output of “Generative AI” may contain incorrect or fake information, leading to what is known as “Artificial Hallucination”. Users in Macao who use “Generative AI” also express the most concern about the authenticity of the generated information. For users, it is necessary to learn to choose appropriate and compliant AI tools and be vigilant when using the output of “Generative AI”. They should not blindly accept all results generated by AI and should independently verify the results to avoid potential errors.

## 6. Future Application Potential is Huge, Advising Active Exploration of Practical Scenarios to Promote Social Development

“Generative AI” not only has a significant impact on daily life and work but also brings opportunities for transformation to various industries in Macao. Macao netizens generally agree that “Generative AI” helps businesses create more value and promote economic development (rated 6.6 out of 10). Moreover, nearly half of them indicate a willingness to use “Generative AI” in the future. Against the backdrop of Macao’s ongoing smart city construction, the potential for “Generative AI” applications in Macao is substantial. Macao’s various sectors of society can work together to strengthen the exploration and application of “Generative AI”. On one hand, they can enhance talent quantity and application capabilities in this field through related training and resources. On the other hand, enterprises/institutions can leverage “Generative AI” to optimize business processes and actively explore practical application scenarios in Macao. Government departments can use “Generative AI” to enhance the efficiency and quality of public services and optimize urban management and social governance through AI technology, promoting the development of smart cities and digital government.

### Conclusion

With the rapid development of “Generative AI” globally, Macao is also embracing opportunities for application and innovation in this field. The awareness and usage rate of “Generative AI” among Macao netizens are showing growth trends, and they hold a positive attitude toward the application of “Generative AI”, particularly in the fields of learning and work. Looking ahead, Macao should continue to promote AI education to enhance public understanding and application capabilities of AI technology. Through training and resource investment, it should improve talent quality and application capabilities, promoting industrial innovation and economic diversification. All sectors of society should strengthen the exploration and application of generative AI, actively exploring practical application scenarios to enable AI to play a greater role in enhancing public service efficiency and optimizing urban management, contributing to sustainable social and economic development. Residents should also actively learn AI-related skills to enhance their employment competitiveness and avoid falling behind the times. As technology continues to mature and applications deepen, “Generative AI” will bring more opportunities to Macao, creating a bright future of intelligent innovation.

**AI Won’t Replace Humans —  
But Humans With AI Will Replace Humans Without AI**

## About “ ‘Generative AI Usage’ in Macao 2024”

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Publish Date: June, 2024

For citation, please follow the format below:

Macao Association for Internet Research (2024). *“Generative AI” Usage in Macao 2024*. Macao: MAIR.



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