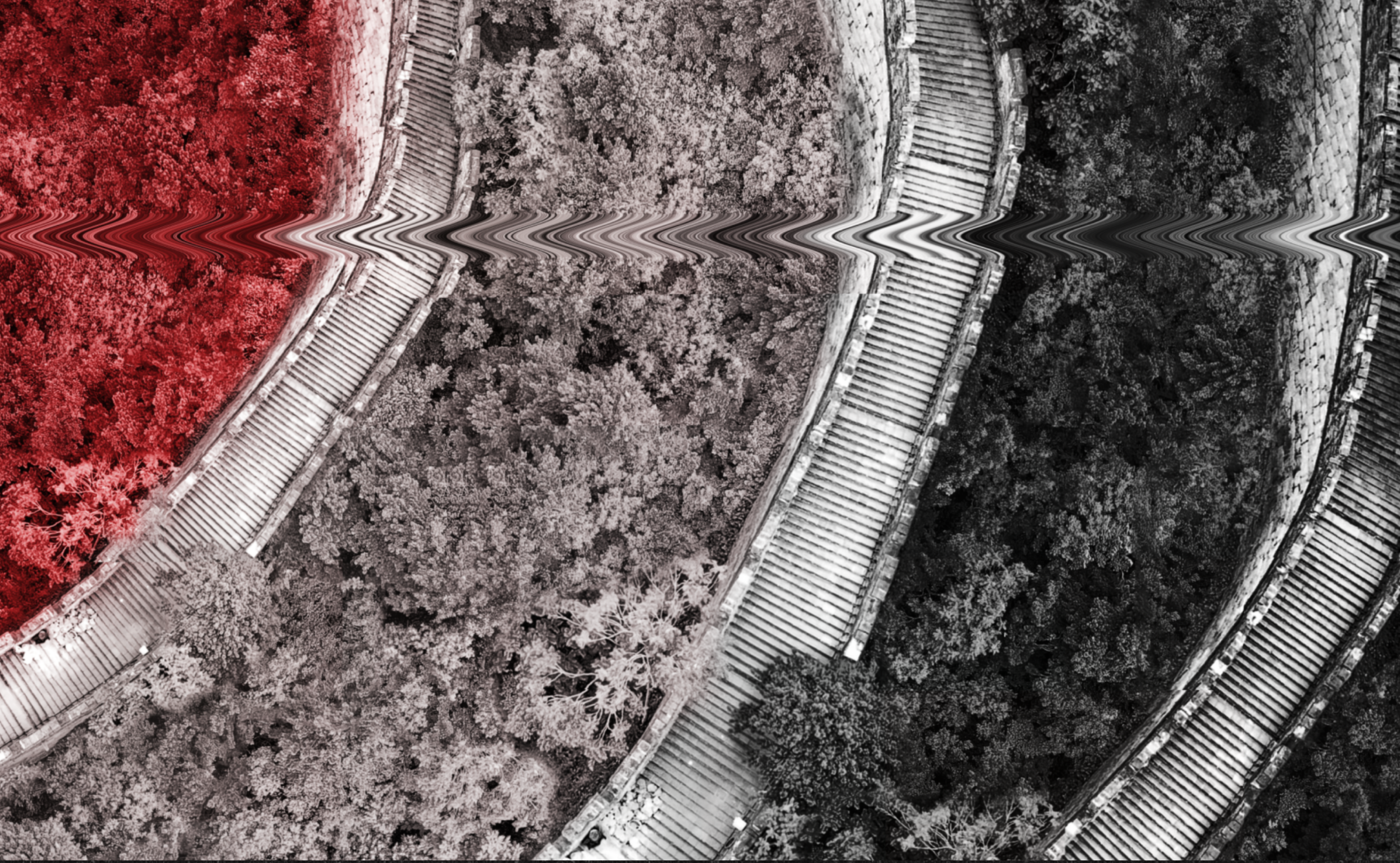

# Blocked by Numbers

The Impact of Real-Name Registration Policies on Transnational Access to Chinese Social Media Apps

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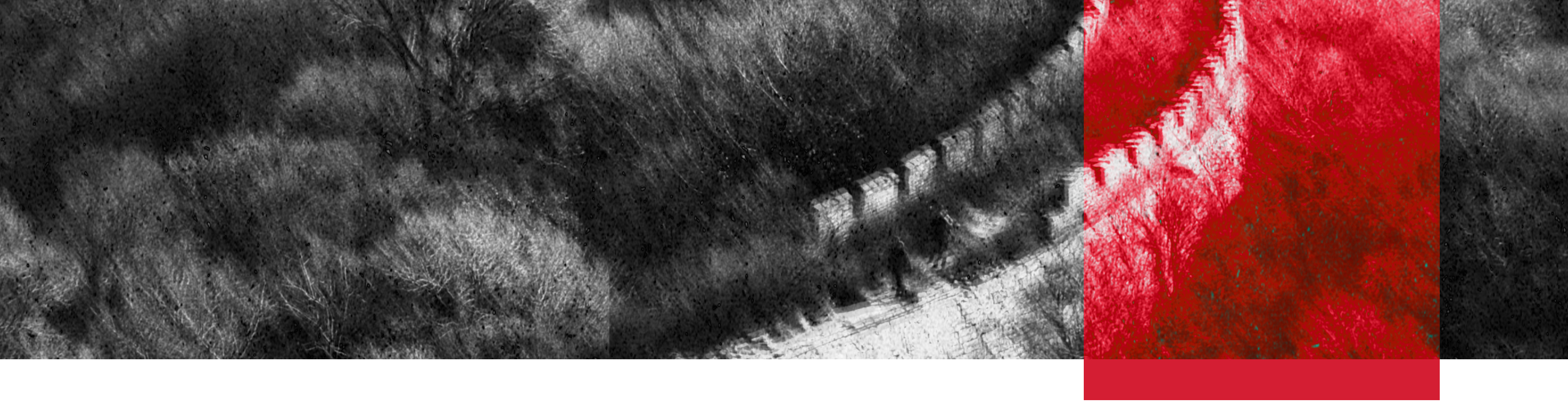


# 1. Executive Summary & Key Findings

The Chinese Communist Party (CCP) views social media apps developed by Chinese internet companies as critical components of a broader, ideological security firewall. Existing in what the CCP has dubbed the "grey zone internet," these platforms should work to prevent the infiltration of potentially harmful foreign ideas and information into the online domestic sphere of the People's Republic of China (PRC).

The findings of this report reveal that roughly 75% of Chinese-developed apps have accordingly implemented such controls in the form of Real-Name Registration (RNR) policies. These policies, which are designed to mandate personal identifiability for all online activities, effectively sacrifice user anonymity in a coordinated effort to maintain strict government control over cyber activities. Yet, when implemented on a transnational basis, these RNR policies challenge the ability of Chinese-developed platforms to sustain overseas users and often result in effective access barriers.

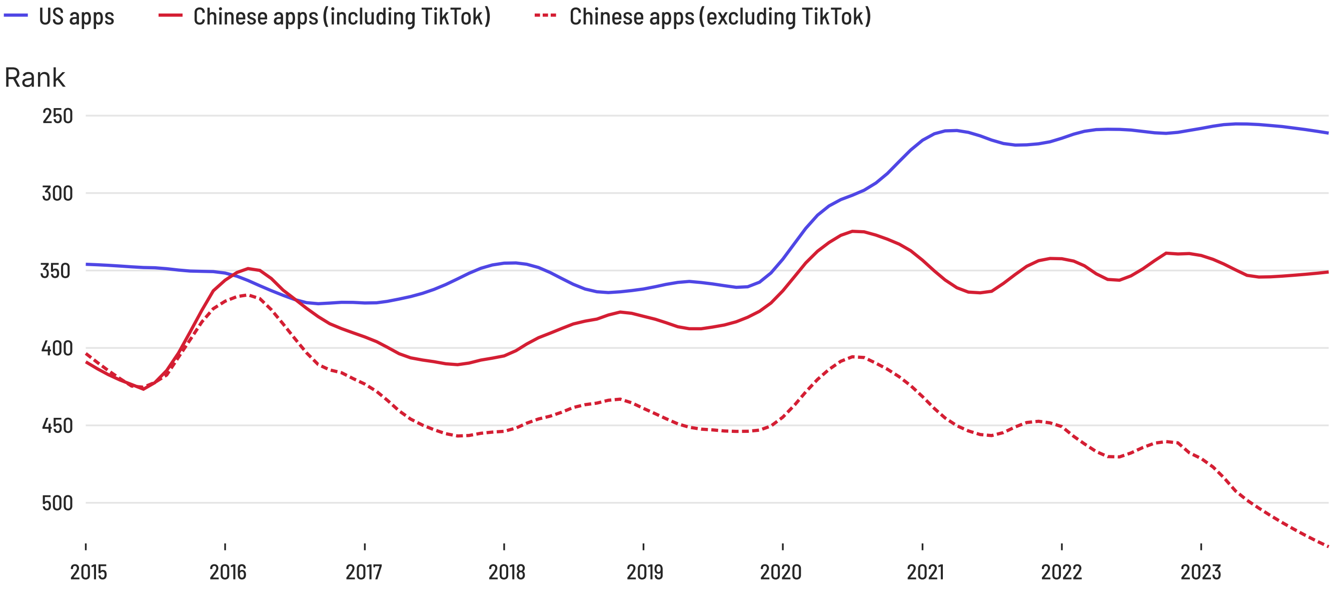
Notably, the global reach of China's cyber sovereignty is only possible because of the dependence of affected communities on Chinese social media platforms and communication tools. Users whose accounts were closed after posting on politically sensitive topics are often forced to write desperate public apologies in an attempt to regain access to the Chinese-controlled social media sphere.[1] For geographically disrupted networks (in which some members are in China, while others live abroad), Chinese social media platforms have become quasi-synonymous with digital infrastructure.[2] After successive bans of international alternatives that started with the likes of Facebook and YouTube in the late 2000's, they serve as the predominant means by which transnational communication can occur.

Yet account closures such as these offer a preliminary indication that there are limits to the exploitation of identifiability for transnational influence or repression. If the danger emanating from a "hostile" user outweighs the benefits of surveilling them, the user may be excluded from the surveillance system altogether.

Chinese social media apps, which once competed with U.S.-based behemoths for downloads and for a brief moment in early 2016 even outranked them, are now waning in popularity (see Figure 1, below). As such, this report pursues the hypothesis that China's securitization of the internet and the decline of these apps are two sides of the same coin. Which begs the question: Have China's efforts to ensure identifiability also, by either accident or design, restricted overseas access?

## Figure 1: The Global Rise and Fall of Chinese Apps

Average monthly ranks of U.S. and Chinese social apps across global app stores



*The graph displays the global ranks of U.S. and Chinese social apps, excluding their domestic markets. The trend lines indicating changes in popularity over the years. For readability, the vertical axis is limited.*

*Source: Calculation based on data by Appmagic.*

In examining this core hypothesis, we address three additional queries. First, to what extent is the RNR system implemented by Chinese platforms on a global scale? Second, what are the consequences for overseas users when the RNR system cannot be complied with (either due to phone number barriers, app store barrier, or both)? And third, how do access barriers like these impact overseas online communities—and can these barriers be understood as a targeted exclusion mechanism by the CCP?

Our key findings are as follows:

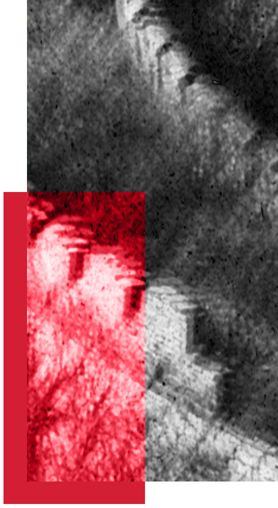
1. **Identifiability Requirements are Common for Overseas Users:** Our research reveals roughly three-out-of-every-four Chinese-developed social media apps now enforce identifiability requirements for overseas users, representing a significant—and controllable—portion of the grey zone internet.

2. **RNR Policy Enforcement Creates Barriers to Access:** Our findings indicate that the enforcement of RNR policies has introduced significant access barriers for not only domestic audiences—but also for overseas users and the Chinese diaspora writ large. Indeed, our quantitative assessment of access barriers across Chinese social media apps across 58 countries reveals a widespread imposition of restrictions. In approximately 35% of tested instances, users encountered barriers preventing full access to these platforms.

3. **Apps with RNR Policies Experience Decline in Downloads:** Our analysis of download trends from 2015 to 2023 shows a pronounced decrease in global downloads for apps influenced by RNR-related access barriers, with an 82% drop following the enactment of China's Cybersecurity Law in 2017. After adjustments, we estimate that 14.1 million app downloads were prevented in that period.

4. **Regional Variability Exists for Access Barriers:** Access barriers imposed by Chinese social media platforms are not uniformly enforced across all geographies. For example, platforms such as QQ and Weibo face relatively fewer restrictions in the Asia-Pacific region compared to the extended European region, the MENA region, and South America. This varied pattern of enforcement suggests that from the CCP's perspective—at least for certain regions—the risks of keeping online channels open and importing "dangerous" foreign ideas outweighs the potential economic and political gains lost by limiting transnational users via RNR-related access barriers.

Given these findings, we posit there are likely strategic digital boundaries and limitations to China's influence operations as applied via RNR policies. China's transnational influence operations center on the protection of the domestic discourse from outside opinion and commentary that is not aligned with the CCP—and this goal may be prioritized over using social media platforms to influence global discourse or mobilize overseas communities. At root then, it appears as though China is not only reshaping online discourse rooms to its advantage—it is also drawing a new digital border between a sphere it seeks to influence and a sphere of "harmful," non-aligned political ideas.



# 2. Background: The Global Impact of China's Efforts to Achieve Cyber Sovereignty

The CCP has become increasingly assertive in leading China on a path towards undisputed control over its domestic cyberspace. This pursuit of "Cyber Sovereignty" includes overcoming Western internet governance principles and standard-setting practices, achieving tech independence, and using information technologies to support the regime, rather and undermining it.[3] But Beijing's guidance primarily envisions a "paternal" internet solely governed by the party-state to ensure that all aspects of cyberspace align with its offline statecraft (网上网下一体化). [4]

In varying degrees of intensity, the CCP has—since its inception—displayed the ambition to exert total control over *which* information can be exchanged in China and by *whom*.[5] After party elites learned that social media had enabled organized protests in Xinjiang between 2009 and 2014, they were reinforced in their conviction that it was of utmost importance to monitor free digital flows of information and censor content that could potentially undermine social—and hence political (i.e. regime)—stability.[6]

As a result, the Xi administration created a swath of legislative reforms and gave meaning and mandate to new powerful agencies, such as the Cyber Administration of China (CAC).[7] These efforts expanded China's highly sophisticated and omnipresent surveillance apparatus, enabling not only the persecution of ethnic minorities and religious groups but also the suppression of free speech and dissent.[8] Political science scholars have argued that such an advanced surveillance system allows for the execution of two highly pervasive and—so far—successful strategies. To stifle political opposition before it can form any meaningful form of resistance (known as *preventive repression*),[9] while allowing or even orchestrating non-threatening forms of resistance (also referred to as *directed digital dissidence*).[10]

Key to enabling such pervasive control online is the enforcement of *ubiquitous identifiability*—requiring identification as a condition for internet access. In China, this mandate is implemented through various technological and regulatory means, collectively referred to as RNR polices.

From a broader perspective, identifiability stands in a dichotomous relationship with anonymity. One must be sacrificed for the other, yet both can serve important functions online. Identifiability can work to foster digital citizenship, strengthen democratic institutions, and counter the likes of hate speech, fraud, and cybercrime.[11] Preserving online anonymity, on the other hand, is crucial for protecting whistleblowers and at-risk individuals, empowering survivors of domestic abuse and marginalized groups, and safeguarding individual rights against severe injustices—especially in repressive regimes like China.[12]

The authors of this report believe online anonymity should only be constrained and replaced by identification measures when it is necessary and appropriate to identify users, such as in instances of hate speech or fraud.[13]

Yet by heavily favoring identifiability over anonymity, the Chinese government has chosen an uncompromising approach under which the criteria for enforcing identifiability extend far beyond concerns of hate speech and fraud. In fact, for China's system of preventive repression, identifiability is the primary means to "monitor plans for future protests, to suppress speech, and to identify those who participated in government protests."[14] For example,[15] all online users in China have been forced to publicly display their IP addresses on social networks since 2020.[16] Since 2022, social media accounts with over 500,000 followers have been required to reveal their real names online,[17] a policy which in turn measurably shrunk China's online communities.[18]

This report adds to the growing body of work that focuses on the international and transnational implications of the CCP's pursuit of cyber sovereignty—the effects of which are multifaceted and pose new questions and challenges to a variety of actors and communities. The global expansion of China's digital economy fuels domestic industrial modernization[19] and shapes international norms and standards in China's favor.[20] At the same time, Chinese internet platforms undermine democratic institutions,[21] engage in cognitive warfare,[22] and support the spreading of propaganda by "telling China's story well" (讲好中国故事) through short video platforms and global influencers.[23] Achieving cyber sovereignty is about economics as much as discursive statecraft.[24]

There are transnational dimensions of identifiability, too. Recent research efforts have shed light on how such measures enable the surveillance and censorship of the wider discourse on China.[25] For example, The Citizen Lab (a Canadian university-adjacent research lab) found that WeChat users registered outside of China (an estimated 100 million) are under the same content surveillance as Chinese domestic users.[26] In turn, data gathered like this on Chinese social media fuels targeted and individualized information campaigns to mobilize members of the Chinese diaspora. Recent studies identified campaigns that exploit the diaspora's dependency on Chinese social media[27] to foster transnational pro-regime solidarity[28] and to divide diaspora communities from host countries,[29] particularly among Chinese immigrants in the US.[30]

Troublingly, user identification on Chinese social media also enables the real-world intimidation[31] and repression of dissidents and exiled minorities, many of whom are co-opted and coerced through a vast network of global CCP-led actors, known as the United Front.[32] Such practices, collectively referred to as transnational repression, have reached communities across the world, including religious groups (such as Tibetans and Muslims), pro-democracy politicians from Hong Kong, human rights lawyers,[33] student activists, influencers, and many others.[34] These tactics work in tandem with extraterritorial and illegitimate police stations,[35] as well as intrusive spyware deployed by China's security organs on the devices of overseas dissidents.[36] Complying with RNR requirements on Chinese platforms exposes users to surveillance, particularly on WeChat,[37] which then provides information that can be used to intimidate and silence these individuals and their families in China.[38]

# 3. Methodology

Three methodological approaches were used to develop the research, findings, and analysis of the various sections of this report. Each is detailed below.

## Efforts to Preserve China's Cyber Ideological Security

For this section we conducted a policy review, in which we analyzed party documents, laws, and regulations issued by Chinese government bodies between 1972 and 2023 regarding Real-Name Registration (实名制[登记]).

*See a list of relevant items from 2000 onwards in Appendix 2 (references to individual entries will be made throughout the report).*

## RNR-related Access Barriers and Patterns of Exclusion

For this section we conducted three interrelated research procedures. In March 2024, we conducted ***app walkthroughs*** to capture transnational RNR barriers. In doing so, we selected all apps that were labeled as "Social" in Apple or Google app stores that allowed for information exchange. This resulted in a group of China's 62 most influential apps, as measured by monthly downloads (Apple's App Store and Google' Play Store).

Through AppleCensorship.org, we then gathered ***censorship data*** by testing app-store level censorship to check whether a specific app was available across the 58 countries covered by our dataset.

Finally, we conducted an ***anonymous survey*** to gauge the impact of access barriers on transnational audience. In doing so, we surveyed perceptions of registration and account maintenance policies of Chinese platforms through an opinion poll among 65 members of the at-risk community. This group included individuals who face significant risks when using these platforms, such as political dissidents, ethnic minorities, activists, or other individuals vulnerable to surveillance and censorship by the Chinese government.

*For more details, please see Appendix 1: Methodology.*

## RNR Policy Impacts on Global App Downloads

For this section we conducted two interrelated research procedures. To scope the transnational impact of China's restrictive RNR system, we first undertook a ***data analysis to examine download patterns, drawing on a dataset provided by app store intelligence provider Appmagic.*** The dataset contains monthly download statistics from 2015-2023 across 60 countries (including China) on the Apple App Store and Google's Play Store, covering about 93% of global downloads. Based on this data, we conducted time-series analysis to identify the overseas impact of access barriers.

We then used ***population and diaspora data*** provided by the World Bank, the United Nations (UN), and the Organisation for Economic Co-operation and Development (OECD) to assess how access barriers impact members of the diaspora community.

*For more details, please see Appendix 1: Methodology.*

# 4. Efforts to Preserve China's Cyber Ideological Security

Since the beginning of the "post-centralization" period, which began with Xi Jinping's major reforms of China's cyber institutions in 2014, the CCP has vastly expanded its censorship apparatus in an effort to exert control over China's domestic internet.[39] Vectors range from app store-level censorship and rectification campaigns, to tightened content moderation.[40] Below, we detail the ideological and legislative development of online identifiability through RNR requirements and explain how these policies are strategically developed to monitor domestic debate and exclude foreign users.

## 4.1 China's three-zone problem: An ideological security firewall around the "red" internet

China's RNR system is the most critical feature of social surveillance[41] and a core element of the CCP's effort to attain its most important strategic goal: ensuring "domestic stability" (维稳)—an ongoing campaign to suppress internal opposition[42] and prevent civil unrest of the kind that led to the Color Revolutions or the Arab Spring.[43]

In a 2013 speech at the National Propaganda and Ideological Work Conference, Xi Jinping addressed the challenges posed by global internet to China's regime stability.[44] In doing so, he conceptualized domestic ideological cohesion and global public opinion in three zones (三个地带): a red one, a black one, and a grey one. Per Xi, China itself represents the inner "red zone," which needs to be controlled by mainstream media and the state propaganda apparatus. Outside this red zone exists a "black zone" filled with hostile narratives and subversive ideas, such as "universal values." In between the inner (red) and the outer (black) zones lies a "grey zone" which acts as battlefield (战场). According to Xi, the internet should be treated as the "biggest variable" (最大变量) in this grey zone, as "hostile forces" (敌对势力) will continuously use it to try to shape and manipulate "threats from within" (心头之患) to topple China.[45]

> *The red zone must be consolidated and expanded, so that its social influence broadens incessantly. We must dare to enter the black zone, we must dig into the belly of the Iron Fan Princess to fight, and progressively push it to change colour. In the grey zone, we must launch large-scale work, to accelerate its transformation into a red zone and prevent it decaying into a black zone.*

*Xi Jinping, 2013*[46]

The party state has since operationalized this Tri-Zone internet framework. As a result, China's domestic online discourse (i.e., the inner red zone) is continuously transformed into what the CCP refers to as "a healthy and orderly online ecology" (健康有序发展), or "a clean and healthy cyberspace" (风清气正的网络空间).[47] Achieving this entails purging China's internet of regime critique and liberal or progressive political concepts, such as "press freedom," "universal human rights," or "constitutional democracy."[48] Content that could "undermine national unity" (破坏国家统一), "damage national honor" (国家荣誉), or advocate "separatism" (分裂思想) must also be actively excluded. Accordingly, it is now a priority for the CAC (China's powerful cyber regulator) to "maintain control in the online information space and prevent organized opposition [regarding] public opinion properties and social mobilization capability."[49]

As China's domestic control and censorship apparatus has grown, the need to monitor and throttle the exchange of information (information penetration "信息渗透风险" ) with the rest of the online world has intensified. Online nationalists and the broader propaganda apparatus increasingly warn about the grey zone, through which "Western stories" (西方故事) and "anti-China content" (反华内容)[50] can infiltrate China and blur the vision of public intellectuals,[51] or even that of party members[52] and military leaders.[53]

In this ongoing battle, the private tech sector is the first line of defense for China. It is this sector's responsibility to "guide and direct netizens' cognition of things" and ensure "discourse security" (话语安全). Non-traditional security actors, such as operators of social media apps and internet companies, protect the grey zone as a form of "cyber ideological security."[54] In turn, party intellectuals often refer to these actors as the "national cybersecurity barrier" (国家网络安全屏障) [55] or "ideological security firewall" (意识形态安全防火墙) that prevents the spread of false and harmful content within China.[56]

The ability to monitor and control the grey zone—and prevent any political discourse that could poison China's inner red zone—is therefore invariably connected to the question of who can access and engage with Chinese social media.

## 4.2 Legislative background: Full identifiability on China's internet through phone number registration

To reinforce China's ideological security firewall, the party-state seeks to reliably and consistently tie online actions to offline identities. Therefore, domestic internet companies must require identifiability as a condition to access their services. User phone numbers, as well as face and identification card (ID) scans, are commonly used to ensure RNR compliance. Comprehensive provisions released in March 2021 and September 2022 clarify that identification information must be collected for virtually all services related to internet access, including DNS resolution and the provision of messenger services (see Appendix 2). With the exception of using search engines, RNR turned into a general access condition for the internet in China.[57] This is the culmination of over a decade of iterative regulatory processes building upon three important benchmarks from 2010, 2015, and 2017.

First, RNR has been mandatory for the acquisition of mobile phone numbers in China since 2010. Per a decision by the National People's Congress, China's three state-owned telecom providers must verify identities whenever a sim card is sold.[58] The goal of this regulation was to link phone numbers to IDs as well as real-time geolocation data.[59] In practice, however, RNR practices were still being debated amongst intellectuals and party members at the time of the decision[60] and implementation of its requirements initially stalled,[61] with various regulatory updates to follow.[62] For example, since 2019, users have been required to submit facial recognition scans upon purchase.[63] See Appendix 2 for a more comprehensive legislative overview.

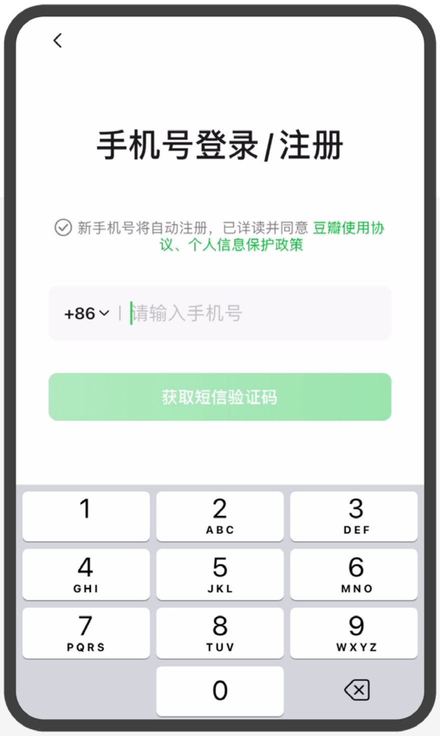
Second, the CAC introduced the online account management principle referred to as "front-end anonymity/back-end identification" ("后台实名、前台自愿") in 2015. According to this principle, any internet information service provider (互联网信息服务提供者) must ensure the verification of users, while users retain the ability to engage anonymously on the platform.[64]

Finally, the Cyber Security Law (CSL) of June 2017 implemented identifiability across most parts of the Chinese internet. Article 24 of the CSL stipulates all network operators (网络运营者) must require users to provide real identity information.[65] Throughout 2017 and into 2018, the party-state also considerably increased its pressure on internet companies to enforce RNR policies and protect national security interests (see Appendix 2). The policies were explicitly mandated to ensure regime stability, increase self-censorship, and enforce the ideological firewall.[66]

Registering user phone numbers is one way for internet information service providers to comply with the "back-end identification" requirement, as the party-state can ensure identification through its access to the data at the three telecom providers. As a result, in 2016, a spokesperson from the Ministry of Industry and Information Technology claimed that 92% of SIM cards in China had been successfully linked to identification information.[67] This high identification rate of phone numbers allows internet service providers to use phone numbers as a proxy for the identification requirements while handling very little private information.[68] In China's internet economy, which runs largely on mobile devices, phone numbers (+86) remain a ubiquitous and low-tech quasi-identifier for account registration (see Figure 2).

## Figure 2: The Mobile Mandate

Account creation on most Chinese apps is tied to mobile phone numbers



手机号登录/注册

新手机号将自动注册，已详读并同意 豆瓣使用协议、个人信息保护政策

+86 请输入手机号

获取短信验证码

*Source: App walkthrough on WeChat, February 2024.*

However, because Chinas RNR systems relied on a complicated handover of data between service providers and telcos, the CAC initiated a national authentication service in 2024 in an attempt to streamline and nationalize China's identification system.[69] Under this new service, users will be provided with national internet IDs (issued by the CAC) and that internet service providers are required to accept as authentication data.[70]

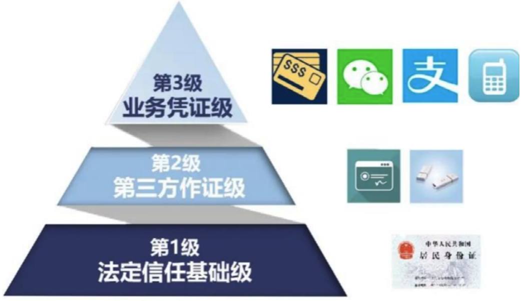
At the core of this national service lies a centralized database of "trusted identities," which the Ministry of Public Security first experimented with in 2014 to provide a technical backbone for RNR-related communication between public and private entities (see Figure 3).

## Figure 3: A centralized database allows identification across all services

### Concept pyramid of the Cyber Trust Identity platform, CTID (互联网+可信身份认证平台)

The Cyber Trust Identity (CTID) platform allows Chinese apps and internet service providers to verify phone numbers against registered IDs. As of 2020, the three-layered platform conducts about 15 million authentications every day. It contains a central database, including identification documents of various administrative agencies and phone numbers, verified by national telecommunication carriers (Layer 1). This allows third-party authentication service providers (Layer 2) to verify users on commercial online services, such as WeChat and Alipay[71] (Layer 3).

CTID operators claim the platform grew from 26 institutional clients in 2020 to clients from 50 industries and 350 institutions by 2022,[72] gathering an astonishing 5 billion pieces of identification information along the way, including ID cards, passports, and data from residents in Hong Kong, Macao, and Taiwan.[73] The CTID has also been developed to facilitate biometric recognition, including facial, fingerprint, voice, and gait recognition—with the goal of eventually replacing IDs and passports.[74]



**Level 3:**
**Commercial authentication layer**

**Level 2:**
**Third-party verification**

**Level 1:**
**Legal and trust layer**

*Source: OIDAA, "CTID Platform: Strategic Practice of China's Network Trusted Identity with Chinese Characteristics" [CTID平台：中国特色网络可信身份战略实践], June 19, 2020, https://archive.is/4qrqb.*

**Background:** The idea of a national "network trust system" (网络信任体系) was first conceptualized in August 2008 by the Ministry of Human Resources and Social Security (MOHRSS). At that time, the ministry also suggested users should only be permitted to access the internet once their identity had been verified.

In 2014, the Ministry of Public Security (MPS) was mandated to build a "network trust system with Chinese characteristics" (中国特色的网络可信体系) to digitalize and unify all identification processes on China's domestic internet.

Building on efforts by MOHRSS, the MPS in 2017 officially started working on the CTID, previously referred to as the "internet + trusted identity authentication platform" (互联网+可信身份认证平台) or the "national network identity authentication public service platform" (国家网络身份认证公共服务平台).[75]

In 2024, the MPS and the CAC proposed a national internet ID system to centralize and nationalize user verification and the handling of personal data.

# 5. RNR-related Access Barriers and Patterns of Exclusion

This section of the report explores qualitative and quantitative evidence illustrating the global implementation of RNR policies as access barriers. In compiling this evidence, we selected a representative group of China's most popular "Social" apps, which represents the "grey zone internet" as conceived by Xi Jinping in 2013. These apps, if freely available, would facilitate broad and meaningful information exchange between domestic and global users.

Whether or how app providers ought to apply RNR requirements to non-PRC based users, however, has never been explicitly regulated in relevant documents. Yet by the same token, overseas users are also not exempt from China's expanding RNR system. This, in theory (or perhaps by design), excludes the use of overseas phone numbers as an RNR proxy for most users. Accordingly, overseas users on Chinese platforms exist in a legislative and political grey zone in which the CCP has operationalized identifiability to enable surveillance and transnational repression.

Given our research and findings, this paper argues that identifiability obligations on China's social media platforms were designed (and in practice operate) as a protective membrane which can be strategically used to restrict the free exchange of ideas and to separate the Chinese internet from global online communities. Such actions turn RNR into a simple, yet effective, exclusionary mechanism applied to ensure domestic discourse security. Unsurprisingly, as discussed below, new access barriers have subsequently emerged around Chinese social media apps, especially in regions crucial for the exchange of (political) ideas with the Chinese internet.

## 5.1 Four types of barriers to keep out overseas users

Article 24 of 2017's Cybersecurity Law required Chinese internet service providers, including social media platforms, to verify RNR before providing users with online services. This requirement forced Chinese internet companies to ramp up their RNR verification processes and account management practices, which ultimately posed significant registration challenges for overseas users. While RNR for Chinese users was achieved by linking phone numbers to accounts, internet companies had to develop new methods to ensure RNR for overseas users whose phone numbers could not be matched with identification documents held by Chinese telecom providers (see Figure 3, above, for more details).

The net effect of these regulations was to significantly increase the administrative and technical burden for companies supporting users outside of the PRC.[76] As a result, certain online payment providers (like Alipay) and mobile game developers (like Tencent) temporarily disallowed new foreign accounts.[77] In turn, the majority of Chinese social media platforms announced that overseas users would now be required to submit ID scans. [78] Video platform Kuaishou, however, pulled its app from app stores altogether due to the new administrative challenges.[79]

Commercial decisions like these highlight how Chinese companies have generally succumbed to pressure from their government, which demands that party interests be prioritized over operational or business interests.[80] Studies have shown that the CCP's extensive influence on tech companies extends deep into their products, including search-engine level censorship [81] and input-level censorship.[82] Even U.S. tech giant Apple has removed numerous apps from its app store as a result of such pressure.[83]

While some companies temporarily halted new foreign accounts to comply with RNR requirements, others attempted to navigate the regulations by developing separate apps for different regions or implementing varying levels of access restrictions (see Figure 4, below). Strategies like these underscore the complex balancing act that Chinese companies must perform to align with the CCP's policies while still pursuing international growth.[84]

### Figure 4: Strategies adopted by Chinese app developers

Chinese app developers have adopted a variety of approaches to reconcile their global growth targets with the complex regulatory environment related to RNR. Research for this report identified three such strategies:

- ***Different apps for different regions:***

Five different versions of the short video app Kuaishou are available for different geographies. The original (快手) is available in China and many other countries, except in the MENA region and most South American countries.[85] A "lite" version is available in China only (快手极速版).[86] There is also a version available only in the MENA region (Kwai - download & share video),[87] a version only available in Latin American countries (Kwai - ver vídeos bacanas), [88] and a version for niche content available everywhere except Brazil and Kazakhstan (噗叽).[89]

- ***One app, two systems:***

Certain apps have split into two entities to cater to domestic and global audiences separately. Some allow limited exchange between users, such as Weibo Intl.[90] and Weibo (微博).[91] Others do not allow any interaction between global and domestic users—ultimately functioning as two separate online spheres, as seen with DingDing and DingTalk[92], or TikTok and Douyin.[93]

- ***Stay available under one ID:***

Apps like WeChat[94] maintain almost identical software packages across international app stores. Various local adjustments can be made, however, such as log-in requirements, default language, and personalized recommendations. This strategy offers less flexibility than the multi-app approach but allows for a more unified presence.[95]

We identified four distinct types of access barriers that can exclude users or force identifiability during our app walkthroughs (from downloading software on app stores to engaging with other users on the platform). These included:

## Type #1. App store censorship:

Apps are pulled from app stores to prevent people from downloading the necessary software. For example, after considerable popularity in 2021 and 2022, Kuaishou, a short video and e-commerce platform, is now unavailable in many MENA region app stores (see Figure 5, below). Users outside of China will not find this version in their app stores.

## Type #2. Phone number registration:

Overseas users are not offered the phone number of their country of residence (or the prefix of their SIM card) in the app's registration interface. When users are unable to select the phone number prefix of their country of residence, receiving a verification message is impossible—turning phone-number-based RNR into an effective access barrier. For example, on "Weibo Intl.," only residents of 29 countries can sign up (see Figure 5, below).

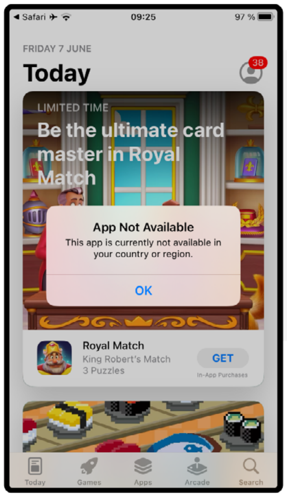
## Type #3. ID verification:

Submitting identification documents and the accompanying loss of anonymity may deter users from registering on a platform if such requirements are believed to be not necessary or appropriate from the perspective of the user.

## Type #4. Cross-Account verification:

When account verification can only be completed by verification of other users on a given platform, new user sign-ups may be effectively excluded if they have no prior contacts or choose not to reveal existing ones.

## Figure 5: Blocked by numbers – Regional restrictions block Chinese app use

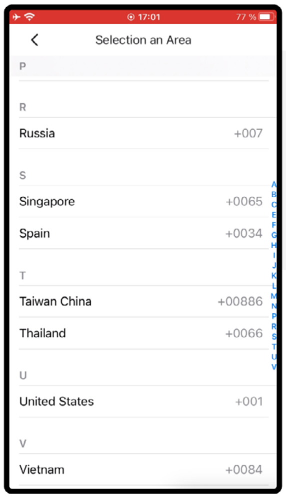


App Not Available

This app is currently not available in your country or region.

OK

App store level censorship for Kuaishou for users in Algeria, Egypt, Saudi Arabia and others



Selection an Area

P

R

| | |
|---|---|
| Russia | +007 |

S

| | |
|---|---|
| Singapore | +0065 |
| Spain | +0034 |

T

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|---|---|
| Taiwan China | +00886 |
| Thailand | +0066 |

U

| | |
|---|---|
| United States | +001 |

V

| | |
|---|---|
| Vietnam | +0084 |

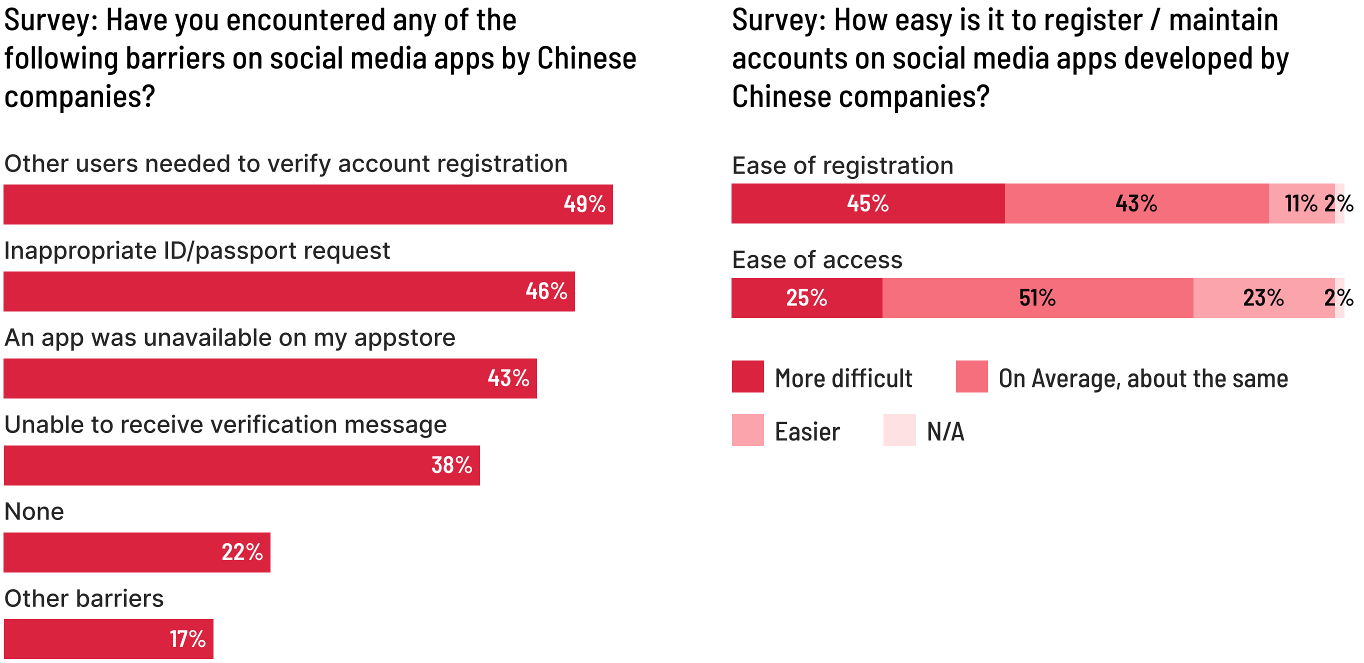
Phone number registration options on app "Weibo Intl."

*Source: App walkthroughs on Kuaishou and Weibo Intl. (conducted March 2024).*

Two different intentions can be identified from these four types of barriers. Types #1 and #2 are exclusionary by design, representing a *hard barrier* around the grey zone (see Figure 5). The limiting intent here is obvious and although workarounds exist for these barriers, they do not provide sustainable or reliable solutions.[96] Types #3 and #4, on the other hand, work to enforce identifiability but do not de facto exclude certain types of users. Instead, these barriers ensure that interactions from new users within the grey zone can be closely monitored. While these barriers pose privacy risks, they are not insurmountable and therefore can be considered *soft barriers*, in so far as the loss of privacy might discourage new users. The intent here appears to be to permit new users from abroad, so long as they are willing to comply with RNR policies.

Our anonymous survey of at-risk communities indicated that overseas users have indeed encountered each type of access barrier identified above (Figure 6, below). Nearly half of all respondents reported having encountered type #3 and #4 access barriers related to identifiability (49% and 46%, respectively). More than a third reported experiencing barriers of types #1 and #2 aimed at excluding users (38% and 43%, respectively). Survey respondents additionally leaned towards the perception that access barriers on Chinese social media apps were more prevalent as compared to other international competitors. The largest group (45%) reported greater difficulty registering on apps developed by Chinese companies. In contrast, most respondents found account maintenance to be similar on both Chinese and international apps (51%).

## Figure 6: Chinese social media apps seem less accessible than international equivalents



Survey: Have you encountered any of the following barriers on social media apps by Chinese companies?

Survey: How easy is it to register / maintain accounts on social media apps developed by Chinese companies?

*Source: Anonymous survey amongst 65 members of the at-risk community* (*conducted March 2024*).

## 5.2 Global patterns of access barriers

In scoping the global implementation of transnational *hard access barriers* of types #1 and #2 (app store-level barriers and unavailable country phone numbers), we selected the 62 most-downloaded Chinese social media apps across 58 countries.[97] Our findings reveal that 75% of these apps have implemented phone-number based RNR (as opposed to e-mail registration or free use). This indicates that roughly three-out-of-every-four Chinese-developed apps enforce identifiability requirements for overseas users, representing a significant—and controllable—portion of the grey zone internet (see Appendix 4). In other words, access conditions set by China's cyber regulators have become almost inescapable.

Further tests were then conducted to determine whether RNR policies have turned into access barriers for information exchange. In doing so, we dropped six of the 39 apps, as they allowed for no exchange of information. The remaining 33 apps represent perhaps the most important information channels in the grey zone internet. We checked *hard access barriers* for those 33 apps from across 58 countries, resulting in 1914 country-app pairs. At least one access barrier of type #1 or #2 was recorded in 664 instances, representing 35% of possible country-app pairs (see the full overview Access Barrier Matrix in Table 1, below, for more details).[98]

Notably, however, the recorded types of hard access barriers and their implementation across the tested apps and regions displayed a considerable degree of heterogeneity—suggesting China's ideological security firewall is not meant to completely prevent information exchange (or is at least unsuccessful in doing so in practice). Three levels of varying global restrictiveness can be categorized among the tested apps. In the first group of 10 apps (Group 1), the apps are largely unavailable across the world due to either type #1 or type #2 barriers. These apps—which included popular options such as DingDing, Kuaishou, and Douban—either cannot be downloaded at all or users cannot register for them with their national phone numbers (or both). The next group of 15 apps (Group 2) is generally accessible around the world, but occasionally faces both types of hard access barriers. This group also contains some popular apps, including QQ, Weibo (微博), and Zhihu (知乎). The eight apps in Group 3 were freely available across the 58 countries in our tests, and include the likes of WeChat (微信) and Little Red Book (小红书).

The matrix below also provides evidence of geographic distinctions. Certain clusters of apps in Group 2 are only unavailable in particular regions. For example, a set of apps in Group 2 (including QQ and other social networks) are only unavailable in the extended European region, whereas certain video streaming and forum apps (including Kuaishou and Zhihu) are largely inaccessible in the MENA region and South American countries. This pattern is particularly noteworthy in the context of the CCP's fear of domestic instability and a U.S.-promoted Color Revolution in China.[99] The Asia-Pacific region, Sub-Sahara Africa, and countries in Central Asia on the other hand, enjoy fairly unrestricted access, even among apps of Group 1. Perhaps surprisingly, few access barriers exist for apps in the U.S.

## Table 1: The Minesweeper of censorship – China limits information exchange on apps

Access barrier matrix for 33 apps that allow information exchange in 58 countries.[100]

| | | | Group 1 | | | | | | | | | | Group 2 | | | | | | | | | | | | | | | Group 3 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region | Country | Total count of barriers | Baidu Tieba (百度贴吧) | DingDing - Make It Happen | DouYin (抖音) | QQ Browser | WeChat Reading | Himalaya FM (喜马拉雅FM) | Hertz (赫兹) | Douban | Mango Live (芒果直播) | Wefun | Ola Party - Live, Chat & Party | Meipai | HeeSay - Blued LIVE & Dating | QQ | SUGO: Voice Live Chat Party | Kuai Shou | Nonolive - Live Streaming | Zhihu (知乎) | Zhihu Daily (知乎日报) | MOMO陌陌 | Weibo (微博) | WeCom-Work Communication&Tools | Yingke Live (映客直播) | YoHo: Group Voice Chat Room | Calamansi - Pinoy Live Cast | HUAWEI FamCare | Haya: Best Audio Experience | JusTalk - Video Chat & Calls | JusTalk Kids - Safe Messenger | Little Red Book (小红书) | Nekogram* | Uplive-Live Stream, Go Live | WeChat (微信) |
| Asia-Pacific | Hong Kong | 12 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Pakistan | 10 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | South Korea | 10 | 3 | 2 | 2 | 2 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Vietnam | 10 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Indonesia | 9 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | New Zealand | 9 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Australia | 8 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Japan | 9 | 2 | 2 | 2 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Philippines | 8 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Thailand | 8 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Malaysia | 7 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Taiwan | 7 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Singapore | 6 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eastern Europe and Central Asia | Kazakhstan | 12 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Belarus | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Russia | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Turkey | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Azerbaijan | 10 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| European Union (EU27) and Affiliates + Extended Europe | Czech Republic | 16 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 3 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Finland | 14 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Hungary | 14 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Ireland | 14 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Portugal | 14 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Romania | 14 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Belgium | 13 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Denmark | 13 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Greece | 13 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 0 | 1 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Netherlands | 13 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Poland | 13 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | France | 12 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Germany | 12 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Italy | 12 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Spain | 12 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Sweden | 12 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 1 | 0 | 1 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

0 No recorded barrier   1 App not available for download   2 No phone prefix available   3 Both

*Table continues on the next page.*

|  |  |  | Group 1 |  |  |  |  |  |  |  |  |  | Group 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Group 3 |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region | Country | Total count of barriers | Baidu Tieba (百度贴吧) | DingDing - Make It Happen | DouYin (抖音) | QQ Browser | WeChat Reading | Himalaya FM (喜马拉雅FM) | Hertz (赫兹) | Douban | Mango Live (芒果直播) | Wefun | Ola Party - Live, Chat & Party | Meipai | HeeSay - Blued LIVE & Dating | QQ | SUGO: Voice Live Chat Party | Kuai Shou | Nonolive - Live Streaming | Zhihu (知乎) | Zhihu Daily (知乎日报) | MOMO陌陌 | Weibo (微博) | WeCom-Work Communication&Tools | Yingke Live (映客直播) | YoHo: Group Voice Chat Room | Calamansi - Pinoy Live Cast | HUAWEI FamCare | Haya: Best Audio Experience | JusTalk - Video Chat & Calls | JusTalk Kids - Safe Messenger | Little Red Book (小红书) | Nekogram* | Uplive-Live Stream, Go Live | WeChat (微信) |
| European Union (EU27) and Affiliates + Extended Europe | Austria | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Norway | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Switzerland | 11 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Ukraine | 11 | 2 | 2 | 2 | 3 | 2 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | United Kingdom | 11 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Latin America and the Caribbean | Dominican Republic | 17 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Peru | 14 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Chile | 13 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Argentina | 12 | 2 | 2 | 2 | 2 | 0 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Brazil | 12 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Colombia | 12 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Ecuador | 11 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Middle East and North Africa (MENA) | United Arab Emirates | 15 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Algeria | 12 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Israel | 13 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Egypt | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Kuwait | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Lebanon | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Saudi Arabia | 11 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| North America | Mexico | 12 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Canada | 12 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | United States | 8 | 2 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sub-Saharan Africa | Nigeria | 12 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | South Africa | 11 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

0 No recorded barrier   1 App not available for download   2 No phone prefix available   3 Both

***Note:*** *Table 1 is vertically ranked by count of barriers per region and regions in alphabetic order; horizontally ranked by count of barriers per app. In cases of multiple global app IDs, we considered only the ID of the original Chinese version in this sample. Original Chinese names of apps as listed in app stores are in brackets.*

** Only on Android*

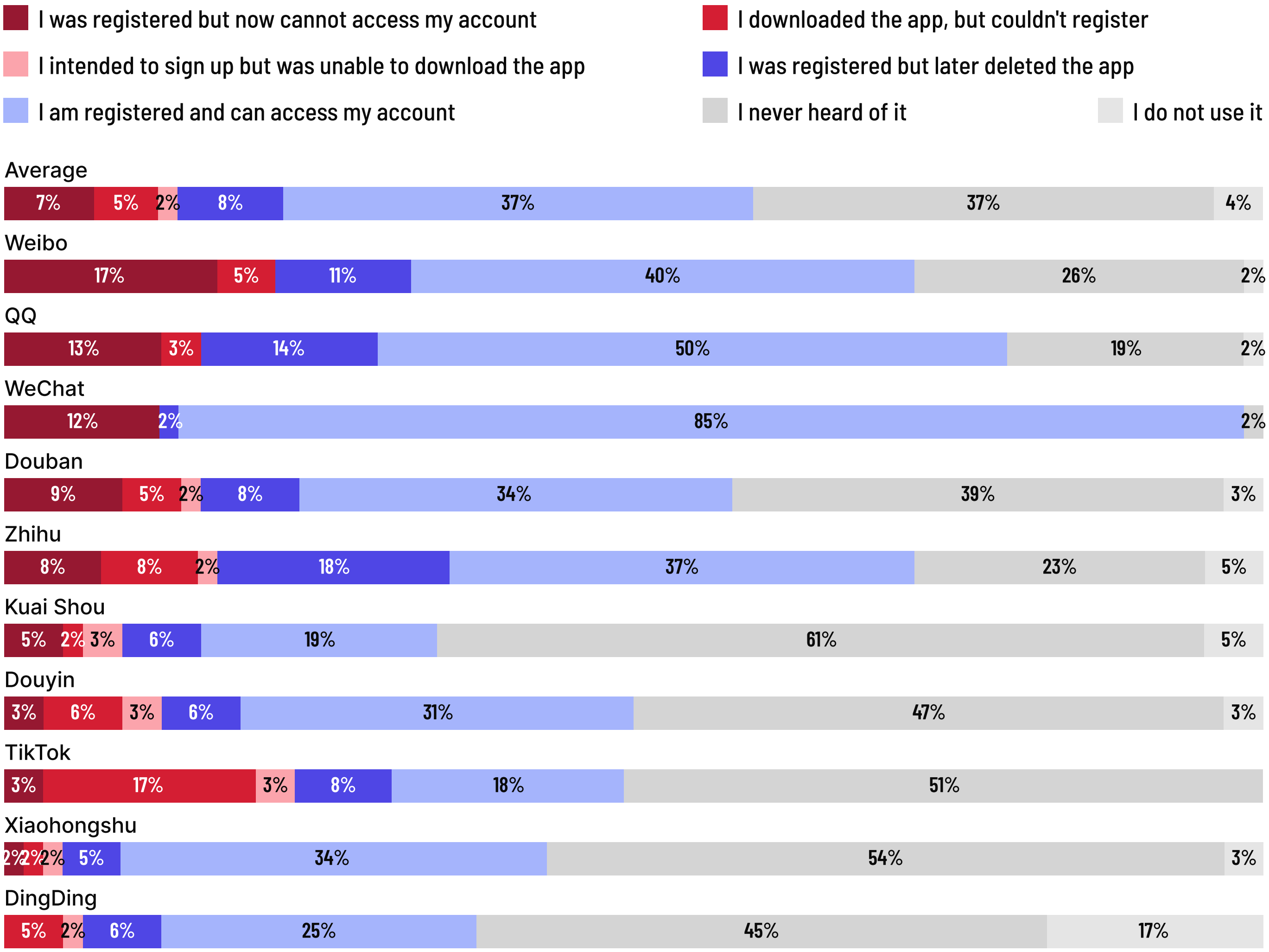
*Source: App walkthroughs conducted in March 2024.*

Our survey further underscores the access difficulties experienced across China's most popular social apps (Figure 7, below). Across 10 major apps, 5% of respondents on average reported being able to download an app but ultimately unable to sign up for it. In addition, survey respondents were unable to download apps roughly 2% of the time, on average. Maintaining access to a registered account also seemed to be an issue, with 7% of respondents reporting they had lost access to their accounts. This issue was particularly prevalent with Weibo (17%), QQ (13%), and WeChat (12%).

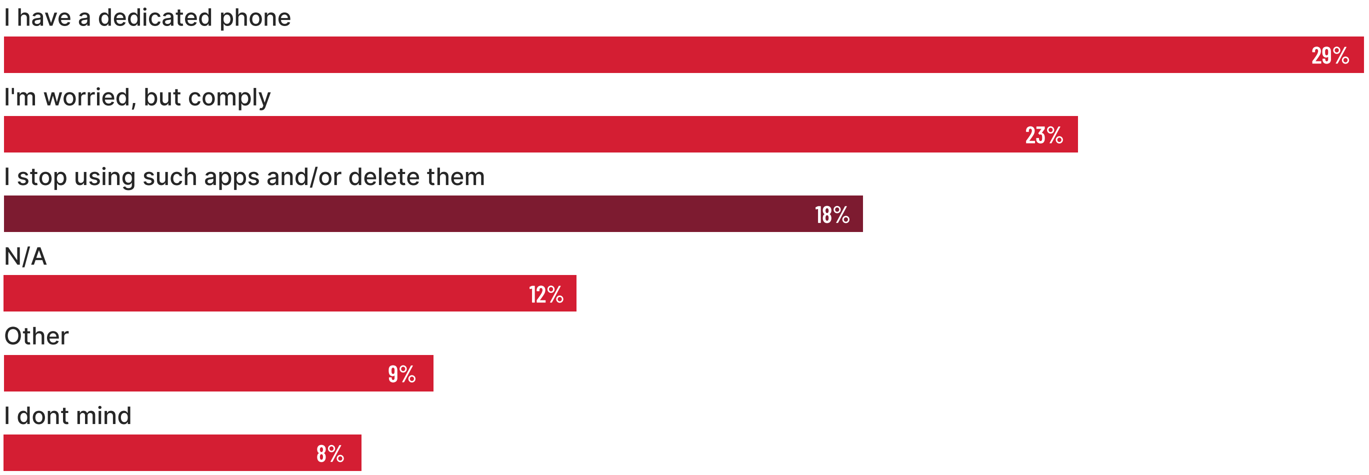
Finally, our research also examined how users typically respond to encountering access barriers (Figure 7, below). The majority of respondents adapted to access barriers, with 29% acquiring separate phones dedicated to running only Chinese social media apps, 23% complying with barrier requirements and 8% reporting they did not ultimately mind the barriers when encountered. Nearly one-fifth of all respondents, however, deleted apps affected by access barriers—and were thus effectively deterred from entering the grey zone and participating in China's online discourse.

## Figure 7: Perceived access barriers vary across China's most popular social media apps

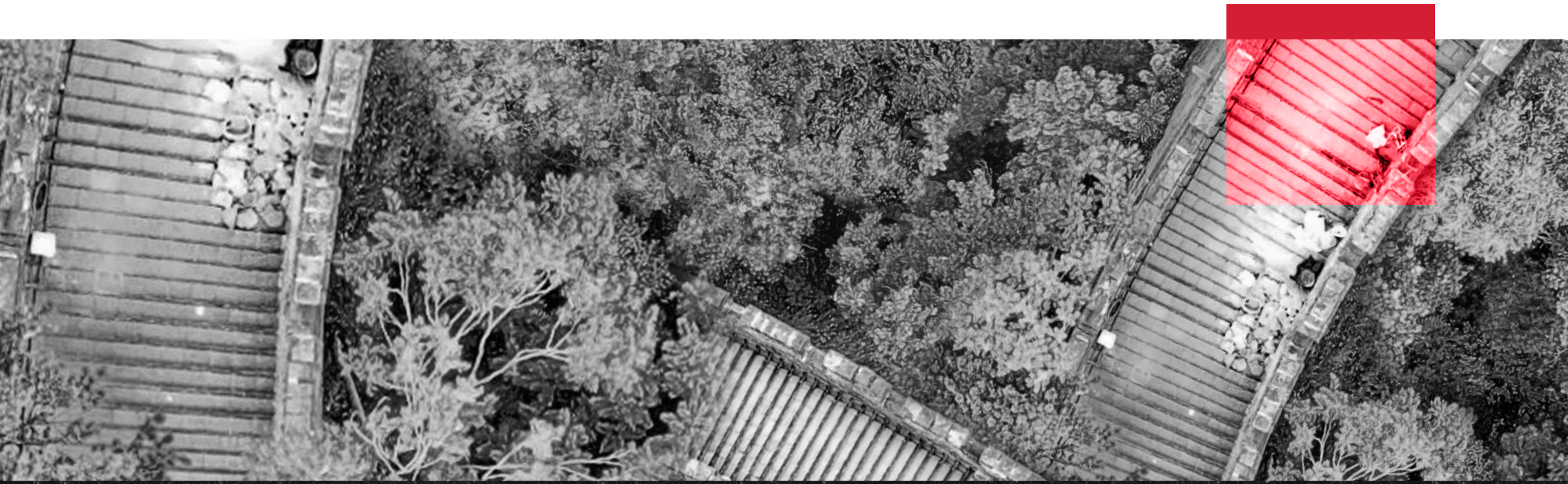
### Survey: Please indicate your current use and experience with the following apps, if any:



**Survey: How do you usually respond when encountering access barriers?**



*Source: Anonymous survey amongst 65 members of the at-risk community (*conducted March 2024*).*



# 6. RNR Policy Impacts on Global App Downloads

Our research indicates that RNR-related access barriers on Chinese social apps have had a profound impact on online communities. In an effort to assess the extraterritorial impact of China's RNR system and app store censorship, we examined the download patterns of Chinese social media apps for which we identified access barriers. This analysis relied on a dataset maintained by app store intelligence provider Appmagic, covering monthly download data for apps developed by China-based companies from 2015-2023 (see Appendix 1 - Data analysis for further details). The data provides a quantitative proxy for the direct or indirect global impact of China's RNR system as a censorship tool.

## 6.1 The post-2017 drop in Chinese app downloads by transnational users

Download trajectories revealed in our analysis indicate that China's great ideological security firewall has effectively limited exchange channels between global communities and PRC-based users. Across a key period of our analysis, we estimate downloads of affected apps declined by an astonishing 82%, amounting to a reduction of 23.5 million downloads. In 2017, the identified apps were downloaded 32 million times—yet by 2023 this figure had dropped to just 5.7 million downloads worldwide (see Table 2, below).

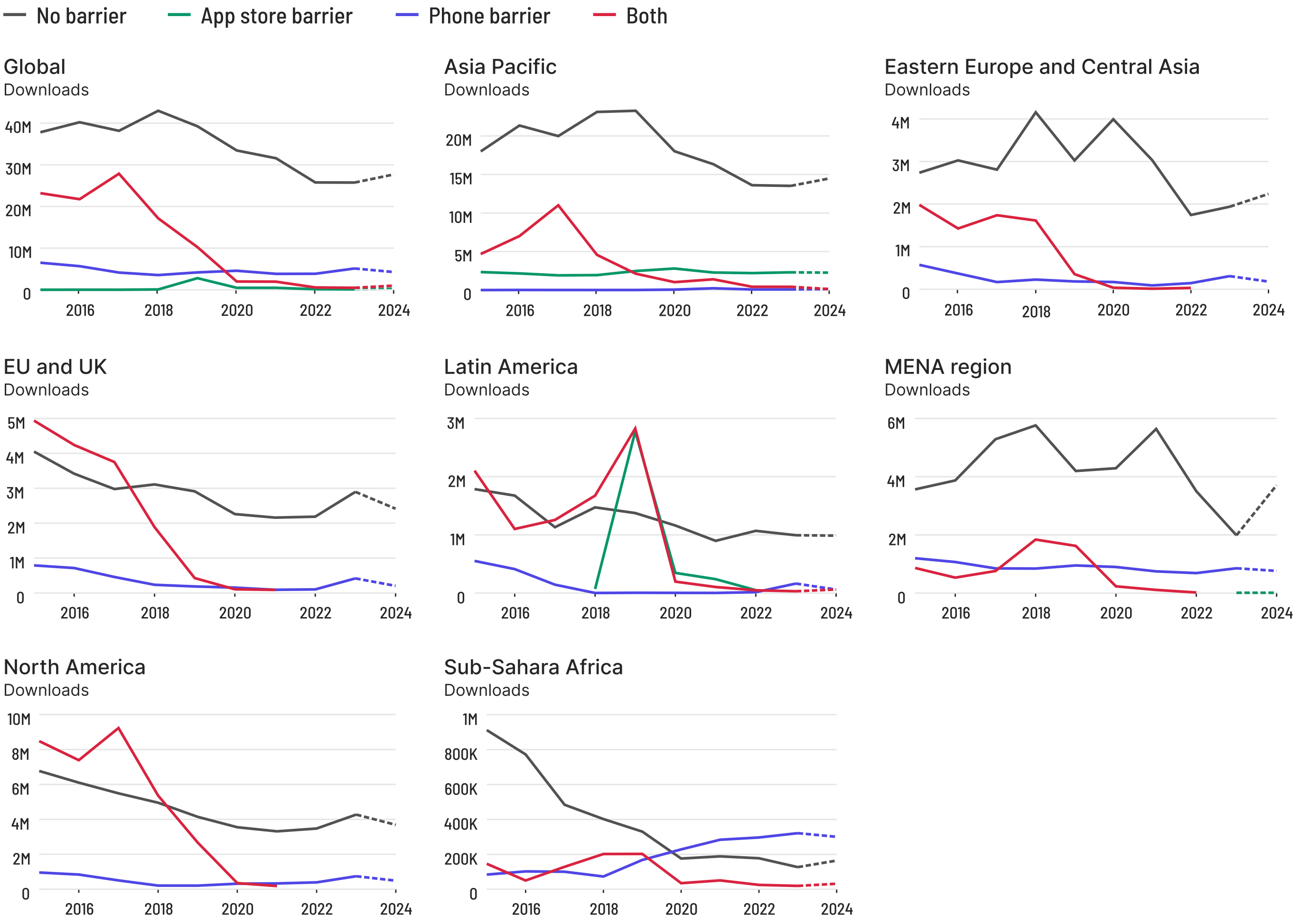
As discussed in Section 4.2 above, major legislative changes in China took effect in 2017 to reinforce the RNR obligations of Chinese internet companies. The subsequent impact and implementation of these regulations coincided with a considerable decline in overseas downloads for apps for which we identified access barriers. While this decline in downloads is significant, it is important to note that other social apps—for which we did not identify access barriers—declined by 40% in that period. This general downward trend indicates that reasons other than RNR-related access barriers contributed to the decline. Therefore, the above mentioned 23.5 million should be lowered to about 14.1 million, for a more accurate estimate for the reduction effect.

Nonetheless, in virtually all regions, monthly downloads for affected apps dropped decisively in a matter of two to three years following the implementation of the RNR requirements. The impact was particularly significant for apps which experienced both types of access barriers, with a drop of 98% (from more than 27.8 million downloads in 2017 to roughly 484,000 in 2023. In North America, apps affected by both phone number barriers and app store censorship dropped from 9 million annual downloads in 2017 to below 1 million in 2020. In the Asia-Pacific region, Chinese social apps peaked in 2017 with 12 million annual downloads, but have since dropped to just below 3 million. Similar trends also occurred in the European Union and UK, Eastern Europe and Central Asia, and the MENA region—a trend that is likely poised to continue as more Chinese apps incorporate domestic RNR requirements for transnational users.

Amidst this considerable decline, our research still identified some recorded downloads for the affected apps. Whether these downloads are the product of successful censorship circumvention by individuals, or the result of the app intelligence provider's data gathering methods, we cannot determine. The remaining downloads could, however, present a gap in China's ideological security firewall that censors may subsequently attempt to close. Indeed, based on three-year averages of downloads for the affected apps (2020-2023), we project that more than 5.5 million downloads of Chinese social apps could be further restricted by hard access barriers in 2024. This includes 4.2 million app downloads affected by phone number barriers, an additional 230,000 affected by app store censorship, and 1 million that face both.

## Table 2: Post-2017 decline in downloads of apps affected by access barriers (worldwide)

### Annual downloads by region of Chinese-designed social media apps from 2015-2023 (and projections for 2024 based on 3-year simple moving average)



*Note: All country-app pairs where an access barrier was recorded based on Table 1 (above) were tagged and grouped into four categories: (1) apps with no access barriers, (2) apps with only phone number barriers, (3) apps with only app store-level censorship, and (4) apps affected by both types of barriers. Dotted-line projections for 2024 are based on average download numbers for the last three years.*

*Source: Analysis and calculations based on data from Appmagic on downloads.*

## 6.2 Effects on Chinese diaspora communities

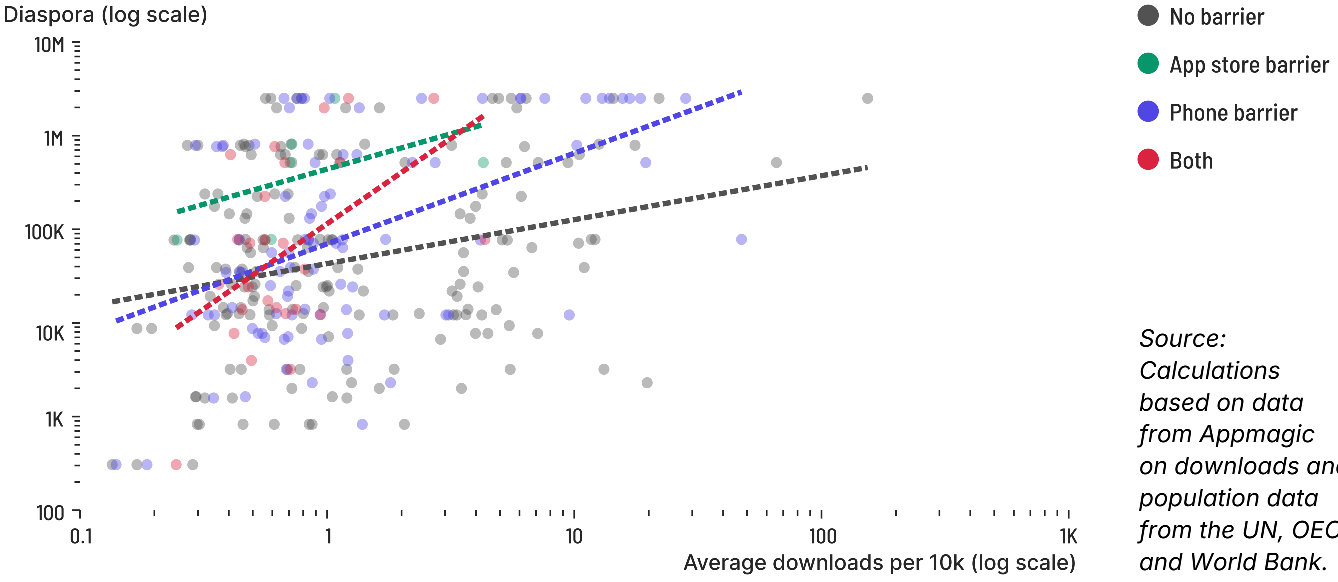
Our findings reveal that access barriers disproportionately affect diaspora networks. To assess these impacts, we selected all Chinese social media apps that showed downloads in 2023 (resulting in a group of 48 apps across the 58 countries). We then plotted a relative measure of their success against the size of Chinese diasporas in the given country (see Figure 8, below). The relative measure (vertical axis) refers to the ratio of average monthly downloads of an app per 10,000 inhabitants in a given country. This ratio was calculated based on download data from Appmagic and global population data from the World Bank. In turn, we plotted that ratio against diaspora numbers (horizontal axis) based on conservative estimates drawn from the OECD and the UN (see Appendix 1 - Global population data and Diaspora data for further documentation).

Each dot in Table 4 represent download values for an individual app in one particular country in 2023. If a dot is plotted further to the top right of the graph, the app it represents was frequently downloaded in a country that hosts a large Chinese diaspora. As suggested by the positive inclination of all trend lines, the popularity of Chinese social apps increases in countries with larger Chinese diaspora communities.

Surprisingly, however, access barriers were found to be more common in countries with larger diaspora communities. App store barriers (blue dots), including six country-app pairs such as for Kuaishou in Singapore, were especially present in countries with large diaspora communities. Conversely, apps not affected by access barriers (cyan dots), such as QQ in Pakistan, were more common in countries with smaller diaspora numbers. This is further demonstrated by the fact that the three access barrier trend lines (blue, green, and red) on the scatterplot predominantly lie above the trend line of apps facing no barriers (cyan). A statistical test (one-tail Z-test) confirmed a statistically significant difference, indicating that larger diaspora countries encounter more challenges regarding app accessibility (see Appendix 1 - Statistical testing for further documentation).

### Figure 8: More barriers for the Chinese Diaspora in 2023

Scatter plot of downloads per 10,000 vs. diaspora estimates, grouped by barrier type



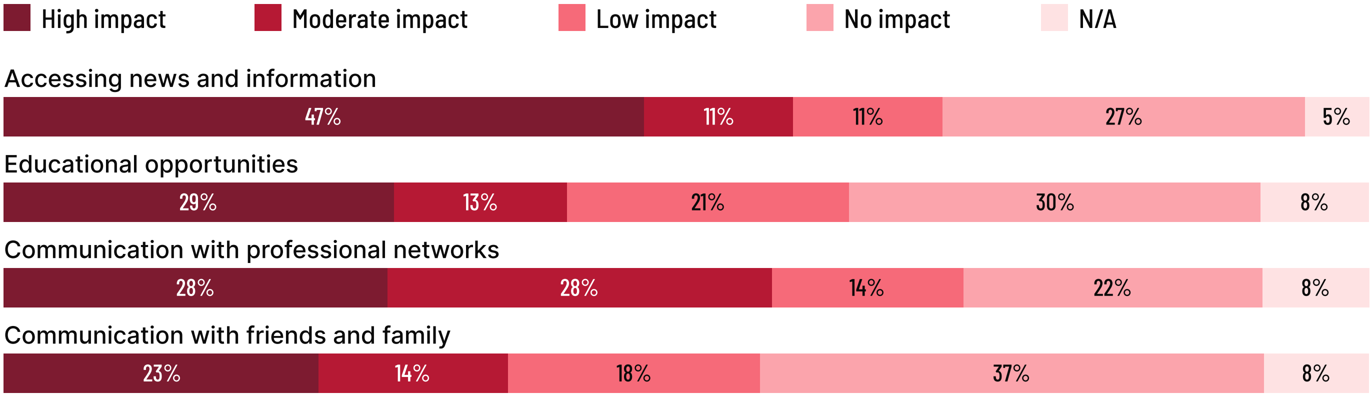
*Source: Calculations based on data from Appmagic on downloads and population data from the UN, OECD, and World Bank.*

Although these results may initially appear to be contradictory, they allow for an interesting interpretation. The Chinese diaspora, while often facing access barriers, managed to bypass government-induced censorship and continued downloading barred social apps.

In the absence of the availability of U.S. social media platforms in China, transnational networks such as the Chinese diaspora are particularly vulnerable to access barriers on Chinese apps. Chinese-designed digital platforms often constitute the only means through which these populations can interact with online communities back in China. As a result, survey respondents overwhelmingly agreed that access barriers had a significant limiting impact, particularly regarding access to news and information (47%). Limitations were also reported for educational opportunities (29%), communication with professional networks (28%), and maintaining connections with friends and families at home (23%).

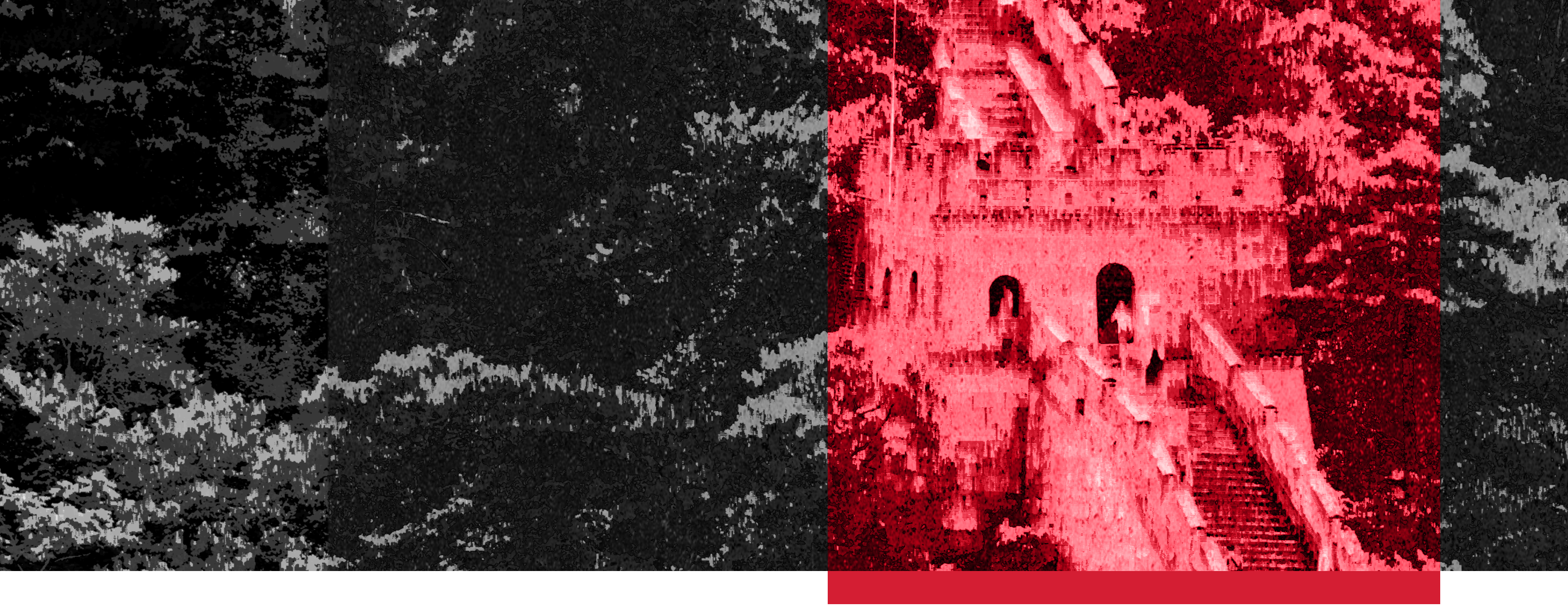
## Figure 9: The negative impact of access barriers to information

### Survey: In your opinion, to what extent do digital access barriers hinder the following aspects?



*Source: Anonymous survey amongst 65 members of the at-risk community (conducted March 2024).*

On a broader note, these findings highlight how the Chinese government's ongoing attempt to guide its netizens' cognition of the world has resulted in the widespread implementation of RNR policies, which have created to detrimental access barriers around social media apps with profound impact on downloads, especially within the Chinese diaspora. We therefore find that the CCP's attempt to secure the grey zone internet—and, in turn, China's domestic online discourse—from politically "dangerous" foreign ideas has achieved considerable successes.



# 7. Discussion & Analysis

This study reveals that the impact of China's RNR policies extends far beyond the country's geographic and digital boundaries—affecting global internet governance, the autonomy of the Chinese diaspora, and the international digital economy. As discussed below, these findings also suggest certain conventional assumptions about the CCP's strategic use of Chinese digital platforms may need to be revisited.

## 7.1 Protecting the online domestic discourse, or mobilizing the Chinese diaspora?

By closing off access to Chinese social media for members of overseas communities, the CCP effectively limits an important channel of foreign influence. The CCP has long proclaimed social media to be a battleground on which China should speak with a strong voice and "tell the China story well."[101] A primary strategy of this approach appears to be focused on maximizing surveillance and data-gathering capabilities, through which collected data can be leveraged for information campaigns to exert control over beliefs and narratives on information spaces and "engineer global consent."[102]

The rise of RNR-related access barriers, however, indicates that China's cyber information strategy is in fact multifaceted—with focuses beyond solely foreign influence operations and the mobilization of overseas Chinese. Rather, the CCP seems to balance the risks of an open information exchange with the benefits of successful global information campaigns. As such, the social media apps tested in our research highlight a bigger impact for the extended European region, the MENA, Latin America, and North America, while fewer barriers for users were identified in the Asia-Pacific and Sub-Saharan Africa regions.

From these results it is possible to infer that the CCP has made a conscious choice to draw geostrategic hard access barriers around Chinese social media platforms. Such an approach would limit foreign information penetration from regions deemed to be problematic, while leaving access unrestricted for other regions where the CCP prioritizes keeping open influence channels.

China's new digital boundaries offer new venues of inquiry, such as, what are the costs of access barrier to China's digital economy? Do the RNR-related boundaries extend beyond social media apps and coincide with other digital boundaries? And how does this strategy integrate with other foreign influence campaigns and potentially converge with China's economic or security spheres of influence? These questions, and related lines of inquiry, offer key avenues for future research.

## 7.2 No community in cyberspace?

The variety of regional differences in access barriers identified in this report similarly suggests that China's cyber sovereignty ambitions have drawn new geostrategic boundaries across the digital globe. Through the implementation of access barriers, China is effectively drawing a new digital border between a *sphere of influence* and a *sphere of bad ideas*. For example, users in the Asia-Pacific and Sub-Sahara Africa regions can now sign up for Chinese social apps that users from Europe are barred from accessing. Users in Latin America and the MENA region, on the other hand, are barred from accessing a different set of apps. This approach also appears to undermine China's cyber diplomacy, which—under the slogan "Common Destiny in Cyberspace"—promotes interconnectivity and intercultural exchange, particularly with countries in the Majority World (referring to countries in Africa, Asia, Latin America, and Oceania that are often underrepresented in global economic and political systems).[103] In contrast to these professed anti-colonial and anti-imperialist aspirations, the Atlantic Council (a U.S. think tank) would point out that China instead wants to divide the Global North  (developed countries, primarily in the Northern Hemisphere) and the Majority World to secure better access to strategic resources and export markets.[104]

## 7.3 RNR's unintended side effect: The rise of independent exile media

Interestingly, exclusionary effects stemming from RNR policy implementation may have spurred the surge of transnational independent Chinese online media. Journalists, academics, and activists who have left China and Hong Kong have subsequently started a plethora "diaspora media" (流散媒體) and "exile media" (流亡媒體) projects.[105] These new platforms, such as those entertained by newly formed communities of exiled Hong Kong pro-democracy activists,  allow exiled communities to avoid identifiability, organize, communicate, and even formulate resistance to Chinese online surveillance and censorship. At the same time, these new platforms are now spaces for contestation and are particularly susceptible to influence campaigns and transnational repression.[106] Host countries should be aware of the current contestation around independent media fora and offer support to strengthen them against United Front activities.

## 7.4 Social barriers are economic barriers

The findings of this report also invite a revisitation of claims that Chinese platforms can challenge the global dominance of U.S. platforms. If, as some scholars have argued, [107] the CCP operates digital protectionism at home while subsidizing Chinese tech firms to help them crowd out U.S. competitors in other markets, then one should expect the Chinese government to use the policy and regulatory tools at its disposal to support the expansion of these apps—rather than stifle their adoption via RNR-related policies. Yet identification requirements, as revealed in this report, prevent Chinese platforms from fully operating in certain foreign markets. Such limitations are exacerbating, if not partially causing, these apps' decline in global downloads and therefore limiting their economic value (see Figure 1, above).

# 8. Conclusion

In 2024, China continues to institutionalize and internationalize its vision of total cyber sovereignty by modifying and reshaping digital discourse rooms to its advantage. Three-quarters of Chinese social media platforms have now implemented RNR, which—when deployed as foreign-directed access barriers—can lead to local download declines in the millions each year. These barriers disrupt social ties and limit human-to-human exchange, with a willingness to close off internet access from abroad, if necessary, to guide the cognition of users.[108] In this manner, the implementation of the ideological firewall should be understood as flexible and with geographical variations; less like a digital *wall* and more like a partial digital *veil*. In other words, a form of censorship that is not hermetically sealing off communication, but rather providing an adaptive and ad-hoc control mechanism to obfuscate access to digital information when deemed necessary.

Structural interventions like these affect global digital communication and the internet as a common social and economic infrastructure.[109] Global policymakers should recognize the structural challenges posed by China's claims to cyber sovereignty and ask how they affect the digital sovereignty and rights of other citizens around the world. In addition to focusing on threats posed by individual apps, it is crucial to also address the broader implications of China's cyber policies. Comprehensive frameworks for the future of the internet, like the Global Digital Compact being developed within the United Nations,[110] could potentially help address these and other related issues. However, such frameworks must also receive robust protection against efforts by China to undermine their implementation and enforcement.[111]

For years, the general understanding of the Great Firewall focused on domestic information suppression (or *preventive repression*), prompting inquiries on how internet users in China could "jump" over the wall and bypass domestic censorship. In light of the findings of this report, such a perspective needs to be broadened to include a new question: how can people "jump" back in? Efforts should also be made to examine how best to address this form of fragmentation, as it may soon be necessary to adapt to a world in which individuals and communities live in separated—sometimes completely isolated—spheres of digital communication and connectivity.

# Appendices

## Appendix 1: Methodology

### *Data selection*

To identify a representative subset of apps indicative of the implementation of China's RNR-related access barriers and their impact on information exchange between users in China and overseas communities, we relied on a dataset by app store intelligence provider Appmagic. Appmagic's data covers monthly downloads of apps across 60 diverse economies, encompassing 93% of global app downloads.[112] Our data ranges from January 2015 to December 2023. Recorded downloads contain both the Google Play Store and Apple's App Store downloads.[113]

Appmagic manually categorizes apps into 15 main categories, including "Social," "Games," and "Finance," as well as a plethora of subcategories, such as "Chats," "Puzzles," or "Money Transfer."[114] We used the labels provided by app stores in a minority of cases where Appmagic labels were missing.

Our query returned a subset of 247 relevant apps, which:

- were developed and operated by a company headquartered in the People's Republic of China;
- were ranked within the top 10,000 in terms of national downloads in of any of the 58 app stores (filtering out the app stores of China and India);
- were in the main category "Social";
- were in one of the sub-categories "Chats," "Messengers," or "Social Network" within the main category "Social" (omitting sub-categories, such as "Dating," "Account Status App," and "Other").

Appmagic's download numbers are based on a relational approximation of ranking data. Appmagic assumes this technique provides an average discrepancy of about 10%, with a decline in accuracy at lower download numbers. To maintain accuracy in our quantitative analysis, we dropped apps below a suggested threshold of less than 30,000 global downloads per month.[115]

This curated dataset of apps was further refined to generate a representative group of apps which allowed for the recording of access barriers. We dropped 31 apps, such as "Tencent News" or "Himilaya Life," as they had ceased operations. Another 26 were also disregarded as they only offered social media adjacent services, such as "5000+ Emoji" or "Sparkling Heart Keyboard Theme." This curation resulted in a final list of 62 apps.

## *App walkthroughs to record type #1 and type #2 access barriers*

Data on app store availabilities by AppleCensorship.com (a project that monitors and provides a publicly accessible database of the availability of apps across app stores worldwide) provided evidence for type #1 access barriers.

App walkthroughs on apps that were still in operation revealed the extent of type #2 barriers. In a first round of app walkthroughs, we determined which method of account registration was required by each app. We tested on both iOS and Android devices, as well as the nascent Play Store and App Store. To circumvent local biases, we tested on changing locations in EU, North America, and Africa. As noted in Appendix 4, signing up for or engaging on an app was only possible after providing a phone number and subsequent verification codes in 39 instances. In 22 instances, setting up an account was permitted based on providing an email address, which allows for anonymous use and access.[116] In one instance ("MOGU – Fashion Destination") the provision of further identification was also required.

To record phone-number-related access barriers, we conducted a second round of walkthroughs on the remaining 39 apps, which took place in February 2024. To minimize human error, we automated the process of recording available phone number prefixes by running an optical character recognition program on screen recordings of the app walkthroughs. Overall, we found 664 instances where an app was inaccessible to local users out of a total of 1,914 tested instances. This figure includes 375 phone number barriers, 231 app store barriers, and 58 instances of both.

## *App ID-resolution*

In most instances apps had one universal ID across app stores. Seven apps had more than one ID, where we used the ID of Chinese original app (QQ邮箱, Tencent Conference, Baidu Tieba, DingDing, Kuai Shou, QQ Browser, and Weibo).

## *Survey*

In March 2024, we conducted an online survey to gather user perceptions of foreign-directed access barriers for Chinese-designed apps. The survey was available in both English and Chinese, and participation was voluntary and anonymous. We specifically targeted Chinese overseas communities for dissemination. The survey received 65 responses, with a high response rate of 98%.

Notably, the survey is non-representative and may come with inherent biases given that it was only disseminated to members of the at-risk community. How accurately the results reflect the experiences of other overseas users is not reflected in the survey (it could be argued that members of this community are more sensitive to access barriers than others). Members of the at-risk community may also face barriers due to individual exclusion. The results of this survey should thus be treated as indicative evidence, not as fact.

## *Data analysis*

To gauge the impact of access barriers on the download trajectories of affected apps, we tagged all instances where, as of March 2024, an access barrier was recorded. A data series was therefore only tagged when the access barrier matrix displayed a value of “1,” “2,” or “3” in a given country. In the time series data of app downloads, we then separated those instances from instances where no access barrier was recorded. This allowed us to isolate the different groups of restrictedness. We extended our analysis beyond the 33 apps within the controlled grey zone internet and included six additional apps in our analysis which permitted no exchange of information (see in Appendix 3). This alteration did not measurably skew the data (<4% of downloads of the entire sample), but rather provided more analytical depth.

## *Statistical testing*

To examine whether the proportion of apps facing access barriers (either from app stores or phone compatibility issues) is appreciably different between countries with varying Chinese diaspora populations, we used a one-tail significance test to determine if larger diaspora countries have a higher proportion of apps with access barriers compared to countries with smaller diaspora populations.

The dataset for this analysis included annual app download data, which was merged with diaspora sizes for each country. Apps were categorized by the type of barrier they faced, and we calculated the proportion of apps with barriers in each country.

Using these proportions, we performed a one-tail Z-test to statistically test the hypothesis that larger diaspora countries have a higher proportion of blocked apps. This involved comparing the mean proportion of blocked apps in countries above and below the median diaspora size.

The results showed a Z-score of 6.227 and a P-value of 0.000, indicating a statistically significant difference. This implies that countries with larger diaspora populations do indeed have a higher proportion of apps facing access barriers compared to countries with smaller diaspora populations.

## *Global population data*

For global population data figures, we primarily relied on the World Bank’s population data.[117] An average annual growth rate for each country was calculated based on yearly percentage changes from 2015 to 2022. The estimated population for 2023 was then calculated using the 2022 population and this average growth rate, with the estimated values added to the dataset. Data for Taiwan, which was missing in the original data, was pulled from the National Statistics Bureau of the Republic of China (Taiwan).

## *Diaspora data*

For diaspora data, we used a dataset that was initially populated with available data from the OECD, transferring data for each country and year directly from the OECD records. For seven countries with incomplete OECD data (Canada, Chile, Greece, Ireland, Mexico, New Zealand, and Portugal), averages were calculated using both OECD data and UN data from 2015 and 2020, filling missing values with these averages. For 26 other countries, missing data was estimated based on the rate of change between UN data from 2015 and 2020. The 2015 values were filled with UN data, and yearly changes were calculated to interpolate values from 2016 to 2020, extending this trend to estimate values for 2021 and 2022. Values for 2023 were estimated using a Simple Moving Average of the previous three years (2020, 2021, 2022) to ensure consistency across the dataset.

| Country | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| Argentina | 14 401 | 14 429 | 14 457 | 14 485 | 14 513 | 14 541 | 14 569 | 14 597 | 14 569 |
| Australia | 508 870 | 557 690 | 606 310 | 649 420 | 667 960 | 647 720 | 595 630 | 637 103 | 626 818 |
| Austria | 15 143 | 15 986 | 16 587 | 16 930 | 17 339 | 17 829 | 17 556 | 22 275 | 19 220 |
| Belgium | 19 048 | 19 452 | 19 915 | 20 350 | 21 031 | 22 053 | 21 979 | 21 688 | 21 907 |
| Brazil | 22 671 | 23 063 | 23 455 | 23 848 | 24 240 | 24 632 | 25 024 | 25 416 | 25 024 |
| Canada | 788 533 | 649 260 | 788 533 | 788 533 | 788 533 | 788 533 | 715 835 | 788 533 | 764 300 |
| Chile | 12 779 | 12 779 | 10 055 | 12 779 | 13 603 | 15 696 | 13 511 | 12 779 | 13 995 |
| Colombia | 1 616 | 1 610 | 1 603 | 1 597 | 1 590 | 1 584 | 1 578 | 1 571 | 1 578 |
| Czech Republic | 4 807 | 5 170 | 5 532 | 5 895 | 6 257 | 6 620 | 6 983 | 7 345 | 6 983 |
| Denmark | 9 953 | 10 611 | 11 341 | 11 710 | 12 116 | 12 452 | 12 060 | 12 209 | 12 240 |
| Dominican Republic | 3 776 | 3 809 | 3 842 | 3 876 | 3 909 | 3 942 | 3 975 | 4 008 | 3 975 |
| Ecuador | 3 025 | 3 052 | 3 080 | 3 107 | 3 135 | 3 162 | 3 189 | 3 217 | 3 189 |
| Egypt | 495 | 550 | 605 | 661 | 716 | 771 | 826 | 881 | 826 |
| Finland | 9 433 | 9 956 | 10 447 | 10 862 | 11 352 | 11 935 | 12 616 | 11 968 | 12 173 |
| France | 109 663 | 110 529 | 112 450 | 113 442 | 119 909 | 113 447 | 115 505 | 164 000 | 130 984 |
| Germany | 106 000 | 106 000 | 121 000 | 131 000 | 132 000 | 143 000 | 153 000 | 142 667 | 146 222 |
| Greece | 6 058 | 1 419 | 6 058 | 6 058 | 6 058 | 6 058 | 6 058 | 15 963 | 9 360 |
| Hong Kong | 2 381 135 | 2 401 480 | 2 421 825 | 2 442 171 | 2 462 516 | 2 482 861 | 2 503 206 | 2 523 551 | 2 503 206 |
| Hungary | 14 829 | 18 193 | 17 460 | 18 155 | 17 049 | 17 774 | 16 766 | 17 196 | 17 245 |
| India | 110 098 | 109 680 | 109 262 | 108 844 | 108 426 | 108 008 | 107 590 | 107 172 | 107 590 |
| Indonesia | 72 302 | 73 047 | 73 792 | 74 538 | 75 283 | 76 028 | 76 773 | 77 518 | 76 773 |
| Ireland | 10 952 | 11 262 | 10 952 | 10 952 | 10 952 | 10 952 | 10 952 | 1 270 | 7 724 |
| Israel | 1 110 | 1 130 | 1 150 | 1 150 | 1 200 | 1 240 | 1 250 | 228 630 | 77 040 |
| Italy | 200 372 | 212 173 | 220 088 | 223 653 | 218 269 | 222 408 | 259 091 | 233 256 | 238 252 |
| Japan | 714 570 | 726 835 | 739 099 | 751 364 | 763 628 | 775 893 | 788 158 | 800 422 | 788 158 |
| Kazakhstan | 2 162 | 2 184 | 2 207 | 2 229 | 2 252 | 2 274 | 2 296 | 2 319 | 2 296 |
| Lebanon | 2 358 | 2 298 | 2 238 | 2 178 | 2 118 | 2 058 | 1 998 | 1 938 | 1 998 |
| Malaysia | 11 347 | 11 482 | 11 618 | 11 753 | 11 889 | 12 024 | 12 159 | 12 295 | 12 159 |
| Mexico | 8 860 | 23 339 | 23 339 | 23 339 | 23 339 | 23 339 | 23 339 | 65 939 | 37 539 |
| Netherlands | 52 545 | 54 413 | 56 051 | 58 329 | 61 074 | 64 239 | 63 787 | 63 033 | 63 686 |

*Table continues on the next page.*

| Country | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| New Zealand | 100 311 | 100 311 | 100 311 | 132 906 | 100 311 | 100 311 | 100 311 | 12 461 | 71 028 |
| Norway | 11 203 | 11 520 | 11 655 | 12 016 | 12 297 | 12 684 | 12 549 | 12 510 | 12 581 |
| Pakistan | 334 | 329 | 325 | 320 | 316 | 311 | 306 | 302 | 306 |
| Peru | 18 783 | 21 413 | 24 042 | 26 672 | 29 301 | 31 931 | 34 561 | 37 190 | 34 561 |
| Philippines | 36 208 | 36 675 | 37 141 | 37 608 | 38 074 | 38 541 | 39 008 | 39 474 | 39 008 |
| Poland | 1 162 | 1 240 | 1 317 | 1 395 | 1 472 | 1 550 | 1 628 | 1 705 | 1 628 |
| Portugal | 13 710 | 13 710 | 13 710 | 13 710 | 13 710 | 13 710 | 14 109 | 13 710 | 13 843 |
| Romania | 3 722 | 4 286 | 4 851 | 5 415 | 5 980 | 6 544 | 7 108 | 7 673 | 7 108 |
| Russia | 56 231 | 56 224 | 56 217 | 56 210 | 56 203 | 56 196 | 56 189 | 56 182 | 56 189 |
| Singapore | 505 913 | 507 552 | 509 192 | 510 831 | 512 471 | 514 110 | 515 749 | 517 389 | 515 749 |
| South Africa | 9 519 | 9 387 | 9 254 | 9 122 | 8 989 | 8 857 | 8 725 | 8 592 | 8 725 |
| South Korea | 759 204 | 767 965 | 776 727 | 785 488 | 794 250 | 803 011 | 811 772 | 820 534 | 811 772 |
| Spain | 155 713 | 158 717 | 161 870 | 165 941 | 171 456 | 176 653 | 176 087 | 174 732 | 175 824 |
| Sweden | 28 699 | 28 410 | 29 640 | 31 333 | 33 288 | 35 282 | 36 023 | 34 864 | 35 390 |
| Switzerland | 20 817 | 22 286 | 23 434 | 24 136 | 24 974 | 25 913 | 26 322 | 25 499 | 25 911 |
| Thailand | 73 828 | 74 518 | 75 209 | 75 899 | 76 590 | 77 280 | 77 970 | 78 661 | 77 970 |
| Turkey | 12 426 | 17 831 | 14 839 | 16 037 | 20 776 | 22 820 | 26 483 | 23 360 | 24 221 |
| Ukraine | 6 560 | 6 582 | 6 603 | 6 625 | 6 646 | 6 668 | 6 690 | 6 711 | 6 690 |
| United Kingdom | 114 000 | 209 000 | 226 000 | 210 000 | 198 000 | 211 000 | 245 000 | 218 000 | 224 667 |
| United States | 2 065 431 | 2 130 352 | 2 216 810 | 2 221 943 | 2 250 230 | 1 942 972 | 1 952 823 | 2 048 675 | 1 981 490 |
| Vietnam | 3 005 | 3 037 | 3 070 | 3 102 | 3 135 | 3 167 | 3 199 | 3 232 | 3 199 |

Notably, this data represents a low-end estimate of diaspora communities since the UN data only refers to first-generation migrants. The actual diaspora groups at risk may be four times as large or more, if second and subsequent generations of the original cohorts of migrants from China are included. In particular, Indonesia, Malaysia, the U.S. and Thailand may host considerably larger groups of individuals identifying as Chinese or dependent on communication with people in the PRC.

# Appendix 2: Regulatory and legislative framework of China’s Real-Name Registration system (实名制[登记]).

Relevant laws, regulations, speeches, and other party documents issued by institutions such as the CAC, the State Council, or the National People’s Congress.

| Month | Document | Impact/Key Provisions |
|---|---|---|
| **Nov 2022** | Provisions on the Administration of Internet Posting and Commenting Services<br>互联网跟帖评论服务管理规定 | ■ RNR should include phone numbers and ID.<br>■ **Article 4:** Platforms need to establish a “censorship before release” system. Comments should be first reviewed by platforms before publication and regularly report to the CAC.<br>■ Update to prior regulation from 2017 with the same title (see Aug 2017). |
| **Sep 2022** | Law of the People's Republic of China on Combating Telecom and Online Fraud<br>中华人民共和国反电信网络诈骗法 | ■ Most comprehensive regulation of RNR that summarizes and combines previous legal texts in Article 21.<br>■ **Article 21:** Telecommunications and internet service providers are required by law to ask users for their real identity information when they sign up for or confirm services. If a user does not provide their real identity information, the following services must not be provided:<br>Internet access; Network address translation services such as network proxies; Internet domain name registration, server hosting, space rental, cloud services, content distribution services; Information and software publishing services, instant messaging, online transactions, online gaming, online live streaming, advertising services. |
| **Jun 2022** | Administrative Provisions on Mobile Internet Applications Information Services<br>移动互联网应用程序信息服务管理规定 | ■ **Article 6:** Application providers that provide information release, instant messaging, and other services to users shall authenticate the real identity information of users who apply for registration based on mobile phone numbers, identity document numbers, or unified social credit codes. Users who do not provide their true identity information, or use their organization or other people’s identity information to register falsely, shall not be provided with relevant services. |
| **Jun 2022** | Provisions on the Management of Internet User Account Information<br>互联网用户账号信息管理规定 | ■ **Article 11-13:** Reiterates obligation of RNR and IP address registration of internet information service providers (互联网信息服务提供者), such as news information services, online publication services, search engines, instant messengers, interactive information services, livestreaming, and application software downloads.<br>■ **Article 14:** Identification data needs to be regularly reviewed and old accounts suspended if necessary. |

*Table continues on the next page.*

| Month | Document | Impact/Key Provisions |
|---|---|---|
| **Nov 2021** | Online Data Security Management Regulations<br>网络数据安全管理条例 | ■ Platform operators (互联网平台运营者) need to register IP-address of domestic users to prevent any re-registration of accounts that were previously closed for violating laws and regulations.<br>■ For overseas-based users, internet platform operators must show the country they are located in.[118] |
| **Mar 2021** | Notice on Issuing the Regulations on the Scope of Necessary Personal Information for Common Types of Mobile Internet Applications<br>常见类型移动互联网应用程序必要个人信息范围规定 | ■ Ensures mobile applications collect only necessary personal data to uphold user privacy.<br>■ Specific categories of mobile applications are defined as well as the essential personal information necessary for their core services. This includes requirements for apps across sectors such as navigation, transportation, communication, and e-commerce. |
| **Dec 2019** | Provisions on Ecological Governance of Network Information Content<br>网络信息内容生态治理规定 | ■ **Article 5:** All online content creators and news providers (网络信息内容生产者) are encouraged to produce nationalistic and patriotic content.<br>■ **Article 6:** Content is prohibited that could damage national honor or interest, spread rumors, or disrupt economic or social order. |
| **Feb 2018** | Provisions on the Administration of Microblog Information Services<br>微博客信息服务管理规定 | ■ Article 4: Microblog service providers must acquire a publishing license at the CAC.<br>■ Suggests enforcement of public real names for all users on microblogging platforms, and a move away from the old system (see "前台自愿，后台实名," Feb 2015).<br>■ Requires microblogging platforms to ensure user registration, content review, safety measures, and proper staffing to uphold content security and legal compliance.<br>■ Microblogging platforms are responsible for the accuracy of their content. They should correct misinformation, such as spreading vulgar content “散布低俗内容“ or confusing the public “混淆视听” |
| **Aug 2017a** | Provisions on the Administration of Internet Posting and Commenting Services<br>互联网跟帖评论服务管理规定 | ■ Article 5: Commenting and posting reaction on news feeds and social media should only be allowed when adhering to RNR principles. |
| **Aug 2017b** | Regulations on the Administration of Internet Forum Community Services<br>互联网论坛社区服务管理规定 | ■ **Article 5 & Article 8:** Community platforms and online forums must enforce RNR and apply 2015 principles. |
| **July 2017** | Regulations on the Administration of Internet Forum Community Service<br>互联网群组信息服务管理规定 | ■ Requires platforms to implement RNR. |

*Table continues on the next page.*

| Month | Document | Impact/Key Provisions |
|---|---|---|
| **Jun 2017** | Cybersecurity Law<br>网络安全法 | ■ **Article 24:** Network operators (网络运营者) must establish a RNR before supplying any service.<br>■ **Article 37:** Access of "important information" from outside of the PRC must undergo a security assessment.<br>■ **Article 47:** Network operators are responsible for user content and must delete it upon request by authorities. |
| **May 2017** | Regulations on Internet News Information Service Management<br>互联网新闻信息服务管理规定 | ■ **Article 15:** Internet news providers (互联网新闻信息服务提供者,including platforms that disseminate news over the internet, whether through websites, apps, forums, blogs, microblogs, public accounts, instant messaging tools, or live streaming) must verify the real identity information of their users. If users do not provide authentic identity information, services should not be offered to them.<br>■ **Article 17:** Features that have the capacity to influence public opinion or mobilize society must be approved by the CAC. |
| **Jan 2017** | Opinions on Promoting the Healthy and Orderly Development of Mobile Internet<br>关于促进移动互联网健康有序发展的意见 | ■ Formulates the vision of a "healthy and orderly" mobile internet.<br>■ **Article 16:** Private companies and mobile services must not support activities that advocate for the overthrowing of state power (吹推翻国家政权) or separatism (分裂思想). |
| **Jun 2016** | Regulations on the Management of Mobile Internet Application Information Services<br>移动互联网应用程序信息服务管理规定 | ■ **Article 7:** Addresses the responsibilities of all app providers and developers, who should establish RNR based on the backend identity system established in 2015 ("后台实名、前台自愿" ). These providers should also enact content moderation and dispose of accounts in instances where a violation occurs. |
| **Feb 2015** | Internet User Account Name Management Regulations<br>互联网用户账号名称管理规定 | ■ Internet information service providers (互联网信息服务提供者) must take on new RNR obligations.<br>■ Such providers should adhere to a new concept: real identity verification at the backend while allowing front-end anonymity if the user chooses ("后台实名、前台自愿").<br>■ Ensure users do not post content that aims to subvert state power (颠覆国家政权), undermine national unity (破坏国家统一), damage national honor (国家荣誉), or spread rumors (散布谣言). |
| **Dec 2012** | Decision of the Standing Committee of the National People's Congress on Strengthening Network Information Protection<br>全国人大常委会关于加强网络信息保护的决定 | ■ **Article 5:** Providers of platforms must manage content posted by their users for compliance with laws or regulations, and report to the relevant authorities if necessary.<br>■ **Article 6:** Platform providers must verify users' real identity information when providing web access, telecommunication services, or information posting services. |

*Table continues on the next page.*

| Month | Document | Impact/Key Provisions |
|---|---|---|
| **Aug 2008** | Notice on Issuing Guiding Opinions on Building a Unified Human Resources and Social Security Network Trust System关于印发建设统一的人力资源社会保障网络信任体系指导意见的通知 | ■ Initial guidelines for an effective and unified identity authentication mechanism. Identities should be verified before access to online services is granted to improve government control and secure services. |
| **Dec 2005** | Regulations for the Registration Management of Non-Commercial Internet Information Services)<br>非经营性互联网信息服务备案管理办法 | ■ Non-commercial online services, such as research platforms, educational, non-profit or cultural entities, need to ensure accountability of their content.<br>■ These platforms are also responsible for ensuring the legality of the content they provide. |
| **May 2005** | Opinions on Further Strengthening Internet Management<br>关于进一步加强互联网管理工作的意见 | ■ **Article 2:** Introduces the obligation to monitor and block harmful content from abroad. |
| **Dec 2000** | Decisions about maintaining Internet security<br>关于维护互联网安全的决定 | ■ **Article 2:** Defines the core tenets of internet censorship, including the safeguarding of national security and social public interests, as well as the criminalization of content that may subvert state power or incite the overthrowing of China’s the socialist system. |

# Appendix 3: Extended Access Barrier Matrix

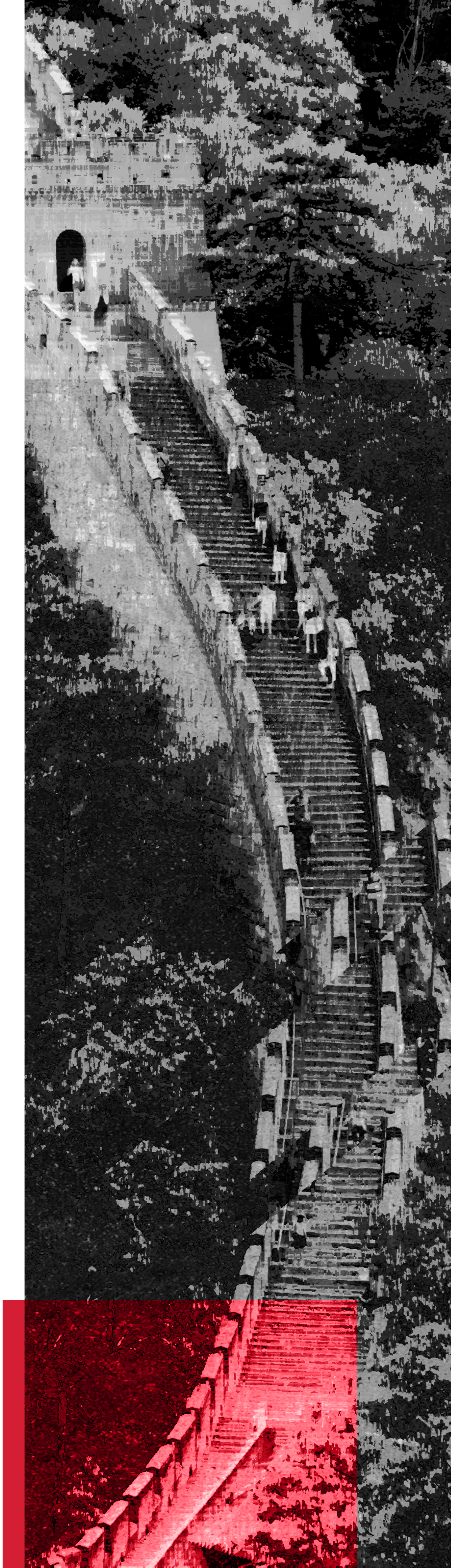
| | Count of type 1&2 AB | Czech Republic | United Arab Emirates | Denmark | Finland | Hungary | Ireland | Romania | Belgium | Dominican Republic | Greece | Poland | Sweden | Netherlands | Ukraine | Nigeria | Portugal | Austria | France | Italy | Brazil | Germany | South Korea | Canada | Mexico |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kuai Shou | 58 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |
| Baidu Tieba (百度贴吧) | 58 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 |
| **PosterLabs** | 58 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| DingDing - Make It Happen | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| DouYin (抖音) | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **QQ空间** | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 |
| Himalaya FM (喜马拉雅FM) | 57 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 |
| QQ Browser | 57 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| WeChat Reading | 57 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Hertz (赫兹) | 53 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| Mango Live (芒果直播) | 50 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 |
| Wefun | 39 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 3 |
| Douban | 33 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| **Butter Camera - New camera, feel free to shoot** | 27 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MOMO陌陌 | 23 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 2 | 3 | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 2 | 0 | 1 | 0 |
| Ola Party - Live, Chat & Party | 22 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 2 | 0 | 0 | 0 |
| Meipai | 21 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 0 | 0 |
| HeeSay - Blued LIVE & Dating | 17 | 3 | 0 | 3 | 2 | 3 | 3 | 3 | 3 | 0 | 3 | 3 | 3 | 2 | 0 | 0 | 1 | 3 | 3 | 3 | 0 | 1 | 0 | 0 | 0 |
| Nonolive - Live Streaming | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| QQ | 9 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BabyTree Pregnancy-Special software for pregnancy preparation and parenting** | 8 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 |
| SUGO: Voice Live Chat Party | 8 | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Zhihu (知乎) | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Zhihu Daily (知乎日报) | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Weibo (微博) | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| YoHo: Group Voice Chat Room | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| WeCom-Work Communication&Tools | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yingke Live (映客直播) | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BeautyCam - Beautify & AI Art** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Star Idol: 3D Avatar Creator** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Calamansi - Pinoy Live Cast | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **iPick** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JusTalk - Video Chat & Calls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JusTalk Kids - Safe Messenger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uplive-Live Stream, Go Live | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WeChat (微信) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Haya: Best Audio Experience | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HUAWEI FamCare | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little Red Book (小红书) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nekogram* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table continues on the next page.*

|  | Count of type 1&2 AB | Peru | Saudi Arabia | Spain | Switzerland | Argentina | Belarus | Chile | Ecuador | Israel | Kazakhstan | United Kingdom | Algeria | Azerbaijan | Norway | Russia | South Africa | Colombia | Kuwait | Lebanon | Egypt | Pakistan | Philippines | Indonesia | New Zealand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kuai Shou | 58 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Baidu Tieba (百度贴吧) | 58 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **PosterLabs** | 58 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 |
| DingDing - Make It Happen | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| DouYin (抖音) | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **QQ空间** | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 |
| Himalaya FM (喜马拉雅FM) | 57 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 |
| QQ Browser | 57 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| WeChat Reading | 57 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Hertz (赫兹) | 53 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| Mango Live (芒果直播) | 50 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| Wefun | 39 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 0 | 0 | 0 |
| Douban | 33 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| **Butter Camera - New camera, feel free to shoot** | 27 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| MOMO陌陌 | 23 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ola Party - Live, Chat & Party | 22 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meipai | 21 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| HeeSay - Blued LIVE & Dating | 17 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nonolive - Live Streaming | 13 | 2 | 0 | 2 | 0 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| QQ | 9 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BabyTree Pregnancy-Special software for pregnancy preparation and parenting** | 8 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SUGO: Voice Live Chat Party | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zhihu (知乎) | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zhihu Daily (知乎日报) | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Weibo (微博) | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| YoHo: Group Voice Chat Room | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WeCom-Work Communication&Tools | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yingke Live (映客直播) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BeautyCam - Beautify & AI Art** | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Star Idol: 3D Avatar Creator** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Calamansi - Pinoy Live Cast | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **iPick** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JusTalk - Video Chat & Calls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JusTalk Kids - Safe Messenger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uplive-Live Stream, Go Live | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WeChat (微信) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Haya: Best Audio Experience | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HUAWEI FamCare | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little Red Book (小红书) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nekogram* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Table continues on the next page.*

| | Count of type 1&2 AB | Turkey | Vietnam | Hong Kong | Thailand | Australia | Japan | Malaysia | Singapore | Taiwan | United States |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Kuai Shou | 58 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Baidu Tieba (百度贴吧) | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **PosterLabs** | 58 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| DingDing - Make It Happen | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| DouYin (抖音) | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **QQ空间** | 58 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 |
| Himalaya FM (喜马拉雅FM) | 57 | 2 | 2 | 0 | 3 | 2 | 3 | 2 | 2 | 2 | 2 |
| QQ Browser | 57 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| WeChat Reading | 57 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Hertz (赫兹) | 53 | 2 | 2 | 0 | 3 | 1 | 0 | 2 | 0 | 0 | 0 |
| Mango Live (芒果直播) | 50 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Wefun | 39 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Douban | 33 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Butter Camera - New camera, feel free to shoot** | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MOMO陌陌 | 23 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Ola Party - Live, Chat & Party | 22 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Meipai | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HeeSay - Blued LIVE & Dating | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nonolive - Live Streaming | 13 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| QQ | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BabyTree Pregnancy-Special software for pregnancy preparation and parenting** | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUGO: Voice Live Chat Party | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zhihu (知乎) | 6 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Zhihu Daily (知乎日报) | 6 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Weibo (微博) | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| YoHo: Group Voice Chat Room | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WeCom-Work Communication&Tools | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yingke Live (映客直播) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BeautyCam - Beautify & AI Art** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Star Idol: 3D Avatar Creator** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Calamansi - Pinoy Live Cast | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **iPick** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JusTalk - Video Chat & Calls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JusTalk Kids - Safe Messenger | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uplive-Live Stream, Go Live | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WeChat (微信) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Haya: Best Audio Experience | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HUAWEI FamCare | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little Red Book (小红书) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nekogram* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



# Appendix 4: Recorded account registration requirements by app

| App name | App Store ID or Google Play Store URL | Allows exchange of information between users | Account Registration Identifier |
|---|---|---|---|
| **BabyTree Pregnancy** | id523063187 | no | Phone Number |
| **Baidu Tieba - chat about interests, go to Tieba** | id477927812 | yes | Phone Number |
| **Beautiful pictures stickers** | id477678113 | no | E-mail address or account-free access |
| **Beauty Camera – Selfie Cam** | id471802217 | no | E-mail address or account-free access |
| **BeautyCam - Beautify & AI Art** | id592331499 | no | Phone Number |
| **Binance Messenger** | id6446617631 | yes | E-mail address or account-free access |
| **Butter Camera - New camera, feel free to shoot** | id587176822 | no | Phone Number |
| **Calamansi - Pinoy Live Cast** | id1476680678 | yes | Phone Number |
| **Clean Doctor - Clean My Phone** | id855008026 | no | E-mail address or account-free access |
| **DingDing - Make It Happen** | id930368978 | yes | Phone Number |
| **Dolphin Zero Incognito Browser*** | id=com.dolphin.browser.zero | yes | E-mail address or account-free access |
| **Douban** | id907002334 | yes | Phone Number |
| **Douyin** | id835599320 | yes | Phone Number |
| **FotoRus -Camera & Photo Editor** | id457517348 | no | E-mail address or account-free access |
| **Haya: Best Audio Experience** | id1485364632 | yes | Phone Number |
| **HeeSay - Blued LIVE & Dating** | id1090274263 | yes | E-mail address or account-free access |
| **Hertz-make friends by listening to sounds** | id1448999159 | yes | Phone Number |
| **Himalaya FM (listening community)** | id876336838 | yes | Phone Number |
| **HUAWEI FamCare** | id1383652311 | yes | Phone Number |
| **InstaBeauty - Makeup Camera!** | id599534650 | no | E-mail address or account-free access |
| **InstaMag - Photo Collage Maker** | id615187629 | no | E-mail address or account-free access |
| **iPick** | id912765938 | no | Phone Number |
| **JusTalk - Video Chat & Calls** | id627958823 | yes | Phone Number |
| **JusTalk Kids - Safe Messenger** | id1403744827 | yes | Phone Number |
| **Kuai Shou** | id440948110 | yes | Phone Number |
| **Litmatch Lite*** | id=com.litatom.lite | yes | E-mail address or account-free access |
| **Little Red Book – Your Guide to Life** | id741292507 | yes | Phone Number |
| **Mango Live-Popular Short Videos** | id1061501109 | yes | Phone Number |
| **Meipai** | id847334708 | yes | Phone Number |

*Table continues on the next page.*

| App name | App Store ID or Google Play Store URL | Allows exchange of information between users | Account Registration Identifier |
|---|---|---|---|
| **Meitu- Photo Editor & AI Art** | id416048305 | no | E-mail address or account-free access |
| **Messaging+ 6 SMS, MMS*** | id=com.crazystudio.mms6 | yes | E-mail address or account-free access |
| **MOGU - Fashion Destination** | id452176796 | no | ID |
| **MOMO陌陌** | id448165862 | yes | Phone Number |
| **Nekogram*** | id=tw.nekomimi.nekogram | yes | Phone Number |
| **Nonolive - Live Streaming** | id1113374949 | yes | Phone Number |
| **O2Cam: Take photos that breath** | id1407731945 | no | E-mail address or account-free access |
| **Ola Party - Live, Chat & Party** | id1525829883 | yes | Phone Number |
| **Pitu - Best selfie and PS Soft** | id724295527 | no | E-mail address or account-free access |
| **PosterLabs** | id875654777 | no | Phone Number |
| **QQ** | id444934666 | yes | Phone Number |
| **QQ Browser** | id370139302 | yes | Phone Number |
| **QQ空间** | id364183992 | no | Phone Number |
| **QQ邮箱** | id473225145 | yes | E-mail address or account-free access |
| **SayHi Chat Meet Dating People** | id469609836 | yes | E-mail address or account-free access |
| **Sogou Input Method-Emoji Art&Funny Sticker** | id917670924 | no | E-mail address or account-free access |
| **Star Idol: 3D Avatar Creator** | id416048305 | no | Phone Number |
| **SUGO: Voice Live Chat Party** | id1574436604 | yes | Phone Number |
| **Tencent Conference** | id1497685373 | yes | E-mail address or account-free access |
| **TikTok** | id1142110895 | yes | E-mail address or account-free access |
| **Uplive-Live Stream, Go Live** | id1235469329 | yes | Phone Number |
| **WeChat** | id414478124 | yes | Phone Number |
| **WeChat Reading** | id952059546 | yes | E-mail address or account-free access |
| **WeCom-Work Communication&Tools** | id1087897068 | yes | Phone Number |
| **Wefun** | id1476921059 | yes | Phone Number |
| **Weibo** | id350962117 | yes | Phone Number |
| **Weibo intl** | id1215210046 | yes | Phone Number |
| **Xiaomi Community** | id=com.mi.global.bbs | yes | E-mail address or account-free access |
| **YI IoT** | id=com.yunyi.smartcamera | no | E-mail address or account-free access |
| **Yingke Live** | id978985106 | yes | Phone Number |
| **YoHo: Group Voice Chat Room** | id1509635224 | yes | Phone Number |
| **Zhihu** | id432274380 | yes | Phone Number |
| **Zhihu Daily** | id639087967 | yes | Phone Number |

# Endnotes

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[2] WeChat is without alternatives for the communication with China, which is why scholars from media and communications speak about a "infrastructuralization" of WeChat. See Jean-Christophe Plantin and Gabriele de Seta, "WeChat as infrastructure: the techno-nationalist shaping of Chinese digital platforms," Chinese Journal of Communication, 12(3), 2019, https://doi.org/10.1080/17544750.2019.1572633.

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and protect minors.

[66] A legal expert at the Beijing University of Posts and Telecommunications explains that RNR, as defined in Article 24 of the Cybersecurity Law, serves one main purpose: to support the establishment of a purified internet environment (净化网络环境) and to psychologically deter netizens who attempt to commit crimes, such as anonymously spreading rumors. See Xie Yongjiang [谢永江], “Backend Real-Name System Has Become a Global Reality, Strengthening Personal Information Protection is Key” [【专家谈】后台实名制已成全球性现实 强化个人信息保护成为关键], People’s Daily [人民日报], September 11, 2017, https://web.archive.org/web/20240114105031/http://opinion.people.com.cn/n1/2017/0911/c1003-29527979.html. Similarly, according to Tian Li, Associate Professor at Peking University’s New Media Research Institute, RNR turns the internal moral constraints of netizens into external legal constraints, for which the “Seven Base Lines” should provide guiding principles, as defined by Lu Wei, formerly head of the CAC and deputy head of the Propaganda Department. See Dong Siyu [董丝雨] and Jiang Qiguang [蒋齐光], “Three Questions on Internet Real-Name System: Information Protection, Technological Supervision, and Freedom of Speech” [三问网络实名制：信息保护、技术监管、言论自由], People's Daily [人民日报], June 1, 2017, https://archive.ph/ymiNI.

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internet-censor-has-closed-over-4000-websites-and-removed-55-apps. Similarly, the platform "全国APP技术检测平台" by China Academy of Information and Communications Technology of Ministry of Industry and Information Technology tests 180,000 apps per month. According to official reporting, app developers must undergo data collection tests and approval by the ministry before apps can be delivered to app stores. The ministry argues these tests are for the sake of protection of personal data of users, the platform monitors each apps data collection practices, including personal and device data (MAC addresses and IMEI numbers). In the first year after launch in 2020, almost 2.5 million apps were tested and more than 2,000 were "rectified." See The Paper [澎湃], "Monitored by Mobile Apps? Ministry of Industry and Information Technology: Enhance Detection Capabilities, Build a Full-Chain Supervision System" [被手机APP监视？工信部：提升检测能力，建全链条监管体系], November 25, 2021, https://web.archive.org/web/20240603170838/https://m.thepaper.cn/kuaibao_detail.jsp?contid=15554170&from=kuaibao.

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[97] This overview excludes China. We also omitted India because the Modi administration has effectively banned hundreds of Chinese apps from national app stores since 2020. As such, India operates the only government other than the CCP responsible for nationwide app-store-level censorship. See "The problem with India's app bans," Justin Sherman, "The Problem with India's App Bans," The Atlantic Council, March 2023, https://www.atlanticcouncil.org/blogs/southasiasource/the-problem-with-indias-app-bans/.

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[108] In line with work on tolerated and even orchestrated non-threatening forms of resistance. See Jason Gainous et al., "Directed Digital Dissidence in Autocracies: How China Wins Online," Oxford University Press, 2023.

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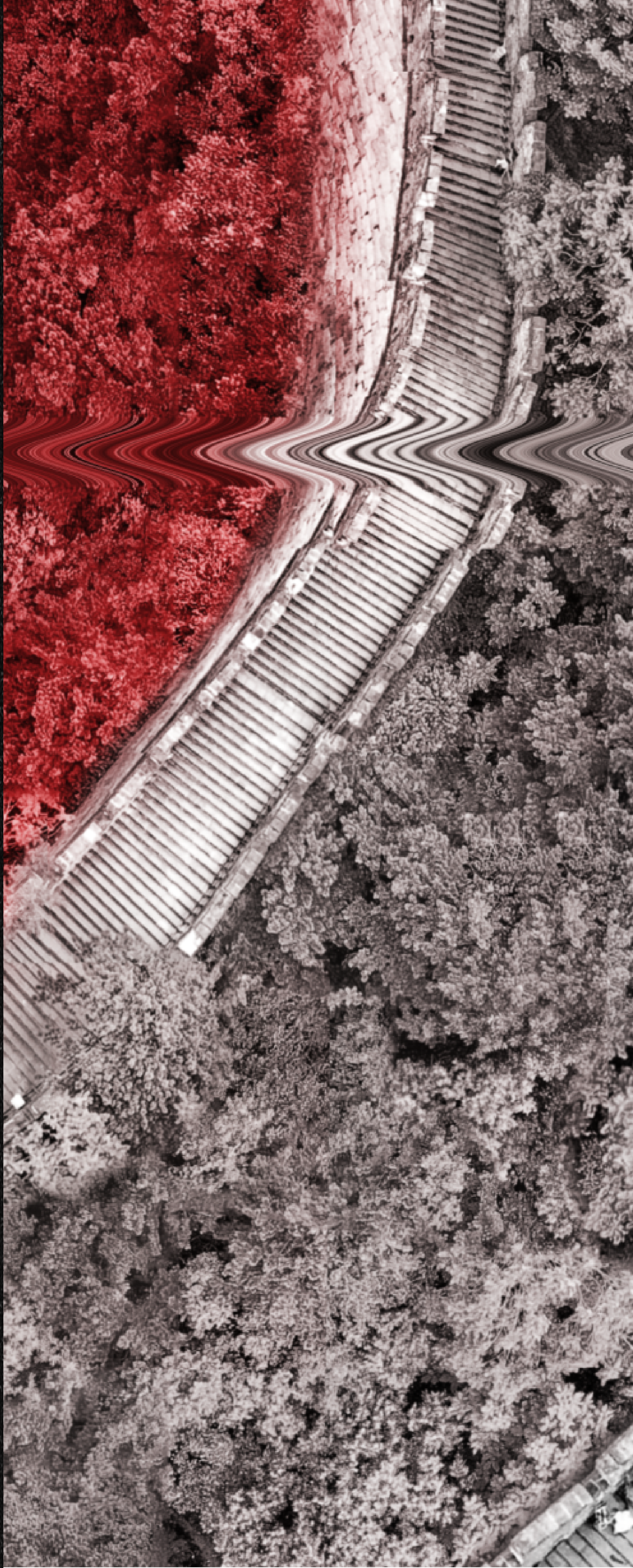

# Blocked by Numbers

## The Impact of Real-Name Registration Policies on Transnational Access to Chinese Social Media Apps

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