

Ideological Risks in Cyberspace in the Big Data Era and How to Mitigate Them

Duan Jiamin

[**Abstract**] Ideological security is an integral part of national security and a necessary prerequisite for the stability of the regime and social harmony and unity. With the advent of the big data era, technological advancements have not only significantly transformed lifestyles and production methods but have also intensified and made ideological struggles more covert, exhibiting new characteristics. China is currently on the path toward achieving the second centenary goal, and the security of its ideological landscape determines whether it can accomplish this objective. Today, cyberspace has become a key platform for ideological exchanges. This paper focuses on cyberspace in the context of the big data era, analyzes the challenges China currently faces in ideological construction within cyberspace, and proposes corresponding measures to foster a cyberspace conducive to the healthy development of ideology.

[**Key words**] mainstream ideology; ideological security; big data; cyberspace

[**About the author**] Duan Jiamin, from Jiujiang, Jiangxi, China, teaching assistant in School of Marxism, Guangzhou College of Commerce, master degree. Research interest: localization of Marxism in China.

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[**Website**] www.oacj.net

1 Introduction

Ideological work is one of the core concerns of every country, and ideological security is of extreme importance to the survival of a nation. China is currently at a critical juncture in its transition from a developing major country to a socialist modernized powerhouse. Maintaining ideological security has become the top priority among all current national tasks. Compared to traditional media such as radio and newspapers, cyberspace has become the forefront of ideological struggle. The advent of the big data era has not diminished ideological struggles; instead, it has introduced new characteristics distinct from those of previous societies. Therefore, in the context of the big data era, focusing on ideological issues in cyberspace and analyzing potential risks and challenges hold significant importance for safeguarding China's national security.

2 Conceptual definition of ideology in cyberspace in the big data era

The analysis of ideology in cyberspace in the big data era is essentially a study of the new characteristics, forms, and issues that have emerged with the advent of ideology in the big data era. Therefore, clarifying the relevant concepts plays a fundamental role in identifying the risks that have emerged and proposing measures to mitigate them.

2.1 The meaning of the big data era

The term "big data" first appeared in the article "Big Data Managers" in the American journal *Science*. With the rapid development of information technology during the Third Industrial Revolution, an increasing number of countries around the world have turned their attention to data analysis research. In 2014, China first included the development of big data in its government work report, emphasizing its importance. Since then, data resources have been recognized by China as a foundational strategic resource, and detailed plans have been made for the development of big data-related industries.

The Big Data era is characterized by massive amounts of data as its core, utilizing technologies such as cloud

computing, the Internet of Things, and digital twins to cultivate digital thinking and make decisions based on data analysis. The rise of the Internet has given rise to a virtual society distinct from the real world, leading to a rapid expansion of information volume. Compared to the traditional society, which had limited information sources, slow information dissemination, and restricted data storage capacity, the big data era relies on data technology to collect vast amounts of data comprehensively, throughout the entire process, and dynamically. It can also identify connections and patterns among massive datasets, enabling efficient data processing. Leveraging the inherent learning capabilities of big data, it can perform correlation analysis on collected data, predict future trends and directions, and enhance people's ability to discern and judge at the macro level.

2.2 The essence of cyberspace

In the era of big data, cyberspace is a product of the internet. Through virtual platforms developed using digital technology, various types of data and information are freely transmitted, received, and shared within these platforms, thereby constituting cyberspace. Within cyberspace, the dissemination of information breaks through the constraints of time, space, and geography. The Internet has to a large extent become the medium through which daily life in an atomized society is conducted, influencing and even reshaping people's ways of thinking, production, and living.

Cyberspace is a virtual space. Essentially, cyberspace is a digital space without a physical entity, representing a digital projection of real life. Therefore, in cyberspace, people's activities are not restricted by national borders or geographical boundaries, exhibiting high mobility. Individuals can freely choose their identities and engage in anonymous communication. In cyberspace, everyone possesses equal speaking rights, unaffected by differences in identity, wealth, or status. Anyone can express their opinions and views, and Internet society fully respects people's pursuit of individuality. However, the pursuit of individuality does not mean that cyberspace is an absolutely free space. As the number of Internet users has grown significantly, the influence of the Internet has increased, and various rules governing online social behavior have been placed within a legal framework. Cyberspace is increasingly viewed as a quasi-public domain.

2.3 Ideological security

Ideology refers to the spiritual form advocated by a specific political or social community. Ideological security is an integral part of national security, and every regime must ensure that the dominant ideology holds a leading position in the ideological sphere and gains the recognition and support of the people. Maintaining ideological security in our country means firmly upholding Marxism as the guiding ideology for our development, supporting and upholding the leadership of the Communist Party of China, resolutely adhering to the path of socialism with Chinese characteristics, and firmly resisting various erroneous ideologies.

Historically, one of the reasons for the collapse of the Soviet Union was the peaceful evolution of Western ideology, which psychologically breached the Soviet Union's defenses against Western countries. Today, we live in an era of peace and openness, and economic globalization has brought about exchanges and collisions between various cultures. With the support of digital technology, information can be transmitted to every corner of the world in a short period of time. It is not difficult to observe that China's cyberspace is also filled with various ideological trends. If left unchecked, this could pose significant challenges to China's security. Strengthening guidance and regulation of ideological trends in cyberspace not only helps create a positive cyberspace environment but also serves as an inevitable measure to safeguard China's national security.

3 Risks posed by ideological trends in cyberspace in the big data era

Since the 18th National Congress of the Communist Party of China, the Party and the state have increasingly emphasized ideological construction in cyberspace. Currently, China's cyberspace ideological domain has achieved significant development, such as the continuous improvement of digital infrastructure, the dissemination of mainstream values through diversified media in an integrated manner, the strengthening of the public's sense of

community, and the significant enhancement of high – quality mainstream works. However, it must also be recognized that Western countries continue to vigorously promote Western values in cyberspace, and issues such as the diversification of social trends and the existence of multi-layered subcultures persist.

3.1 Western ideological penetration

General Secretary Xi Jinping once pointed out, “Various hostile forces both domestically and internationally always attempt to make our Party change its banner and name, with the ultimate goal of making us abandon our faith in Marxism and our belief in socialism and communism.” Taking the United States as an example, the export of ideology is a key component of its foreign policy. Through media channels, it injects Western ideological concepts into target countries to subvert the value systems of their populations, thereby advancing U.S. national interests. In reality, ideological struggles did not cease with the dissolution of the Soviet Union; they simply shifted to more covert forms.

In recent years, the international landscape of “the East rising and the West declining” has become increasingly clear. China’s comprehensive national strength has significantly enhanced, impacting the interests of certain countries in economic globalization, thereby arousing concerns among Western nations about China’s development momentum. By promoting the “China threat theory”, they focus on some issues in China’s development process, exaggerating them to undermine public confidence. In the big data era, utilizing technological means for ideological penetration is one of the primary methods. Currently, Western countries still hold a significant advantage in technological mastery. The United States possesses 70% of the world’s large-scale databases. This data advantage enables Western countries to collect information on the preferences of China’s citizens, thereby achieving precise personalized customization, causing citizens to unknowingly accept Western value systems. Through online “wall – jumping”, China’s citizens can access negatively framed articles about China’s development carefully crafted by Western countries. Over time, citizens may lose their objective and rational thinking about issues, easily shifting toward Western value systems. Additionally, recruiting and cultivating agents is another common tactic. The number of Sino-foreign joint venture Internet companies is growing, with foreign capital interfering in Internet content development, distorting the images of national heroes, misinterpreting national history, undermining public faith, and intentionally disseminating provocative statements to infiltrate ideological influences.

3.2 Diverse social ideologies

Social ideologies and ideologies are inseparable from social reality. In fact, ideology is the dominant social ideology. Ideology guides the differentiation and development of social ideologies, and ideological security also depends on the coordinated development of various social ideologies. In traditional societies, the state unilaterally imposed mainstream ideology on society through top-down methods. However, in the era of big data, people can access information from around the world more quickly and conveniently than ever before, which has led to the weakening of mainstream ideology.

Since the reform and opening-up, China has increasingly emphasized the role and value of the market. At the same time, recognition of the market economy inevitably accompanies the awakening of interest consciousness. The rapid increase in the number of Internet users has drawn society’s attention to cyberspace, objectively promoting the emergence and development of new media, making the dissemination and spread of social trends more difficult to control. Looking at the current situation, Western-promoted ideologies such as liberalism, consumerism, and individualism have also gained a foothold in China’s cyberspace. At one point, individualism even gained significant momentum, shaking the Marxist beliefs of young Internet users and blurring and reducing people’s identity with mainstream ideology. On the other hand, besides the influence of foreign ideologies, the mindset of the big data era has also changed with the emergence of the Internet. The openness, anonymity, and decentralization of cyberspace have led to increasingly diverse value systems and orientations among people. Faced with various

ideological trends in the virtual cyberspace, individuals have the freedom to choose their value orientations based on personal preferences. When there is a significant gap between reality and expectations, or when negative social news emerges, this further weakens netizens' identification with the mainstream ideology. Additionally, the emergence and popularity of various subcultures challenge the authority of mainstream ideology. For example, feminism, extreme nationalism, the LGBT minority group, and environmental groups characterized by anti-globalization, "these are difficult to judge using traditional ideological frameworks such as 'good' or 'bad', but they challenge the ways in which humanity has thought and perceived the world up to now". The spread of these ideas poses higher demands on ideological and political education work.

3.3 The influence of online public opinion on the acceptance of mainstream ideology

In the era of big data, traffic not only signifies increasing attention but also a steady stream of wealth for entities. To secure traffic, online influencers manipulate the online public opinion ecosystem, weakening the influence of mainstream ideology and fueling social division and conflict.

In recent years, the frequency of social news stories that severely contradict mainstream values has risen sharply, challenging the public's outlooks on the world, life, and value. It is not difficult to observe that the frequent emergence of lowbrow news is closely linked to the public opinion guidance of online influencers. To cater to netizens' psychological preferences, online influencers may deliberately sensationalize certain lowbrow content, pushing the boundaries of morality. The more unconventional and anti-traditional the content, the more it seems to attract attention and satisfy entertainment-driven psychological needs. Online influencers exploit the entertainment-oriented nature of cyberspace to weaken the influence of socialist core values promoted by mainstream ideology. On the other hand, the convenience of information dissemination also facilitates the spread of rumors and erroneous ideas. The flood of information leaves the truth in a "blind spot", and netizens, unaware of the facts, are easily tempted to engage in irrational behavior that harms public interests. In the era of big data, mainstream ideology should be based on a truthful and rational environment, with consensus reached through free discussion. However, online influencers intentionally steer public opinion toward predetermined directions, disrupting the online environment and blurring mainstream values. Over time, this will hinder the healthy development of China's online environment.

Additionally, China is currently in a critical period of national rejuvenation. While achieving economic development through reform and opening-up, issues such as social changes, emotional detachment, and income disparities have emerged under the influence of the times, introducing unstable factors into society. Issues arising during development are amplified by online influencers, and some are even exploited by foreign criminals to disseminate politically inflammatory statements, causing the public to overly focus on negative aspects of development, alter their ideological orientation in political events, and promote specific value systems and political ideologies, thereby threatening China's ideological security.

4 Measures to optimize ideological security in cyberspace in the big data era

In the big data era, although new risks have emerged in China's ideological construction, if these issues are properly addressed, leveraging digital technology and integrating online and offline efforts will be more conducive to maintaining China's ideological security and increasing public recognition of the state and the government. Therefore, measures can be taken to strengthen Internet regulation, optimize propaganda methods, enrich educational content, and establish early warning mechanisms to enable cyberspace to contribute to China's ideological security construction.

4.1 Strengthening cyberspace regulation

In the era of big data, algorithms are being widely applied, and strengthening algorithm regulation is an urgent priority for maintaining cybersecurity. Currently, China lacks systematic regulations in algorithm regulation. To address this, China needs to clarify the objectives of algorithm registration, including safeguarding citizens'

legitimate rights and interests, promoting socialist core values, and ensuring national security. It should also establish a collaborative mindset, a dialectical mindset balancing development and security, and a systemic mindset within the algorithm registration process, guiding the algorithm registration system toward maturity and perfection through scientific methods. Transparency of algorithms to the public should be enhanced, with clear disclosure of algorithmic principles and potential biases, to create an environment of information symmetry. When making personalized recommendations to netizens, the traditional single-algorithm recommendation approach should be replaced with a dual “human-algorithm” recommendation system. This approach balances individual preferences in cyberspace while subtly promoting mainstream ideology, breaking information silos, and preventing users from becoming captive to algorithms. Additionally, instilling correct value concepts into algorithms is the fundamental prerequisite for safeguarding ideological security in cyberspace. Mainstream media should participate in the design and development process to guide value concepts, thereby fundamentally enhancing their influence and voice in cyberspace.

In addition to government regulation, the initiative of online social organizations can also be mobilized. Compared to the government’s role as a regulator, online social organizations serve as a bridge, enabling a more authentic, comprehensive, and timely understanding of the ideological ecosystem in cyberspace. By directly engaging with grassroots communities, online social organizations can anticipate the fermentation of social hotspots and the formation of public opinion, demonstrating greater flexibility in problem-solving and complementing and reinforcing government management. Furthermore, unlike businesses with explicit profit motives, online social organizations lean toward public welfare organizations. Acting in the national interest, they can maintain neutrality and objectivity in cyberspace ecological governance, promoting the healthy development of algorithms. Therefore, the state should support the development of online social organizations, explore government-plus-online-social-organization cooperation models, clarify the division of labor and responsibilities between the two parties, achieve information sharing and complementary advantages, and realize the rational allocation of resources.

4.2 Optimizing the dissemination content of mainstream ideology

Ideology is not an abstract theory; it is the glue that binds a social community together. For ideology to truly take root in people’s minds and hearts, its content is of critical importance. To ensure that mainstream ideology dominates the online space in the era of big data, we must interpret mainstream ideology in a way that aligns with the times, as President Xi Jinping has stated, “The vitality of theory lies in constant innovation”. However, while interpreting theory in a contemporary manner, we must still adhere to the guidance of Marxism, innovate the theoretical framework of mainstream ideology, equip our minds with the latest theoretical achievements, and enrich the content of mainstream ideological discourse. Additionally, in the era of big data, mainstream ideology should not be limited to theoretical indoctrination and preaching. It should enhance its appeal to the public, consider their emotional needs and the characteristics of the era, integrate into the times, connect with the people, and be close to their lives. Using the criteria of “having ideas, warmth, and quality”, we should create outstanding works recognized by the people, promote compelling stories, and enhance the acceptance of mainstream ideology among online audiences through an entertaining and educational approach.

Online ideological construction must not only focus on the central level but also be implemented at the grassroots level, and people’s livelihood is an excellent vehicle for this. People’s livelihood refers to the lives of the masses, and issues related to people’s livelihood often spark concern and heated discussions among netizens. Public opinion typically ferments around issues related to people’s livelihood. Due to the openness of the online space, diverse opinions can arise. If not properly guided, this can lead to negative social emotions. Therefore, online ideological construction should focus on social issues of concern to the public, such as labor protection, employment, education, healthcare, and rural development, providing timely explanations and disclosures. By focusing on and safeguarding people’s interests, potential social risks can be mitigated, and the recognition and

support of netizens can be earned.

4.3 Optimizing the dissemination methods of mainstream ideology

Compared to the traditional era, the dissemination methods in the big data era have undergone revolutionary changes. While the content of ideology is undoubtedly important, the dissemination methods also play a crucial role in achieving tangible results. On the one hand, platforms like Weibo, WeChat, Douyin, and rednote attract large audiences. New media platforms, with their low barriers to entry, openness, and interactivity, can be leveraged to swiftly deliver mainstream ideology into the daily lives of online audiences, promptly refute erroneous ideas, and guide public thought. On the other hand, integrated media has become a prominent trend in the development of the big data era. By “strengthening the construction of a full-media communication system”, leveraging existing resources, establishing communication and coordination mechanisms, and achieving the integrated development of channels, platforms, and concepts, new development opportunities can be explored.

Additionally, communication methods should be refined and differentiated, with different approaches tailored to different age groups. Teenagers constitute a significant proportion of the online population, and their outlooks on the world, life, and value are still forming. Considering the age characteristics of teenagers, mainstream ideology promotion should balance seriousness and liveliness, incorporating technologies such as digital twins, VR, and AR to conduct promotion through short videos and animations, thereby guiding their thoughts in an entertaining and educational manner. Middle-aged individuals in cyberspace possess independent thinking and rational analytical capabilities. News and commentary-related information can be increased, leveraging data analysis of personal preferences to achieve precise dissemination of mainstream ideology. For elderly individuals in cyberspace, in addition to daily news, information related to the founding, reform, and development of the People's Republic of China can be emphasized. In summary, the dissemination of mainstream ideology must fully consider the audience and adopt diverse communication strategies.

4.4 Establishing a risk prevention mechanism

In the era of big data, the speed at which public opinion spreads and ferments is unprecedented. Once public opinion has formed, the cost of calming it down is too high. Therefore, ideological security in cyberspace must be prevented before it occurs. Big data information collection and analysis technologies can be used to monitor and analyze online public opinion and establish a monitoring system. By leveraging digital technology to monitor public accounts, comment sections, live streams, and other online platforms, one can track changes in public opinion. Sensitive keywords and dialogue scenarios that may pose risks to national ideological security should be identified. When such sensitive content appears in cyberspace, big data can swiftly identify and report it to administrators, enabling them to assess new trends and developments in ideological struggles within cyberspace.

Maintaining ideological security also requires clarifying the responsible entities. The Communist Party of China is the ruling party of our country, and maintaining ideological security should be the responsibility of the Party committee. Party members and cadres must not only strengthen their theoretical learning but also understand basic data processing and analysis knowledge, master necessary modern information technology, enhance their ability to anticipate and respond to situations, and handle online public opinion in an orderly manner. On the other hand, think tanks can be established, such as those comprising experts in Marxist ideology, sociology, anthropology, big data technology, and other related fields, to pool collective wisdom and jointly safeguard ideological security. Additionally, warning levels should be clearly defined, categorized based on factors such as the scale of the risk, urgency, and potential harm. The impact of negative public opinion on the mainstream ideology should be predicted, enabling resources to be allocated and utilized more effectively according to the classification. Relevant departments should be promptly coordinated to swiftly and appropriately address public opinion.

5 Conclusion

Maintaining ideological security in cyberspace in the era of big data is a top priority for China at present. As

technology advances, ideological work has become more covert and intense. To safeguard ideological security, it is essential to discern new trends emerging in the development process and continuously explore pathways to utilize the latest technological achievements for this purpose. It is also crucial to remain steadfast and persistent in this endeavor. Under the strong leadership of the Party, socialist ideological work will undoubtedly achieve new progress and secure victory in this critical ideological battle.

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