III. AIGC application scenarios

Against the backdrop of the protracted and recurring COVID-19 pandemic, demand for digital content in various industries has seen an upsurge, and there is an urgent need to narrow the gap between the consumption and supply of content in the digital world. With its verisimilitude, diversity, controllability, and ease of composition, AIGC is expected to help enterprises improve the efficiency of content production, as well as provide them with more richly diverse, dynamic, and interactive content, and it may help highly digitalized industries with abundant demand for content, such as media, e-commerce, film and television, and entertainment, achieve significant innovation-based development.
AIGC + media: Production based on human-computer collaboration is promoting media convergence

With the accelerating increase of the global informatization level in recent years, the integrated development of AI and the mass media industry has continued to progress. AIGC is a new method of content production that comprehensively empowers content production for media. Applications such as writing bots, interview assistants, video subtitle production, audio-visual broadcasting, video compilation, and AI-synthesized hosts and anchors have appeared continuously, and have penetrated the whole process from collection and editing to broadcasting. They have profoundly changed how media content is generated, becoming an important force driving media convergence.

Collection and editing: (1) The achievement of recorded voice transcription has improved the work experience of media workers. Transcribing recorded speech into text with the help of speech recognition technology effectively compresses the repetitive work of recording and organizing during the article production process, further assuring the timeliness of news. During the 2022 Winter Olympics, iFlytek’s smart voice recorder helped reporters quickly produce articles in two minutes through cross-language voice transcription. (2) The achievement of
intelligent news writing has improved the timeliness of news information. Algorithm-based automatic news writing automates some of the labor-intensive gathering and editing work, helping media produce content faster, more accurately, and with greater intelligentization. For example, Quakebot, a robotic reporter of the Los Angeles Times website, wrote and published relevant news only three minutes after the earthquake in Los Angeles in March 2014. Wordsmith, an intelligent writing platform used by the Associated Press, can write 2,000 reports per second. The China Earthquake Network’s writing robot finished compiling and distributing news within seven seconds after the 2017 Jiuzhaigou earthquake. Yicai Media Group’s “DT Draft King” can write 1,680 words a minute.

(3) **The achievement of intelligent video editing has improved the value of video content.** The use of intelligent video editing tools such as video subtitle generation, video compilation, video topic segmentation, and video super-resolution efficiently saves manpower and time costs and maximizes the value of copyrighted content. During the 2020 National People’s Congress, the People’s Daily used an “intelligent cloud video editor” to quickly generate videos, and was able to achieve technical operations such as automatic subtitle matching, real-time character tracking, fixing of picture flutter, and speedy switching between horizontal and vertical screen orientations, so as to meet the requirements of multi-platform distribution. During the 2022 Winter Olympics, CCTV Video used an “AI intelligent content production editing system” to efficiently produce and distribute video highlights of the Winter Olympics ice and snow events, creating more possibilities for the in-depth value development of copyrighted sports media content.

**In terms of dissemination, AIGC applications are concentrated mainly in areas such as news broadcasting, with AI-synthesized anchors as the core application.** AI-synthesized anchors have created a precedent for real-time voice and character animation synthesis in the field of news. It is only necessary to enter the text content that needs to be broadcast. The computer will then generate the corresponding news video with an AI-synthesized anchor reporting, and ensure that the character in the video maintains naturally consistent sound, expressions, and lip movements, displaying the same effectiveness in conveying information as real anchors. Looking at the application of AI-synthesized anchors in the media area, three characteristics are apparent. (1) **The scope of application is expanding.** At present, Xinhua News Agency, CCTV, People’s Daily, and other national media, and Hunan TV and other provincial and municipal media, have begun to actively layout the application of AI-synthesized anchors, launching virtual news hosts including “Xin Xiaowei” and “Little C.” They have also pushed their application of the technology from news broadcasting to a wider range of scenarios such as special show hosting, reporting, weather forecasting, etc., and profoundly empowered the dissemination of major events such as the National People’s Congress, the Winter Olympics, and the Winter Paralympics. (2) **Application scenarios are being upgraded.** In addition to regular news broadcasting, a series of AI-synthesized anchors have begun supporting multilingual broadcasting and sign language broadcasting. During the 2020 National People’s Congress, a multilingual virtual anchor used Chinese, Korean, Japanese, English, and other languages for news reporting, realizing the broadcasting of one voice in multiple languages, delivering Chinese news to the world, and conforming to the trend of information sharing in the information age. During the 2022 Winter Olympics, Baidu, Tencent, and other enterprises launched broadcasting with sign language by “digital humans” to provide sign language commentary for millions of hearing-impaired users, further promoting the progress of barrier-free watching of the games. (3) **Application forms are being perfected.** In terms of imagery, there has been a gradual expansion from 2D to 3D; in terms of actuation, the range has begun to extend from the mouth to facial expressions, limbs, fingers, and background content material; and in terms of content construction, the direction is from
supporting SaaS-based platform tool construction to exploring intelligentized production. For example, Tencent’s “Lingyu” 3D digital sign language interpreter achieves the generation of lip movements, facial expressions, body movements, finger movements, etc., and works with a visualized action editing platform which supports the fine-tuning of sign language actions.

**AIGC is having a profound impact on media organizations, media practitioners, and media audiences.** For media organizations, incorporating AIGC into the news production process greatly improves production efficiency and brings new visual and interactive experiences. It enriches the forms of news reporting, accelerates the digital transformation of media, and promotes the transformation of media to smart media. For media practitioners, AIGC can help them produce more humanistic, socially significant, and economically valuable news. It can also automate part of the laborious work of news gathering, editing, and broadcasting, so that they can focus more on work that requires in-depth thinking and creativity, such as news features, in-depth reports, special reports, and other niche areas that have greater need for the strengths human beings have in the precise analysis of things, the proper handling of emotional elements, and other aspects. For media audiences, the application of AIGC enables them to obtain news content in richer and more diverse forms in a shorter period of time, which improves the timeliness and convenience of obtaining news information. It also lowers the technical barriers of the media industry, which prompts media audiences to have more opportunities to participate in the production of content, greatly enhancing their sense of participation.

(ii) **AIGC + e-commerce: Promoting the blending of virtual and real, and creating an immersive experience**

With the development and application of digital technology and the upgrading and acceleration of consumption, the field of e-commerce is developing in the direction of an immersive shopping experience. AIGC is accelerating the construction of 3D merchandise models, virtual brand representatives, and even virtual showrooms, and through combination with new technologies like augmented reality (AR) and virtual reality (VR), an immersive shopping experience is achieved with audio-visual and other kinds of multi-sensory interaction.

**Generation of 3D product models for product display and virtual trial is enhancing the online shopping experience.** Based on images of products from different angles, 3D geometric models and textures of merchandise are automatically generated with the help of visual generation algorithms. Supplemented by online virtual “seeing and trying on,” they provide a differentiated online shopping experience close to the real thing, helping to efficiently boost user conversion. Baidu, Huawei, and other enterprises have launched automated 3D product modeling services, supporting the completion of 3D product photo shooting and generation in minutes, with millimeter-level accuracy. Unlike traditional 2D displays, 3D models can show the appearance of a product from all angles, which can significantly reduce the user’s product selection and communication time, enhance the user experience, and quickly facilitate merchandise transactions. At the same time, the 3D product models thus generated can also be used for trying on online, greatly restoring the experience of trying out goods or services, and allowing consumers more opportunities for exposure to the absolute value of products or services. An example is Alibaba’s 3D Tmall Home Furnishing City, which it put online in April 2021. By providing merchants with 3D design tools and AI-based 3D product model generation services, it helps them quickly build a 3D shopping space. It also supports consumers in doing their own home furnishing, providing them an immersive “cloud shopping” experience. Data show that the average conversion rate of
3D shopping is 70%, 9 times higher than the industry average. The unit price compared with normal guided transactions increased by more than 200%, while the rate of commodity returns and exchanges fell significantly. Many brands have also begun exploring and making attempts in the virtual trial direction. Examples include Uniqlo’s virtual fitting, Adidas’ virtual shoe try-on, Chow Tai Fook virtual jewelry try-on, Gucci virtual try-on for watches and glasses, Ikea’s virtual furniture matching, and Porsche’s virtual test drive. Although the traditional manual modeling method is still used, more consumer-level tools are expected to emerge in the future as AIGC technology continues to progress, thus gradually reducing the threshold and cost of 3D modeling and facilitating the large-scale commercialization of virtual try-on applications.

Creating virtual hosts and empowering interactive livestream marketing (“live shopping”) Creating virtual livestream hosts based on visual, voice, and text generation technology provides audiences 24-hour uninterrupted product recommendations and introductions, as well as online service capabilities, and for merchants it lowers the barriers to livestreaming. Compared to a livestream shopping “studio” with real people, virtual hosts have three major advantages: First, virtual hosts can fill the livestreaming gaps left by real hosts, so that the livestream can have non-stop rotation, both providing greater viewing time flexibility and a more convenient shopping experience for users, but also creating greater business growth for participating merchants. For example, the virtual hosts of brands like L’Oreal, Philips, and Perfect Diary generally go online at midnight and do nearly 9 hours of livestreaming, forming with human hosts a 24-hour seamless livestreaming service. Second, the virtualization of brand representatives can accelerate the store or brand rejuvenation process, narrow the distance to new consumer groups, and shape a store’s image for the metaverse era. In the future, it can be extended and applied to more diverse virtual scenarios in the metaverse to achieve multi-sphere dissemination. For example, the makeup brand Carslan launched its own brand virtual image and introduced it into its livestream as the daily virtual host and shopping guide of its Tmall flagship store. At the same time, traditional enterprises that already have a virtual brand IP image can directly utilize the existing image by quickly transforming it into a virtual brand representative. For example, during Haier’s livestream promotion activity in May 2020, the “Haier Brothers” virtual IP with which we are all familiar came to the livestream and interacted with the human host and fans, receiving ten million plays. Third, the persona of a virtual host is more stable and controllable. In situations where a leading brand representative is limited and could undergo a “public persona collapse,” a virtual representative’s persona, words, and deeds are controlled by the brand, so there is stronger controllability and security than with a real star. Brands do not have to worry about the persona of a virtual image collapsing, bringing them negative news, bad reviews, and financial losses.

Empowering online malls and offline showrooms to accelerate their evolution and provide consumers new shopping scenarios. The rapid, low-cost, and high-volume construction of virtual showrooms can be achieved by reconstructing the 3D geometric structure of scenes from 2D images. For businesses, this will effectively reduce the barriers and costs of building 3D shopping spaces. For some industries that originally relied heavily on offline stores, it has opened up room for imagining online-offline fusion, while for consumers it is providing a new online-offline fusion consumer experience. Some brands have already begun to try to create virtual spaces. For example, during the 100th anniversary celebration of its brand, luxury goods merchant Gucci moved its offline Gucci Garden Archetypes exhibition to the Roblox online game platform, launching a two-week virtual exhibition with five themed exhibition halls whose contents corresponded to those of the real exhibition. In July 2021, Alibaba showcased its “Buy+” VR project for the first time, offering a 360° virtual shopping site open for shopping experience. In
November 2021, Nike and Roblox partnered to launch the Nikeland virtual world open to all Roblox users. Following the successful application of image-based 3D reconstruction technology in Google Maps’ immersive view feature, the automated construction of virtual showrooms will be better applied and developed in the future.

(iii) **AIGC + film and television: Expanding the creative space and enhancing the quality of creative works**

With the rapid development of the film and TV industry, process problems, from the early creation phase and shooting to post-production, have also emerged. There are development pains, such as a relative lack of high-quality scripts, high production costs, and poor quality of some works, so structural upgrading is urgently needed. The use of AIGC technology can stimulate ideas for film and TV script creation, expand the space for film and TV character and scene creation, and greatly improve the quality of post-production for film and TV products, thereby helping to maximize the cultural and economic value of film and TV works.

**AIGC provides new ideas for script creation.** By analyzing and summarizing massive script data and producing scripts quickly according to preset styles, with creators then doing the screening and secondary processing, creators are thereby inspired to broaden their creative thinking, and the creative cycle is shortened. Foreign countries have taken the lead in carrying out related attempts. As early as June 2016, New York University used AI to write the screenplay for the movie *Sunspring*, which, after filming and production, was shortlisted in the top ten in Sci-Fi London’s 48-Hour Challenge competition. In 2020, students at Chapman University in the United States used OpenAI’s GPT-3 large language model to create a screenplay and produced the short film *Solicitors*. Some domestic vertical technology companies have begun to provide services related to intelligent script production, such as Haima Qingfan’s “novel to screenplay” intelligent writing function, which has been of service in more than 30,000 episode scripts, more than 8,000 in-theater or made-for-streaming movie screenplays, including hits like *Hi, Mom* and *The Wandering Earth*, and over five million online novels.

**AIGC expands the space for character and scene creation.** First, through AI synthesis of faces, voices, and other related content, it is possible to realize “digital resurrection” of deceased actors, replacement of “bad actors,” synchronization of audio and video in multi-language translations, age-spanning of actors’ roles, and synthesis of difficult action to reduce the impact of actors’ limitations on film and TV productions. For example, in the CCTV documentary *China Reinvents Itself*, CCTV and Tech iFlytek used AI algorithms to learn the voice data of the late dubbing artist Li Yi’s past documentaries, and synthesized the dubbing according to the documentary’s script. Coupled with post-processing editing and optimization, this ultimately allowed Li Yi’s voice to be reproduced. During the 2020 broadcast of the TV show *Healer of Children*, an academic scandal of the actor playing the main character adversely affected publicity and distribution. Intelligent video face-switching technology was then used to replace the main actor, thus reducing the losses of the program in the process of creation. In 2021, the British company Flawless launched the visualization tool TrueSync to address the problem of unsynchronized lip shapes of characters in multilingual translations. It can accurately adjust the facial features of actors through AI-based in-depth video synthesis technology to make the actors’ lip shapes match dubbing or subtitles in different languages. Second, virtual physical scenes are being synthesized through AI to generate scenes that are impossible or too costly to film in real life, greatly broadening the boundaries of the imagination for film and TV works and giving
audiences better visual effects and auditory experiences. In the 2017 hit *Detective Samoyeds*, for example, a large number of scenes in the drama were virtually generated through AI technology. Workers collected a large amount of scene information early on, and special effects personnel performed digital modeling to produce simulated shooting scenes, while the actors performed in a green screen studio. By combining real-time matting technology, the actor’s movements were fused with the virtual scenes to finally generate the footage.

**AIGC empowers film and TV editing and boosts post-production.** First, it allows the repair and restoration of film and TV images and improves the clarity of image materials, assuring the picture quality of film and TV works. For example, the China Film Digital Production Base and the University of Science and Technology of China jointly developed the “China Film Shensi” AI image processing system, which has successfully restored many film and TV productions such as *Amazing China* and *Street Angel*. With the AI Shensi system, the time it takes to restore a movie can be shortened by three-quarters and the cost can be cut in half. Meanwhile, streaming media platforms such as iQIYI, Youku, and Xigua Video have begun to develop AI-based restoration of classic movies and television shows as a new growth area. Second, it achieves film and TV trailer generation. After learning audiovisual techniques from hundreds of thriller trailers, Watson, an AI system under the IBM banner, produced a 6-minute trailer by picking movie scenes from the 90-minute film *Morgan* that meet the characteristics of a thriller trailer. Although the trailer needed to be reworked by production staff before it was finalized, it shrank the trailer production cycle from about a month to 24 hours. Third, it achieves the automatic conversion of film and TV content from 2D to 3D. The AI-backed automatic 3D content production platform “Zhengrong” launched by DreamWld Tech supports the dimensional conversion of film and TV works, and improves the efficiency of theater-level 3D conversion more than a thousand fold.

(iv) **AIGC + entertainment: Expanding boundaries and gaining development momentum**

In the digital economy era, entertainment not only brings consumers closer to products and services, but also indirectly satisfies modern people’s desire for a sense of belonging, which is becoming increasingly important. With the help of AIGC technology, through the generation of interesting images, audio, and video, the creation of virtual idols, and the development of digital avatars for consumers, the entertainment industry can rapidly expand its own boundaries radially in ways that are more readily accepted by consumers, thereby gaining new growth momentum.

**Generating interesting images, audio, and video to stimulate user participation and enthusiasm.** In terms of image and video generation, AIGC applications represented by AI-based face swapping greatly satisfy users’ need for novelty, and become tools for breaking out of the pack. For example, the image video synthesis applications FaceAPP, ZAO, and Avatarify, once launched, immediately went viral to trigger a craze, topping the App Store free download list; an interactive app for generating portraits using 56 ethnic group clothing photos, launched by the People’s Daily New Media Center for the 70th anniversary of the National Day, promptly swept through users’ networks, with more than 738 million photographs synthesized; in March 2020, Tencent launched an activity for taking pictures with (Chinese idol girl group) Rocket Girls 101 within the Game for Peace avatar-driven game. Such interactive content has greatly stimulated user’s emotions and brought about rapid breakthroughs in social communication. In terms of voice synthesis, voice modification increases interactive entertainment. For example, QQ and many other social media software, as well as Game for Peace and many other games, have integrated
voice modification functions, allowing users to experience a variety of different voices, such as “big uncle,” “cute girl,” etc., making communication a joyful game.

**Creating virtual idols and releasing IP value. First**, it allows the co-creation of synthesized songs with users, so as to continuously deepen the adhesion of fans. “Virtual singers,” represented by Hatsune Miku and Luo Tianyi, are virtual characters created based on the VOCALOID voice synthesis engine software. Real people provide the sound source, and then a voice is synthesized by the software, allowing fans to participate in-depth in the co-creation of virtual singers. Take Luo Tianyi as an example: Anyone who creates lyrics and music through the voice library can achieve the effect of “Luo Tianyi singing a song.” In the ten years since Luo Tianyi’s debut on July 12, 2012, musicians and fans have created more than 10,000 works for Luo Tianyi, providing users with more room for imagination and creativity while establishing deeper connections with fans. **Second**, AI-synthesized audio and video animation supports virtual idol-based content monetization in more diverse scenarios. With the growing maturity of audio and video synthesis, holographic projection, AR, VR, and other technologies, scenarios for monetizing virtual idols have gradually diversified. Virtual idols can now be monetized through concerts, music albums, advertisement endorsements, live broadcasting, and derivative products. At the same time, as the commercial value of virtual idols continues to be revealed, brands are increasingly willing to link with virtual IP. For example, “Ling Ling [翎 Ling], an internet celebrity created jointly by Xmov Ai and Next Generation, debuted in May 2020 and has now cooperated with VOGUE, Tesla, GUCCI, and other brands.

**Developing consumer-end user avatars and laying out the consumer metaverse.** Since the release of Animoji on Apple cell phones in 2017, the iteration of avatar technology has developed from a single cartoon animal avatar to AI-automated generation of cartoon images of real people, so that users have more creative autonomy and a more lifelike image library. Major technology giants are actively exploring avatar-related applications, accelerating the layout of a future with a grand fusion of the “virtual digital world” and the real world. For example, at the 2020 World Internet Conference, Baidu demonstrated the ability to design dynamic virtual characters based on 3D virtual image generation, virtual image actuation and other AI technologies. You only need to take a photo to quickly generate a virtual image that can mimic the expressions and movement of “you” in a few seconds. In the developer exhibition area of the 2021 Apsara Conference, Alibaba Cloud demonstrated its latest technology—the Cartoon Smart Drawing project. It became a conference hit, attracting nearly 2,000 people to come experience it. Alibaba Cloud’s Cartoon Smart Drawing adopts a hidden variable mapping technology solution. With pictures of a person’s face as input, it can automatically generate virtual images with personal characteristics and discover their distinctive features, such as eye size and nose shape, while also tracking the user’s facial expressions to generate real-time animation, giving ordinary people the opportunity to create their very own cartoon images. In the foreseeable future, avatars serving as the user’s personal identity in the virtual world and vehicle for interaction will be further integrated with people’s productive lives and lifestyles, and will lead to the development of a virtual goods economy.

(v) **AIGC + other: Promoting digital-real integration and accelerating industrial upgrading**

In addition to the above industries, AIGC applications are also developing rapidly in other industries such as education, finance, healthcare, and manufacturing. **In the education field,**
AIGC is breathing new life into educational materials. Compared with traditional methods such as reading and lectures, AIGC provides educators with new tools to deliver knowledge to students in more vivid and convincing ways by making originally abstract and flat textbooks concrete and three-dimensional. For example, videos can be made of historical figures talking directly to students, injecting new vitality into an unappealing lecture; realistic virtual teachers can be synthesized to make digital teaching more interactive and interesting, and so on. **In the financial field, AIGC is helping to achieve cost reductions and efficiencies.** On one hand, through AIGC, automated production of financial information and product introduction video content can be achieved to improve the efficiency of financial institutions’ content operations. On the other hand, AIGC can be used to shape dual-channel (audio and video) customer service with virtual digital humans, bringing greater warmth to financial services. **In the medical field, AIGC is empowering the whole diagnosis and treatment process.** AIGC can be used in assisted diagnosis to improve the quality of medical images, enter electronic medical records, etc., completing the liberation of doctors’ intelligence and energy so that their resources can be focused on the core business, thereby improving the business ability of doctor groups. In terms of rehabilitation therapy, AIGC can synthesize speech audio for people who have lost their voices, synthesize limb projections for people with disabilities, and synthesize non-aggressive medical accompaniment for patients with mental illnesses. It can comfort patients in a humanized ways, thereby soothing their emotions and accelerating their recovery. **In the manufacturing field, AIGC is increasing industrial efficiency and value.** First, incorporating computer-aided design (CAD) greatly shortens the engineering design cycle. By automating repetitive, time-consuming, and low-level tasks in engineering design, AIGC can shrink to a matter of minutes engineering design tasks that would otherwise take thousands of hours. It also supports the generation of derived designs to provide inspiration for engineers and designers. In addition, it supports the introduction of changes in designs to achieve dynamic simulation. For example, for its BMW VISION NEXT 100 concept car, BMW used AIGC-assisted design to develop the car’s interior and its dynamic and functional exterior skin. Second, it accelerates the construction of digital twin systems. By quickly transforming digital geometries formed based on physical environments into real-time parametric 3D modeling data, digital twins of real-world factories, industrial equipment, production lines, etc. can be created efficiently. **Overall, AIGC is developing into a horizontal combination deeply integrated with various other industries, and its applications are accelerating their penetration into all aspects of the economy and society.**

IV. Problems facing AIGC’s development

Now that AI technology development has entered the fast lane, AIGC is playing important roles in all aspects of social production and life because of its rapid response capability, lively knowledge output, and abundant application scenarios. At the same time, however, AIGC’s key technologies, the core capabilities of enterprises, and relevant laws and regulations have not yet been perfected, and disputes around fairness, responsibility, and safety are proliferating, triggering a series of problems in urgent need of solution.

Key technologies are not fully mature enough, and there are still problem areas and difficulties in large-scale promotion and implementation. At present, AIGC technology is constantly being upgraded to further release the productivity of content, but key AI technologies still have limitations that impede the industry development process. **First, AI algorithms have inherent flaws.** AI algorithms have yet to overcome technical limitations in terms of transparency,
robustness, bias, and discrimination, leading to numerous problems in algorithm application. **Transparency**: Due to the black-box operation mechanisms of algorithm models, their operation rules and causal logic are not obvious to developers. This characteristic makes the generation mechanisms of AI algorithms difficult for humans to understand and interpret, and once an algorithm makes an error, the lack of transparency will undoubtedly hinder external observers from correcting and removing errors. **Robustness**: Algorithm operation is prone to interference from data, models, training methods, and other factors, giving rise to non-robustness. For example, when the amount of training data is insufficient, an algorithm that has been tested with good performance on a specific dataset is likely to be affected by slight perturbations from small amounts of random noise, thus causing the model to give incorrect conclusions after the algorithm is put into application. When content is updated with online data, the algorithm is likely to produce deviations in the performance of the system, which may lead to system failure. **Bias and discrimination**: Algorithms use data as raw material. If data used initially has biases, those biases may persist over time, invisibly affect the results of AI algorithm operation, and ultimately lead to bias or discrimination in the content generated by algorithms, triggering user disputes about the fairness of the algorithms.

Second, **AIGC content editing and creation technology is imperfect**. AI-enabled content editing and creation technology is still constrained by shortcomings, resulting in technical barriers to industry development. **Text generation**: Enterprises have bottlenecks in natural language understanding technology. Very often, templates are simplistically applied to generate mechanistic filler, resulting in similar and monotonous text structures. Moreover, it is difficult for text generation to truly produce emotional, anthropomorphic expression, departing from users’ expectations that text synthesis products be easy-to-read and of high-quality. **Speech synthesis**: Problems such as lack of fluency in speech expression and strongly mechanical-seeming voices are conspicuous. Emotional embedding in speech requires large-scale data volumes to support training, and the modeling requirements are very high, which increases the complexity of use and also makes it difficult to control the corresponding costs, restricting enterprises from unlocking the technology’s value. **Visual generation**: There are problems such as where intelligent image processing results are less than ideal and real-time motion capture is insufficiently accurate. In applications, due to the inability of large vision models to complete multiple visual perception tasks simultaneously, the accuracy, reduction, and simulation of machine vision are imperfect, so manual labeling is required at a later stage. Thus, the problems of high technical barriers and low production efficiency have not been well solved.

The core capabilities of enterprises are uneven, threatening the healthy and secure development of the web content ecosystem. With the open-sourcing and openness of digital technology, AIGC technology R&D barriers and production costs have been continuously lowered, resulting in a mixed bag of platform enterprises in the market, and the dearth of core competencies among enterprises has caused serious obstacles to the construction of a good network ecosystem. **First, content moderation ability needs to be improved.** In recent years, AIGC enterprises, as entities with primary responsibility for internet content governance, have implemented their responsibility by establishing content moderation mechanisms, and “machine moderation + human moderation” has become their basic moderation method. In terms of machine moderation, the moderation accuracy rate is affected by the type of moderation, the multiplicity of content violation variants, and the intensification of countermeasure efforts by illegal and gray-area industries, resulting in a high rate of false alarms and the need for overlaid manual moderation. As for human moderation, the use of human moderation outsourcing services has become the mainstream in the market, but the performance of different human moderation teams varies with
respect to personnel management, business process management, moderation capabilities, etc., and the industry has not formed a unified standard. Overall, the lack of qualified moderators may lead to an outpouring of illegal and illicit content containing fake and undesirable information, seriously harming the industry and even the entire network ecosystem. **Second, enterprises need to further build their technology management ability.** Because AIGC technology is becoming more and more complex, and its application in enterprises is often highly dynamic, enterprises need to have corresponding technology management capabilities for them to serve as technology designers and service providers. However, enterprises are commercial in nature, and where resources are limited, this often means they will tend to satisfy their own interests first and invest insufficiently in technological security and institutional safeguards. In this respect, the gaps between enterprises are very obvious. Enterprise with “deep pockets” and long development histories are more likely to have better levels of technological protection and management, and vice versa. Many small enterprises entering the market will put AIGC into application before their technology management ability is up to standard, providing a hotbed for plagiarism, infringement, content faking, malicious marketing, and other illegal and gray-area industry chains. **Third, enterprises have yet to perfect their risk governance capacity.** The “Guiding Opinions on Strengthening the Comprehensive Governance of Network Information Service Algorithms” clearly proposes strengthening the requirement for enterprises to shoulder primary responsibility. Enterprises should build and perfect AI management capacity and effectively prevent all risks in the process of AI development. However, the current AIGC technology is still in the early stages of development, and its risks are characterized by unknowns and complexity. Many enterprises have not yet perfected their risk prediction, prevention, and emergency response abilities, and the risk management concept has not been implemented in engineering and technology practices. This problem makes it likely for enterprises to miss opportunities to nip risks in the bud. When you are in a passive state in the complex network security game, once internal threats or external attacks are suffered, they can very easily trigger security risks to the network information content ecosystem.

**The relevant rules and guidelines still need to be improved, and there is a mismatch problem between development and governance.** AI industry rules and guidelines have been launched continually in recent years, and the governance system has begun to take shape, but as the progress of science and technology accelerates, institutional construction may not always keep up with it. This in turn gives rise to a mismatch problem between the development of technological innovation on one hand and policy support and legal regulation on the other. **First, policies to support the industry’s development need to be implemented.** China’s 14th Five-Year Plan, issued in March 2021, put forward the policy of “forging new digital economy advantages” and emphasized the important value of AI and other emerging digital industries in improving national competitiveness. Guided by this planning, and faced with the rapid development of AIGC-related industries, especially digital cultural industries, the central government has issued a number of policies to promote the development of new digital cultural industries. The latest “Opinions on Promoting the Implementation of the National Cultural Digitization Strategy,” issued in May 2022, calls for the study and formulation of industrial policies to support cultural digitization, emphasizing that localities should formulate specific implementation plans according to local conditions, and that relevant agencies should refine their policies and measures. In the future, the strength of support, promotion of implementation, and dynamic adjustment of policies of different localities and agencies will determine the degree of mutual construction between technology and society, which will play an important role in the development of AIGC technology in social
contexts. **Secondly, the ability to copyright AIGC has yet to be clarified.** Currently, China’s *Copyright Law* stipulates that the objects of copyright are “works.” Just looking at the legal text, China’s current intellectual property law system stipulates that a subject of law is a person who enjoys rights, has obligations, and bears responsibilities, so it is difficult for non-human-produced intelligentization content to obtain copyright protection through the logic of “work-creation-author.”¹ This view was supported in a 2019 judgment by the Beijing Internet Court. However, in the 2020 case of Tencent v. WDZJ.com, the Shenzhen Nanshan District Court held that an article written by AI is a copyright-protected work if it meets the requirement of originality. Ambiguity in the legal concepts triggered the reversal of judicial decisions, leading to the real-life dilemma of unclear copyright attribution for AIGC works. This problem may not only lead to an inability to obtain copyright protection for works created using AIGC technology, keeping AI technology from realizing its creative value. Due to the massive copying behavior of AI, it may also dilute the originality of rights holders of existing works, threatening the legitimate rights and interests of others. **Third, the new technology makes supervision more difficult.** In recent years, with the continuous maturation of AI technology, the content generated by computers after deep learning has become increasingly realistic, achieving the effect of “confusing fake and real.” By the same token, the application threshold is also decreasing. Everyone can easily “swap faces,” “modify voices,” and even join an “internet troll army.” Because of the universal “seeing is believing” cognitive trait among the public, when the technology is misused, it is likely that fake content will reach users through the internet instantly and in highly credible ways, causing the public’s judgment to fail in the game of ideas, given the difficulty of identifying trolls and false information. This in turn involves another real problem. That is, due to the virtual identity cloak provided by the internet and the development of related technologies, the producers of fake content are decentralized, mobile, large in number, and hidden, which makes tracking them an ever more difficult and complex task. Coupled with the vagueness and lagging nature of rules and guidelines, defining the boundaries for borderline counterfeiting behaviors poses a real dilemma, and this undoubtedly creates serious obstacles to the regulation of content.

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Wu Zhaohui, Member of the Party Group and Deputy Minister of the Ministry of Science and Technology: Brain-Computer Intelligence and Human-Computer Collaboration are Important Directions for AI Development

Source: National Business Daily 每日经济新闻
Date: 06/09/2023

On the morning of June 9, the 2023 Beijing Zhiyuan Conference was held in Haidian, Beijing.

A reporter from the Daily Economic News noted that during the conference, Wu Zhaohui, member of the Party Group and Vice-Minister at the Ministry of Science and Technology, stated in his keynote speech that an important future direction for the development of artificial

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¹Cyberspace Administration of China, “Copyright Protection of AI-generated Content,”
intelligence is brain-computer intelligence, human-computer collaboration, and brain-computer integration. These technologies can enhance perception and cognition, leading to more efficient human-machine relationships and generating new interactive logics. Humans and machines will coexist, with the physical world and the virtual world interacting in parallel. Human-computer collaboration will accelerate, transforming the physical world into a four-dimensional space composed of humans, physical objects, intelligent machines, and virtual information.

Wu Zhaohui further stated that in this four-dimensional space, artificial intelligence will interact seamlessly with both the perception, cognitive mechanisms, learning, and reasoning abilities of biological beings, and the information integration, storage, and computing abilities of machine intelligence. This compatibility is expected to continuously generate new forms of intelligence, such as superintelligence and fusion intelligence, which will increasingly generate [economic] value but also become increasingly disruptive.

In his keynote speech, Wu Zhaohui also mentioned that ChatGPT integrates theories and methods from across the three major schools of artificial intelligence, as well as from various software and hardware technologies. It has excellent capabilities in terms of logical cognition and understanding human intention via dialogue. ChatGPT has accelerated the arrival of the era of general artificial intelligence, which will in turn lead a new industrial revolution and transform the social relations of production.

Specifically, Wu Zhaohui believes that ChatGPT will reshape the division of labor in the industrial sector. In the future, a hybrid division of labor model based on human-computer collaboration will impact industries that involve traditional intellectual labor, such as content production and creation. Thus, general-purpose AI technologies will change, even reshape, existing production models.

Secondly, ChatGPT will lead to the emergence of new business models. General AI technology will more quickly and accurately pinpoint user needs. The emergence of brain-computer integration will change industries such as search, content creation, and advertising and marketing, creating entirely new business models.

Additionally, ChatGPT will affect the global economic landscape. The deep integration of human-computer collaboration and intelligence will greatly improve production efficiency and reduce production costs, acting as an enduring driving force for economic growth, and opening new tracks for development. Having advantages in computing power, algorithms, and data may lead to future development capabilities.

"Facing the opportunities and challenges brought by the development of general artificial intelligence, I hope that all parties will join hands to strengthen international cooperation and open sharing, jointly promote the continuous and healthy development of artificial intelligence, and enable AI to better benefit our human society," Wu Zhaohui concluded.
Introduction

Science and technology (S&T) competition has increasingly become an important part of the strategic competition among powers. The technological progress of emerging countries will affect the distribution of power in international relations, and their innovative activities may have externalities on dominant countries. Therefore, when any country makes a breakthrough in S&T competition, this will help the country gain an advantage in the fierce competition among nations. As a representative of cutting-edge technologies in recent years, the impact of the development trend of artificial intelligence (AI) on the international community has gradually become apparent: Both the series of S&T wars launched by the United States against China and the technological alliances established by the United States, Japan, South Korea, and other countries to restrict China's S&T development exhibit the characteristics of scientific and technological competition. In particular, the emergence of the sensational application ChatGPT at the end of 2022 once again highlighted the urgency of S&T competition. As a generative AI launched by OpenAI, ChatGPT features "strong interaction," "strong understanding," and "strong generation." Through dialogue with ChatGPT, people can quickly retrieve information, write abstracts of papers, write computer applications, and perform other operations. Compared with the AI of the past, these breakthrough capabilities have allowed people to see the dawn of the development of artificial general intelligence. This type of AI is an AI system with universal applicability, autonomy, creativity, and learning capabilities. This is expected to become an important driving force for the progress of human society. Microsoft Chairman and CEO Satya Nadella excitedly stated that ChatGPT will be a killer application that changes productivity and the way we work in the future. From the perspective of national security governance, the application of AI in the cognitive and physical domains can certainly improve the country's governance level in the security field. However, the rapid development of AI based on big data models as represented by ChatGPT has significantly expanded the breadth and depth of the content and fields involved in the national security field in a short period of time. The widespread use of this type of AI will profoundly change the security situation countries face.

In recent years, discussions on the development of AI and international relations both inside and outside China have increased, and specific issues of concern have gradually turned to international political and national security issues, such as the relationship between AI technology and national power. In current research, scholars’ discussions of political issues around AI as represented by ChatGPT mainly include the following: The first is the relationship between the development of AI technology and changes in power among countries. As AI becomes the core force behind a new round of industrial revolution and is seen as the "technical foundation" of the innovation paradigm of the future, AI research has become a key factor for countries vying for S&T supremacy. Therefore, the current contest among technological powers in AI research will lead to increasingly fierce competition among countries. The changing composition of national
power will further disrupt the originally stable structure of the balance of power. The strategic behavior of countries will change, and the gap between developed countries and developing countries will gradually widen. The second is the increasing complexity of AI and the national security situation. Some studies argue that the widespread use of AI will make the security situation that countries face more complex. The application of AI in military equipment has partially changed the format of war, and the United States and Western countries have become more willing to launch regional wars. The third is research on the impact of ChatGPT itself. At present, the focus of academic circles is on the impact of the emergence of ChatGPT on academic ethics and social development, with less attention paid to the impact of ChatGPT on the current national security situation.

The research discussed above makes a relatively comprehensive study of the relationship between AI and the development of international relations from the perspectives of changes in power, the transformation of the international power structure, and competition between major powers. However, current research focuses on the relationship between AI and the relative dynamics of power among countries. There is relatively little research on the impact of the development of generative AI as represented by ChatGPT on national security. With the progress of the times and the advancement of technology, the intrinsic meaning of security and power are changing. In the field of non-traditional security, power is present at the traditional technical level and in the game of international systems and standards, and is also reflected at the level of discourse in the struggle for dominance. Power manifests itself in technical power, institutional power, and discursive power. Although discursive power is less obvious than the other two types of power, in a sense, it is only when a country’s comprehensive power in multiple dimensions is enhanced that this country can safeguard its rights and interests in this field. Different from any previous technological progress, ChatGPT’s discursive power is shaped by technology and manifested in human-computer interaction. This means that whoever can influence the input content and output preferences of the machine by setting its algorithms will hold discursive power. Compared with all previous strategic power games, the ideological penetration and security risks caused by this game are more subtle. The setting of algorithms and content preferences will be decisive factors in the production of discursive power. The emergence and development of generative AI as represented by ChatGPT will further increase the intensity of the discursive power game among countries and will also further enrich and rewrite the meaning of security.

Every technological revolution in history has brought immense changes to the economy and society, but they have also brought new challenges and imposed new requirements for national governance systems and governance capabilities. From the perspective of maintaining national power and national security, we must squarely face the challenges and opportunities brought by this technology. Therefore, this article aims to answer the following questions: In the context of increasingly fierce competition among countries for dominance in the AI field, how are ChatGPT and generative artificial intelligence different from the AI of the past? How will this type of AI change the features of the current state of national security? What methods should we adopt to respond to changes in real security challenges? The answers to the above questions will help us squarely face the challenges that the new technologies are bringing to national security and provide a reference for maintaining the national security order and taking hold of the development of the security situation.

The development of AI technology and the rise of ChatGPT
ChatGPT and related technologies are the latest data points plotting out the rapid development of AI technology. To understand the impact of ChatGPT on current societal development and international security, we must first understand the operating mechanisms of ChatGPT and how it changes and impacts the combined application of AI technology.

(i) The development of AI technology and the features of ChatGPT’s capabilities

Research on AI began in 1956 when scientists such as John McCarthy and Marvin Lee Minsky discussed how to use machines to simulate human intelligence. The concept of "artificial intelligence" proposed in these discussions opened the door to research in the academic discipline of AI. After several technological upgrades, breakthroughs were continuously achieved in the technological development and application of AI. The nature of the technology AI is based on has gradually shifted from the "logical reasoning" of the 1.0 era to the "knowledge engineering" of the 2.0 era and then to the "machine learning" of the 3.0 era. Along the way, AI capabilities improved rapidly, and the scope of applications gradually expanded. After the third wave of AI technology development, AI technology has also crossed the threshold of industrialization, gradually taking on the characteristics of a systemic variable in the international system. Countries continue to expand the scope and depth of their applications of AI technology in military, economic, and other fields: Smart weapons and information processing platforms such as unmanned aerial vehicles (UAVs) have gradually changed the face of traditional warfare, and AI's empowerment of industries and innovation have greatly increased the rate of production and economic development. AI is seen as an important part of the new round of S&T revolution. As early as 2016, analysts realized that the development of AI technology has crossed the threshold of affecting human political life and would become an important influencing factor in the international system in the future. The unprecedented importance of AI technology and equipment may make policies for this field into the most critical element of national policy. The United States is well aware of the significant momentum that AI contains in the fields of national defense, military affairs, and industrial innovation. Therefore, it has always closely linked leadership in AI with the maintenance of U.S. hegemony, continuously introducing many AI development strategies. The competition for the initiative in AI technology R&D and application has become an important component part of the S&T competition between major powers.

S&T companies also continue to accelerate the pace of their exploration of AI technology development. In 2017, Google proposed a new AI deep learning model, the Transformer model. The researchers introduced a self-attention mechanism into the model and proposed a multi-head attention mechanism that can improve the parallel efficiency and operational performance of the model, greatly improving the computational speed of AI when faced with large-scale data. This gives AI strong abilities to understand contextual relationships. After that, OpenAI developed the Generative Pre-Training (GPT) model based on the Transformer model, introducing an unsupervised pre-training mechanism and supervised fine-tuning method into model training. This, combined with the prompt learning method, gives AI powerful natural language understanding capabilities. OpenAI successively developed several versions based on the GPT model. By the time it reached the GPT-3 model, the number of parameters used to train the model had reached 175 billion, achieving in-context learning and allowing the model to produce high-quality answers from a small number of samples. ChatGPT is a conversational AI launched by OpenAI based on the GPT-3.5 model. Researchers at OpenAI introduced the reinforcement learning from human feedback method into the training of ChatGPT. Engineers provided dialog
data during AI training, created and used the reinforcement learning reward model, and used proximal policy optimization to fine-tune the model. AI sorts the generated answers by ranking method during the training and learning process, and feeds them back to the system for a new round of training. This way, it can learn the expressions and grammatical rules of human language through large-volume training, thereby simulating the generation process of human language. Therefore, ChatGPT can generate text content in a more natural manner and is viewed as a new-generation knowledge invocation and processing tool. The combination of the above technologies gives ChatGPT more unique capabilities compared to traditional AI.

![Features of ChatGPT](image)

**Figure 1**  Features of ChatGPT

Source: Compiled by the author

First, in terms of linguistic expression, ChatGPT can efficiently understand and interpret human language and produce corresponding answers that conform to the laws of natural language, demonstrating strong anthropomorphic expression capabilities. Based on reports, ChatGPT is capable of generating impressive, detailed, human-like written text. Compared with the mechanized and programmed expressions found in interactions with previous AI systems, the ChatGPT model has a built-in scientific and humanized AI language system. Its surprising language "understanding" and expression capabilities exceed those of 90% of people. This enables ChatGPT to rid itself of the lack of emotional expressions found in the output process of previous AI systems during its operation. ChatGPT can conduct basic logical deductions and emotional judgments based on the conversation content, and output text that is as consistent with the context and language characteristics as possible. This gives it broad prospects for use in human-computer interaction fields such as text translation.

Second, ChatGPT shows far superior capabilities compared to traditional AI. ChatGPT shows people the capabilities and potential of large language models based on deep learning, that is, large-scale models with parameters in the hundreds of billions, which can break the traditional scaling law to achieve a qualitative leap in model capabilities. ChatGPT has already demonstrated document translation, data code writing, and other capabilities. The latest GPT-4 model has further demonstrated advanced reasoning capabilities that far exceed ChatGPT, and can even produce functional websites based on handwritten requirements in a few minutes. These capabilities make ChatGPT an auxiliary tool that can greatly improve the efficiency of learning and research. At the
same time, ChatGPT also possesses strong learning capabilities. The AI of the past rarely had the ability to make interactive corrections, and its answers were often based on certain "patterns" that were "summarized" from the data. Once the information received did not conform to these patterns, the answers it gave would deviate significantly. Based on self-reinforcement learning through unsupervised pre-training and human feedback, ChatGPT can continuously correct errors in interaction with human discourse and autonomously strengthen its language processing capabilities. Limited by the size of the training database and the failure to update the training data in a timely manner, ChatGPT sometimes makes minor or even common-sense errors. However, it quickly makes corrections and produces records after receiving user feedback. After multiple rounds of training, the accuracy of its output results significantly improves, and it achieves a high degree of intelligentization through continuous technological iteration. Of course, limited by its training data and algorithms, ChatGPT may sometimes "talk nonsense in a very serious tone." This requires a further strengthening of algorithm capabilities and expansion of the scale of data used in AI training to improve the accuracy and precision of its answers.

Third, the emergence of ChatGPT has made people realize the broad application prospects of generative AI. As a generative AI, ChatGPT can improve natural language processing and natural language understanding in many applications, and demonstrates the ability to generate multi-modal information. In addition to language-based question and answer, ChatGPT has shown us a variety of functions including language translation and text summarization and generation. This reflects the outstanding advantages of generative AI, namely, the ability to generate new content based on training data rather than simply logically arrange knowledge. The AI developed in the past was mainly decision-making AI, which primarily learns the conditional probability distribution in the data and then performs analysis and makes judgments based on the data. Starting from this basis, generative AI has achieved a breakthrough. It can not only perform prediction functions similar to decision-making AI, but can also perform in-depth learning, induction, and creation based on large amounts of data. After receiving instructions, it can independently make judgments and generate corresponding content. Currently, generative AI is being used in many fields, including ultra-high-definition video generation, remote medical diagnosis, and computer code generation. People with no basic skills in painting can even use AI to create award-winning paintings. Generative AI is likely to be the main direction of future AI development. It is foreseeable that, as the training cost of generative artificial intelligence decreases and computing efficiency improves, more auxiliary tools will be used in fields such as drug and chip design. Researchers can optimize product design layouts with the assistance of such AI, reducing the cost and time required for drug and material discovery, and thus greatly improving industry productivity.

(ii) ChatGPT intensifies competition among S&T companies and pushes society to consider it from all sides

The emergence and popularity of ChatGPT have attracted S&T giants to continue to increase their investment in AI research, launching a new round of competition in this field. In terms of the development of AI technology, after OpenAI launched ChatGPT based on the GPT-3.5 model, it continued on to launch the GPT-4 model that provides stronger comprehensive capabilities. Google has accelerated the training of ChatGPT-like AI and launched the latest version of the large language model PaLM and a new tool MakerSuite. Developers can use this tool to rapidly prototype their own ideas, achieve real-time engineering, generate synthetic data, adjust custom
models, and perform other functions. Chinese S&T companies and universities are also stepping up their efforts to develop ChatGPT-like AI in an attempt to catch up with this wave. For example, Baidu quickly launched a large model "Wenxin Yiyan," benchmarked against ChatGPT.

At the same time, ChatGPT’s powerful capabilities have impacted many areas of society. ChatGPT is essentially a conversational AI, and its output results are mainly text. Therefore, in some information exchange fields based on text exchange, ChatGPT will have a transformative impact on existing interaction and production methods. In the field of education, for example, ChatGPT’s multi-modal applications, information retrieval, and result production capabilities will gradually revolutionize the existing education system. It will not only serve as a "prosthetic limb" to gradually narrow the gap between the knowledge-disadvantaged and others, but also improve the ease of use and accuracy of the adaptive learning systems and enhance the completeness and creativity of teaching results. In the field of public administration, ChatGPT’s rapid processing capabilities for text and other data enable it to help the national government quickly handle certain public matters and realize the integrated development of intelligent government affairs including intelligent decision-making, intelligent management, intelligent services, and intelligent supervision. However, social changes are often accompanied by corresponding risks. As a new knowledge invocation tool, ChatGPT brings ethical risks and knowledge plagiarism to the academic world, which also makes whether to allow its use in academic research a controversial issue. Some people believe that "ChatGPT may be the end of civilization." They think that widespread reliance on ChatGPT will make people lose their critical thinking. Therefore, how to define the role of similar AI in papers and experiments has become a major problem that the academic community will face.

The potential security risks brought about by ChatGPT have caused widespread concern in society. Elon Musk believes that AI (as represented by ChatGPT) is "both positive or negative and has great, great promise, great capability," but that "with that comes great danger." Viewed from the level of national security, the impact of the development of ChatGPT and AI on national security has received widespread attention. The U.S. National Institute of Standards and Technology released an AI risk management framework to help researchers think about the development of AI technology, and measure and monitor AI risks and their potential negative impacts. Italy has banned the use of ChatGPT on the grounds of leakages affecting "personal privacy." At the societal level, the shock caused by ChatGPT also made people worry about the breakthrough development of AI. In Japan, nearly 70% of respondents believe that the country should impose stricter supervision on the development of AI. From this, we can see that ChatGPT will not only have impactful results on traditional AI application fields, but its unpredictable functions and application spillovers will also have a multi-faceted impact on society. Therefore, discussing the impact of the emerging applications of ChatGPT on national security will not only help to clarify doubts about its application and the technical mechanism behind this, but also help to comprehensively understand and correctly view the disruptive influence of generative AI on society in the future.

**New features of national security under the influence of ChatGPT**

High-tech innovations and breakthroughs have had multiple overlapping influences on national development. From the perspective of international power comparisons, a new round of scientific and technological revolution carried by AI technology is accelerating the reshaping of the global power order. From the perspective of social and economic development, AI can help
countries establish a more sustainable growth model that is free from economic crises. Looking back at the development and evolution of several technological revolutions from the past, we can see that they often have a significant or even disruptive impact on national security. The "cross-field extensibility" of national security studies naturally coincides with the broad adaptability of AI, and the development of AI technology is naturally deeply embedded in various national security fields. In the fields of political security, economic security, and military security, AI, as a systemic element itself, will create a wide range of new issues and become the central node of an issue network. In the fields of network security, nuclear security, and homeland security, where security has a relatively specific meaning, AI will become an important enabler, shaping the semi-central area of the network. The remaining national security fields are more loosely linked to AI, forming the peripheral area of the issue network. Therefore, it is very important to explore the multiple overlapping influences of ChatGPT on the national security situation.

(i) The information field will become more complex, increasing the ability of some countries to manipulate international public opinion

Developed Western countries are relatively mature in the AI field, so they have been able to strengthen their control over international public opinion by seizing opportunities and technological advantages. This is more conducive to their values-based targeted manipulation of public opinion and the establishment of information cocoons. Rapidly developing AI will facilitate the generation of disinformation, allowing the creation of a false appearance of consensus and hiding underlying societal fractures. For a long time, the United States has relied on its S&T hegemony and international voice established after World War II. Through its control of international media, the United States has continued to project anti-China public opinion and a negative image of China with views such as the "debt threat theory" and "economic aggression theory." In terms of propaganda strategies, the Western media often only take up political issues and human rights issues that are in line with Western interests in order to set the agenda, while focusing on negative issues in their reporting. Once this sort of public opinion gains dominance, it can hide its value orientation under the cloak of "collective will" through discourse suppression and creation functions. Generative artificial intelligence, as represented by ChatGPT, has great advantages in conducting public opinion wars: After purposeful training, this type of AI can continuously output speech that is politically biased and contains false information, and convert such speech into the formats of images, videos, and online speech. When exported to international data networks through various public opinion communication channels, this speech will directly or indirectly interfere with international public opinion and affect the public perception of other countries. On this basis, countries with technological and data advantages can combine AI developed based on big data models with various Internet bots to create a new type of "cyber army." By mixing in false information and distorting facts, this army can concoct large volumes of speech that smear the images of other countries. This not only directly affects public opinion and tarnishes the images of other countries, but also helps the perpetrating countries strengthen their dominance and initiative in the field of international public opinion.

After the large-scale application of generative AI as represented by ChatGPT, the public opinion ecosystem will be further complicated and muddied, and the validity and credibility of Internet information will be further reduced. New media gives every individual the right to speak out. The emergence and application of generative AI such as ChatGPT has reduced the information asymmetry among different individuals in the social information field and greatly increased the
frequency and weight of individual voices in public opinion. Information entropy in the public opinion field will greatly increase. The social information field and public opinion field further present the features of "multi-centering," and the government's authoritative position in information release and public opinion guidance is severely challenged. With the rapid development of generative AI capabilities, the threshold for creating false information such as fake videos will be significantly lowered. AI can use deep fakes to manipulate elections, exacerbate social divisions, and reduce society's trust in the government. The credibility of such deep fake content is rapidly increasing with the development of AI. Even originally accurate content can be dismissed as deep fake content, directly affecting the credibility and authority of the government.

In recent years, fake news circulating on social media has caused much controversy. For example, fake videos of the U.S. president's speeches are constantly circulating online, causing people to worry about the president's health. Some videos have even had a direct effect on the battlefield of public opinion. After the widespread use of generative AI developed based on general large models as represented by ChatGPT, more social groups will use this technology to produce videos, charts, and other information. The power to produce highly credible news and information will no longer be concentrated in the hands of the state and mainstream media, and the entities involved in information dissemination will become more diversified. This will further increase the complexity of Internet information and intensify the existing trend towards the fracturing of Internet society. Social groups that have mastered the technology will compete with the state over the right to interpret the truth, and false information that is difficult to identify as such will further reduce the authority and credibility of the news media and even the government.

In addition, ChatGPT's "bias amplification" ability will amplify biases and stereotypes in its training data, further marginalizing groups that are already at a disadvantage in society. When using ChatGPT, some users have found it responds to certain questions about Black women by downplaying their contributions, and it sometimes deliberately belittles certain political figures. This is because the data from the current international Internet contains a large amount of biased information. Stereotypes, prejudices, and discrimination have been widely recorded in machine learning methods, and R&D institutions, limited by algorithm capabilities and costs, are unable to completely scrub out such information. Countries with monopoly advantages in international network data management can artificially create "information cocoons" for AI by methods such as inserting malicious information to pollute databases. This will make it so AI develops a thinking framework with ideological and cognitive biases during the training process, affecting its output results and thereby potentially affecting the viewpoints and cognition of users.

(ii) Data security will be difficult to safeguard, and ideological infiltration methods will grow more diverse

With the widespread use of AI based on large models and big data, the risk of leakage of important data of citizens and countries will suddenly increase, causing a sharp increase in security risks. At present, the new generation of AI is made possible by deep learning and operations based on big data. The interactive use of large amounts of sensitive data by AI during deep learning not only exposes the private information of humans to AI, but also greatly weakens the government's ability to supervise data and information. The political security issues caused by personal information leakage already largely extend beyond the traditional security field. From a government perspective, a national government can quickly improve the efficiency of its information collection and decision-making by using ChatGPT, but this requires the government
to "feed" relevant documents and data to ChatGPT so that it can make decisions more in line with actual situations. This undoubtedly increases the risk of national data being stolen: On the one hand, the working mechanism of ChatGPT is still a "black box", and the possibility that it can store and transmit relevant data during its operations cannot be ruled out. On the other hand, the functionality of ChatGPT enables it to fully understand the relationship between data in a short time through self-supervised learning capabilities. In a feature update in May 2023, OpenAI lifted the restrictions on ChatGPT's Internet connection capabilities, allowing it to "know" the latest information, using specific third-party software as a springboard. Although it still cannot access certain "security-protected" websites, the unlocking of networking capabilities has strengthened ChatGPT's deep data retrieval and serialization capabilities. ChatGPT and similar generative AI systems collect and associate targeted large-scale data through keyword reminders and other methods, creating "portraits" of certain events or plans. For example, a country's government could use this technology to collect targeted information on port shipments and important resource transfers in some other country, using this small window to dynamically perceive the domestic conditions of other countries in order to get an early warning of possible military activities. This would significantly reduce the confidentiality and security of government behavior. Without specific countermeasures, countries weak in S&T will be unilaterally transparent to technologically powerful countries, and technologically powerful countries will always hold the strategic and tactical initiative. The power structure among countries will become more unbalanced, forming a "Matthew effect" in the field of international power.

From the perspective of user information exchange, the dialogue between users and ChatGPT is not only a process of AI self-reinforcement learning, but also a process of the disclosure of users' personal information. When a user uses ChatGPT for information query, ChatGPT can learn the user's speech characteristics, current areas of interest, and even identity through information exchange. In a networked information society, each citizen's state of mind, behavioral habits, and characteristics can be obtained through the collection and processing of monitoring data such as their real-time public speech and online behavior. The constant communication between the public and ChatGPT actually gives AI the opportunity to conduct in-depth analysis of user portraits for the group. Language models not only offer the potential to produce lower-cost propaganda, but can also improve the effectiveness of propaganda by tailoring the quality of propaganda to specific groups. Thus, such models can serve as content generators and disseminators for cognitive warfare between states. Through in-depth group portraits, a state is able to "prescribe the right medicine" and carry out ideological subversion using propaganda models that are more familiar and favorable to the target group. In this way, subversive activities transition from a method of "indiscriminate delivery" to one that is "precise and differentiated," significantly increasing the effectiveness and efficiency of ideological penetration activities. In addition to drawing group portraits, ChatGPT also gives humans the ability to accurately construct portraits of elites. Currently, AI systems are already able to accurately portray the personal images of other countries’ political elites, who are seen as opponents in a strategic game. AI can analyze and grasp the personality traits of political leaders by using their public speeches on different occasions as data. It can even predict the language characteristics of political leaders based on language data. This makes targeted attacks on perceptions of leaders more difficult to defend against.

(iii) The imbalance in power development among countries will further increase, intensifying changes in domestic and international power structures
With the in-depth development of AI technology, the existing competition among technological powers will further intensify. Changes in AI technology will further consolidate the power of the pioneer countries to develop technology in the knowledge field, and the control of this power by major countries will become more invisible and natural. When a certain party's AI research achieves a breakthrough in algorithms or computing power, this advantage can spill over to other fields, empowering rapid breakthroughs and development in other technologies. Therefore, the cross-field application of such technology will lay down rules for the research ideas of others, and latecomers will rely on this path of research. The dominant party can therefore dominate and formulate the rules and discourse in the general large model research and application fields. At present, the exponential development trend in AI performance is rapid and sustained once it gets going. It is easy for those with advantages in research to transform their algorithm and computing power advantages into an insurmountable superiority over disadvantaged parties, and gain most of the fruits of development. This creates a "winner takes all" situation. Such technological progress will ultimately create winners and losers at the national level. Especially at this critical moment when the international power structure is changing, breakthroughs brought about by technological changes will be regarded by all parties engaged in competition as the "key" to winning the contest. This will inevitably result in more intense, zero-sum competition between different countries or political alliances in this field. Today, the Group of Seven has reached a consensus through the establishment of the "Hiroshima AI Process" in an attempt to "preemptively" seize the leading voice in the international discourse around issues such as suitable values for AI. This means that the establishment of organizations such as transnational data alliances and algorithm alliances may become an important strategy for S&T competition among countries. Technology and data protectionism centered on big models, big algorithms, and big data will become the core content of S&T competition among major powers. International confrontation situations such as S&T blockades and even S&T cold wars may become new trends in international competition.

The first feature is that unbalanced S&T development will worsen the "Matthew Effect" in the development among countries, making it more difficult for developing countries to change their disadvantaged position in the global economic system. The capitalist global economy is based on a worldwide division of labor, with different actors assuming different economic roles. The advantages of developing countries participating in the global economic system are mainly their relatively low labor costs and ample supply of natural resources. However, in the AI era, there is a possibility and tendency for peripheral areas to be permanently marginalized. Although generative AI can significantly improve the efficiency of industrial production and experimental R&D, many developing countries lack the digital infrastructure needed to power AI, the innovation environment needed to build new models that utilize AI, and the skills to fully utilize its power. This means that these countries can only continue to be forced to accept industries transferred to them from developed countries. Generative AI has extremely high requirements for cumulative training and infrastructure, which determines that the R&D and application of this technology have cumulative features. Long-term investment is needed to achieve in-depth research and development of the technology. This makes it difficult for other countries, especially countries under chip import and export restrictions, to achieve "overtaking on the curve" (弯道超车, using new opportunities to overtake current leaders), widening the "rich-poor gap" among countries in the development of AI industries. The replacement of labor by AI technology has further diluted the demand for labor in the capitalist economic system, while the development of the AI industry has not yet created new labor positions. This has further weakened the relative advantages of
developing countries, and their relative position in the global economic system is further shifting to the periphery. Countries with advantages in technology and capital can build a "center–periphery" economic and S&T development structure for the new era, relying on their advantages in the development of AI technology to continuously strengthen their core position in the economic and S&T research fields. Meanwhile, countries at the periphery of the structure will be stuck with the choice of obtaining some core technologies through exchanges with and learning from core S&T countries in order to promote the upgrade of their national industrial structure, or else continuing to receive industries transferred from developed countries. The former choice means that peripheral countries will continue to strengthen their dependence on central countries, making it more difficult to break out of the system structure that exploits them. The latter choice means that relatively underdeveloped countries will miss out on the wave of cutting-edge technology R&D and applications, and their development potential will be further reduced, ultimately leading to the further expansion of the gap created between countries by the "Matthew Effect."

The second feature is a further enhancement of the power of non-state actors and a trend toward the "multi-centering" of political power. Big data, algorithms, and even AI, while bringing profound changes to society, are also becoming effective means for platform companies to capture power. Core technologies such as the learning iteration of generative AI are mainly in the hands of S&T giants such as Google and Microsoft. Such ownership will give rise to a group similar to a "transnational S&T community." The information monopoly of S&T companies gives them power over the acquisition and interpretation of information. The originally relatively stable boundaries of power between sovereign states, especially in terms of power to produce public goods, will become blurred or even disappear due to the arrival of new entities. The data training and algorithms used for the update and iteration of ChatGPT and other similar generative AI are mainly in the hands of large technology companies, especially Internet companies, and groups of scientists, so it is difficult for the government to get involved. Moreover, the broad application prospects of generative AI in many fields allow S&T companies to participate in national affairs and share some power, which in turn creates the possibility for these companies to intervene in or even dominate affairs over which the state originally had a monopoly of power. Through long-term investment, technology R&D, and the practical application of research results, S&T giants will assume the role of producing and providing public goods in many areas of society. Therefore, in some fields such as economic and social management, the right to supply public goods will to a certain extent be transferred from the traditional political authority held by nation-states to the power of capital. Government power will be further differentiated, and the disconnect between technical authority and bureaucratic authority may gradually erode the effectiveness of the national government's actions and allow national power to be "hijacked" by S&T companies.

(iv) Generative AI will enable battlefield weapons, turning the cognitive battlefield into an important area of contest

Technical equipment equipped with new types of AI will significantly affect and change the current battlefield situation. AI has been called the third revolution in warfare, following the invention of gunpowder and the atomic bomb. ChatGPT’s high adaptability and powerful information processing and output capabilities give it broad prospects for battlefield applications. The CIA is currently discussing how to use ChatGPT and similar programs to assist in intelligence collection and espionage operations. The large-scale application of ChatGPT and similar AI in military operations will greatly enhance military capabilities. In terms of battlefield target
recognition and combat information processing, ChatGPT can be loaded onto drones and military equipment to perceive battlefield information in real time. Recognition networks equipped with the GPT-4 model can effectively improve the accuracy of target recognition in complex environments, greatly improving the combat effectiveness of drones. ChatGPT can also efficiently connect different battlefield information perception systems in series to create intelligence-sharing terminals through perception, aggregation, processing, and output methods. AI based on the GPT model architecture can continuously filter large volumes of battlefield information and data and flag its important content, improving the efficiency of manual information processing and analysis and providing command departments with accurate information and data and decision-making bases. In terms of battlefield command, combat command systems controlled by generative AI have faster response rates, higher-level decision-making, and more outstanding efficiency compared to traditional command systems. In the face of increasingly complex battlefield formats and exponential growth of battlefield information, generative AI based on big data technology and trained on military decision-making styles can efficiently analyze the combat needs of commanders and provide highly accurate risk assessment and decision-making suggestions through large-scale model processing, combat simulation, and deduction based on war game deductions, helping commanders discover and defeat threats before they arise and greatly improving the level of ad hoc decisionmaking on the battlefield. In terms of logistics, ChatGPT can be combined with technologies such as the Internet of Things (IoT) and cloud computing to dynamically monitor the use and deployment of strategic military materials. It can improve warehouse management efficiency by analyzing data such as the quantity of stored materials and maintenance status, achieving a dynamic balance between demand and resource transportation to provide optimal logistics supply solutions. Therefore, when ChatGPT is applied in the combat field, it will significantly raise the military's intelligentized information acquisition and decision-making level. The military's combat capabilities are closely linked to the intelligentization level of its equipment. Battlefield information collection and decision-making methods will transform by moving in the direction of "cloud collection" and "AI decision-making."

The emergence of ChatGPT will also highlight the importance of cognitive confrontation capabilities between states. New cognitive warfare and information warfare weapons developed based on generative AI, big data, and big algorithms may reduce trust between countries. NATO's cognitive warfare doctrine holds that victory is defined more by capturing the psychological and cultural high ground than the geographical high ground. Cognitive warfare is highly dependent on support from network information technology and social media platforms. Social media platforms and networks not only give each individual the ability to obtain information and communicate instantly, but they have also become important platforms from which hostile countries launch targeted attacks. Such attacks can be divided into cognitive attacks, such as transmitting false battlefield information and fake speeches by leaders, and information attacks such as destroying other countries' information transmission systems and intercepting and deciphering information transmitted by other countries. In these areas, generative AI will become a powerful tool for cognitive warfare: After attack information is processed by generative AI, its capabilities for concealment and deception will be greatly improved, gradually giving cognitive warfare the features of "highly interactive, occurring throughout all time and space from multiple perspectives." The military can train generative AI to continuously strengthen its capabilities in the production and delivery of false information. It can intensively carry out multi-angle information bombing and emotional incitement on the opponent's people through AI generated images of battlefield witnesses and victims. Through continuous interaction and communication
with the public, it can continuously indoctrinate people with falsified facts and create targeted information fog, which in turn can generate war-weariness and anti-war sentiment in other countries and threaten the stability of public opinion in the domestic societies of other countries, ultimately overcoming the opponent's will to resist. At the same time, generative AI can launch non-stop information bombing against the enemy's information receiving systems, affecting the normal operation of the enemy's network technology facilities, cutting off the enemy's information reception, and reducing the efficiency of internal communication within the enemy's military. Therefore, the outstanding performance of generative AI in cognitive warfare may aggravate public opinion relations between countries. Every country will always be on guard against possible disinformation attacks and tend to blame any disruptions arising from public opinion within society on the actions of other countries, especially enemy countries. This will further weaken the foundation of strategic mutual trust between countries.

(v) ChatGPT training and operations will impact existing legal requirements and significantly lower the threshold to crime

At present, the party who is responsible for materials related to ChatGPT is not clear, and ChatGPT can easily infringe on the rights of others during training and use. As a very large model with more than 100 billion parameters, ChatGPT cannot provide a clear logical reasoning process and clear data source for each decision or output result produced during its operation. Even the "real" sources it provides may be accompanied by real details and false citations. When an accident results from the use of the output results of generative AI, there is no clear subject who can bear this part of the responsibility. Considering this issue, the U.S. Supreme Court once discussed the entities liable for AI chatbots, and one justice suggested that "the legal protections that shield social networks from user content lawsuits may not apply to AI-generated work." At the same time, the large amount of data used to train ChatGPT means that it is difficult to prevent the theft and misuse of personal information, significantly increasing the risk of data leakage. It is difficult for the existing legal system to restrict related behaviors. The capabilities of generative AI such as ChatGPT come from the capture and learning of massive data, but this involves issues such as whether the behavior of capturing data is compliant with laws and whether the captured data will be used for other purposes. It is also difficult to verify the legality and validity of data sources. This is deeply related to the legality of the source of generative AI capabilities. In addition, the training and operation methods of ChatGPT undermine the public’s informed consent mechanism, in that data capture is carried out by S&T companies without individual consent, making it difficult for the public to protect the privacy of personal data. It is even difficult for citizens to detect the leakage of their private personal data. Payment information, addresses, taxi records, and even chat records may be easily obtained by others due to program design flaws and widespread user use, making it increasingly difficult to protect the privacy of information. In addition, the relevant companies are not transparent about the procedures used to process training data. Personal information and confidential government information may not be fully processed before being used directly for training. After the training, the relevant data may also be deliberately retained by the company, increasing the possibility of data leakage.

At the same time, the widespread use of generative AI will lower the threshold for cybercrime and make it more difficult to track criminal behavior. Europol believes that ChatGPT is a valuable resource for potential criminals who lack the technical knowledge to generate malicious code. As a conversational AI, ChatGPT can quickly produce the required type of code and generate
programs based on user requirements, making it a natural criminal tool when in the hands of criminals. Although each company currently claims to have set up a program for rejecting inappropriate requests for its artificial intelligence products, the current programs do not yet have the ability to identify the deeper intentions behind requests, and users have still found that they can "trick" the program during use to achieve their purposes. At the same time, generative AI has the ability to edit batches of text and forge pictures and videos on a large scale. Criminals can combine these capabilities to carry out telecommunications fraud and other activities in a way that better aligns with cultural and social characteristics, so that their tactics are more "authentic" and "effective." Criminals can take advantage of information gaps to create scams that are more in line with logic and strike at the weakness of people who lack the ability to discern information. The frequency and success rate of these crimes will increase significantly.

(vi) ChatGPT will bring about structural unemployment, affecting the labor market and social stability

As an important component of national security governance efforts, employment risk governance is embedded in the system of national development practices. This technological revolution, represented by AI, may bring about many types of unemployment. ChatGPT and other generative AI will permanently replace some jobs in certain industries, posing the risks of collective and long-term unemployment risks to social development. As a new productivity tool, ChatGPT will inevitably have a severe impact on the current ways in which people work and the balance of supply and demand in the labor market. Companies can quickly obtain and extract information through generative AI such as ChatGPT. For example, OpenAI Codex, which is based on the GPT-3 model, is proficient in more than a dozen programming languages and improves programmers' efficiency through "memorizing code". Generative AI has also greatly improved the productivity and creativity of the workforce. Low-skilled workers can use tools such as ChatGPT to narrow the gap in work quality between themselves and high-skilled workers.

However, the substantial improvement in productivity also means that the labor force required for existing jobs will be reduced, as well as the demand for manual workers and workers doing basic intellectual work, and it will be possible to replace some repetitive labor and creative work with generative AI. From the perspective of economic development, the development and application of disruptive and breakthrough technologies will affect the existing economic format and economic distribution relations, reshape the current employment and social and economic pattern, and produce destructive substitution effects on existing technical groups. A report released by OpenAI in March 2023 shows that approximately 80% of the U.S. workforce will see some of their work tasks affected by GPT models and related technologies. A report released by Goldman Sachs shows that, at present, about 2/3 of the jobs in the United States and Europe are "affected to some extent by AI automation," and as many as 1/4 of the jobs can be completely performed by AI. Different from the replacement of low-end manufacturing jobs by AI of the past, the job positions that generative AI can handle are more concentrated among positions where similar operating rules and procedures are applied and that require frequent processing of large amounts of similar data. These behaviors can be easily completed through generative artificial intelligence. For example, you only need to input basic news copywriting rules and information capture procedures into generative AI, and it can automatically capture news data and "fill" it into a manuscript, greatly reducing the time required for news writing. Therefore, the widespread use of generative AI such as ChatGPT in these fields will reduce corporate operating costs while
improving operational efficiency. The main production entities in this field will shift from humans to AI, and some workers doing intellectual tasks will lose employment opportunities. At the same time, we should also note that the current ChatGPT is a milestone in the development of generative AI, but it is by no means the end of that development. In the future, generative AI may serve as the "control console" and "core brain" of other AI technologies or industrial technologies. Besides some positions that require innovative thinking or subjective adaptability, most fields will see the introduction and dominance of production entities based on generative AI, unleashing an unpredictable surging tide of labor unemployment.

An organized schematic of the impact of ChatGPT on national security is shown in Figure 2.

![Diagram showing the impact of ChatGPT on national security](source)

**Strategies to cope with the new security situation**

The emergence of ChatGPT poses unprecedented challenges to national security. At the domestic level, ChatGPT impacts existing legal norms and ethics, affects the labor market, and influences ideological stability. At the international level, this technology will affect the dynamics of S&T competition in the international community and impact the international power structure. Needless to say, we can say these challenges are massive, or even disruptive. Therefore, we must prepare for a rainy day and make corresponding preparations in advance, strengthen international cooperation in the construction of innovation systems, and work hard to improve laws and regulations in order to lay a solid foundation for safeguarding China's national security in the ChatGPT era.

(i) Internally, we must accelerate the construction of an open, collaborative, and diversified AI innovation system.
First, we can establish decision-making institutions including an AI development committee to solve the issue of an overall governing force in the AI field. Official departments such as the Ministry of Science and Technology and big data administration bureaus can coordinate the development pace of technology-based enterprises and promote the improvement of China's general large model R&D and innovation capabilities. The development of existing S&T enterprises currently focuses more on technology R&D and application centered on market competition, with investment in applications far exceeding investment in basic theoretical research. The situation of internal competition hinders improvements in technological innovation and application capabilities. Therefore, taking accelerating basic theoretical development and breakthroughs in major technological applications as our point of departure, we should innovate the technology R&D and application paths of existing enterprises and universities. Based on the diverse and interconnected characteristics of general large model R&D, we should fully realize the interaction and collaboration between various entities and levels in the R&D and application chain to improve our original innovation capability in the general large model R&D system. We should focus on solving the pain points and difficulties in the development of general large models and accelerate the pace at which we are catching up with international leaders.

From the perspective of lateral R&D, the government should strengthen support for basic research, especially model data training, and use tax subsidies and other preferential policies to encourage enterprises to make incubation investments around basic theoretical research. Entities such as technology enterprises, universities, and governments play complementary roles: Different enterprises can integrate their data resources, build shared open-source databases and computing engines, reduce barriers to entry by evenly sharing scientific research costs, facilitate large model training for innovative S&T companies, and build a technology R&D model in which "the government provides basic support, multiple parties share responsibilities, and enterprises verify." In view of the difficulties in the development of existing large models, enterprises and universities should set up key joint research teams to explore the feasibility of different solutions and paths through long-term research. We should leverage the capabilities of S&T companies to convert research results into applications in order to quickly verify technical paths, thereby breaking through the obstacles to the development of large models. From the perspective of vertical applications, entities up and down the production chain should orient themselves to the actual application needs of society, give full play to the multi-modal application capabilities of general large models, create innovative application solutions based on large model capabilities, and quickly realize good iteration and upgrade of application capabilities through methods such as research and interactive feedback. The government should collect opinions from experts and scholars, set up "test fields" for the conversion of technology into applications around key application scenarios, continue to empower enterprises to conduct large-scale experiments on applications, innovate practices for generative AI operations, achieve the integration of the needs of generative AI technology and the current needs of social development, and accelerate the innovative application of generative AI in multiple fields.

In addition, we should gradually reform the talent training model and delivery system, build a high-tech talent cultivation alliance linking universities, research institutes, and enterprises, and provide more intellectual support for generative AI R&D. Talent is the first resource, and the technological innovation system cannot operate without the support of talents. With the explosive rise of ChatGPT, the demand for talents studying the training and application of general large models has surged. However, China still has a large gap in research-type talent in the field of the development of general large models, with a shortfall of nearly 30 million relevant talents.
Therefore, in order to promote the rapid development of generative AI, it is necessary to speed up the cultivation of domestic talent.

The education system, led by universities, should gradually expand the scale of AI research and development majors, subdivide the research directions of these majors, increase the cultivation and application conversion courses on general large model training, and improve the basic AI literacy of school students. At the level of high-quality talent delivery, universities can directly connect with enterprises and research institutes and regularly push high-quality talents to existing AI R&D and application systems through the establishment of joint internship mechanisms.

The government and enterprises should increase their support for relevant talents, attract top talents in relevant fields, selectively introduce some teams of outstanding scientists, and directly enhance the country's innovation and research capabilities in this area. For example, the government can include talents in the purification of general large model training data and model applications in the existing overseas high-level talent recruitment plan requirements, and by setting up admission criteria and graded benefits, continuously find and attract high-quality overseas talents to return to China to advance their careers. Objectively, there is still a large gap between China and foreign countries in terms of large models and other technologies. Attracting overseas talents should become an important means of quickly improving R&D capabilities. To this end, we should break down ideological constraints, recruit talents with a more open and inclusive attitude, and build a solid talent foundation for the development of AI in China.

(ii) Externally, we must share in the AI technology development achievements to break down the situation of technological hegemony

As a new technological singularity, generative AI can effectively empower different industries, produce industrial innovation, and greatly improve productivity. It should become a powerful helper for realizing a community with a shared future for mankind. However, most of the value created by AI has not been truly enjoyed by most countries. Instead, it has become a new tool for countries with technological hegemony to expand their monopolistic advantages. At present, the main force in the development of large models is still the leading S&T enterprises, and various R&D entities have not yet reached a consensus on technical standards and usage rules for the development of general large models at the level of international society. At present, China has a certain degree of influence in the development of AI and has the ability to unite other countries to change the "haves" and "have-nots" situation in the field of AI R&D. Therefore, under the new situation, China should continue to adhere to the concept of a community with a shared future for mankind and realize technology and research achievement sharing within the international community so as to slow down the trend of technological polarization on a global scale, win more friends from among developing countries through technology sharing, and breaking the United States' "Technological Democratic Alliance" (技术民主联盟).

China should actively explore and discuss international rules and standards related to the development of general large models internationally and actively pursue the right to make rules and technological leadership in new technology fields. This requires China to launch initiatives in multiple areas. In terms of data connectivity, China can take the lead in establishing regional organizations such as a General Large Model R&D Cooperation Organization. On the basis of establishing deeper strategic mutual trust with other countries, China can engage in cooperation based on data and technology exchanges, sign data sharing agreements to build larger databases
covering social data from multiple countries, and jointly establish a team of experts from various countries to manage the database. While ensuring data security, this would provide solid support for the training and strengthening of general large model capabilities, effectively broadening the scope of applications and depth of use of the model. In terms of application sharing, China can work with other countries to develop common large-model applications according to local conditions. According to the needs of different countries, such as disaster early warning and social service management, and through methods such as resource exchange and establishment of joint ventures, with guarantees provided by government and technical support and maintenance from leading enterprises, we should cooperate with different countries to develop general large model applications and build digital information hardware facilities, realizing the direct sharing of generative AI achievements. In terms of sustainable development, China can help other countries train the information talents they need and build a basic information talent cultivation system by dispatching scientific research teams, remote guidance, and mutual visits for learning. These practices can not only effectively share AI development achievements and "realize the dreams" of other countries' informatization and intelligentization development goals, but also effectively enhance China's influence in international digital information standards and application development paths. In addition, by setting agendas and discussing data processing standards at AI conferences and in international organizations, China can regulate the application scenarios and capabilities of general large models, coordinate the steps taken by various countries in global AI governance, and make positive contributions to guide the development of general large models so that they work for the good.

(iii) We must innovate existing domestic governance tools and improve laws, regulations, and policies in the AI field

Network technology is neutral in itself. We must not only observe the impact of emerging technologies, represented by ChatGPT, on the current international security order, but also realize that this is an important opportunity to innovate security governance tools. After all, the new security issues brought about by new network technologies should also be addressed through the development of corresponding governance tools. With the rapid improvement of generative AI capabilities, existing security detection and processing tools are unable to deal with the threats it brings. For example, in the face of forged video and simulated data attacks, traditional information detection tools have difficulty determining the authenticity of information. Only supervision tools built on the same technical foundation can detect and manage such attacks. This also requires enterprises to assume the responsibility of using AI information review technology to regulate the proliferation of false information and frequent criminal frauds that may be induced by AI.

At the same time, generative AI can revolutionize existing governance tools. Based on this technology, enterprises and governments can jointly develop highly automated tools that require data collection and processing, such as natural disaster early warning tools. This can improve society's early warning and response capabilities for traditional governance issues. Generative AI can also play a supporting role in social services and other fields. Therefore, the comprehensive utilization and development of "generative AI + X" services will help promote the establishment of smart governments and friendly societies. This is a key step in creating an interconnected and intelligent society.

In addition, legal and regulatory systems should also be improved to regulate the development and application paths of generative AI. First, the law should establish a reasonable
system of legal regulations around the copyright of the content generated by generative AI and the legitimacy of the source of the content, provide basic legal support for the content created by generative AI, avoid hindering the training and development of generative AI due to violations of intellectual property protection and other regulations so as to encourage and regulate the large-scale production of S&T companies and the deployment of their applications in multiple fields, achieving the stable implementation of the achievements of generative AI research. The abuse of big data by S&T companies itself touches on the right to keep personal information private and the right to know, but excessive restrictions will hinder the development and training of big data models by S&T companies. Therefore, laws and regulations must be introduced to clearly define the boundaries of data that can be used for general large model training and find a balance between ensuring model training and protecting information privacy. For example, using document-based generative AI as an example, the government should negotiate with enterprises on the data types and scale of training texts and "feed" the corresponding content to the AI to avoid intrusion into some unauthorized and private data.

Second, the government and enterprises should implement effective supervision of the AI industry with clearly defined responsibilities, and implement AI technology safety standards. Enterprises must establish a standardized production system when training and using generative AI, consult with the government and submit documentation in a timely manner on the training data and related feedback of generative AI, focus on cooperation and development of high-quality training data, and ensure the reliability of generative AI capabilities from the source. The government should set up a review team for AI-generated content to regularly review and inspect the operation and use of generative AI. This can then be used as a basis for the assignment of scores linked to the credit rating and preferential tax treatment of development companies, forcing companies to pay attention to safety standards in the process of developing and training AI and ensuring that generative AI does not incorporate discriminatory and biased values into its output framework during the training process. Enterprises should also create compliance design plans to promote AI innovation and ensure system transparency and explainability.

Finally, the law should clarify the entities responsible for generative AI and improve the legal liability system accordingly. Transparency and accountability are critical issues in the development and deployment of generative AI, as they are key to ensuring that the technology is trustworthy and remains fair and secure. If a technology or application lacks an entity that can bear responsibility, criminals who use the technology as a criminal tool can easily escape relevant responsibilities. This actually encourages entities in society to abuse it. Therefore, when formulating future laws, we should pay attention to the sharing of responsibility among the designers, users, and maintainers of generative AI, clarify the rights and responsibilities of different entities in the form of laws and regulations, establish corresponding responsibility tracking mechanisms, unify standards for the division of responsibilities, establish reasonable and reality-based principles of attribution, reasonably allocate responsibility for accidents to people or "actual actors," and cooperate with network information security departments to jointly combat new types of cybercrimes. At the same time, the law must also put forward higher requirements for the producers and maintainers of generative AI and fundamentally reduce the possibility of generative AI being used to commit crimes.

Conclusion
We can expect generative AI, as represented by ChatGPT, to change the security situation facing the country, but it will also bring new opportunities for national development. The report to the 20th Party Congress pointed out that we must "promote the development of integrated clusters of strategic emerging industries and build a number of new growth engines such as new-generation information technology, AI, biotechnology, new energy, new materials, high-end equipment, and green environmental protection." This requires us to look at the impact of this technological breakthrough on the country's development situation from multiple perspectives and realize that generative AI as represented by ChatGPT will serve as a new-generation "Internet platform", following on the heels of the Internet to become another tool to deeply connect different development fields and accelerating China's process of building an intelligent society and information superpower.

The emergence of ChatGPT is not the endpoint of the development of this type of AI, but one of the "singularities" in AI development and application model research. We need to pay full attention to its ample development potential. As similar AI technologies continue to be injected into the development and architecture of digital applications, the software and devices we use in our daily work will become more intelligentized and humanized, and virtual assistants, virtual doctors, and other such things will develop more comprehensive and more innovative functions. In addition, this will break through some of the physical limitations of existing humans, presenting characteristics such as "round-the-clock service, high-precision operations, and multithreaded work." We can predict that this will achieve substantial improvement in S&T research and development and social service efficiency. In the future, as training scales increase and algorithms are updated, this type of AI will present more comprehensive and powerful functions, with more access ports and more diversified application fields, and will continue to innovate the existing knowledge transfer networks and means of information acquisition in society. It will essentially become the "external brain" of human beings in the digital age, achieving a leap in productivity.

However, the development of generative AI such as ChatGPT also means that AI will pose unprecedented and complex challenges to the national security situation, which requires us to promptly and squarely face up to the role of similar AI and its status in societal development. Only in this way can we prepare for the high-tech competition of the future.

Li Qiang Chairs the State Council Executive Meeting to Study Comprehensive Measures for Rural Revitalization

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According to a Xinhua News Agency report from Beijing on January 22, Premier Li Qiang of the State Council presided over the executive meeting of the State Council, which discussed comprehensive measures to promote rural revitalization. The meeting reviewed and passed the Guiding Opinions on Promoting the High-Quality Development of the Instant Delivery Industry, studied and planned work to empower new industrialization with artificial intelligence, heard reports on the operation of the capital market and considerations for work, and discussed the Atomic Energy Law of the People's Republic of China (Draft) and the Anti-Money Laundering Law of the People's Republic of China (Revised Draft).
The meeting emphasized that promoting comprehensive rural revitalization is the key focus in the new era's journey for the “Three Rurals.” It is necessary to anchor the goal of building a strong agricultural country, learn and apply the experience of the "millions of projects," and better advance the modernization of agriculture, rural areas, and Chinese-style modernization. The priority development of agriculture and rural areas should be adhered to, modern agricultural construction accelerated, the foundation of food security solidified, and farmers' income increased through multiple approaches. The status of farmers as the main body should be maintained, rural talents vigorously cultivated, and all kinds of talents incentivized to participate in rural revitalization. The meeting also called for deepening the construction of rural ecological civilization, accelerating the green transformation of development methods, and building livable, business-friendly, and beautiful villages.

The meeting pointed out that in recent years, the instant delivery industry has emerged rapidly, playing an increasingly important role in promoting consumption, ensuring people's livelihood, and expanding employment. It is necessary to strengthen facilitation and guidance, further create a favorable business environment, improve the industry's development level and support capacity. Companies should be urged to adhere to food safety and delivery safety, strengthen the protection of workers' rights, and promote the reduction of compliance operating costs for companies.

The meeting stressed the need to coordinate high-quality development and high-level security, focus on the deep integration of artificial intelligence and manufacturing as the main theme, focus on intelligent manufacturing, and develop scenario-based applications. Key industries should be accelerated to upgrade intelligently, intelligent products developed vigorously, the industrial manufacturing system empowered at a high level, new productive forces formed rapidly, and strong support provided for the construction of a manufacturing powerhouse, network powerhouse, and digital China.

The meeting emphasized the need to further improve the basic system of the capital market, pay more attention to the dynamic balance of investment and financing, enhance the quality and investment value of listed companies, increase the intensity of medium and long-term funds entering the market, and enhance the market's intrinsic stability. Capital market regulation must be strengthened with "zero tolerance" for illegal and non-compliant behavior, and a standardized and transparent market environment must be established. More effective measures should be taken to stabilize the market and confidence. The consistency of macro-policy orientation must be enhanced, the innovation and coordination of policy tools must be strengthened, the economic recovery must be consolidated and enhanced, and the stable and healthy development of the capital markets must be promoted.

The meeting decided to submit the Atomic Energy Law of the People's Republic of China (Draft) and the Anti-Money Laundering Law of the People's Republic of China (Revised Draft) to the Standing Committee of the National People's Congress for deliberation.

The meeting also delved into other topics.