Title

Research Report on Governance Modernization in the Digital Age: Practice and Prospects for the Application of Large Models in the Government Domain (2023)
数字时代治理现代化研究报告——大模型在政务领域应用的实践及前景（2023 年）

Authors

The Policy and Economy Institute (政策与经济研究所) of the China Academy of Information and Communications Technology (CAICT; 中国信息通信研究院; 中国信通院) and the Industry and Planning Institute (产业与规划研究所) of CAICT. CAICT is a think tank under China's Ministry of Industry and Information Technology (MIIT; 工业和信息化部; 工信部).

Source

CAICT website. The Research Report is dated December 2023 and was uploaded to the website on February 4, 2024.

The Chinese source text is available online at:
   http://www.caict.ac.cn/kxyj/qwfb/ztbg/202402/P020240204637794572244.pdf
An archived version of the Chinese source text is available online at: https://perma.cc/8SYR-Z2LN

Translation Date	**Translator**	**Editor**
June 11, 2024	Etcetera Language Group, Inc.	Ben Murphy, CSET Translation Manager

Research Report on Governance Modernization in the Digital Age

--Practice and prospects for the application of large models in the government domain

(2023)

Policy and Economy Institute of the China Academy of Information and Communications Technology (CAICT)

CAICT Industry and Planning Institute

December 2023

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Preface

Currently, large generative artificial intelligence (AI) models have become a focus and hot topic for all different people. Large models such as ChatGPT and Bard are a leap forward in AI technology and represent the transition of AI technology from perceiving and understanding the world to creating the world. The government domain involves a large volume of content production and human-to-human interaction. It is highly aligned with the high-level information collection, text summary, and intelligent interaction capabilities of generative AI large models. This field is fertile ground for the future application of generative AI large models.

Since the emergence of large model tools, countries around the world have explored the possibility of applying new technologies in government governance, promoting the formation of a wave of digital government reforms with intelligentization (智能化) as their main feature. **In terms of the scope of application**, the application of large models in the government domain has been widely explored. Eighteen countries or regions, including the United States, the UK, Australia, Canada, Singapore, Japan, and South Korea, have applied large models in government affairs management, covering 13 specific scenarios in the 5 major fields of government internal office work, government information disclosure, government service provision, optimization of people's livelihood (民生) services, and national defense and aerospace. **In terms of application depth**, the awareness and utilization rate of large models in the government domain have reached a high level in some countries. The Roland Berger consulting firm predicts that, provided they receive ample applications, large models are expected to reduce operating costs in the public service industry by 1.8%. **In terms of deployment and promotion**, countries and regions such as Singapore, Japan, and the United States are at the forefront in practice. They have promoted the transition from local and dispersed exploration to integrated applications and have made overall arrangements for deployment methods, data processing, and other aspects.

In order to make good use of the "double-edged sword" of large model technology, **countries are actively promoting organizational, talent, and technological changes to adapt to new governance challenges, while accelerating the application of large models in the government domain at the same time**. Since 2023, South Korea, Singapore, the United States, the UK, Australia, New Zealand, Japan, Canada, and Denmark have successively issued interim guidelines for the use of generative AI by government agencies (civil servants). They are working to avoid technical risks and promote the compliance of applications by clarifying usage principles, framing the scopes of scenarios, and establishing regulatory norms.

However, because the technology is still in the stage of rapid development, ambiguity still exists in governance policies: First, a complete risk governance framework for government application of AI technology has not yet been formed. Second, scenario categorization and grading, and end-to-end supervision specifications are relatively rough and cannot achieve full coverage of new technology application behaviors.

In China, the application of large models in the government domain is still in its initial exploratory stage. According to statistics, there are at least 56 large model vendors in China that have deployed products in the government domain. Of these, 15 vendors including Baidu (百度), Beijing Knowledge Atlas Technology Co., Ltd. (Zhipu AI; 智谱华章), iFlytek (科大讯飞), SenseTime (商汤科技), the Institute of Automation of the Chinese Academy of Sciences (CAS Institute of Automation; 中国科学院自动化研究所), Alibaba Cloud (阿里云), 360, and Kunlun Tech (昆仑万维) have registered large model products. Localities including Beijing, Shanghai, Hangzhou, and Shenzhen have introduced policies to promote the implementation of large model applications in the government domain. Government hotlines, intelligent customer service, urban governance, healthcare, and education are key implementation directions. With the rapid development of large generative AI models, it is expected that, in the future, related technologies will be widely applied in the construction of smart cities and the provision of government services in various places, becoming a powerful force promoting a new round of governance transformation. Government agencies need to strengthen forward-looking deployment, proactively respond to the opportunities and challenges brought by new technological changes, develop a full understanding of large model technology from multiple levels, including strategy, business, organization, and risk, accelerate explorations into the feasible paths for the development and application of large government models suitable for China, and accelerate the modernization of government governance.

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I. AI large models bring new opportunities for reforms of government governance

Currently, scientific and technological (S&T) innovation in the field of artificial intelligence is extremely active and has increasingly become an important force that is changing the world's competitive landscape. A number of landmark, cutting-edge achievements have been achieved one after another, and large model technology, as represented by ChatGPT, has triggered a new development boom in general purpose artificial intelligence.[1] With the advantages of strong intelligence, strong versatility, and strong interactivity, large models have been deeply integrated with traditional sectors such as transportation, healthcare, and industry, becoming a key force in further promoting changes in industrial development and governance. In the industrial field, large models have achieved automated optimization for automotive, modeling, and other design processes, as well as intelligentized management through logistics and security. In the medical field, large models can predict the structure of protein molecules, assist doctors in image reading and analysis of case reports, and launch AI caregiving and interactive psychological counseling applications. In the financial field, large models have given birth to digital employees, with AI customer service, AI investment consultants, and AI finance used to automate services, and further optimized investment management and risk management.

The government field involves a large volume of content production and human-to-human interaction. It coincides well with the high-level information collection, text summary, and intelligent interaction capabilities of generative AI. This field is fertile ground for the future application of large models. On the one hand, the government has a good foundation for the application of AI technology. International Data Corporation (IDC) data show that AI penetration in China's government industry will be 52% in 2022, behind only the Internet industry (83%) and the financial industry (62%).[2] According to official disclosures from the National Development and Reform Commission (NDRC), China's government data resources

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[1] Translator's note: The Chinese term 通用人工智能 can be translated into English either as "artificial general intelligence" (AGI) or "general purpose artificial intelligence" ("general purpose AI," for short). This translation opts for "general purpose AI" because when Chinese writers use the term 通用人工智能, they are usually referring to a broadly capable form of AI, rather than to AI that resembles human cognition, as AGI implies. For a more thorough discussion of this term, see Wm. C. Hannas, Huey-Meei Chang, Daniel H. Chou, and Brian Fleeger, "China's Advanced AI Research: Monitoring China's Paths to 'General' Artificial Intelligence," Center for Security and Emerging Technology, July 7, 2022, https://cset.georgetown.edu/publication/chinas-advanced-ai-research/, pp. 1-3.

[2] IDC, *Evaluation Report on the Development of Artificial Intelligence (AI) Computing Power in China for 2023-2024*, December 2022.

account for more than 3/4 of the country's total data resources, which will provide ample base fuel for large model training and continuous updates.[3] On the other hand, as the construction of digital government proceeds, the level of inclusiveness and convenience of government services continues to improve, and the volume of online and offline services increases, there will be an urgent need to use new technological means to solve the problem of insufficient government response capabilities. Taking the 12345 government service hotline as an example, from 2020 to 2022, Beijing received 11.04, 14.85, and 75.92 million calls from the public, respectively, an increase of 588% in three years. Among them, simple consultation and information hotlines accounted for 88% of the total in 2022. The utilization of core capabilities such as generative AI intelligent interaction and document production can significantly alleviate the service pressure caused by the surge in hotline consultations in megacities.[4]

Digital government construction in the AI-generated content (AIGC) era will also face new changes and opportunities. **First**, it will change the existing human-computer interaction model, promoting the evolution and upgrading of "Internet + government services" to "intelligence + government services." On the service demand end, through anthropomorphic communication and human-like interaction, large models can enhance the ability of an inquiry system to understand users' natural language and the context of inquiries, automatically and accurately extract user needs, and improve response accuracy and service success rate. On the service supply end, they can replace human workers or intelligently assist in repetitive tasks such as service guidance and consultation, replace and optimize front-end human labor in government services on a large scale, and reduce service pressure. **Second**, innovative content production methods will achieve the automation and replacement of human workers in some administrative activities such as keeping meeting minutes and document writing, eliminate unnecessary administrative burdens, and free government personnel, especially lower-level personnel, from "endless paperwork" so they can apply themselves to forward-looking, holistic, and innovative work, assuming a role more like a comprehensive coordinator and final decision maker in responding to complex problems. **Third**, the formation of a new "model as a service (MaaS)" service format to sit alongside the traditional infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS) formats as a component of government cloud platforms. Together, they can empower upper-level government application systems such as "one network for everything" ("一网通办"), "one network for unified

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[3] See https://www.ndrc.gov.cn/xxgk/jd/jd/202303/t20230317_1351341_ext.html.

[4] Beijing Municipal Affairs Bureau, *2022 Annual Data Analysis Report on the Beijing 12345 Citizen Service Hotline*.

management" ("一网通管"), and "one network for collaboration" ("一网协同") to improve the existing digital government construction layout.

II. There is a global wave of large model applications in the government domain

(i) Exploration is advancing rapidly and application prospects are broad

Since the emergence of large model tools, such as ChatGPT, more and more countries around the world are exploring the possibility of applying new technologies in government governance, promoting the formation of a wave of digital government reforms with intelligentization as their main feature. **In terms of application breadth, the exploration of the application of large generative AI models in the government domain is already relatively mainstream.** As of October 2023, 18 countries and regions including the United States, Portugal, the UK, Ireland, Denmark, Australia, Canada, the United Arab Emirates (UAE), Qatar, Israel, Singapore, Japan, South Korea, India, Malaysia, and Cambodia have applied large models in government affairs management. At the application level, large models have been applied by both local and central government departments as well as local agencies. For example, the General Services Administration (GSA) of the U.S. federal government, the Washington State Government, and the City of Boston are simultaneously promoting the application of large model technology. In Japan, central government departments such as the Ministry of Agriculture, Forestry and Fisheries, level-1 administrative districts such as the Tokyo Metropolitan Government, and local governments such as that of Yokosuka City also use large model tools such as ChatGPT in government offices. In terms of application scenarios, these applications cover multiple scenarios such as text generation, service provision, decision-making analysis, and scientific research and innovation. Large models are integrated into all aspects of government activities as auxiliary tools. In addition, some regions or departments have issued instructions to prohibit public officials from using large model tools for a limited period due to data security risks and other reasons, such as the U.S. Environmental Protection Agency and the Maine state government.

Table 1　Application of large model technology by governments of various countries (regions)

No.	Country/ Region	Scope of application
1	United States	House of Representatives, Department of Defense (DoD), National Aeronautics and Space Administration (NASA), Department of Health and Human Services (HHS), General Services Administration (GSA), and 8 states, cities, counties, etc.
2	Canada	Civil servants use large model products in office work

No.	Country/ Region	Scope of application
3	United Kingdom	Chancellor of the Exchequer uses ChatGPT to write speeches
4	Denmark	Prime Minister uses ChatGPT to write speeches
5	Portugal	Ministry of Justice, 112 government emergency hotline
6	Ireland	Department of Agriculture, Department of Transport
7	Romania	Prime Minister uses ChatGPT-like AI assistant
8	Australia	Department of Home Affairs
9	Singapore	Agency for Science, Technology and Research, Ministry of Manpower, Ministry of Health, etc.
10	Japan	Ministry of Agriculture, Forestry and Fisheries, Tokyo Metropolitan Government, Fukushima Prefecture, Tochigi Prefecture, Yokosuka City in Kanagawa Prefecture, Tobetsu Town in Hokkaido, etc.
11	South Korea	120 Dasan Seoul Call Center
12	India	Ministry of Electronics & Information Technology, Ministry of Education
13	Malaysia	Ministry of Science, Technology, and Innovation
14	Cambodia	Digital Government Council
15	Taiwan (中国台湾)	Taiwan regional main oversight department for educational affairs (台湾地区教育事务主管部门), Taipei City Education Bureau, Tainan City Education Bureau, Hualien County
16	United Arab Emirates (UAE)	Dubai Electricity and Water Authority, Telecommunications and Digital Government Regulatory Authority, National Government Portal
17	Qatar	National Government Portal
18	Israel	President uses ChatGPT to write conference speeches

Source: Compiled from public data

In terms of application depth, the rates of awareness and utilization of large models in the government domain have reached a high level, and their application prospects are broad. Research data released by Goatman, an AI research company, shows that more than 50% of Japanese prefecture-level governments are using ChatGPT.[5] An online questionnaire survey conducted by Japan's Nomura Research Institute showed that the utilization rate of ChatGPT in government departments reached 17.5%, behind only the information and telecommunications industry (32.8%) and manufacturing (19.2%).[6] A survey of 1,320 civil servants in the Public Service of Canada showed that 11% of civil servants have used large AI model tools such as ChatGPT and Bard in their work.[7] Roland Berger, a well-known management consulting firm, predicts that the second wave of large generative AI models will be in

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[5] Goatman, *Survey on the Introduction and Use of ChatGPT in 47 Prefectures Across the Country*, August 2023.

[6] Nomura Research Institute of Japan, *ChatGPT Usage Trends in Japan (as of June 2023)*, June 2023.

[7] Global Government Forum, *One in ten Canadian public servants already using AI for work purposes*, August 2023.

industries such as education, telecommunications, and public services. Although these industries invest relatively little in informatization (信息化), generative AI technology can offer vast potential value. Roland Berger predicts that, provided they receive ample applications, large models are expected to reduce operating costs in the public services industry by 1.8%.
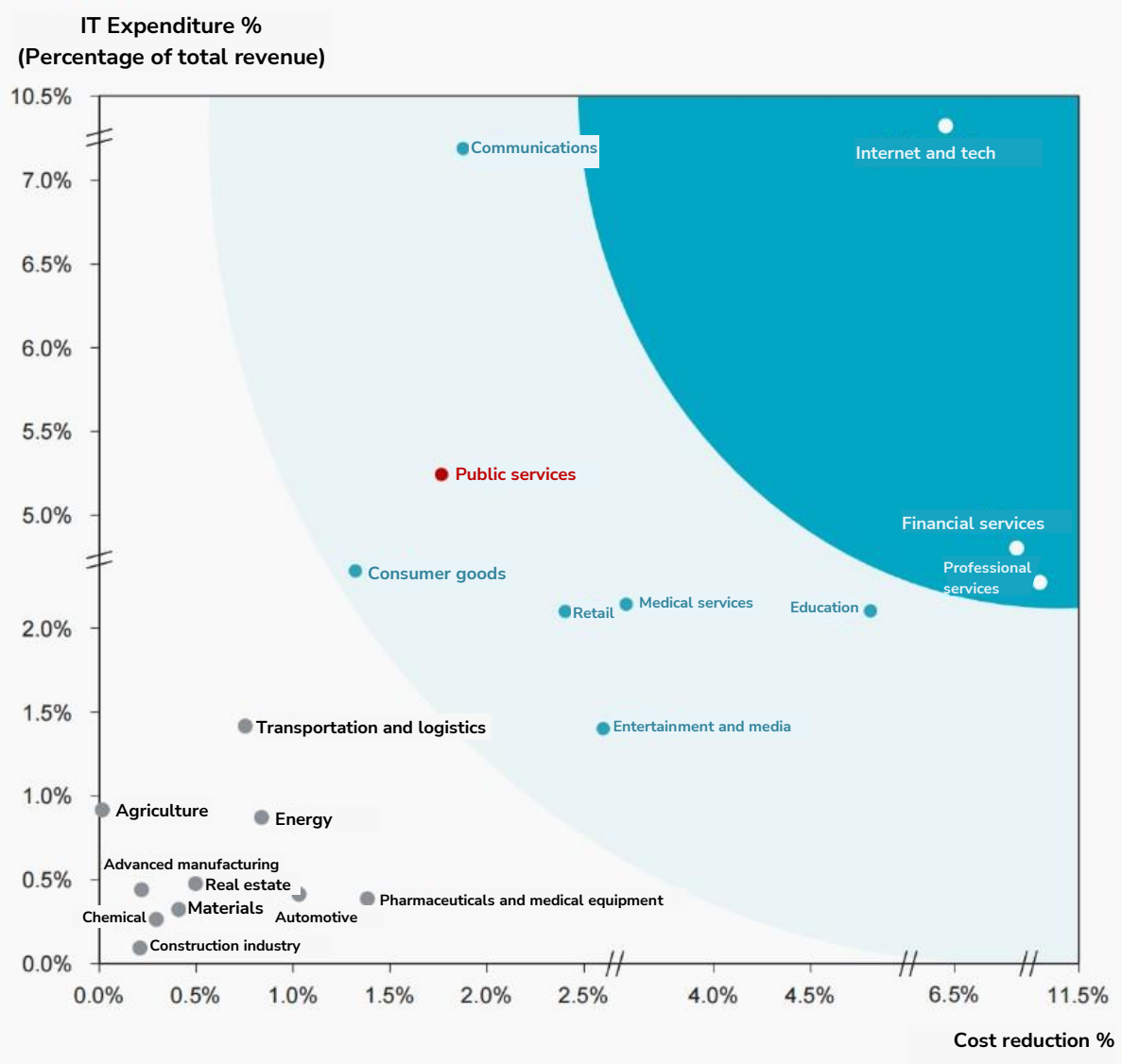
Figure 1   Sequence waves of the industrial impact of generative AI

In terms of deployment promotion, countries and regions such as Singapore, Japan, and the United States are at the forefront in practice and have promoted the transition from local and decentralized exploration to integrated applications. Some countries are deeply aware of the transformative impact of large model technology on government governance and its prominent security risks. They have begun to try to

make overall arrangements concerning deployment methods, data processing, and other aspects in order to improve the government's ability to integrate and apply new technologies. Japan's Digital Agency partnered with Microsoft to set up high-processing power equipment used in large-scale AI model products in government data centers to process classified (机密) government information. Singapore has set up an AI innovation sandbox to provide the public sector with pre-trained generative AI models and elementary code development tools. Some large model vendors have adapted to the needs of governments for application integration and provide service capabilities tailored to governments. Microsoft has concluded partnerships with the U.S. and Japanese governments to provide them with services to call ChatGPT through the Microsoft Azure intelligent cloud platform. Accenture released FedGPT specifically for use by U.S. federal government agencies. The South Korean Internet giant NAVER provides Arab countries with large AI models aligned with their cultural backgrounds.

(ii)   Applications cover a wide range of scenarios and their technological potential is emerging

Judging from the practice of various countries (regions), we can divide large model applications into 13 specific scenarios in the 5 major fields of government internal office work, government information disclosure, government service provision, optimization of people's livelihood services, and national defense and aerospace. Large model application scenarios have expanded from inside the government to external services and governance, from simple office work to smart people's livelihood construction, and good application results have been achieved in some scenarios.

Table 2   Distribution of large model application scenarios in government governance

Application field	Scope	Specific scenarios	Representative cases
Internal government office work	For the operation and processing of internal affairs, with civil servants as the main users	Knowledge retrieval and collection	Yokosuka City, Japan
		Internal document drafting	Singapore Pair civil service document writing system
Government affairs information disclosure	Provide text, video, audio, and other information to external users, mainly for external publicity	Public news or manuscript writing	Yokosuka City, Japan
		Simplify or rewrite official documents	Ministry of Agriculture, Forestry and Fisheries of Japan
		Produce government promotional materials	Boston city government
Government service provision	Provides services to the public and enterprises, with the main purpose of helping them transact	Government affairs hotline	Portugal 112 hotline
		Business management intelligent assistants	Dubai Electricity and Water Authority, UAE

Application field	Scope	Specific scenarios	Representative cases
	government-related business	Specialized field inquiry systems	Ministry of Electronics & Information Technology of India
Optimization of people's livelihood services	Improve social and livelihood services such as healthcare, transportation, education, and employment	Education	Chinese province of Taiwan
		Healthcare	Singapore Ministry of Health
		Employment	Singapore Ministry of Manpower
National defense and aerospace	Applications involving national security, national S&T innovation strength, etc.	National defense and security	U.S. DoD
		Aerospace	NASA

Source: Compiled from public data

1. Auxiliary tool in internal government office work

First, auxiliary knowledge retrieval and collection: Based on a massive volume of training data, large models can instantly collect a large amount of information based on prompts. Deep learning algorithms can also enable large models to categorize and cluster information, organize and summarize dispersed information, and provide civil servants with highly relevant, highly integrated information, becoming an "intelligent inquiry assistant" for civil servants. Specifically, civil servants can use tools such as large language models (LLMs) to conduct knowledge retrieval in scenarios such as information collection, policy research, and bidding standards research. For example, the **Irish Department of Agriculture** uses ChatGPT to retrieve information on and handle technical and software-related issues. **The UK, South Korea, and Australia** recommend that government staff use tools such as ChatGPT in policy research and information collection. In **Yokosuka, Japan,** civil servants use ChatGPT to retrieve information for task inspiration and policy recommendations. A survey showed that 30.4% of civil servants in the Yokosuka city government use ChatGPT for knowledge retrieval, which is the scenario with the highest proportion of use. 54.3% of civil servants believe that the knowledge retrieval function provides them with information and creativity that traditional methods cannot provide.[8] Yokosuka city also used ChatGPT to develop and launch a Q&A system designed for other government departments, so that other cities can inquire about and understand the use of ChatGPT by the city government. **Chiba Prefecture, Japan** conducted a survey on generative AI applications, which showed that about 70% of civil servants believe that using large

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[8] Yokosuka City Management and Planning Department, *ChatGPT Application Demonstration Results Report*, June 2023.

model tools such as ChatGPT can improve their business efficiency. Of these, 90% of civil servants believe that the most obvious scenario for improving efficiency is in Visual Basic for Applications (VBA) creation and coding knowledge.[9]

      Second, assistance in the automation of internal document drafting: Writing government documents is an internal affairs task that has a heavy workload and is highly mechanical with "templates" to follow. After being trained on a high-quality corpus, large models and their derivatives can competently complete tasks such as content proofreading, materials compilation, and content summarization. They can also output text information according to specified frameworks and templates. Applying large model tools to the writing of government documents can free civil servants from complicated text writing work, allowing them to devote more time to creative work. At present, large models are used in the writing of various application-type documents such as government briefings, reports, meeting minutes, and emails. For example, **Singapore's Open Government Products** developed the Pair civil servant document writing system, which can sort through a large number of inquiries in a few seconds and write emails and first drafts of government reports, which are then revised by staff. Data shows that, during the trial operation phase, the Pair system served more than 11,000 users from more than 100 government agencies, with more than 4,500 weekly active users.[10] In the **U.S. House of Representatives**, ChatGPT is mainly used internally in offices to create and summarize text content, including summarizing information from speeches, writing policy documents, and drafts of bills. The **Japanese** government has concluded an agreement with Microsoft, whereby Microsoft will provide large model tools to Japan's Digital Agency and other departments, which will be mainly used in scenarios such as statistical analysis of government data and providing government officials with draft responses to parliamentary inquiries. In addition, other regions are departments such as **Yokosuka City and the Tokyo Metropolitan Government in Japan, Hualien County of the Taiwan Province of China, and the Digital Government Committee of Cambodia** have applied ChatGPT to the preparation of internal government documents.

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[9] Chiba Prefectural Government official website, *Results of the department-wide survey on the utilization of generative AI*, November 2023.
[10] Public data from Singapore's Open Government Products. https://www.open.gov.sg/products/pair/.
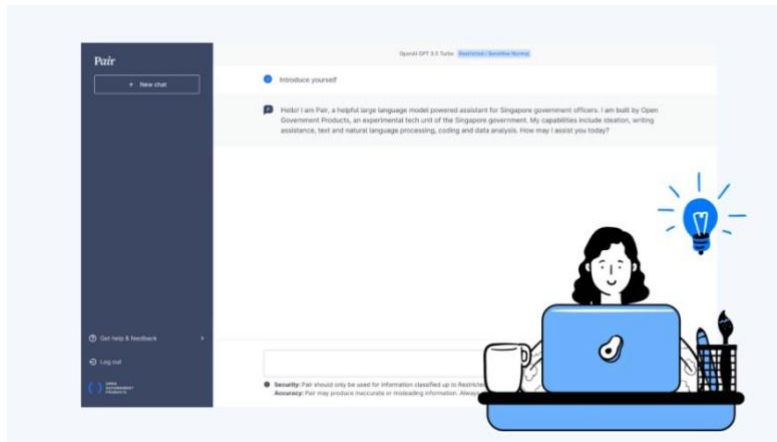
Figure 2   Singapore Pair civil service document writing system
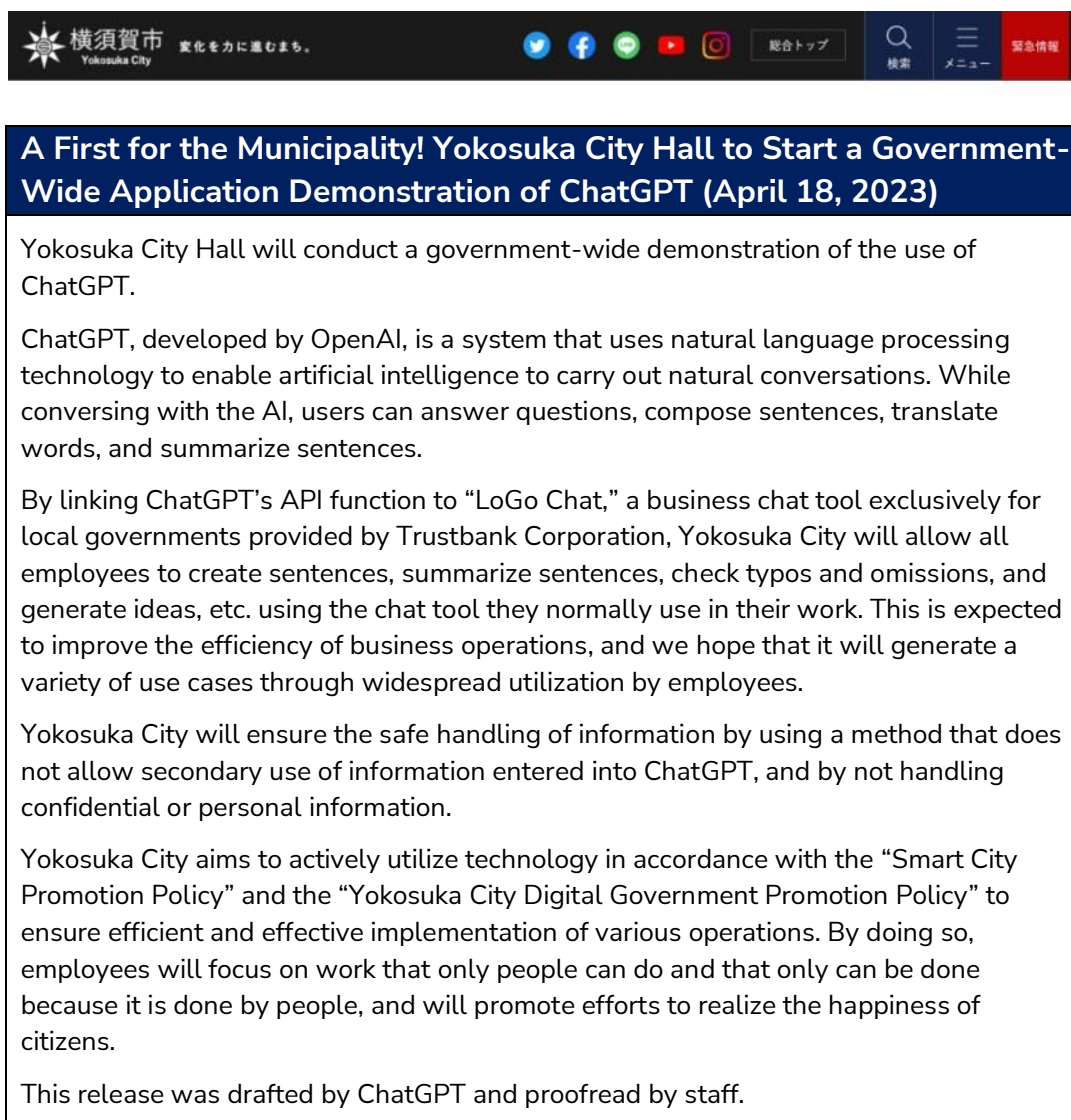
2.   Facilitating government affairs information disclosure

Different from the use cases oriented to the internal office work of government officials, the application of large models in government information disclosure refers to the use of large model tools to output government intentions or information to the public. Applications in this field not only rely on the natural language processing capabilities of large models, but the multi-language and multi-modal capabilities of large models also help governments expand the scope of their information audiences and enrich the formats of information disclosure. In addition, large model tools can output content according to a specified tone and style, which can help the government adopt the standpoint of the masses, output concise and easy-to-understand information that meets the needs of the masses, and make it easier for the masses to accept and understand government information. Currently, large models are effectively used in three specific scenarios: drafting public press releases, simplifying and rewriting policy documents, and generating government promotional materials.

First, drafting public press releases: For example, on April 18, 2023, the official website of the Yokosuka city government in Japan published a news item titled *A first for a city government! The Yokosuka city government has begun to demonstrate the use of ChatGPT citywide*. This article clearly stated that "this news article was written by ChatGPT, and the staff only partially proofread and polished it." Hualien County, Taiwan Province, China used an exclusive closed database of news articles to fine-tune ChatGPT to produce press releases for events, saving about 15 minutes in writing each press release.[11] The U.S. House of Representatives Digital Services Team said that ChatGPT will be used in the House of Representatives to generate voter response

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[11] United Daily News, *Leveraging AI to improve efficiency, Hualien County takes the lead in using ChatGPT*, September 2023.

drafts and press documents.

A First for the Municipality! Yokosuka City Hall to Start a Government-Wide Application Demonstration of ChatGPT (April 18, 2023)

Yokosuka City Hall will conduct a government-wide demonstration of the use of ChatGPT.

ChatGPT, developed by OpenAI, is a system that uses natural language processing technology to enable artificial intelligence to carry out natural conversations. While conversing with the AI, users can answer questions, compose sentences, translate words, and summarize sentences.

By linking ChatGPT's API function to "LoGo Chat," a business chat tool exclusively for local governments provided by Trustbank Corporation, Yokosuka City will allow all employees to create sentences, summarize sentences, check typos and omissions, and generate ideas, etc. using the chat tool they normally use in their work. This is expected to improve the efficiency of business operations, and we hope that it will generate a variety of use cases through widespread utilization by employees.

Yokosuka City will ensure the safe handling of information by using a method that does not allow secondary use of information entered into ChatGPT, and by not handling confidential or personal information.

Yokosuka City aims to actively utilize technology in accordance with the "Smart City Promotion Policy" and the "Yokosuka City Digital Government Promotion Policy" to ensure efficient and effective implementation of various operations. By doing so, employees will focus on work that only people can do and that only can be done because it is done by people, and will promote efforts to realize the happiness of citizens.

This release was drafted by ChatGPT and proofread by staff.

Source: Official website of Yokosuka city government, Japan

Figure 3   Yokosuka City, Japan publishes news article written by ChatGPT

Second, simplifying or rewriting official documents: For example, the **Ministry of Agriculture, Forestry and Fisheries of Japan** uses ChatGPT to update regulatory documents. Because the ministry needs to revise thousands of pages of regulatory documents every year, the introduction of ChatGPT has significantly reduced the workload of document revisions. The ministry also uses ChatGPT to simplify online operation guides, such as the guide for subsidy applications, to help people successfully complete applications. The government of **Fukushima Prefecture** uses ChatGPT to create summaries and children's versions of the prefecture's plans. The city government of **Boston, USA** recommends the use of large model technology for

simplified text writing and multilingual text writing to promote the disclosure of government information to people of different ages, different education levels, and in different languages.

Third, generating government promotional materials: For example, places such as Tobetsu Town, Hokkaido and Yokosuka City, Kanagawa Prefecture in Japan use ChatGPT to produce government promotional text. **Ibaraki Prefecture** is integrating ChatGPT into "Hiyori Ibara," a virtual tourism YouTuber certified by the county government to enhance the fun of interaction between the masses and this virtual person and enhance the prefecture's attraction as a tourist destination. The **U.S. House of Representatives** uses ChatGPT to generate logo graphics for government brand promotion. **Boston** also specified the production of government promotional posters, videos, and songs as recommended use cases.

3.   Optimizing government service interaction

The human-like dialogue and interaction capabilities of large models can reshape the model by which governments provide service consultation and business processing to users. Existing practice is mainly found in the optimization and upgrading of government service inquiry systems. Inquiry systems are the most visible and most important link in the government's provision of services to the people and enterprises. Traditional government inquiry systems only support the "one question and one answer" format, requiring users to use specific vocabulary or specialized language to trigger responses. In addition, the responses are broad and instructions are not direct and precise enough. The combination of large model technology and government inquiry systems can improve the inquiry system's ability to understand users' natural language and inquiry context, automatically and accurately extract user needs, and improve response accuracy and service success rate. Multiple rounds of dialogue interaction can also help the government inquiry system to guide and assist users through the entire business process, creating government service delivery models such as "dialogue as a service" and "platform as an assistant."

At present, large model technology has been implemented in three types of specific scenarios: government hotlines in inquiry systems, government portal Q&A bots, and government knowledge Q&A systems in niche scenarios.

First, helping intelligentize government hotlines: For example, in **Seoul, South Korea,** the 120 Dasan Call Center plans to apply ChatGPT to its city inquiry hotline to promote full automation of violation information reporting, petition processing, and consultation. The **Portuguese** government is testing a new AI system based on ChatGPT to be used in call answering, problem assessment, work order dispatch, and other aspects of the 112 emergency hotline in order to shorten the call response time

and improve the call completion rate.

Second, creating intelligent assistants for government services: For example, the **Dubai Electricity and Water Authority in the UAE** has embedded ChatGPT into a chatbot to provide users with 24/7 service support, which can provide task consultations for bill inquiries, outage updates, and service requests. **Qatar's Ministry of Communications and Information Technology** embedded GPT technology into the Hukoomi national government portal to improve the user experience and increase service efficiency. The **Telecommunications and Digital Government Regulatory Authority of the UAE** uses ChatGPT on government websites to provide website domain name recommendation services for small and medium-sized enterprises. Enterprises can obtain Arabic or English domain names with the suffix ".ae" by providing a description of their business operations. The **UAE** national government portal has also embedded ChatGPT into its inquiry system U-ASK. The **Singapore Government Technology Agency** formed a knowledge base based on government documents and linked it to LLMs provided by Google and Microsoft. It has transformed 21 government service chatbots into engines driven by LLMs. Previously, staff had to manually specify as many as 10 to 15 different forms of a question to trigger keywords for a single question. However, with the natural language processing and human feedback reinforcement learning capabilities of large models, this process is simplified, reducing the manpower and time required to train, maintain, and update chatbots.[12] This agency plans to move all government chatbots to LLM-driven engines by the end of 2023. **Malaysia's Ministry of Science, Technology and Innovation** reported that it is embedding ChatGPT into government services to handle public consultations. The **New York City** government in the United States has applied AI technology to help families obtain childcare services by launching the MyCity portal. They also launched the first AI chatbot pilot project to help business owners and entrepreneurs more easily access information from the New York City government website.

Box 1: Dubai Electricity and Water Authority uses ChatGPT to improve the skills of its virtual AI employee Rammas
In February 2023, Moro Hub, a subsidiary of the Dubai Electricity and Water Authority, partnered with Microsoft and announced that it would use ChatGPT technology to enhance the services of and upgrade its existing virtual AI employee Rammas. The Dubai Electricity and Water Authority became the first government department in the world to use large model technology. After integration with ChatGPT, Rammas's ability to learn from data and understand and analyze customer

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[12] GovInsider, *Is it time to say goodbye to 'Ask Jamie'? Inside GovTech's refresh of government chatbots*, September 2023.

inquiries has improved, and it can respond to user needs in a more timely and accurate manner. In addition, with the support of a large model, Rammas can also adapt to the usage behavior habits and preferences of users to provide them with customized answers. In addition, it can analyze data such as sensor data, electricity meters, and weather forecasts to provide data-driven recommendations for the operation of the Electricity and Water Authority. Data show that from the end of April 2023 to the end of June 2023, Rammas supported by ChatGPT responded to 32,084 inquiries, with a customer satisfaction rate of 90%. With the successful application of ChatGPT in the government consultation system, the Dubai Electricity and Water Authority will use large model technology in the provision of more services to assist its digital transformation.

Source: Compiled based on public news articles from Emirates News Agency and other websites

Third, supporting inquiry services in specialized fields: For example, the **Ministry of Electronics and Information Technology of India** trained ChatGPT based on Indian government documents and 12 commonly used local languages and also integrated it with speech recognition software. They then embedded ChatGPT into the chat software WhatsApp to provide inquiry services for government subsidy support related policies and projects to vulnerable groups such as farmers and low-income people with different language backgrounds and low educational levels. The **Portuguese** government uses large model technology, supplemented by training on specialized legal professional knowledge, to develop a knowledge Q&A guide program for the judicial field. This program provides citizens with consulting services related to judicial proceedings, document processing procedures, and other such processes. The **Singapore Government Technology Agency** has introduced large model technology into the SupportGoWhere government assistance application website. Residents can directly obtain information on assistance programs they can apply for by describing their situations.
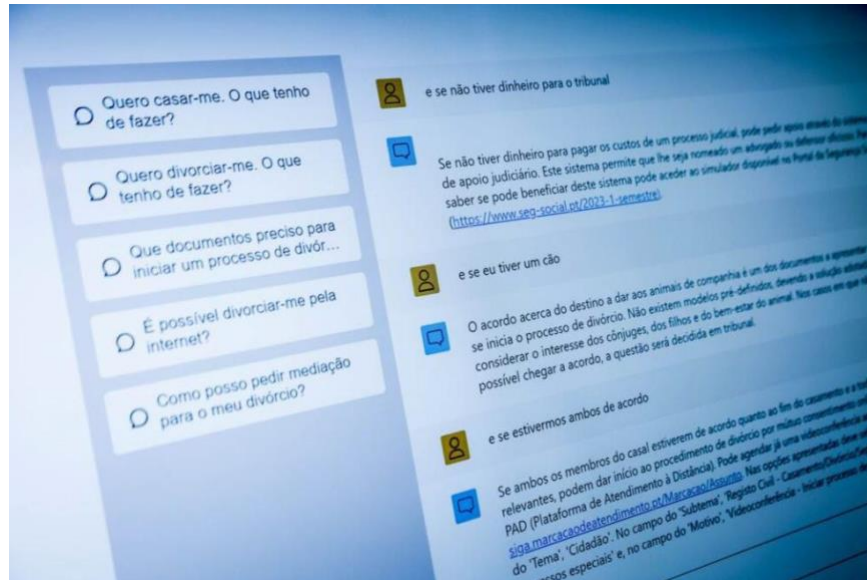
Figure 4   Portuguese judicial user guide program

4.   Creating intelligent livelihood projects

Large models demonstrate excellent performance in fields relevant to the people's livelihoods, such as education and healthcare. OpenAI officials report that ChatGPT-4 surpasses 89% of human candidates in mathematics scores on the SAT, the U.S. college entrance examination. ChatGPT-4 and Med-PaLM 2 (a medical LLM developed by Google) have both passed the United States Medical Licensing Examination. At present, governments in many places use large model technology to optimize people's livelihood services in education, healthcare, and employment.

First, helping to build intelligent education. For example, the **Taiwan regional main oversight departments for educational affairs** have leveraged large model technology and speech recognition synthesis technology to develop the CoolE Bot thematic scenario-based English chat robot to help primary and secondary school students improve their English. **Taipei City** used ChatGPT to develop an automatic question generation system and AI teaching assistant on its online education platform "CooC-Cloud" to reduce teachers' workload and track students' online learning status. **Tainan City** used ChatGPT to develop a generative AI-assisted learning intermediary platform, which has functions such as asking questions to guide teaching, filtering out inappropriate information, analyzing and recording the learning process, and instantly diagnosing learning results. It assists teachers and students in lessons on programming, English, literature and art creation, and other related subjects. The **Indian** government used the course repository of the national teaching platform DIKSHA to train ChatGPT and then integrated it with online translation software to

create a local language course knowledge acquisition platform for students and promote the democratization of local education.

Second, improving the level of intelligentization in medical and health services. For example, the HIV.gov website of the **U.S. Department of Health and Human Services** uses LLMs to process and analyze data from the Centers for Disease Control and Prevention to assist in decision-making. Synapxe, a health information system company directly under the **Ministry of Health of Singapore**, used GPT tools in the Microsoft Azure cloud to develop a professional GPT platform for healthcare personnel, providing disease care plans for patients and helping doctors track patients' medication use and changes in health status.

Third, providing employment guidance services. Large models have powerful data analysis capabilities and can accurately match the individual characteristics of job seekers with employers' job requirements. They can also further analyze job market data and provide reliable data support for government employment policy formulation. For example, **Singapore's Ministry of Manpower** used ChatGPT and open-source frameworks to create a career assistant that not only achieves two-way accurate recommendations of both job seekers and positions, but also generates personalized resume summaries for job seekers based on specific positions.

5. Strengthening national defense S&T power

The United States has explored the application of large model technology in two major national S&T innovation programs: national defense and security, and aerospace.

The U.S. Department of Defense (DoD) continues to promote the monitoring and exploration of large model applications in the field of national defense and security. In January 2023, the DoD Defense Information Systems Agency (DISA) included generative AI technology in the 2023 Tech Watchlist to increase the DoD's awareness of the potential of new technologies in improving intelligence, operational planning, and administrative business processes. In June, the Pentagon stated that it was joining forces with academia and business to jointly train and develop a multi-modal large model system specially customized for the DoD. At the same time, the DoD is testing a variety of generative AI models in its "Global Information Dominance Experiments." It aims to use new technologies to enhance the capabilities of the U.S. military's Joint All-Domain Command and Control operations structure. In August, the U.S. Marine Corps Systems Command pushed forward the development of a dedicated large-scale chatbot to enhance the capabilities of its decision support system.

NASA is developing a ChatGPT-like aerospace AI assistant, which can not only provide conversational operational guidance for astronauts, but can also improve the efficiency of spacecraft malfunction detection and repair. In addition, NASA employees

are also testing and evaluating the feasibility, accuracy, and cost of using ChatGPT for code writing and research summarization.

(iii) Deployment methods are diverse and there is still no unified path

Due to different risk tolerance levels, government innovation traditions, national conditions and policies, and other factors, governments of various countries adopt different deployment methods for large models, and no unified model has yet been formed. Based on factors such as data security, compute stability, and deployment costs, the current deployment methods adopted by major countries can be roughly divided into three categories: paid subscription, customized deployment, and the creation of dedicated government models.[13]

1. Paid subscription

Paid subscription means that government agencies or civil servants directly access a public third-party AIGC platform, or call mature large-model products on the market through enterprise services. Seven regions, including Japan, adopt the paid subscription model. The Ministry of Agriculture, Forestry and Fisheries of Japan, the U.S. House of Representatives, the Cambodian Digital Government Committee, and the UK, Denmark, Israel, Canada, and other governments allow their civil servants to directly use ChatGPT for daily office affairs. From June to July 2023, Microsoft concluded partnerships with the U.S. and Japanese governments to provide them with services to call ChatGPT through the Microsoft Azure intelligent cloud platform.

Adopting a paid subscription model can reduce government financial investment and speed up the transformation of government governance enabled by new technologies, but it also has serious drawbacks. **First, the security risks are relatively high**. The existing large model platforms or tools on the market still have technical vulnerabilities, and data security incidents occur from time to time. Government information can be highly classified and improper use can very easily lead to major risks such as data leaks and infringement on privacy. **Second, the degree of personalized service is low**. The corpus materials used to train existing large models mainly come from public data such as Wikipedia and social media platforms, and specialized government affairs knowledge makes up only a small proportion. The model capabilities are not closely aligned with the governance activities of government agencies, and application scenarios for government are relatively limited.

2. Customized deployment

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[13] References Roland Berger's classification of large model deployment methods in *The Road to Enterprise Applications of Generative Artificial Intelligence*, October 2023.

Customized deployment refers to training and fine-tuning models on the foundation of a general purpose large model combined with data and knowledge bases from the government domain[14]. The resulting model is deployed on government proprietary servers to improve the professionalism of responses and data security. Nine countries and regions, including Singapore, adopt the customized deployment model. Malaysia, the UAE, Qatar, South Korea, the United States, and other countries and regions have embedded ChatGPT into existing government service systems or government portals, using large model technology to improve the personalized service capabilities of government systems. Singapore, India, Portugal, and others have used large model technology capabilities to develop special software for government offices, people's livelihood services, and other scenarios so as to improve government service efficiency and optimize the service experience of the public.

Customized deployment is more secure and more personalized than the paid subscription model. **First, the application scenarios are better suited to the government domain**, extending from general knowledge Q&A and public text generation to government document writing, government service Q&A, legal policy consultation, and other scenarios, and the degree of personalization in these scenarios has been improved. The more in-depth nature of these application scenarios means that the government needs to use government data to fine-tune the model for the corresponding scenarios. For example, the policy advisory system for vulnerable groups developed by the Ministry of Electronics & Information Technology of India, the "Practical Guide to Justice" developed by the Ministry of Justice of Portugal, and the large-model chatbot project of the Singapore Government Technology Agency all use government data for model tuning. **Second, these large models have greater access to government information, prompting governments to take measures to reduce security risks.** Three general approaches are taken to promote data security: The first is to set up dedicated equipment. For example, Japan's Digital Agency partnered with Microsoft to set up high-processing power equipment used in large-scale AI model products in government data centers to process classified government information. The second is independent data storage. For example, when the United States and Singapore use large model tools, the data is stored in the government cloud and a confidentiality agreement is set up to ensure that the data is not obtained by enterprises. The third is to set up a secure testing environment. For example, Singapore has set up an AI innovation sandbox to provide the public sector with pre-trained generative AI models and elementary code development tools. Institutions can

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[14] McKinsey: Fine-tuning is the process of adapting a pretrained foundation model to perform better in a specific task. This entails a relatively short period of training on a labeled data set, which is much smaller than the data set the model was initially trained on. This additional training allows the model to learn and adapt to the nuances, terminology, and specific patterns found in the smaller data set.

build and test their own AI solutions in a dedicated cloud environment, which implements risk control.

3. Creation of dedicated government models

"Dedicated government models" refers to building an internal generative AI system from scratch based on domain-specific large data sets in order to create exclusive large models suitable for the government domain. This generally requires strong financial capabilities and R&D talent support. Currently, only the U.S. DoD and NASA have claimed to adopt the third model, but their models have not yet been implemented. The U.S. DoD stated that the Pentagon will not purchase ready-made products or rely on industry to provide solutions, but will use DoD data to train customized systems. NASA also claims to be independently developing dedicated AI models for spacecraft use. The dedicated large model is trained and developed by the government, and all steps in the process are controlled by the government to meet safety and compliance requirements. At the same time, however, this approach may bring higher development costs, and the training on exclusive data may also make the emergent abilities and generalized capabilities of such large models insufficient, so their degree of intelligentization will be compromised to a certain extent.

Generally, the deployment method adopted is closely related to factors such as national conditions, policies, cultural background, technical capabilities, and deployment costs. Taking Japan as an example, two factors have driven it to adopt the paid subscription model. First, the COVID-19 epidemic exposed the serious problem of Japan's low level of digital society construction, forcing the government to accelerate the acceptance and use of new technologies. Second, Japan is faced with the dilemma of a labor shortage due to its aging population and declining birthrate. It urgently needs the help of automation tools such as large models in various fields to reduce labor costs. Governments that adopt customized models have generally formed good deployment conditions or development foundations from an early stage. For example, the Indian government is promoting the "Digital India" project and focusing on providing services to marginalized groups. The embedding of ChatGPT will help promote the implementation of these projects. The e-government development indexes of the United States, Singapore, South Korea, the UAE, Portugal, and Malaysia are all very high.[15] This gives them the institutional environment and basic capabilities for customized deployment.

(iv) Supporting measures are comprehensive and their intensity continues to

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[15] United Nations Department of Economic and Social Affairs, *United Nations E-Government Survey 2022*, December 2022.

increase

In order to adapt to the needs of the new round of technological transformation and effectively enable the improvement of government governance, major countries are vigorously promoting reforms in government organizations, talent, funding, and other areas and improving supporting measures.

1. Specify a dedicated team for application exploration

Roughly speaking, there are two responses: **One is to clarify the main oversight department (主管部门)**. Generally, the department of the national government in charge of digital transformation and technological innovation is responsible for promoting large model applications. For example, in the UK, the Central Digital and Data Office and the Department of Science, Innovation and Technology are clearly responsible for exploring the use cases, risks, and opportunities of large model technologies. In Australia, the Digital Transformation Agency and the Department of Industry, Science and Resources are clearly responsible for exploring government policies and standards related to the use of new AI technologies. **The other is to form a dedicated team** to accelerate the promotion and use of technology. For example, the Tokyo Metropolitan Government in Japan established a project team responsible for testing the efficiency of ChatGPT use, and discussing and formulating guidelines for the use of government large model technology. The U.S. House of Representatives established an Artificial Intelligence Working Group to test and share information about the use of new AI tools such as ChatGPT in congressional office environments. The U.S. DoD established the AIGC Task Force Lima, which is tasked to "assess, synchronize, and employ" AIGC technology throughout the DoD. In the U.S. White House, the President's Council of Advisors on Science and Technology (PCAST) has established a Working Group on Generative Artificial Intelligence to help assess key opportunities and risks in the use of generative AI by federal agencies and provide input on how to better ensure the development and deployment of the technology.

> **Box 2: The U.S. DoD establishes AIGC Task Force Lima**
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> On August 10, 2023, the U.S. Department of Defense announced the establishment of a new task force dedicated to researching generative AI tools: Task Force Lima. Task Force Lima is part of the DoD's Chief Digital and Artificial Intelligence Office (CDAO) and is tasked to "assess, synchronize, and employ" generative AI technology across the DoD to minimize the potential risks posed by this technology.
>
> On September 27, Task Force Lima stated that it will gain a full understanding of the military's and DoD's requirements for generative AI technology over the next 18 months to speed up the understanding, assessment, deployment, and monitoring of this technology, and then integrate mission-adaptive and relevant technologies at scale. The work of Task Force Lima includes: (1) Comprehensively understand the working principles of AI and the external data application process, focus on the connection between military use cases and combat processes, and cooperate with other departments to train multiple types of LLMs. (2) Develop interim guidelines, frameworks, and workflows based on generative AI for the DoD, and participate in the DoD's actual research and deployment of LLMs. (3) Establish weekly, monthly, and quarterly meeting mechanisms to keep internal personnel of all ranks informed of the plans and methods being developed by Task Force Lima. (4) Issue a request for information (RFI) to industry to understand and explore the risks and benefits of innovative AI development and integration.
>
> Source: Compiled based on online news articles

2. Improve the artificial intelligence literacy of public officials

Two methods are generally adopted: **The first is to introduce third-party technical capabilities into government departments**. For example, the UK Cabinet Office plans for the temporary assignment of data and AI experts from the private sector, while forming a team of civil servants responsible for government automation technology innovation in order to solve the government's technical skill shortage. **The second is to strengthen the training of civil servants to improve their understanding of new technologies and their ability to use them.** For example, four states in the United States, including New Jersey and California, jointly established the InnovateUS organization to improve civil servants' generative AI skills through training. Singapore provides ePrimer training courses for civil servants to enhance their understanding of new AI technologies through videos and real case study materials. In addition, Dubai, Taiwan, and other regions have also conducted ChatGPT skills training for civil servants.

3. Enhance technological innovation and application capabilities

The first method is to strengthen investment in and R&D support for large model technology. For example, Japan's Digital Agency plans to spend 330 million yen (approximately $2.35 million) per year to use and promote ChatGPT in government departments. Japan's Ministry of Economy, Trade and Industry has introduced cutting-edge supercomputers to promote the empowerment of various fields by large AI models. The South Korean government has opened a database with 1.5 billion data entries, covering 14 fields such as manufacturing, education, finance, automation, and sports, for AI training. **The second method is to create a social atmosphere conducive to technology application**. For example, Toda City in Japan holds an innovation competition to encourage public officials, citizens, and enterprises to participate in discussing the safe use of ChatGPT in municipal operations. Australia holds a Generative AI for Government Summit, inviting experts from all fields to answer pressing questions about how government agencies should use new technologies.

III. Countries are accelerating the application of large models in government affairs

The application of large models is a "double-edged sword". While promoting changes in government governance, it also brings many security risks. In order to cope with the impact of this change, governments of various countries (and regions) are simultaneously promoting the application of generative AI and issuing relevant regulations for the use of generative AI by government agencies in an effort to make the application of new technologies safe, beneficial, trustworthy, and controllable.

(i) Publish interim guidelines in order to promote compliance

As of October 2023, nine countries, including South Korea, Singapore, the United States, the UK, Australia, New Zealand, Japan, Canada, and Denmark, had introduced special governance regulations for the use of generative AI by government agencies. Some regions in the United States and Japan have also issued detailed regulations or requirements to guide local civil servants in the rational use of new AIGC technologies. Government use of AI tools tends towards compliance.

Looking at the background of such policies, various countries and regions generally agree that AIGC technology will provide many potential benefits to government agencies and have introduced policies to maximize the application potential of new technologies and encourage local agencies to explore more uses. But at the same time, the rapid development of AIGC technology and its widespread popularity among civil servants have also brought many uncertain risks, forcing

governments to formulate interim policies in a short period of time. The city of Seattle noted: "Generative artificial intelligence (AI) systems have become extremely popular and prevalent in a very short amount of time. There is likely interest in using such systems to conduct City business. The field is emergent and rapidly evolving, and the potential policy impacts and risks to the City are not fully understood. Use of generative AI systems with the City of Seattle, therefore, can have unanticipated and unmitigated impacts. This Interim Policy is intended to minimize issues that may arise from the use of this technology while additional research and analysis is conducted." The Canadian government also pointed out: "Generative artificial intelligence (AI) tools offer many potential benefits to Government of Canada (GC) institutions. Federal institutions should explore potential uses of generative AI tools for supporting and improving their operations, but they should not use these tools in all cases. Institutions must be cautious and evaluate the risks before they start using them. They should also limit the use of these tools to instances where they can manage the risks effectively."

Looking at the scope of application, the documents mainly regulate internal use within government agencies. The U.S. GSA has expanded the scope of its guidance to contractors of government information systems, the City of Boston has expanded the scope of application to all city agencies and departments except public schools, and the City of San Jose requires all government-related personnel (city civil servants, related vendors, volunteers, etc.) to follow the guideline requirements at work.

Looking at the validity period, countries or regions generally regard the guidelines issued as temporary and transitional policies, which are valid for one year or six months, or are constantly updated based on technological development and applications. This reflects the flexibility of these policies and the agility of governance.

Looking at the regulatory content, the guidelines mainly draw attention to or clarify the risks, use cases, and regulations regarding the use of generative AI by government agencies. Judging from the release timeline, the policy contents of various countries or regions are informed by each other and show a process of gradual improvement. On April 18, 2023, the U.S. city of Seattle took the lead in releasing the world's first interim policy on generative AI applicable to the public sector. This policy set out preliminary requirements for government agencies for obtaining and using AIGC technology and assigned relevant responsibilities. On May 18, the city of Boston issued its first interim guideline, detailing the purpose, principles, examples, and detailed operating specifications for each scenario in the public sector's application of AIGC. In June, the U.S. GSA, the United Kingdom, and Australia released relevant policy specifications, with the level to which the policies applied rising from local to central departments. The content of these policies further clarified requirements for software procurement, security testing, and prohibited usage scenarios, and also

detailed the regulatory responsibilities of each department. In July, the U.S. city of San Jose released a generative AI usage protocol, and for the first time systematically proposed a categorization and grading method for application scenarios. In September, Canada issued guidelines for the use of generative AI by federal agencies. In addition to general risks, it also clarified that excessive reliance on AI may interfere with administrative judgment, stifle creativity, and affect procedural fairness. On October 30, Biden signed the *Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence*, proposing three initiatives to "ensure the government's responsible and effective use of artificial intelligence." The first is to issue guidelines for agencies that use AI, set clear standards to protect rights and security, improve AI procurement, and strengthen AI deployment. The second is to help organizations obtain designated AI products and services faster, cheaper, and more effectively by signing contracts more quickly and efficiently. The third is to accelerate the recruitment of AI professionals. As part of the government-wide AI talent surge plan led by the Office of Personnel Management, the U.S. Digital Service, the U.S. Digital Corps, and the Presidential Innovation Fellows program, agencies will provide AI training for employees at all levels in related fields.

Table 3　Guidelines on the application of AIGC by government agencies issued by major countries (regions)

No.	Country/ Region	Department	Document name	Date of issuance	Validity period
1	South Korea	Ministry of the Interior and Safety	Government Guidelines and Precautions on the Use of ChatGPT	May 2023	—
2	Singapore	Ministry of Communications and Information	Guidelines on the Use of Artificial Intelligence by Civil Servants	May 2023	—
3	United States	GSA	Security Policy for Generative Artificial Intelligence Large Language Models	June 2023	To June 30, 2024.
		DoD	Interim Guidance on Generative AI	November 2023	—
		City of Seattle	Interim Policy on the Use of Generative Artificial Intelligence	April 2023	To October 31, 2023.
		City of Boston	Interim Guidelines for Using Generative AI	May 2023	—
		City of San Jose	Generative AI Guidelines	July 2023	Continually updated

No.	Country/ Region	Department	Document name	Date of issuance	Validity period
		State of Washington	Interim Guidelines for Purposeful and Responsible Use of Generative Artificial Intelligence	August 2023	Regularly reviewed and updated
		New York City	Artificial Intelligence Action Plan	October 2023	Updated as needed
4	United Kingdom	Central Digital and Data Office, Department of Science, Innovation and Technology	Guidance to Civil Servants on Use of Generative AI	June 2023	Reviewed after 6 months
5	Australia	Digital Transformation Agency, Department of Industry, Science and Resources	Interim Guidance on Generative AI for Government Agencies	June 2023	Continually updated
6	New Zealand	Department of Internal Affairs	Initial Advice on Generative Artificial Intelligence in the Public Service	July 2023	May be updated and reviewed
7	Japan	Tokyo Municipality	*Guidelines on the Use of Text Generation AI*	August 2023	May be revised
		Kanagawa Prefecture	*Guidelines on the Use of Generative AI in Kanagawa Prefecture*	August 2023	—
8	Canada	Treasury Board of Canada Secretariat	Guide on the Use of Generative Artificial Intelligence	September 2023	Continually updated
9	Denmark	Data Protection Agency	Guidance on the Development and Use of Artificial Intelligence by Public Authorities	October 2023	—

Source: Compiled from public data

(ii) Clarify key risks, propose management, and control principles

As a new technical tool, the introduction of AIGC into government governance faces multiple risks. Countries have focused on discussing and solving the following four types of issues:

The first is privacy and data security. Government data is highly sensitive and improper use and abuse can easily lead to information leakage. Currently, privacy and data security issues have become the primary concern of governments around the

world in the promotion of the application of large models. Tottori Prefecture in Japan announced on April 20 that it would ban the use of ChatGPT in answering questions, preparing budgets, and formulating policies, and would not allow the computers of civil servants to connect to ChatGPT. The U.S. House of Representatives formulated new regulations on the use of ChatGPT on June 8, allowing members to only use the paid version, ChatGPT Plus, because the Plus version provides the function of "protecting the privacy of important data such as Congressional data," and the regulations also prohibit the input of non-publicly available text content. South Korea's National Intelligence Service prohibits civil servants in various departments from entering any information that is not publicly available when using the GPT system.

The second is unconscious bias and discrimination. AIGC tools may generate content that is discriminatory or unrepresentative, or that contains stereotypes (such as bias related to multiple intersecting identity factors such as gender, race, and ethnicity). Many generative models are trained on Internet data, which is often a source of generative bias. Research by the Canadian Centre for International Governance Innovation pointed out that ChatGPT has political tendencies, and the use of ChatGPT tools for government governance can easily lead to infringement on political value concepts. In March 2023, a U.S. technology ethics organization[16] complained to the Federal Trade Commission (FTC) that GPT-4 was biased and deceptive, and could easily lead to negative associations and harmful stereotypes of marginalized groups. On June 9, U.S. senators from both parties proposed a new bill that requires the disclosure of the government's use of AI in the formulation of key policies in education, employment, and other fields to avoid policy discrimination and bias.

The third is technical credibility and transparency. Research shows that the corpus materials used to train existing large models mainly come from publicly available data such as Wikipedia and social media platforms, and specialized government affairs knowledge makes up only a small proportion.[17] Application of such models in government governance activities is likely to produce inaccurate, incoherent, and incomplete content. A survey conducted by Yokosuka City in Japan on the use of ChatGPT by government agency staff showed that nearly half of the users believed that ChatGPT would produce inappropriate answers and wished that the accuracy of responses could be improved.

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[16] Translator's note: The U.S. "technology ethics organization" referenced here is the Center for AI and Digital Policy (CAIDP).

[17] Alan D. Thompson, WHAT'S IN MY AI?, March 2022.
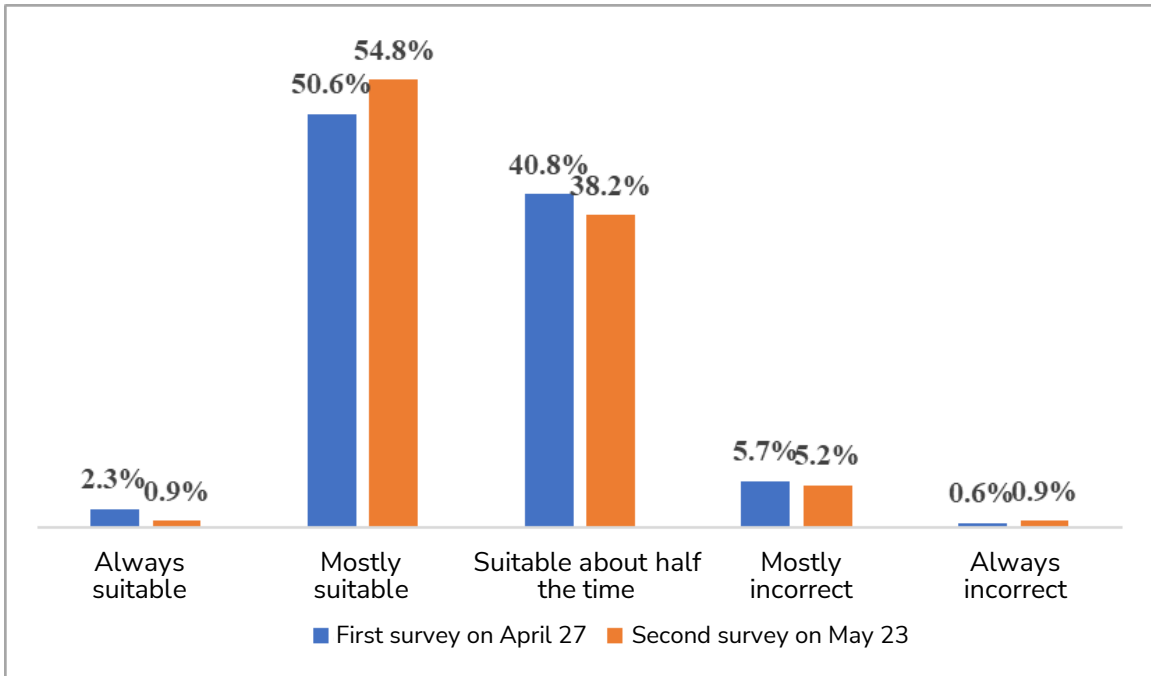
Source: Digital Government Promotion Office, Corporate Planning Department, Yokosuka City, Japan

Figure 5   Survey results from Japan's Yokosuka City government agency personnel on the accuracy of ChatGPT responses

The fourth is technological dependence and impact on procedural fairness. Overreliance on generative AI tools may interfere with the autonomy and judgment of individual civil servants, may strengthen automatic biases, and may also lead to a decline in the critical thinking ability of civil servants, thereby inhibiting innovation and creativity and resulting in the lack of complete and comprehensive policy analysis. In addition, the opacity of generative AI models makes it difficult to track and understand their outputs, potentially undermining procedural fairness in situations where government agencies are obliged to provide the public with the reasons for administrative decisions (such as denying welfare policies). When the public uses generative AI tools (such as chatbots) provided by the government to find information or conduct public communications, they may receive inappropriate content or incorrect information, causing the government to bear unnecessary burdens.

The interim guidelines issued by various countries also focus on the above four risks and propose corresponding management and control principles. **The first principle is to ensure the security of data and privacy.** Governments generally prohibit the input of non-publicly available information, classified information, and citizens' private personal information. The U.S. GSA prohibits staff from privately accessing publicly available, third-party AIGC platforms. Australia and New Zealand require that tools be prevented from saving chat records to prevent large models from

inferring government information from chat records or using the records for secondary training. **The second is to avoid unconscious bias and discrimination**. Governments emphasize that the use of AIGC in the public sector should contribute to the social well-being of people regardless of race, age, sexual orientation, or disability and minimize risks to technologically disadvantaged groups, with continuous testing for biases in data, models, and outputs before deploying systems. **The third is technical credibility and transparency**. Civil servants are generally required to verify and manually review recommendations or decisions obtained through AIGC, and must not rely on the responses provided by the AIGC as the only source of information. If the government applies new technologies that have an impact on the public, it should disclose its use process, clearly inform the public how, when, and why AIGC tools are used, and how potential risks are addressed. **The fourth is the reduction of technological dependence.** Governments emphasize that civil servants should be trained in the application of AIGC, understand the advantages and limitations of such tools, and learn how to create effective prompts and identify potential problems with the output results. The use of AIGC should effectively support the organization's service needs, and AIGC technology may not be the best choice in all situations.

Table 4   AIGC application principles of major countries (regions) in the government domain

Country/Region	Principles and requirements
Canada	1) Fair; 2) Responsible; 3) Safe; 4) Transparent; 5) Trained; 6) Effective
Australia	1) Responsible deployment; 2) Transparency and explainability; 3) Privacy protection and security; 4) Accountability and human-centered decision-making
New Zealand	1) Strongly manage the use of GenAI; 2) Assess and manage privacy risks; 3) Assess and control security risks; 4) Consider partnership with Māori (Māori communities may face higher risks of bias and discrimination in relation to GenAI applications); 5) Use ethically and ensure accuracy; 6) Responsible; 7) Transparent; 8) Use open-source AI with caution; 9) Comply with government procurement principles; 10) Conduct security testing
San Jose, USA	1) Privacy first; 2) Accurate; 3) Transparent; 4) Fair; 5) Responsible; 6) Effective
Boston, USA	1) Authorization; 2) Inclusion and respect; 3) Transparency and accountability; 4) Innovation and risk management; 5) Privacy and security; 6) Public purpose
State of Washington, USA	1) Safe, dependable, and resilient; 2) Accurate and effective; 3) Fair, inclusive, and non-discriminatory; 4) Privacy and data protection; 5) Accountable; 6) Transparent and auditable; 7) Explainable; 8) Public purpose and social welfare
Seattle, USA	1) Protect intellectual property; 2) Transparent and accountable; 3) Reduce bias and harm; 4) Protect data privacy; 5) Keep public records
Tokyo Municipality, Japan	1) Do not input highly classified information such as personal information; 2) Pay attention to copyright protection; 3) Check the generated answers; 4) Make annotations

Source: Compiled from public data

(iii)   Define the scope of scenarios and promote applications in a categorized manner

AIGC empowers a wide range of government governance activities, from policy consultation and program design to service provision. Different audiences and business processes may produce different benefits and risks. Judging from the experience of various countries, the overall governance thinking for the hierarchical categorization of scenarios has generally become clear, but there are still differences in the application specifications for some complex scenarios.

Categorize application scenarios according to the level of risk. Generally, scenarios are categorized in a three-level or two-level system. The city of San Jose in the United States divides application scenarios into three categories: medium risk, high risk, and unacceptable risk based on the two dimensions of "information leak risk" and "adverse impact risk" (see Figure 6). Canada classifies scenarios into three categories: use with caution, can be used, and not suitable for AIGC technology. The UK Cabinet Office divides scenarios into three categories: general examples, specialist examples,

and inappropriate examples. General examples refer to using generative AI to conduct research or summarize information, and specialist examples refer to complex scenarios such as code development and text data analysis. Australia simply divides scenarios into two categories: low-risk situations and unacceptable risk situations. The latter mainly include: the need to input a large amount of government data or classified and sensitive information, provide services or make decisions, and output code for use in government systems. Judging from the categorization results, regardless of whether governments use a two- or three-level method, the two main dimensions are the risk of information leakage and the risk of adverse consequences. Adverse consequences include discrimination, decision-making bias, and inaccurate output information. In addition, South Korea, Boston, Washington State, and other places only list recommended scenarios and do not impose restrictions on scenarios.
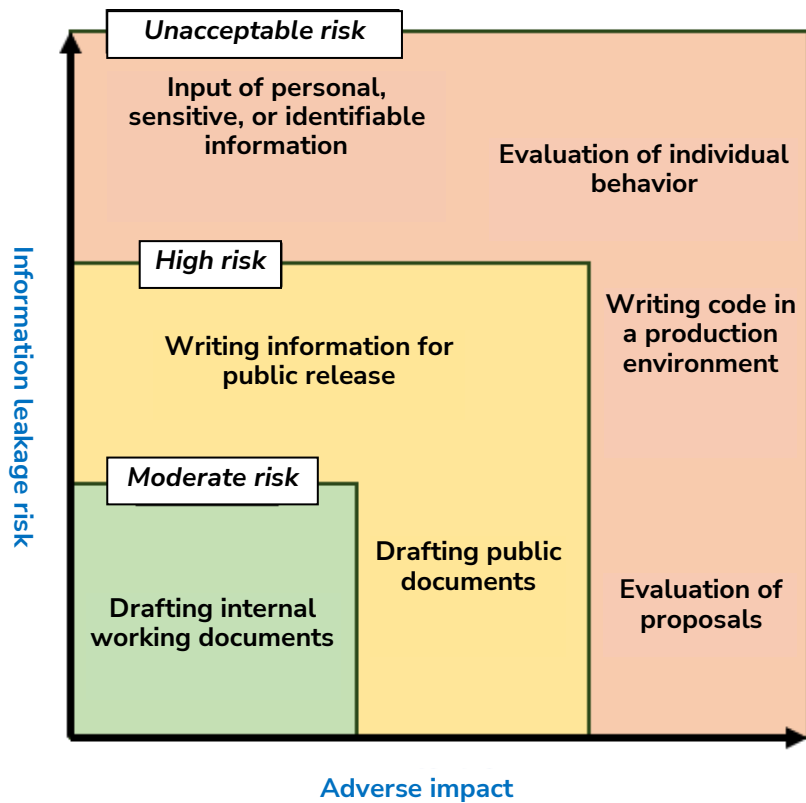
Source: San Jose, USA

Figure 6   AIGC risk matrix for public sector applications

Governments uniformly emphasize that direct use of AIGC tools for public decision-making is not allowed. The Canadian government believes that generative AI may not be suitable for administrative decision-making at this stage because the federal government cannot ensure the transparency, accountability, and fairness of AIGC decision-making. Australia and the City of San Jose emphasize that using AIGC

to directly provide services or make decisions may alter the rights, freedoms, and access to services of individuals or communities, posing unacceptable risks. Since 2023, many states in the United States have expressed concerns about bias in automated decision-making by government agencies using generative AI, and have proposed bills requiring government workers to follow responsible AI procurement and implementation practices. Likewise, OpenAI's terms of use instruct users not to use ChatGPT in making decisions related to credit, employment, educational institutions, or public assistance services. Google prohibits users of its generative AI products from "making automated decisions in domains that affect material or individual rights or well-being."

Countries have different attitudes when it comes to application scenarios such as translation, coding, and speech generation. In **translation scenarios**, the City of San Jose believes that at this stage, LLMs such as ChatGPT are not more suitable for translation than professional translation software such as Google Translate, and their performance has yet to be evaluated by professionals. Therefore, it is prohibited to directly use ChatGPT to translate work documents. Other countries and regions have fewer restrictions on this scenario. In **programming scenarios**, the UK, Canada, and the U.S. GSA believe that tools such as ChatGPT can be used to develop code in scenarios such as the creation of website front-end interfaces, but require manual review of its accuracy, functional effectiveness, security, and other aspects. The Tokyo Metropolitan Government in Japan accepts AIGC applications in macros, VBA, and other simple code generation scenarios. Australia, New Zealand, and the City of San Jose believe that using large models to develop code for government systems is an unacceptable risk because the generated code may be outdated, copyright-protected, or contain vulnerabilities, but large models can be used to check for code vulnerabilities. In **speech generation scenarios**, the city of San Jose prohibited the government from using AI to generate audio during official events, because using AI to replicate a person's voice in any city document or recording could damage the trust of staff and residents in the government, as well as lead to potential legal issues. Other countries and regions have fewer restrictions on this.

(iv)   Establish usage specifications and form a closed loop of supervision

Countries clarify AIGC application specifications in terms of aspects such as institutional mechanisms, deployment environment, and usage behavior, and strive to form a closed-loop regulatory system covering all aspects and entities.

In terms of institutions and mechanisms, one method is to implement prior approval or reporting. The UK and Australia require civil servants to use government work email addresses to register accounts on AIGC platforms. The use of accounts

must be approved by the chief information security officer or data officer. The city of San Jose requires city employees to fill out a registration form and report every time they use tools such as ChatGPT, Bard, or Midjourney. The Tokyo Metropolitan Government in Japan requires that employees fill out a use application form before using AI tools and only use such tools after approval. They should also engage in online learning before using them to master the correct usage method. **A second method is to conduct security risk assessment before use.** The Tokyo Metropolitan Government in Japan conducted an effectiveness verification before promoting the use of ChatGPT, and Australia and New Zealand require security risk assessments to be conducted before applying the technology to specific scenarios. **A third method is to establish a risk tracking and problem feedback mechanism**. The United States, the UK, Australia, and other countries require users to regularly report exceptions in usage procedures to the main oversight agencies. The U.S. GSA monitors Internet communication traffic to understand government departments' access to AIGC platforms and establishes appropriate cybersecurity protection capabilities to achieve controlled access.

In terms of **deployment environment**, except for a few countries and regions, most do not prohibit government agencies from directly using public AIGC tools to carry out work, as long as they comply with relevant usage specifications. Singapore requires that public sector AI solutions be built and tested in a dedicated cloud environment to achieve controllable risks. The U.S. GSA requires localized deployment and specialized evaluation and authorization before AIGC tools can be used. The city of Seattle requires that all software services go through the government procurement process to ensure that the software services have undergone the necessary review. Employees who use generative AI services must submit software service center purchase requirements and obtain departmental approval. The Tokyo Metropolitan Government requires employees to use ChatGPT through Microsoft's "Azure OpenAI" service and requires servers to stop processing personal data to reduce the risk of data leakage caused by the system.

In terms of usage behavior, most countries and regions have detailed lists of "allowed" and "disallowed" behaviors for public officials in their use of AIGC tools. Roughly speaking, these include four requirements. **First, instructions must be explicit and detailed**. Civil servants must correctly master the skills of using AIGC tools. For example, when using AIGC to simplify official documents, they must specify the document audience in the prompt, so that the response output can better meet the requirements. **Second, manual verification of the output results is required.** For example, when converting text, readability verification can be performed through other tools. When generating text summaries, the entire article needs to be manually

checked to ensure that no key information is missed. **Third, keep records of the interaction process** in order to disclose usage behavior and support subsequent internal research and usage statistics. **Fourth, label all generated content**, including the name of the generative AI system used and whether the content has been fact-checked. If AIGC is used in a video, the usage needs to be labeled in each frame.
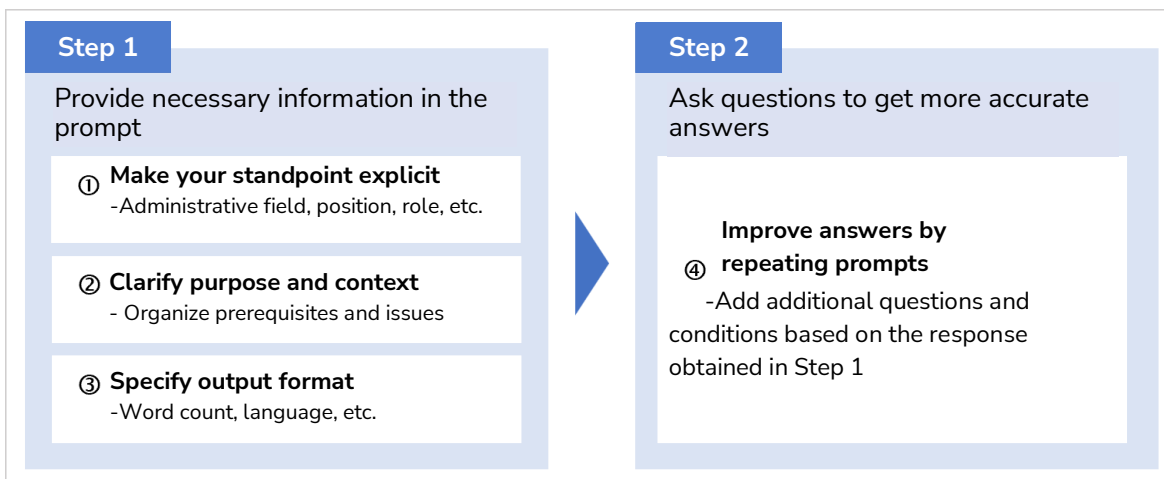
Figure 7   Tips and tricks for civil servants using text-generating AI

IV. Progress in the application of large model technology in the government domain in China

(i) Overall, China is still in the initial stage of exploration

The massive impact of ChatGPT has led Chinese companies to give unprecedented attention to the AIGC track. Major Internet and AI companies are rushing to launch large models and accelerate their entry into the market. As of November 2023, nearly 200 companies in China have released large model products[18], among which more than 30 large model products have passed registration[19]. Some models are already providing service to the public. **The government domain is a hot spot for the vertical layout of large model vendors. According to statistics, there are at least 56 large model vendors in China that have deployed products in the government domain.** Of these, 15 vendors including Baidu, Zhipu AI, iFlytek, SenseTime, the CAS Institute of Automation, Alibaba Cloud, 360, and Kunlun Tech have registered large model products. According to public news, **the application**

[18] Refer to: https://github.com/wgwang/LLMs-In-China, November 2023.

[19] Refer to: Announcement of the Cyberspace Administration of China on the Release of the Second Batch of the Deep Synthesis Service Algorithm Filing List http://www.cac.gov.cn/2023-09/01/c_1695224377544009.htm and public news.

scenarios of large models in the government domain cover 7 types of scenarios, including government office work, official document writing, government services, intelligent justice, intelligent Party building (智慧党建), urban management, and public security.

In terms of the popularity of these scenarios, government service scenarios have attracted the attention of 29 vendors. It is the scenario with the largest number of large model vendors in the government domain and has the fiercest competition. The construction of inquiry systems for government services is the scenario that is most suitable for the dialogue and interaction capabilities of large model products. Huawei, Alibaba Cloud, iFlytek, China Telecom, China Mobile, TRS (拓尔思), TopSight (拓世科技), and other vendors have released solutions for large model-enabled government consultation hotlines and government chatbots. The urban management scenario has attracted the attention of 20 vendors and is a scenario where many vendors have a presence.

In terms of the maturity of different scenarios, urban management and government services are two types of scenarios where large model technology is frequently implemented. In the urban management scenario, SenseTime and Shenzhen's Luohu District worked together to create a large model "AI Intelligent Visual Analysis Platform" to help improve the efficiency of urban operations management. Huawei cooperated with the Xi'an City Government to add the "Smart Brain" of the "Pangu" ("盘古") Computer Vision (CV) large model to all cameras to achieve minute-level automated handling of abnormal events. PCI (佳都科技) and Chongqing Municipality jointly developed a large model for the urban transportation industry to promote smart urban transportation management. In the government service scenario, Baidu partnered with Wuxi City to create the 12345 intelligent Q&A assistant and government digital person to support a "one network for everything" ("一网通办") for government services. Shenzhen's Longgang District applies Intellifusion's (云天励飞) "Tianshu" large model to the construction of government service consultation systems. The Xiamen City Bureau of Human Resources and Social Security released the 12333 smart government model, which uses AI intelligent agents to replace human agents in providing advice services. In addition, large model applications in intelligent justice, public security, and other fields are also seeing initial explorations.

In terms of deployment methods, vendors generally develop customized models based on a general large model that is fine-tuned with data from the government domain.
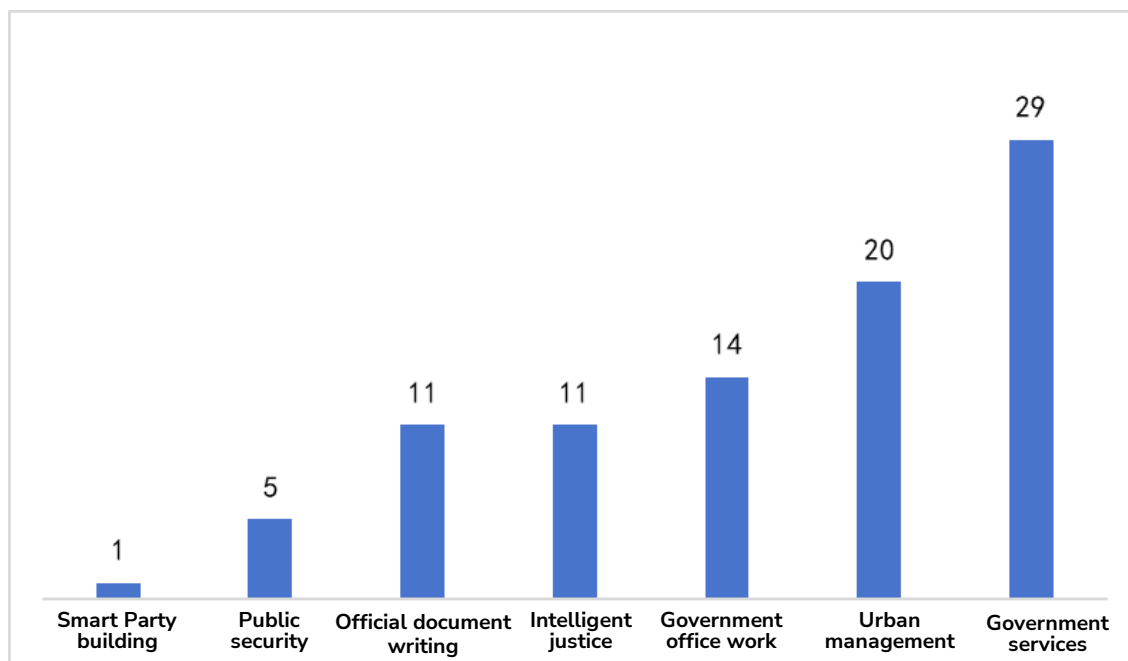
Figure 8   Distribution of vendors participating in the government domain

Table 5   Layout of domestic large model vendors in the government domain

No.	Enterprises:	Large model name	Province/ Municipality	Relevant government scenarios	Has been registered
1	Baidu	ERNIE Bot (文心一言)	Beijing	Urban management, government office work, official document writing, government services	Yes
2	Zhipu AI	ChatGLM (清言)	Beijing	Government services	Yes
3	DataGrand (达观数据)	Cao Zhi (曹植)	Shanghai	Official document writing	
4	iFlytek	Spark (星火)	Hefei, Anhui	Government office work, government services, intelligent justice	Yes
5	SenseTime	SenseChat (商量)	Shanghai	Government office work, official document writing	Yes
6	CAS Institute of Automation	Zidong Taichu (紫东·太初)	Beijing	Intelligent justice	Yes
7	Alibaba Cloud	Qwen (通义千问)	Hangzhou, Zhejiang	Urban management, government services	Yes
8	Huawei	Pangu (盘古)	Shenzhen, Guangdong	Smart city, government services, government office work, decision-making assistance	Yes

No.	Enterprises:	Large model name	Province/ Municipality	Relevant government scenarios	Has been registered
9	Beijing Academy of Artificial Intelligence (BAAI)	Wu Dao Aquila (悟道·天鹰) Wu Dao Emu (悟道 Emu)	Beijing	Government services	Yes
10	Zhejiang University	wisdomInterrog -atory (智海-录问)	Hangzhou, Zhejiang	Intelligent justice	
11	Tencent (腾讯)	Hunyuan (混元)	Shenzhen, Guangdong	Urban management, government office work, official document writing, government services	Yes
12	Unisound (云知声)	Shanhai (山海)	Beijing	Government services, scientific decision-making, urban management	Yes
13	360	Smart Brain (智脑)	Beijing	Public security, urban management, government office work, government services	Yes
14	Peking University School of Electronic and Computer Engineering	ChatLaw	Beijing	Intelligent justice	
15	Xiaoduo (晓多科技) + National Supercomputing Center in Chengdu (国家超算成都中心)	XPT (晓模型)	Chengdu, Sichuan	Government services	
16	Kunlun Tech (昆仑科技)	Skywork (天工)	Beijing	Urban management	Yes
17	Beijing Jiaotong University	TransGPT (致远)	Beijing	Urban management	
18	Zhuiyi Technology (追一科技)	Bowen (博文)	Shenzhen, Guangdong	Government services, government office work, official document writing	
19	Metabrain AGI (智子引擎)	Chatimg (元乘象)	Nanjing, Jiangsu	Urban management	
20	TopSight (拓世科技)	TopSight (拓世)	Nanchang, Jiangxi	Urban management, government services, public security	
21	4Paradigm (第四范式)	SageRA (式说)	Beijing	Intelligent justice	
22	TRS (拓尔思)	Tuotian (拓天)	Beijing	Government office work, official document writing, government services	

No.	Enterprises:	Large model name	Province/ Municipality	Relevant government scenarios	Has been registered
23	CloudWalk (云从科技)	Congrong (从容)	Guangzhou, Guangdong	Government services, urban management	Yes
24	IEIT Systems (浪潮信息)	Yuan (源)	Jinan, Shandong	Government services, government office work	
25	Wenge Group (Zhongke Wenge; 中科闻歌)	YaYi (雅意)	Beijing	Government services, scientific decision-making, urban management	Yes
26	Langboat Technology (澜舟科技)	Mengzi GPT (孟子)	Beijing	Government services	
27	JD.com (京东)	ChatRhino (言犀)	Beijing	Government services	Yes
28	Xiao-i (智臻智能)	Hua Zang (华藏)	Shanghai	Government services	
29	SDIC Intelligence (Meiya Pico; 美亚柏科)	Tianqing (天擎)	Xiamen, Fujian	Public security	
30	Shandong University	fuzi.mingcha (夫子·明察)	Jinan, Shandong	Intelligent justice	
31	DIIT (数慧时空)	Great Wall (长城)	Beijing	Urban management	
32	CETC Taiji (电科太极)	Xiaoke (小可)	Beijing	Government office work, official document writing, government services	
33	China Mobile	Jiutian Zhongqing (九天·众擎)	Beijing	Government office work, official document writing, urban management	
34	China Telecom	TeleChat	Beijing	Government services	
35	Midu (蜜度)	Wenxiu (文修)	Shanghai	Official document writing	
36	CEC Cloud (中国电子云)	Xingzhi (星智)	Wuhan, Hubei	Government office work, government services	
37	WAYZ (维智)	CityGPT	Shanghai	Urban management	
38	PCI (佳都科技)	PCI Zhixing (佳都知行)	Guangzhou, Guangdong	Urban management	
39	Jcubing (今立方)	12333	Xiamen, Fujian	Government services	
40	Kriston.AI (快商通)	Hanchao (汉朝)	Xiamen, Fujian	Government services, intelligent justice	
41	UniTTEC (众合科技)	UniChat	Hangzhou, Zhejiang	Urban management	
42	UCAP (开普云)	Kaiwu (开悟)	Dongguan, Guangdong	Government office work, official document writing, scientific decision-making	
43	H3C (新华三)	LinSeer (百业灵犀)	Hangzhou, Zhejiang	Government office work, urban management, government services	

No.	Enterprises:	Large model name	Province/ Municipality	Relevant government scenarios	Has been registered
44	AInnovation (创新奇智)	AInnoGC (奇智孔明)	Qingdao, Shandong	Urban management	
45	Dahan Software (大汉软件)	Galaxy (星汉)	Nanjing, Jiangsu	Government services, official document writing, urban management	
46	Dataway Horizon (零点有数)	Lingdian Kaimo (零点楷模)	Beijing	Government services, government office work, urban governance	
47	Shenzhen Power Supply Bureau (深圳供电局)	Zhurong 2.0 (祝融 2.0)	Shenzhen, Guangdong	Urban management	
48	University of Science and Technology of China	UniDoc	Hefei, Anhui	Government office work, official document writing	
49	Hanvon (Hanwang Technology; 汉王)	Tiandi (天地)	Beijing	Intelligent justice	
50	State Cloud (天翼云)	Huize (慧泽)	Beijing	Government services, official document writing, urban management	
51	Behavioral and Spatial Intelligence Laboratory, Peking University (北京大学行为与空间智能实验室)	PlanGPT	Beijing	Urban management	
52	CETC Digital Technology (中科数字)	Zhiyi (智弈)	Shanghai	Smart Party building	
53	Intellifusion (云天励飞)	Tianshu (天书)	Shenzhen, Guangdong	Government services, intelligent justice, urban management	
54	Southeast Institute of Information Technology, Beijing Institute of Technology (北京理工大学东南信息技术研究院)	MindLLM (Ming De LLM; 明德)	Putian, Fujian	Intelligent justice	
55	Dahua Technology (大华股份)	Xinghan (星汉)	Hangzhou, Zhejiang	Government services, intelligent justice, official document writing	
56	DAS-Security (安恒信息)	Hengnao (恒脑)	Hangzhou, Zhejiang	Public security	

Source: Compiled from public data

(ii)   Policy specifications still need to be refined and improved

In July 2023, seven departments including the Cyberspace Administration of China (CAC) jointly announced the *Interim Measures for the Management of Generative Artificial Intelligence Services* (hereinafter the *Interim Measures*),[20] clarifying the implementation of inclusive, prudent, and categorized and graded (分类分级) supervision for generative AI services and stipulating regulations for generative AI services to encourage the innovative application of generative AI technology in various industries and fields, to generate positive, healthy, and beneficial high-quality content, to explore and optimize application scenarios, and to build an application ecosystem. In the government domain specifically, there are currently no special documents regulating the use of AI technology by government departments. Based on practice, various regions and departments have put forward a number of requirements in order to promote development and standardize applications. Generally speaking, the content is relatively scattered.

In terms of promoting application, multiple places have issued documents to clarify the application directions of large models in the government domain and strengthen guidance and support. AI policies or action plans issued by Beijing, Shanghai, Hangzhou, Shenzhen, and other places clearly mention promoting the application of large models in the government domain, require government affairs to be listed as a demonstration application vertical field for large models, and call on cities to take the lead in making breakthroughs and creating benchmarks for large model products and services. In terms of scenario requirements, government service inquiry-related scenarios such as government hotlines and smart customer service, as well as people's livelihood scenarios such as urban governance, healthcare, and education, are widely regarded as key directions for the application of large model technology. In terms of application promotion, a variety of support methods that integrate software and hardware have been adopted. Hangzhou and Anhui require accelerating the creation of large vertical industry models in the government domain. Jiangxi proposes to build the country's first province-wide unified AI panoramic intelligent public service generative pre-trained transformer (GPT) platform. Beijing supports large model vendors in deploying scenario applications in the government domain by recruiting government general purpose AI innovation partners, publishing typical application case and scenario requirements, compiling industrial innovation maps, and conducting competitions to solicit application cases. Shanghai, Beijing, Jiangxi, Anhui, and other places support the training and application of large models in

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[20] Translator's note: An English translation of the *Interim Measures for the Management of Generative Artificial Intelligence Services* is available online at: https://www.chinalawtranslate.com/en/generative-ai-interim/.

the government domain by issuing compute vouchers (算力卷).

Table 6　Policies for the application of large models in the government domain issued by various regions in China

Region	Period	Name of policy	Relevant requirements
Beijing	May 2023	*Several Measures to Promote the Innovation and Development of General Purpose Artificial Intelligence in Beijing Municipality* (北京市促进通用人工智能创新发展的若干措施)	Utilize the capabilities and advantages of AI in semantic understanding, autonomous learning, and intelligent reasoning to improve the level of intelligent Q&A in government consultation systems
	June 2023	Haidian District, *Several Measures to Accelerate the Innovation and Development of Artificial Intelligence Large Models in Zhongguancun Science City* (关于加快中关村科学城人工智能大模型创新发展的若干措施)	Encourage the demonstration and application of new technologies and products such as independently controllable (自主可控) large models in various vertical fields including but not limited to healthcare, urban management, and consumer services.
	October 2023	*Artificial Intelligence Computing Power Voucher Implementation Plan (2023-2025)* (人工智能算力券实施方案（2023—2025 年）)	Support enterprises in leasing intelligent compute resources from unrelated parties to conduct industrial AI large model training and application in the fields of government affairs, healthcare, education, legal affairs, transportation, cultural tourism, scientific research, urban management, and convenience services.
Shanghai	March 2023	*Key Points for Shanghai to Comprehensively Deepen "One Network for Everything" Reform Work in 2023* (2023 年上海市全面深化"一网通办"改革工作要点)	Explore the use of new technologies such as natural language large models to continuously optimize the intelligent retrieval, user intent recognition, multi-round conversation, and accurate answer push capabilities of the intelligent customer service bot "Xiao Shen" ("小申")
	November 2023	*Several Measures to Promote the Innovation and Development of Large-Scale Artificial Intelligence Models in Shanghai Municipality (2023-2025)* (上海市推动人工智能大模型创新发展若干措施（2023-2025 年）)	Focus on supporting the construction of demonstration application scenarios in the fields of smart manufacturing, autonomous driving, robots, and digital government and creating benchmark large-model products and services
Hangzhou	July 2023	*Opinions of the General Office of the Hangzhou City People's Government on the Implementation of Accelerating the Innovation and Development of the Artificial Intelligence*	Accelerate the implementation and application of AI models, implement model innovation and application benchmarking pilot projects, and promote the deployment and use of special models in urban governance, government services, the real

Region	Period	Name of policy	Relevant requirements
		Industry (杭州市人民政府办公厅关于加快推进人工智能产业创新发展的实施意见)	economy, financial institutions, and other fields
Shenzhen	May 2023	*Shenzhen City Action Plan to Accelerate the High-Quality Development of Artificial Intelligence and High-Level Applications (2023-2024)* (深圳市加快推动人工智能高质量发展高水平应用行动方案（2023—2024 年）)	Encourage all districts to take the initiative in the fields of public services and urban governance and actively create conditions to carry out full-scale and full-time AI application demonstrations
Anhui	October 2023	*Anhui Province Three-Year Action Plan for General Purpose Artificial Intelligence Innovation and Development (2023-2025)* (安徽省通用人工智能创新发展三年行动计划（2023—2025 年）)	Focusing on smart office, smart government affairs, smart education, smart healthcare, and smart political and legal affairs (政法), accelerate the development of vertical industry large models based on foundational cognitive intelligence large models.
	November 2023	*Several Policies to Create a Bastion of Innovation and Application of the General Purpose Artificial Intelligence Industry* (打造通用人工智能产业创新和应用高地若干政策)	Promote applications in scenarios such as government governance, society and people's livelihood, and industrial upgrades to the greatest extent feasible; carry out provincial "Top Ten" general purpose AI scenario application benchmarking and evaluation
Jiangxi	August 2023	*"Jiangxi Service Channel" Version 6.0 Construction Work Plan* ("赣服通" 6.0 版建设工作方案)	Actively use modern information technologies such as AI, big data analysis, and generative AI to build China's first province-wide unified AI panoramic intelligent public service GPT platform

Source: Compiled from public data

In terms of regulation development, existing policies mainly put forward some requirements for the government's use of AI technology as it relates to personal information protection and government data security. The *Data Security Law* has a special chapter to regulate the security of government data, which states that when state agencies need to collect and use data to perform their statutory duties, they should do so within the scope of their statutory duties and in accordance with the conditions and procedures stipulated in laws and administrative regulations. Entrusting others to build and maintain e-government systems and store and process government data must be subject to strict approval procedures, and the entrusted party shall not retain, use, leak, or provide government data to others without authorization. The *Personal Information Protection Law* requires that state agencies handle personal

information within the scope of their authority specified in administrative regulations and must not exceed the scope and limits necessary to perform their statutory duties. There are no detailed requirements regarding ethical norms, algorithm transparency, algorithm responsibility, or algorithmic bias in the government's application of AI technology. Although the *Interim Measures* put forward general requirements for generative AI services, it applies to entities that use generative AI technology to provide generated text, images, audio, video, and other content services to the public in the People's Republic of China (PRC). The provisions of these measures do not apply if generative AI services are not provided to the public in China. Government actions include not only external service provision scenarios, but also internal decision-making and regulatory actions, so the requirements of the *Interim Measures* do not apply to all scenarios. In the future, as practices advance, it will be necessary to accelerate the exploration of normative requirements for the application of new technologies and new applications such as AI in the government domain, and to refine and form industry norms.

(iii)   Example application practices in China

1.   China Telecom's large government affairs model supports the "Heart of Guangdong" government affairs service platform

China Telecom's large government affairs model is a pre-trained large model for the government affairs industry. It adopts the "pre-training and fine-tuning" strategy. Based on a foundation model, it uses the knowledge base of Guangdong's "Heart of Guangdong" ("粤省心") government affairs service along with provincial and city policy documents as a large-scale corpus, fine-tuning the model to better adapt to government affairs scenarios and equip it with local government affairs knowledge. At the same time, engineering adaptation development is carried out in connection with customer service business processes, giving the model Q&A interaction capabilities that are better suited to customer service scenarios.

China Telecom's large government affairs model provides three major intelligentized scenarios for citizens, customer service agents (坐席), and government decision-makers, respectively. For citizens, the large model-based online intelligent customer service provides a better Q&A experience, reduces the time spent waiting in line, and provides government service guidance functions to guide citizens to complete service processes by "asking and doing at the same time." For customer service agents, it intelligently empowers the entire agent process and provides capabilities such as knowledge recommendation, intelligent form filling, intelligent form sending, intelligent quality inspection, and intelligent follow-up visits to improve agent efficiency. For government decision-makers, through ticket information mining, it

provides decision-making support along with analysis and judgment capabilities, quickly discovers hot-button events, and helps the government better analyze situations and make better decisions.

At present, China Telecom's large government affairs model has been applied to the "Heart of Guangdong" government affairs service platform, where it has achieved remarkable results. Through large model pre-training and fine-tuning, the "Heart of Guangdong" intelligent customer service's response accuracy in the government domain has reached more than 90%, effectively improving the user experience and government service efficiency. For the hotline, the use of the large-scale government model reduces the degree of manual participation in hotline services, effectively alleviating the pressure to increase staff brought about by the annual increase in the call volume to the "Heart of Guangdong" hotline.

2. The Jiutian Haisuan government affairs large model empowers the construction of digital government in Heilongjiang

The Jiutian Haisuan (九天•海算) government affairs large model is an industrial model for the government domain built by China Mobile based on the wealth of experience in digital government construction it has accumulated in recent years. Relying on the Jiutian Haisuan government affairs large model, the government service system will have strong capabilities to understand government affairs, multi-dimensional information correlation capabilities, and diverse interaction capabilities suited to complex matters and complex processes. At present, the Jiutian Haisuan government affairs large model has been implemented in multiple digital government construction scenarios in Heilongjiang Province.

First, it is an intelligent government affairs assistant. In order to effectively improve the government's integrated government service capabilities and create the friendliest intelligent personal assistant for government affairs, the government is uniformly building a provincial-level and prefecture-level city (地市) government service network intelligent customer service and government service mobile terminal intelligent customer service system based on the Jiutian Haisuan government affairs large model. This system will perform 26 functions, including precise intelligent Q&A, the country's first intelligent administrative guidance (导办), intelligent recommendations customized for each individual, and convenient and fast voice interaction so as to provide a quick and convenient intelligent customer service experience for the 31 million people of the province. So far, 107,100 online Q&A service processes have been completed for individuals/legal persons across the province, covering multiple industries and fields such as government services, healthcare, education, transportation, and finance, with a Q&A satisfaction rate of

98.7%.

Second, it is a dashboard assistant for government affairs. In order to better improve the interactivity, ease of use, and intelligent analysis capabilities of dashboard displays, the Heilongjiang Provincial Digital Government Project has introduced a digital human intelligent broadcasting system based on the Jiutian Haisuan government affairs large model. This digital human can broadcast and interpret relevant content on the dashboard through voice dialogue with the user. With the introduction of a digital human, users no longer need to manually switch pages to search for data. They simply need to ask questions, and the digital human can quickly search for and report the results within 1 second, greatly improving productivity. Currently, this digital human can answer 6,000+ government affairs questions, with an accuracy rate of over 85%.

Third, it is a "Heilongjiang Government Intelligent Search" ("龙政智搜") engine. Using the digital government indicator database, data resource database, policy and regulations database, and other resources as channels, the model gathers government affairs data from various departments across the province, builds a label system for the gathered data, and uses LLM technology to realize natural language queries. This allows users to query the data they need anytime, anywhere. At present, the "Heilongjiang Government Intelligent Search" engine supports intelligent search for data in eight major modules, including government services, government information release, and economic operations. It supports multiple search methods such as fuzzy search, trend search, and time and space dimension search as well as various display methods such as chart display, personalized chart customization, and data drill-down. It provides convenient functions such as smart search hotspots, associative search, and government affairs trending keyword word clouds to provide greater convenience to users.

3.   Huawei's Pangu government affairs large model creates the government smart assistant "Xiaofu"

Huawei has partnered with the Futian District Government Service Data Management Bureau in Shenzhen City to create the Futian government smart assistant "Xiaofu" ("小福") based on Huawei's Pangu government affairs large model. This revolutionizes the traditional "one network for everything" model by using AI to accurately capture communication dialogue fields, accurately understand residents' consultation intentions, convert the spoken language of ordinary people into the language of government services, improve the efficiency of government affairs processing, and enhance residents' service experience. The Pangu government affairs large model is fine-tuned on more than 200,000 government affairs data points,

including 12345 hotline data, policy documents, and government affairs wikis. It has mastered a wealth of industry knowledge such as laws and regulations and service processes, empowering government affairs business to advance from local intelligence (局部智能) to ubiquitous intelligence and providing scenario model capabilities such as a government intelligent service assistant, 12345 hotline agent assistant, and enterprise business assistance to realize the intelligentized construction of government inquiries (问政), burden reduction, and policy planning (谋策).

First, it creates an intelligent task assistant. Using context-related recommended service portals, the conversation assistant searches for existing knowledge and experience based on prompts, generates the answers to questions, and improves the accuracy of task item identification. In scenarios involving applications, the assistant uses element extraction to provide reference cases that precisely match along with conversation-based auxiliary services. It intelligently identifies the key points where approval is required so as to achieve "one click at most" (最多点一次).

Second, it creates an intelligent 12345 hotline agent assistant. Based on the basic capabilities of the Pangu government affairs natural language processing (NLP) large model, it provides knowledge/communication recommendations, Q&A generation, form-filling assistance, and intelligent categorization and assignment. This way, it satisfies the intelligent integration and acceptance requirements of the entire 12345 process from consultation response to quality inspection and archiving, shortens the time it takes customer service agents to fill out forms, and enables accurate incident assignment and intelligent ticket dispatch.

Third, it helps enterprises do business. Through policy learning and intelligent deduction, it assists the government in formulating preferential policies for enterprises. Through end-to-end deduction analysis, it assists the government in tailoring preferential policies to enterprises, enabling policy deduction and prediction beforehand, improving policy fulfillment rate during implementation, and supporting post-hoc analysis of redemption results. This allows the government to make enterprise-related policies more inclusive and services more precise.

4.   iFlytek helps Shanghai's Tangqiao subdistrict build a new paradigm of large model + grassroots governance

In August 2023, iFlytek's Spark (星火) digital social engineering system was officially released, building a "1+N model"—1 Spark large model platform and N business applications. Oriented toward the three major areas of grassroots city operations, grassroots services for the people, and grassroots community work, it realizes business functions such as intelligent incident dispatch, AI-assisted handling, resident service assistants, and social work task stewards. It addresses current

practical problems such as the difficulties in the dispatch and analysis of grassroots managers, low efficiency of grassroots staff in the handling of tasks, and low resident satisfaction with services, providing a solution to the current "last mile implementation problem" in urban governance incidents. Currently, the Spark digital social work system has been implemented in the Tangqiao subdistrict to empower community cadres.

First, it helps improve the quality and efficiency of the handling of urban operations incidents at the grassroots level. The Spark digital social work system provides intelligent incident dispatch services to solve the problems of grassroots incident dispatchers' difficulty in mastering long lists of rights and responsibilities, and of inter-departmental buck-passing, improving dispatch efficiency by more than 30%. It also provides auxiliary incident handling services to solve practical problems such as the difficulty for grassroots incident handling personnel to master massive volumes of laws and regulations, their reliance on experience in incident handling, and their low incident handling efficiency. It provides incident analysis and reporting capabilities to solve the current problems of rigid incident statistical types, the inability to dig deeper, and the lack of full incident correlation and inference capabilities. It greatly improves the discovery rate of hidden danger (隐患) incidents and enables the rapid generation of incident analysis reports.

Second, it helps grassroots personnel serve the people with precision and warmth. Focusing on serving the people at the grassroots level, the Spark digital social worker system provides 24/7 non-stop consultation service assistants to help solve the problem where in-person-only consultation cannot provide service outside of work hours. It also provides assistants for the agents at the windows, solving the problems where window service staff have difficulty in quickly understanding the massive volume of service regulations in order to serve residents requesting multiple services, and thus truly and effectively improving residents' service satisfaction.

Third, it helps increase convenience and reduce the workload of grassroots community work. The Spark digital social work system focuses on the daily work of grassroots social workers and provides intelligent task management services to solve the current practical problems of complex and difficult tasks and the difficulty of personnel management and assessment for grassroots social workers, effectively improving the efficiency of task completion and performance appraisal. It provides an intelligent notification assistant that, taking into account the actual notification needs of the community, automatically communicates with residents through phone calls to complete notification tasks and records the entire process. This solves current practical problems such as the highly repetitive and time-consuming work of notification, truly reducing the workload of front-line workers.

V. Trends and outlook

At present, general purpose large AI models have become the largest technological wave since mobile Internet technology. AI has become an important driving force for a new round of S&T revolution and industrial revolution. S&T giants around the world are vying for position in the field, kick-starting an entrepreneurial boom chain reaction. The value this technology brings will increase with the continuous expansion of future application scenarios, and may create new application interfaces, build a new application ecosystem, bring about efficiency improvements, and potentially revolutionize business models.

At the same time, however, we need to realize that generative AI technology is still in its early stages, the technology itself is not mature, and there are still many problems in terms of content credibility and explainability. Government promotion of generative AI applications must still continue to explore their value points and usage methods. At the present stage, it is more important to form a full understanding of the applications of generative AI in government agencies from the multiple levels of strategy, business, organization, and risks: First, what impacts and value will generative AI technology bring to government governance? Second, what implementation strategy is suitable for the government's special informatization development path? Third, how must the government's organizational talent system adapt to the needs of technological change? Finally, what risks and limitations of technology should be addressed by regulations? Correspondingly, we put forward four technical application recommendations:

(i) Balance the risks and benefits of applications

Generative AI large models have broad application prospects in the government domain, and they have especially great potential in human interaction and content production areas such as government services and document writing. They can greatly improve interaction efficiency, reduce unnecessary administrative work, and help build a collaborative, efficient, ubiquitous, and accessible digital government. However, because the technology itself is still changing rapidly, the potential risks of its application are not completely clear, and governance still lags behind. Confronted with this new technology boom, we must not only explore its value to avoid falling behind others, but also remain cautious to avoid risks. First, we must establish agile governance methods to adapt to rapid technological changes, such as using regulatory sandboxes to promote the testing and application of large government affairs models, encourage technology companies, civil servants, citizens, and others to jointly discuss application and governance strategies, and promulgate targeted usage specifications or guidelines in the government domain to guide local exploration. Second, we should

establish an appropriate categorized and graded risk management framework. The risks of technology application in different government affairs scenarios vary greatly and differences in national conditions mean that foreign categories and grades are not fully applicable to the situation of our government. They should be informed by the relevant requirements of China's digital government construction to make a specific list of application fields and usage scenarios and conduct a "risk-benefit" assessment for each potential application scenario to achieve categorized and graded management. Third, we should promote scenario application exploration in stages according to local conditions, with priority given to support and auxiliary work with less risk, such as drafting emails and knowledge search. Then, we can gradually transition to moderate and advanced application scenarios such as text generation, data analysis, and policy Q&A to ensure application security and compliance.

(ii)   Strengthen the integration of technology and scenarios

When foreign governments use ChatGPT, they mainly use commercially available products and customized deployment. A few government agencies are developing exclusive large models for government affairs. General-purpose large models similar to ChatGPT on the market have sufficient breadth of knowledge, but insufficient depth. Their lack of government affairs expertise will affect the credibility of the output results and require a large amount of manpower to be invested in review, contrary to the original intention of improving efficiency. Customized applications require the government to possess a strong foundation and capabilities for innovation, and the cost of self-built large models is high. Therefore, to promote the application of large model technology in digital government, it is necessary to take into account both technical efficiency and service effectiveness, and maximize benefits while ensuring safe application. At the application level, the government needs to fully understand the technical features of large models, reasonably assign priorities to implementation scenarios based on the digital foundations of relevant departments and governance needs, and do a good job in monitoring and evaluating performance. At the same time, we should comprehensively consider factors such as strategic importance, technical thresholds, resource investment, data reserves, and system compatibility in order to select an appropriate deployment method. For example, we must consider at what levels and in which fields we should build our own large model capabilities and where we can purchase solutions from external suppliers to maximize technological empowerment. From an industrial perspective, we must actively develop large models in vertical fields and use peripheral extensions to implement a strategy of combining large models with government affairs knowledge graphs and government affairs knowledge bases to improve the results of the implementation of large models.

(iii)   Promote the establishment of internal and external ecosystems

To promote the large-scale application of large models, we must establish supportive policies, talent, and technical assurance and use internal and external forces to form a benign ecosystem for technology application and upgrades. First, the government should strengthen guidance and clarify the direction of application exploration by issuing policy requirements, compiling innovation atlases (创新图谱), and collecting archetypal cases, and guiding the market to provide products or services that meet specific scenario, performance, and safety requirements. Second, we should provide organizational talent support that is compatible with the application of new technologies. By recruiting technical talents and forward-deploying AI experts from technology companies, we can help the government formulate appropriate large model deployment and promotion strategies. At the same time, we should strengthen digital literacy training for existing employees to help them acquire AI knowledge and skills, understand technical limitations, optimize interactive window prompt input, and use and implement AI technology responsibly. Third, we should strengthen positive interactions and cooperation with enterprises and society. For example, with the help of third-party institutions, we can establish systematic evaluation, monitoring, and incident-handling capabilities for large-scale government models. With the help of industry forces, we can develop standards for large models in the government industry, comprehensively evaluate the overall level of large government affairs models, and achieve healthy and orderly development. We should strengthen public participation in the technology application process and jointly determine the priority scenarios and risk boundaries of large models in government services, urban governance, and other fields.

(iv)   Increase the supply of high-quality data

Data is the basic fuel for large models. Industries with large volumes of data, high data quality, and strong data diversity can provide sufficient data for the training and fine-tuning of large models. Whether we adopt a customized deployment model or develop dedicated government affairs models, we will need the support of huge volumes of high-quality public data. At present, our country has gradually improved the sharing channels in the integrated government big data system and accelerated the promotion of government data sharing and public data openness. However, the problems of channels without coordination, low data quality, and insufficient governance at the source (源头治理) still exist. To promote the application of large models in the government affairs fields, on the one hand, we must accelerate the integration and utilization of public data, create a unified foundation for the training of government affairs large models based on public data or openly available government text, and improve the availability of enterprise training models while ensuring security.

On the other hand, we must coordinate the implementation of full-scale government data governance, refine the data management responsibilities of each department, strengthen the construction of laws, regulations, and standards systems for data source governance, implement data quality projects, conduct regular data quality assessments, and improve the supply of high-quality data.

Notes on the preparation of this document

In February 2023, the Chinese Communist Party (CCP) Central Committee and the State Council issued the *Plan for the Overall Layout of Digital China Construction* (《数字中国建设整体布局规划》), proposing to collaboratively promote the "five-in-one" deep integration of digital technology with economic, political, cultural, social, and ecological civilization construction and basically form an integrated promotion layout with horizontal integration, vertical integration, and strong coordination by 2025. Under this overall layout, it has become increasingly urgent to accelerate the development of collaborative and efficient digital government affairs and drive the digital transformation of the economy and society through the construction of digital government.

This *Research Report on Governance Modernization in the Digital Age* is part of an annual series of reports released by CAICT focusing on the construction of digital government. It aims to track and examine hot topics in related fields each year, observe them from this specific perspective, and provide a reference for industry and practitioners. Large model technology was undoubtedly the topic of greatest interest in various industries in 2023. Based on this, the CAICT Policy and Economy Institute established a project team to research and compile information concerning domestic and foreign progress in the application of large model technology in the government domain, analyze the key risks and difficulties in the application process, and judge future development prospects. The purpose was to provide a reference for the Chinese government to follow so as to effectively apply these new technologies. In the process of our research, in order to fully understand the development and application practice of large models in the government domain in China, we conducted extensive surveys of representative large model vendors and collected typical cases of relevant applications from industry. We would like to express our gratitude to: China Telecom, China Mobile Limited, iFlytek Co., Ltd., Huawei Technologies Co., Ltd., JD.com Inc., Alibaba Group Holding Limited, Baidu, Inc., and all the organizations who assisted us.