

Sociotechnical imaginaries and digital orientalism in social media discourses about Asian “tech nations”

A critical exploration using computational methods

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Abstract

Sociotechnical imaginaries and national imaginaries are intrinsically linked, as visions for the role of technology often go hand in hand with aspirations for economic growth and political power within specific countries. Discourses around Asian “tech nations” such as China and South Korea exemplify this dynamic, as they are frequently portrayed as technology leaders. Arguably, digital technologies have become prominent features in the portrayal and perception of nation states, while, simultaneously, expectations surrounding these technologies shape the sociotechnical imaginaries that emerge around them. A critical analysis of this relationship—and how it becomes manifest through framing practices in global media discourses—can reveal the extent to which oversimplified (mis)representations amount to forms of digital orientalism, particularly among foreign commentators. These include the selective emphasis on either predominantly negative or positive portrayals of Asian countries and their relationships with emerging technologies. Digital orientalist sentiments conflate sociotechnical and national imaginaries to promote highly selective representations of a given “Eastern” culture and its role in technological development. Social media platforms such as Twitter (now *X*) are important sites for such tech-nation discourses, featuring media commentators, politicians, entrepreneurs, and tech professionals. This article offers a critical analysis of discussions on Twitter about China, India, Japan, and South Korea in the context of digital technology. Using computational text analysis on a large sample of tweets from 2010 to 2021 ($N = 2,077,232$), the study explores how Asian countries are portrayed within the global Anglophone tech discourse and the extent to which they are subject to forms of digital orientalism. The findings highlight how online discourses, sociotechnical imaginaries, and national imaginaries intersect, with an emphasis on both commonalities and differences in the framing of Asian countries based on cultural, political, and economic factors.

Keywords: tech discourses; socio-technical imaginaries; nation states; computational methods

1. Introduction

Social media discourses about emerging technologies contribute to the formation and dissemination of “sociotechnical imaginaries” (Jasanoff & Kim, 2009): prevalent interpretative frameworks about the implications, effects, uses, benefits, and risks that give societal meaning to technologies. These imaginaries are constructed and shared through the strategic use of language that emphasises selected aspects as well as real or hypothetical impacts of technology (Nguyen, 2023). Cultural norms and the social, political, and technological factors configuring discourses are crucial in this complex process. Digital media communication plays an important role in the formation of sociotechnical imaginaries, as it can shape respective framing practices—what aspects of a technology are highlighted and in which way—and determine the structure of discourses in terms of their social composition (who speaks) and technological foundation (what media technologies are used to speak). The concept of sociotechnical imaginaries underlines that technologies are not simply material matters devoid of social and cultural context but that non-technical factors are likely to be most influential in perceptions, evaluations, and adoptions of emerging technologies, including ethical implications (Lindgren, 2024).

Arguably, sociotechnical imaginaries are never exclusively about technologies. Discourses around technologies tend to link them to political, cultural, social, and economic questions and implications. Importantly, sociotechnical imaginaries often go hand in hand with narratives and imaginaries about nation states, their societies, and (dominant) cultural formations. This includes geopolitical ambitions and aspirations towards economic prowess as well as technological sovereignty. A case in point is the media discourse about an alleged arms race in the development of artificial intelligence (AI) between China and the USA. Both present themselves as global leaders in AI and are portrayed as competitors for geopolitical influence in a zero-sum game echoing the nuclear armaments race of the cold war, especially in Western news media coverage (Nguyen & Hekman, 2022). Relatedly, China is often imagined as a society that underwent rapid and expansive digitalisation (Keane & Chen, 2017). Other examples are narratives portraying countries as influential technology hubs, such as South Korea or Israel (Lee, 2024; Mashiah, 2024), as well as stories centering on the emancipatory potentials of technology, especially for the so-called Global South (Arora, 2019).

Discourses about technology and nations are initiated and maintained from two general directions. First, domestic voices frequently link their nation state projects to technology. Governments worldwide drive technology-nation-state discourses, promoting their preferred national imaginaries based on current political agendas (Smuha, 2020). Tech entrepreneurs, media commentators, and social media influencers contribute to these discussions when outlining how, for example, big data, AI, blockchain, the Internet of Things (IoT), or 5G matter for national development and global competitiveness. Second, foreign views construe imaginaries about countries and their relation to technology, sometimes corresponding with “domestic” narratives but often—intentionally—misrepresenting as well as oversimplifying more complex empirical realities. Plenty of media commentators and tech experts have portrayed foreign places as inspirational examples for how to adopt technology or warned about how they could become economic, political, or even existential threats (Nguyen & Hekman, 2022; Nguyen, Wang & Mutsvairo, 2024).

Historically, especially Asian countries have been associated with technology developments from both domestic and foreign perspectives, which are entangled in a complex relationship of mutual influence and ignorance. Notions of “tech-savvy” cultures and tech nations emerged in the 1980s and 1990s with the economic rise of Japan and South Korea (Hart, 1987; Ostry, 1997; Lee & Joshi, 2015). In the 2010s, China became renowned for rapid technology adoption, datafication, and AI innovation (Appelbaum & Parker, 2012; Liu, 2021; Nguyen & Hekman, 2022). India gained reputation for ambitious tech policies aiming to boost domestic development and global competitiveness (Thomas, 2013; Athique, 2019). These Asian countries are examples for the intrinsic relationship between imaginaries about the nation state and sociotechnical imaginaries: digital technologies are prominent features in future visions for specific

nation states while, simultaneously, the respective aspirations and expectations towards technologies shape the sociotechnical imaginaries about them.

Critically analyzing this relationship can unearth how both influence each other within discursive contexts where domestic and foreign perspectives contribute to the construction of different imaginaries linking countries and technology. Empirically investigating discursive practices reveals where especially foreign views distort the relationship between nation states and technology and, in the case of Asia specifically, potentially contribute to forms of digital orientalism: the selective and stereotypical portrayal of the “exotic” East through a technology lens. Simply put, digital orientalism emerges when reductive views on both technology and nation states are intertwined to make evaluative statements about a given country.

The present article offers a critical-empirical analysis of social media discourses on the four aforementioned Asian countries, examining their connection to the broader concept of “tech” as an umbrella term for emerging digital trends. A large volume of English Twitter (now X) data about China, India, Japan, and South Korea and “tech” for the decade between 2010 and 2021 is analysed with computational methods for automated text analysis ($N=2,077,232$). The main objective is to chart out the dominant emphasis frames for technology in relation to each country and to explore what social media discourses can reveal about the intricate relationship between sociotechnical imaginaries and the imaginaries of (Asian) nation states. Emphasis frames (Chong & Druckman, 2007) refer here to the specific aspects or dimensions highlighted in representations of a complex issue—for example, whether technology is primarily presented as political, economic, or cultural. Importantly, emphasis framing goes hand in hand with issue specification, such as references to concrete social entities, problematisations, questions, processes, and relationships. When combined with more explicitly evaluative valence framing (e.g., sentiment), emphasis framing can be considered a building block of the narratives that shape sociotechnical and national imaginaries. This strongly suggests that text-analytical approaches can reveal the specific discursive practices through which emphasis and valence framings become manifest (Nguyen & van Es, 2024).

While acknowledging the relevance of domestic narratives, the present analysis focuses on foreign—that is, mostly external—perspectives that share their imaginaries in the global Anglophone Twittersphere by highlighting selected aspects of technology and Asian countries. It is likely that Orientalist views are typically held by foreign commentators (Said, 1978). Analytical focus is placed on commonalities and differences in the portrayal of the selected countries in the context of digital technology developments, especially to illustrate misconceptions that reflect digital orientalist views. As such, the study can be considered historical in nature, as it looks back on a decade of social media discourse on a platform that has undergone considerable—and rapid—changes in recent years following its rebranding under new and controversial ownership. For the remainder of this article, the platform is referred to as Twitter, not X. While offering a critical reflection on the past, the study’s insights nevertheless provide productive stimuli for further theorising the political implications of sociotechnical and national imaginaries in global technology discourses, and they demonstrate the potential of computational methods for this kind of analysis.

The study’s main question therefore is How do sociotechnical and national imaginaries intersect in social media discourses about Asian countries, and to what extent do these discourses display forms of digital orientalism? The analysis is further guided by two sub-research questions:

SQ1: What are the dominant emphasis frames pertaining to tech that are associated with Asian countries in Anglophone social media discourses on Twitter?

SQ2: What are the differences in the framing of Asian countries in the context of tech?

Answering these questions provides the foundation for critical reflection on the complex relationship and dynamics between sociotechnical imaginaries, national imaginaries, and digital orientalism.

The article is structured as follows: first, it highlights the intrinsic link between sociotechnical imaginaries and national imaginaries as mutually affective discursive constructions. These are then connected to digital orientalism as a reductive lens through which Asian countries are viewed in technology discourses. It is subsequently argued that social media platforms such as Twitter play a key role in enabling these discourses, which involve a diverse set of communicators (including, among others, journalists, experts, government representatives, entrepreneurs, and technologists). After establishing the conceptual framework, the methodology and setup of the computational text analysis are introduced. The results and critical analysis focus on historical trends in the framing of Asian countries in social media texts over the sampled timeframe. The paper concludes with a critical discussion of digital orientalism as a key component of contemporary technology discourses, along with reflections on the benefits and limitations of the methodological approach.

2. Sociotechnical imaginaries and national imaginaries

Historically, technologies have been essential to modern nation state projects, since the latter locate considerable socio-economic, political, and military power potentials in advancing the former. Aspirations to acquire and develop new technologies are of interest to most forms of government, regardless of their ideological underpinnings. Nevertheless, differences in worldviews, governance practices, culture, the available material and social resources, and societal components needed for tech development matter greatly for the materialisation of intentions and aspirations. Coccia argues that the “social, political, and economic ecosystem of nations affects pathways of scientific and technological development, as well as the understanding and appreciation of science and technology in society” (2019, p.2). Stimulating the formation of such ecosystems is a key goal of governments devising policies for tech development.

However, policies are not merely technocratic instruments for steering action in desired directions; they result from and affect narratives about the present and future of nation states and their approaches to technology from specific ideological perspectives (Jasanoff & Kim, 2009). It is in this context where sociotechnical imaginaries connect to national imaginaries (Steger, 2009). Both are manifestations of social imaginaries (Steger, 2009): frameworks for social action and communication influenced by ideology. Imaginaries are infused with normative assumptions, values, and beliefs shaping how to perceive and think about specific issues, contexts, and relationships and how to pursue corresponding courses of action. They are formed within discourses and are contingent regarding socio-cultural and political factors; while imaginaries can temporarily attain a paradigm-like dominance, they are inherently dynamic and subject to change. Sociotechnical imaginaries center on the (desireable and undesirable) role of technology in society, while national imaginaries construe collectively shared visions for what society and culture should look like in the first place, as well as how “the nation” should position itself vis-à-vis other countries on the world stage.

Imaginaries are built and shared through stories about technologies and societies. Accordingly, imaginaries can be broken down into narratives and the framing practices within them. For example, a sociotechnical imaginary that presents AI as “superhuman” draws on narratives emphasising the alleged superiority of algorithms. This is achieved through emphasis framing, which highlights episodes where algorithms appear to make better and faster decisions—for instance, in cancer diagnoses or legal cases (Bunz & Braghieri, 2021). Valence framing may further reinforce the “superhuman” image by associating AI with qualities such as “more efficient,” “more accurate,” or “never tired” when compared to human capabilities. The tonality and core message of such narratives can be dissected through the specific use of language that enacts framing practices. Analysing these practices can unearth how issues and entities are talked into being, perceived, assessed, or problematised (Bareis & Katzenbach, 2022).

In the present study, discourses are understood as dynamic accumulations of different narratives—i.e., related communicative acts that construct specific framings of a given issue and/or entity—centred around a shared focal point, such as AI, big data, or digital technology more broadly (Figure 1). Discourses evolve over time, as narratives emerge, shift, expand, diversify, and gain or lose acceptance within specific socio-cultural contexts. These narratives give rise to imaginaries—both sociotechnical and national—which, while analytically distinguishable, are often deeply intertwined. Multiple imaginaries can coexist, with some more widely held than others across social units (individuals and collectives) within a given socio-cultural configuration. The present understanding of discourse draws on Hepp et al. (2012), who define discourses as the condensation of public, media-based communication anchored around shared thematic concerns. Ultimately, discourses about technology and nation states can be analysed by identifying and exploring imaginaries, which can then be critically examined in terms of the framing practices embedded in narratives—both textual and visual—as well as the (under)representation of diverse societal perspectives.

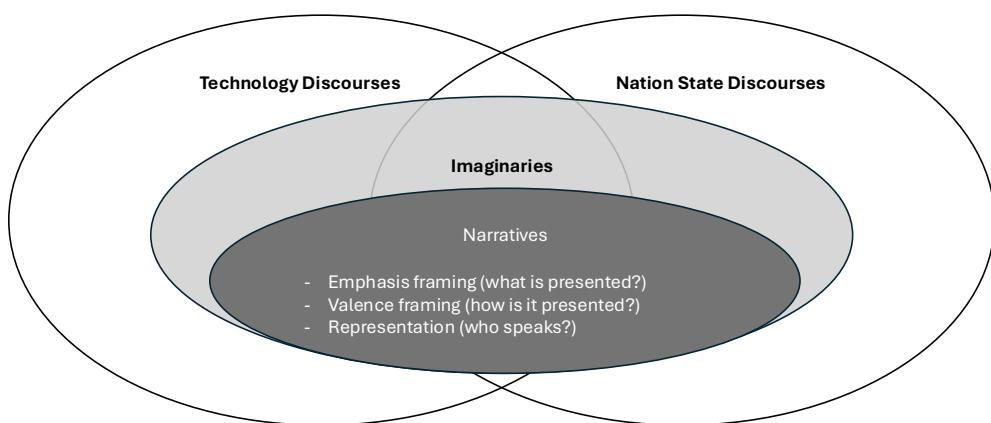


Figure 1. Conceptual Framework.

Grand narratives about innovation and technology in respect to nation state projects usually focus on four general “pay-offs”: 1) increased efficiency and higher living standards; 2) economic growth and wealth, including global economic competitiveness; 3) global political soft power; and 4) military power. During the past decade, such narratives have shifted attention to digital and data-driven technologies: big data, AI, IoT, blockchain, and 5G (Nguyen & Hekman, 2022). These and similar digital technologies are often subsumed under the buzzword “tech”, which carries strong techno-capitalist notions that emphasise the economic value of technology development.

Arguably, promoting—and exaggerating—narratives about technological progress is to some extent more important for governments than practical implementations and material achievements, as myths about technological capabilities enabled by supposedly smart and visionary leadership can support a desired self-representation in domestic and global media discourses. Consequently, trending digital technologies are important topics in governmental narratives surrounding policy-making and self-portrayal that feed into forms of ‘techno-nationalism’ (Rikap & Lundvall, 2021). Respective narratives place emphasis on a given country’s exceptionalism in technology development, such as AI and its growing role in generating economic wealth or security-centric geopolitics (Bächle & Bareis, 2022; Sarkin & Sotoudehfar, 2024; Hine & Floridi, 2022). Dominating emerging digital technologies is considered essential in politics and business to be taken seriously as a competitor in the techno-capitalist

global economy and hard power politics. For Asian countries such as China, where anti-colonialist sentiments are an essential part of political discourse culture, technological progress is viewed as a key factor in achieving and maintaining sovereignty (Mahoney, 2022).

Simultaneously, countries and their real and imagined technological capabilities are frequently subject of foreign discourses about them (Lengen, 2022). Dominant participants are often domain experts, entrepreneurs, journalists, pundits, and academics/scientists. Media discourses varyingly assign technological prowess and degrees of global influence to different countries, whereby the respective framing approaches and resulting narratives often seem to depend on current political climates and trends. For example, while in the early 2000s China's technological development was observed and commented on with awe, sentiment largely flipped to the opposite in the later 2010s, when the country was more frequently portrayed as a challenger to Western powers. The alleged tech rivalry between China and the West that has emerged in media discourse in recent years represents only one dimension of the broader negative framing of the country, particularly within U.S. political discourse (Ooi & D'Arcangelis, 2018). Geopolitical tensions concerning global political influence, clashing economic interests, and ideological differences are important factors that play into these shifting perceptions among foreign discourse participants within the wider (digital) media landscape.

Importantly, domestic and foreign discourses are intrinsically linked through a complex relationship of mutual influence, as local discussions feed into global ones—and vice versa. No national public discourse is ever fully detached from transnational or global formations, nor is it immune to foreign communicative stimuli (Nguyen, 2017). Nevertheless, both dimensions are analytically distinguishable to some extent, based on factors such as language, intended audiences, and the communicative goals of public speakers (e.g., a politician addressing a nationally framed target audience). Social media platforms facilitate the formation of discourses that may focus primarily on local or regional contexts and audiences, as well as those with more global orientations. They are spaces where one can rapidly transition into the other—such as when a local politician's statement, originally intended for a domestic audience, is cited in a post shared with a foreign or global readership. The “borders” between local, regional, transnational, and global discourses are inherently fuzzy, and depending on the context, the direction of communication can quickly expand. This does not make a clear distinction between these discursive scopes impossible, but it does caution against conceptualising discourses as closed or self-contained entities (Nguyen, 2017).

While some foreign commentators provide nuanced portrayals of Asian countries in the context of tech, they can tend to provide one-sided narratives focused on selected aspects that may misrepresent and distort empirical realities. It is here argued that sociotechnical imaginaries, national imaginaries, and new forms of Orientalism intersect.

3. Digital orientalism and technology discourses

Sociotechnical imaginaries and related national imaginaries can offer distorted representations of technologies, societies, and cultures—often through exaggerated positive or negative portrayals. Some imaginaries are overly enthusiastic about the capabilities of technology and how certain countries allegedly excel at unlocking its potential for economic benefits and general improvement of life. Others may overemphasise more remote risks of technology—often depicted through dystopian scenarios—and portray foreign countries' use of emerging technologies as more threatening than it actually is. Such extremes result from deliberate, politically motivated framing practices, particularly among highly invested and outspoken discourse participants in business and politics.

In the context of East Asian countries and digital tech, one-dimensional, distorted framings can be linked to a longer history of politically motivated misrepresentation in Western discourses centred on Orientalism. One of the most influential conceptualisations of Orientalism for critical research, especially in the context of postcolonial studies, was introduced by Edward Said in 1978. He contends that Western colonial powers historically constructed distorted and mostly fictional representations of Eastern societies

through cultural and media outputs, such as arts, literature, and scholarship. This Western “gaze” cast colonized peoples into exoticized, stereotyped, and ultimately inferior positions. The resulting representation of Easterners in orientalist discourses served as justification for perpetuating Western dominance over colonial subjects (Said, 1978). A key component of orientalist views is the focus on and exaggeration of selected aspects of more complex empirical realities. Often, orientalist discursive practices present non-Western social and cultural formations in a negative light, emphasizing alleged inferiorities and/or potential threats.

While Asian countries are free from direct Western colonial oppression in the current world order, discourse strategies and framing approaches among foreign commentators can still reflect Orientalist sentiments, also in the context of digital technology. The term *digital orientalism* attempts to capture this continued tendency in how Western commentators present non-Western regions and socio-cultural formations. Although it is a relatively recent term without a firm definition, it has been proposed to describe how Western discourse practices reflect distorted, oversimplified views that feed into stereotypes and can potentially harm intercultural understanding.

For example, Mayer (2019) observes a strong negative framing of the Chinese government’s official digitalisation strategy, reflective of “techno-skepticism” in European political discourse. This, Mayer posits, can be regarded as a new form of “digital orientalism” (2019) that primarily focuses on hypothetical risks and threats, while ignoring the relatively mundane and risk-free realities of technology adoption in practice. Relatedly, Mahoney (2023) identifies a strong link between technophobia and Sinophobia, connecting current manifestations of digital orientalism with its historical predecessors of anti-Chinese sentiment. However, emphasis now shifts to risks and threats that digital technology allegedly poses in the hands of a more assertive China on the global stage.

Concerning big tech platforms and social media specifically, Alimardani and Elswah (2021) identify another problematic dimension to digital orientalism: the prevalence of platform policies that put non-Western users at a disadvantage by disproportionately delimiting freedom of expression of specific cultural groups. Their case study shows how social media such as Facebook seem to apply harsher content moderation rules on Arab users than on other groups, possibly reflecting orientalist views that cast them in a negative light.

While earlier notions of digital orientalism tend to emphasise negative framings and stereotypes—centred on authoritarianism, prejudice, risk, and threat—reductive, one-dimensional, and inaccurate portrayals of how Eastern societies relate to digital technology continue to manifest in various forms. Taking a broader critical view of Western narratives about digital technology in the Global South, Arora (2019) argues that Western commentators often present inaccurate and reductive accounts of digital transformation in these regions. They tend to overemphasise the role of digital technology in development—an area that frequently falls short of expectations—while overlooking that most non-Western users share similar motivations with their Western counterparts, primarily using technology for entertainment and distraction. Digital orientalist views can misrepresent the non-Western Other and their use of digital technology in different ways, portraying them as focused solely on daily survival, in need of help and guidance, or virtually devoid of agency. Discourses about digital technology in the Global South, such as Africa, are exemplary for this (Nguyen, Wang & Mutsvairo, 2024).

However, there are also positive stereotypes reflecting digital orientalism sentiments. For example, Japan is often portrayed as a tech-savvy society and culture that is particularly open to embracing robots and AI in daily life. The Japanese government actively contributes to this narrative by prioritising technological development and adoption in its policies, and by promoting these aspects culturally through nation-branding campaigns advertising “Cool Japan” abroad (Tamaki, 2019). This demonstrates that domestic and global discourses are closely interlinked. Visions of a technology-affine Japan, however positive they may be, can still result in oversimplified and stereotyped portrayals among foreign perspectives. The downsides of technology use—such as inequality, exploitation, and other ethical challenges—are often overlooked. Similarly, South Korea has been frequently hailed as a technology hub

and digital innovation leader (Chung, 2020), especially in digital governance, consumer electronics, and smart technologies. While it is a fact that the countries' technology companies are major global players, boosting the domestic economy, their modes of operation have frequently raised critical questions about corruption and undue political influence (Oh, 2017). China has been subject to both extremes in global discourses at different times, with overly positive portrayals praising its rapid digital transformation especially—in the early stages—and extremely negative ones highlighting perceived threats becoming more visible in recent years (Lee, 2018; Keane, 2019; Liu, 2021; Davis, 2024; Moore, 2022). Positive portrayals of specific Asian countries as extremely tech-affine illustrate a form of digital orientalism that fabricates fantasies of technological utopias, where the respective foreign cultures are exoticised as wondrous places to be inspired by.

In the present study, digital orientalism is considered to encompass a wide spectrum of reductive and oversimplifying framing practices that can emphasise either mostly negative or positive portrayals of East Asian countries. Examples include framing Japan as an advanced, tech-savvy society to learn from or portraying China's advancements in AI as a global risk. Digital orientalist framings connect sociotechnical and national imaginaries to promote a highly selective representation of a given culture and the role of technology within. Analysing media discourses through this lens can reveal how certain hypotheses surrounding both desirable and undesirable uses of technology are associated with specific countries. However, digital orientalist framings shared by foreign commentators are not separate from sociotechnical imaginaries and the broader narratives about nation state projects as promoted by domestic speakers from the countries in question. Arguably, both dimensions are often intrinsically linked, each affecting the other. For example, publicly voiced aspirations to lead in AI development by Asian governments may trigger negative—and potentially racist—counter-framings by foreign commentators.

3. Tech discourses on Twitter

Twitter has been described as a dynamic communication space with global reach and potential for hosting digital public spheres (Pond and Lewis, 2017). The original platform provided users with means for communicating, connecting, and consuming content. Users formed communities of varying densities and strengths of mutual ties. Some were loosely connected audiences with shared interests that emerged only temporarily; others were tightly knit communities around common causes, issues, and subjects of interest. The platform popularised the use of hashtags to label user-generated content with keywords. Hashtags serve two interrelated purposes: technically, they facilitate orientation through the vast volume of content by clustering related tweets for more precise searches and recommendations. Discursively, hashtags are framing devices that indicate what the content of a social media posting is about and may communicate a political position (Ferra & Nguyen, 2017). Twitter and similar platforms do not substitute previous media technologies' infrastructural roles in the formation of mediatized public spheres but have transformed their underlying configurations.

Between 2010 and 2021, the number of monthly active users on Twitter grew from approximately 50 million to over 350 million globally (WithBlaze, n.d.). A considerable proportion of users have consistently been based in the United States; in 2021, 75 million users—around 24% of the global user base—were located in the USA. Regarding the four Asian countries examined in this study, there were approximately 58 million active monthly users in Japan and 24 million in India in 2021. While the latter figure represents only a small fraction of India's total population, it still placed the country third in terms of global Twitter user numbers (Omnicore Agency, n.d.). South Korea had 15.9 million users, making Twitter one of the most popular social media platforms in the country at the time (Guan et al., 2022). China presents a special case, as the platform is officially banned. However, several tens of millions of users were still estimated to access Twitter via VPNs (Deccan Chronicle, 2016).

Over time, Twitter became a “hotspot” for tech discourses, as some of the most influential tech entrepreneurs and tech communities used it to discuss trends and developments among themselves and

with a general audience, such as IoT, blockchain, self-driving cars, or non-fungible tokens (NFTs). For example, Åkerlund and Nylén (2021), in their mixed-methods study, demonstrate how Twitter discourse on the Internet of Things (IoT) shifted from a primarily technical framing to one focused on practical value. They emphasise that social media discourses ultimately consist of user-generated content, making “it imperative to pay specific attention to who is responsible for defining IoT on Twitter” (Åkerlund & Nylén, 2021, p. 4). Focusing on the IoT as well, Zubia et al. (2018) observe that Twitter users discussed not only business potentials but also risks and threats, such as privacy invasion. Other studies have explored how trends like generative AI are perceived and evaluated by Twitter users (Giordano et al., 2024), or have used the platform to probe public opinion on blockchain (Mnif et al., 2021). These studies highlight the diversity of perspectives on technology issues, showing that tech discourses on Twitter often address topics at the intersection of innovation and research, business and finance, regulation, politics, and social or cultural implications. However, while these studies have yielded valuable empirical insights, it is important to note that Twitter discourses have never been fully representative of “society” as a whole. The platform has tended to amplify the voices of experts, journalists, and politicians (Dagoula, 2019), and is marked by demographic biases in its user base (Mellon & Prosser, 2017).

Structurally, X—as the latest iteration of the platform—retains most of its core functionalities. However, crucial aspects such as content moderation policies and the composition of the user base have changed considerably in recent years, potentially affecting the thematic focus and tone of current discourses. Thus, while valuable for examining recent technology discourses, the present analysis is somewhat limited in capturing current trends on the platform.

3. Methods & data

To recap, social media platforms serve as sites of discourse in which sociotechnical and national imaginaries are constructed through narratives that emphasise specific aspects of technologies and nations (emphasis framing), often articulated from an evaluative standpoint (valence framing). These narratives can potentially express digital orientalist views in various forms. Given that such discourses are primarily articulated through typed language within media-specific communication formats and at large scale, computational methods for text analysis are particularly well-suited for investigating the complex relationship between imaginaries and digital orientalism.

Accordingly, an automated content analysis was applied to a large volume of texts retrieved from Twitter (Atteveldt et al., 2022). Specifically, topic modelling via BERTopic (Grootendorst, 2022) was used to cluster texts and identify emphasis frames. Here, topics—understood as bag-of-words representations of text clusters—are conceptualised as emphasis frames (Nguyen et al., 2024) and are referred to as such throughout the remainder of the article. In addition, the most frequently used hashtags per country were compared to explore framing through this media-specific discursive practice. All analyses were conducted in Python 3, and manual inspection of sample texts was carried out to validate the computational findings.

3.1 Data collection and data exploration

The data were retrieved via Twitter’s now-defunct Academic Application Programming Interface (API), which allowed for full-archive keyword searches. The exact search query used was “[COUNTRY] tech” for tweets in English, where [COUNTRY] was replaced with China, India, Japan, and South Korea, respectively. The term “tech” was selected to cast a wide net for capturing tweets related to technological developments. Within Twitter’s API, a space between keywords functioned as a Boolean “AND” operator. The timeframe spans from 2010 to 2021. First, four separate datasets were compiled, each containing tweets that mentioned the respective country and the word “tech” (see Table 1). Next, exact duplicates (i.e., identical posts by the same account) and retweets were removed. The datasets were then

merged for preprocessing and further analysis, resulting in a combined dataset of $N_1 = 2,085,992$ tweets. As the study's main goal is to explore foreign perspectives within global discourses, data collection was limited to English-language content. While this still includes some domestic voices—for example, official Chinese government accounts that tweet in English—the dataset is more likely to reflect content from the global Anglophone Twittersphere rather than from within the four Asian countries.

Table 1. Data.

| Country | All Tweets | Analysed Tweets |
|-------------|------------|-----------------|
| China | 1.353.659 | 854174 |
| India | 1.341.936 | 779110 |
| Japan | 651.335 | 383053 |
| South Korea | 142.224 | 69655 |
| Total | 3.489.154 | 2.085.992 |

Overall, between 2010 and 2021, the frequency of relevant postings increased sharply until 2012, followed by a steady decline in the subsequent years (Figure 2). There are notable differences in the number of tweets per country. For China and India, the full-archive search yielded a similar volume of tweets, following an almost identical trajectory over time. In contrast, tweet volumes for Japan and South Korea were lower, with distinct peaks in activity. These observations are indicative only of the sampled data. It is likely that other keyword combinations related to technology debates—such as #AI or #cloudcomputing—have gained popularity over time, potentially influencing the visibility of country-specific tech discourse on the platform.

Nevertheless, each country is indeed discussed in relation to tech with the two most populous Asian countries more frequently represented in this keyword combination than the other two. Potential reasons are topicality and newsworthiness that especially China acquired for tech issues, as well as India's growing role as a source of and market for tech. 2012 marks the height of tweet activity for tech in relation to China and India, respectively, before steadily declining in the years after.

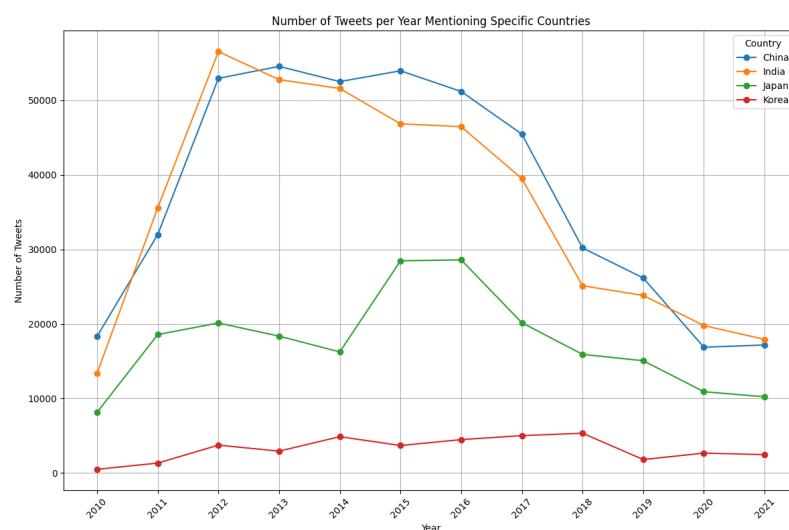


Figure 2. Distribution of Tweets per country over time.

Furthermore, a relatively small number of unique accounts posted the sampled tweets (Table 2). Comparing the top 100 accounts based on frequency of postings, reveals similarities and noticeable differences (Figure 3). Their backgrounds were manually checked for this categorisation to gain a quick overview. News media accounts are a strong presence. This category includes mainstream news and special interest outlets focusing tech. Another frequently represented group are tech experts, commentators, and influencers. These usually have a background in entrepreneurship, investment, research, or journalism. Personal accounts often include users with a tech background. Tech companies and governmental organisations are the smallest category.

Table 2. Unique Twitter accounts per country-specific dataset.

| Country | Number of unique accounts |
|-------------|---------------------------|
| China | 2689 |
| India | 2654 |
| Japan | 365 |
| South Korea | 1401 |

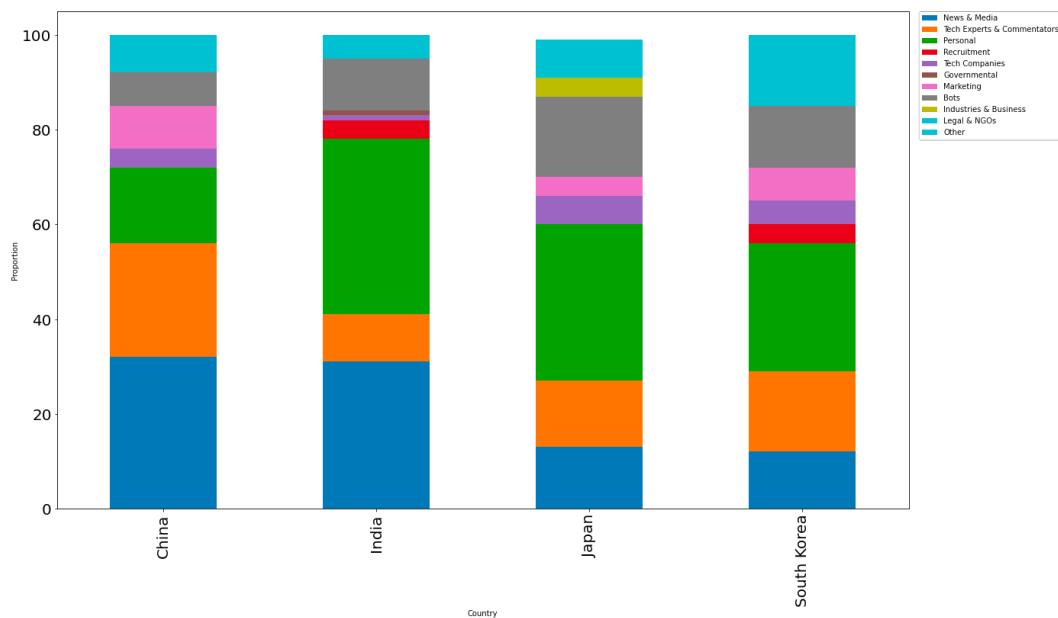


Figure 3. Categories in Top 100 Twitter.

3.2 Preprocessing & automated text analysis

Prior to the automated text analysis, several standard preprocessing steps were applied to the data. The tweets were stripped of punctuation, all words were lowercased, tokenized, lemmatized, and stop words removed (Atteveldt et al., 2022). To keep track of which country-specific search query an original tweet was retrieved from, each tweet was pre-labelled with one of the four countries. This ensured that each tweet could be traced back to its country-specific subset, even after subsequent analytical steps and the enrichment of the dataset with additional columns for emphasis frames and meta-frames. The final dataset for analysis eventually included the following columns: username, timestamp, tweet (unprocessed

original), country (i.e, what subset it originally belonged to), emphasis frame, and meta frame (Screenshot 1).

| username | created_at | tweet | Country | topic | meta |
|----------|---------------------------|---|---------|--------------------|--------------------------|
| 8000 | 2012-01-04 20:35:03+00:00 | Tech News: Study shows China and India's socia... | China | Tech News China II | Tech Trends & Innovation |

Screenshot 1. Final Dataset Columns.

For clear and interpretable results with text clustering methods, it is often sufficient to focus only on nouns in a corpus (Nguyen & Hekman. 2022; Burscher et al., 2016). Thus, SpaCy (model: `en_core_web_trf`) was used for part-of-speech-tagging (PoS) and the filtering of nouns. The pre-processed texts were primarily used for automated text clustering via BERTopic, while for the hashtag analysis and other word counting methods the original tweets were considered more suitable. All data were fully anonymised and are presented in aggregated form, except for representative examples for the identified frames. Usually, transformer-based approaches such as BERTopic require minimal preprocessing. However, after comparing results, the stricter feature selection focused on nouns yielded clearer outcomes with the standard BERT model.

The automated text analysis aimed for an emphasis frames analysis. An emphasis frame is considered as a topical focus that several texts share. For example, tweets that primarily mention the words “war”, “military”, “weapons”, and “army” can be considered the Military and Armed Conflict emphasis frame. BERTopic clusters the tweets in a similar fashion. It is an advanced topic modelling technique utilising embeddings generated with Bidirectional Encoder Representations from Transformers (BERT) for more accurate and fine-grained topic extraction from text data. The method combines vector representations for creating embeddings with clustering algorithms such as Hierarchical Density-Based Spatial Clustering of Applications with Noise (HDBSCAN). For each document cluster the most dominant words are extracted, which serve for human interpretation and labeling. Since BERTopic uses transformer-based embeddings and can detect semantic relationships between words, it is better suited for short texts than conventional topic modeling methods such as Latent Dirichlet Allocation (LDA). However, there are still limitations: BERTopic may label some short texts more quickly as noise if they do not fit a topic well or can oversegment, i.e., tweets about the same topic may be split into two different topics based on different wordings. Human inspection of the results is therefore important for fine-tuning preprocessing steps and collapsing similar topics.

Applying BERTopic can be computationally demanding, despite its built-in mechanisms to reduce processing load through dimensionality reduction techniques such as Uniform Manifold Approximation and Projection (UMAP). For the present study, it was necessary to train the model on a smaller yet representative sub-set of the full dataset. A stratified sample of 25% was compiled ($N_2 = 519251$ tweets), reflecting the proportions to which the different countries were represented in the full dataset N_1 . The trained model was then applied to the full dataset ($N_1 = 2,085,992$ tweets), which combines all four complete country-specific subsets originally collected. BERTopic generated a total of 1582 interpretable topics that can be considered as emphasis frames for $N_2 = 1,130,563$ tweets, while the remaining texts could not be classified (indicated by topic number -1, which stands for “noise”). This is a clear limitation of the approach, as the “noise cluster” may still include emphasis frames that can be discerned by a human. Still, the generated topics provided detailed insights into the social media discourse, accurately clustering even niche topics.

1582 emphasis frames were considered too large for a summarising comparative analysis. Thus, only the most frequent 250 emphasis frames were manually labelled, validated, and grouped into larger meta-frames based on shared similarities. During the process, purely marketing-centric emphasis frames were

excluded (tweet clusters consisting almost exclusively of advertisements and product announcements). This further reduced the number of labelled emphasis frames to 230 with a total volume of relevant tweets of $N_3=511723$. The labelling process went as follows: for each of the top 230 emphasis frames a random sample of 10% was manually reviewed and considered in the labelling along the top words extracted by the BERTopic model. Importantly, this was necessary to explore the bag-of-words representations in context (appendix 1). Manual inspection revealed whether any of the four specific Asian countries was frequently mentioned in the reviewed tweets, even if not explicitly included in the bag-of-words representation. These findings informed the final labelling. One example is the emphasis frame China & Cybersecurity. The bag-of-words representation for this cluster—after preprocessing—consists of dominant keywords such as “cyberattack, hacking, hacker, attack, hack, hacking attack, cyberespionage, cyberwar, news hacker, claim”. However, upon inspecting 10% of the original tweets in this cluster, it became clear that most referred to China. Additionally, this emphasis frame was more likely to appear in tweets retrieved via the China-specific search query.

Next, these emphasis frames were assigned to a meta-frame that grouped them with other similar frames. For example, emphasis frames around issues such as “Facebook in India”, “Google in India”, and “Twitter Japan” were grouped under the meta-frame Big Tech & Social Media. This reduced the top 230 emphasis frames to 28 meta-frames, providing a birds-eye-view of the data (appendix 2).

4. Findings

4.1 Country-specific differentiation within a techno-capitalist master frame

To begin the critical analysis of discourses surrounding technology and Asian countries, an exploration of the most prevalent hashtags already yields notable insights. There is considerable similarity across tweets for each country, as a dominant techno-capitalist meta-narrative appears to shape the hashtag landscape. Figures 4 to 7 display the top 100 hashtags by frequency, selected from a total of 112,859 unique hashtags across all tweets ($N = 2,085,922$), grouped by country. Frequencies range from 23,768 for the most common hashtags in the word clouds to 2,189 for the least frequent, excluding general tags such as #china, #india, #japan, #korea/#southkorea, and #tech.

The hashtag #tech is primarily associated with products (e.g., #gadgets, #honorview20—a smartphone brand offered by the Chinese tech company Huawei—and #iphone), product marketing (e.g., #worldsfirsttechnology, an advertising slogan for the HONOR View phone), and business and entrepreneurship (e.g., #startups, #apple, #business). Another prominent category includes references to broader technology trends, such as #blockchain, #ai, and #robot.

Despite these similarities, the hashtag overview also reveals differences between countries and their specific tech-related concerns. For instance, hashtags such as #infosec, #cybersecurity, and #privacy—indicating discussions around cybersecurity—appear among the top 100 in tweets about China, while #jobs and #indiajobs are more distinctive to India. Tweets referring to Japan more frequently include #robots, #robotics, and #gaming, whereas #blockchain and #IoT are comparatively more prevalent in tweets about South Korea.

Still, most hashtags suggest that a techno-capitalist master frame—or “grand narrative”—centred on innovation, commercialisation, and economic potential preconfigures sociotechnical imaginaries from a techno-capitalist perspective in the broader Twitter discourse about the different countries, at least during the analysed period. This master frame resembles that found in Western media discourses around emerging technologies, where a business- and innovation-centric focus is relatively typical (Nguyen & Hekman, 2022). Given Twitter’s popularity among technology experts, entrepreneurs, marketers, technologists, and tech journalists, these initial observations are not surprising and align with previous research on sociotechnical imaginaries associated with specific technological trends, such as AI (e.g., Brennen et al., 2018).

However, it is important to note that the social media platform also serves as an important site for digital advertising and marketing, where tech products are often mentioned in relation to a particular country as a targeted market. While tech products can be understood as material manifestations of sociotechnical imaginaries, advertising- and marketing-oriented communication primarily serves commercial purposes and may only indirectly reflect the intersection of sociotechnical and national imaginaries. Such posts can be insightful, but they are often one-dimensional, typically limited to announcing the launch of a product or service. Therefore, to gain deeper insights into prevalent emphasis framings and country-specific narratives, it is essential to move beyond hashtag analysis.

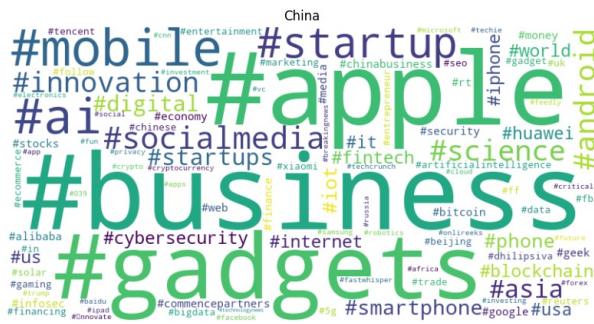


Figure 4. Top 100 Hashtags China.

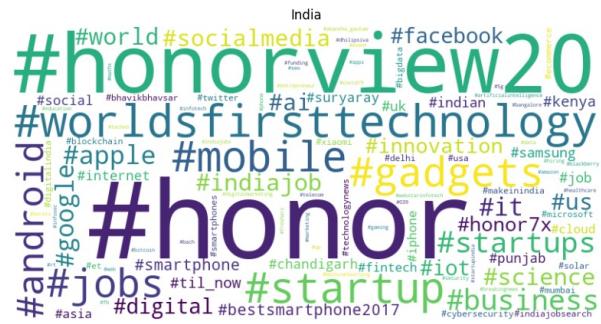


Figure 5. Top 100 Hashtags India.

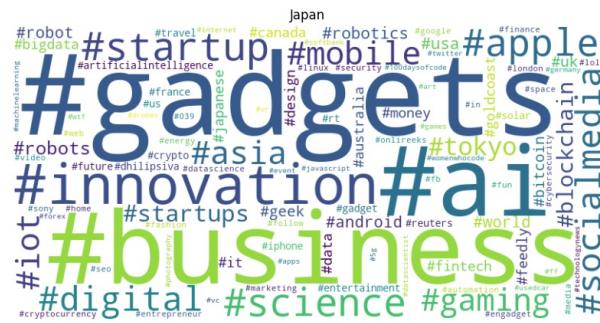


Figure 6. Top 100 Hashtags Japan.

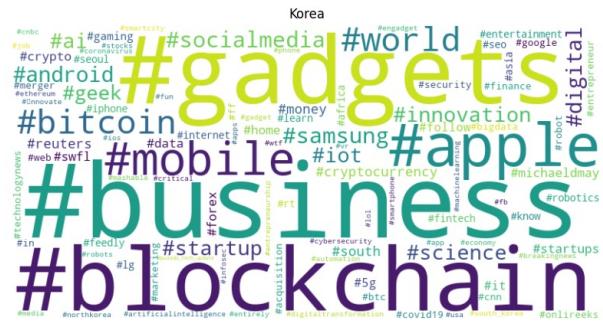


Figure 7. Top 100 Hashtags South Korea.

Analysing the dominant meta-frames by country provides a more nuanced picture, revealing notable differences in how each is portrayed—differences that align with some of the patterns observed in the hashtag analysis. At the same time, the meta-frame analysis confirms the presence of an overarching techno-capitalist master frame, as most meta-frames reflect business and economic themes. Table 4 presents an overview of the most and least distinct meta-frames per country. A chi-squared test was conducted to assess whether the observed differences are statistically significant. The results indicate a strong association between countries and meta-frames, $\chi^2(1, N_3 = 511,723) = 225,229.01, p < .001$. To see which meta-topics drive that association, Pearson residuals were calculated for every (country, meta) cell (appendix 3). Each residual indicates how much the observed count deviates from what is expected if tweets were distributed randomly across topics—so a large positive residual marks a topic as “most distinct” (overrepresented) for a country in the dataset, while a large negative residual marks it as “least distinct” (underrepresented). Investigating these residuals highlights the strongest and weakest associations in more detail.

Table 3. Most and least distinct meta-frames per Asian country (based on top 250 emphasis frames, N3=511723).

| Country | Most distinct meta-frame | Least distinct meta-frame |
|-------------|---|---|
| China | <i>Cyberattacks</i> <i>Geopolitics & Conflict</i> <i>Chinese Tech Companies</i> <i>Surveillance</i> <i>Internet Censorship</i> <i>Resource</i> <i>AI Development & Competition</i> <i>Environment</i> <i>Health Tech</i> <i>Big Tech & Social Media</i> <i>Corona Pandemic</i> <i>Space Exploration</i> <i>Science</i> <i>Transportation</i> <i>Self-Driving Cars & Automobile Industry</i> | <i>Tech Jobs</i> <i>Start-Ups</i> <i>Smartphones & Gadgets</i> <i>Tech Infrastructure</i> <i>Tech Business & Industry</i> <i>Natural Disasters</i> <i>Sports</i> <i>Energy</i> <i>Music</i> <i>Education</i> <i>Blockchain & Crypto</i> <i>Military Tech</i> <i>Tech Trends & Innovation</i> <i>Tech Governance</i> |
| India | <i>Tech Jobs</i> <i>Smartphones & Gadgets</i> <i>Tech Business & Industry</i> <i>Big Tech & Social Media</i> <i>Education</i> <i>Start-Ups</i> <i>Tech Infrastructure</i> <i>Sports</i> <i>Science</i> | <i>Cyberattacks, Geopolitics & Conflict</i> <i>Chinese Tech Companies</i> <i>Blockchain & Crypto</i> <i>Transportation</i> <i>Natural Disasters</i> <i>Tech Trends & Innovation</i> <i>Self-Driving Cars & Automobile Industry</i> <i>AI Development & Competition</i> <i>Surveillance</i> <i>Music</i> <i>Internet Censorship</i> <i>Resources</i> <i>Environment</i> <i>Space Exploration</i> <i>Military Tech</i> <i>Corona Pandemic</i> <i>Tech Governance</i> <i>Energy</i> <i>Health Tech</i> |
| Japan | <i>Natural Disasters</i> <i>Self-Driving Cars & Automobile Industry</i> <i>Transportation</i> <i>Music</i> <i>Start-Ups</i> <i>Tech Trends & Innovation</i> <i>Energy</i> <i>Military Tech</i> <i>Tech Infrastructure</i> <i>Blockchain & Crypto</i> <i>Sports, Tech Governance</i> <i>Space Exploration</i> <i>AI Development & Competition</i> | <i>Cyberattacks, Geopolitics & Conflict</i> <i>Big Tech & Social Media</i> <i>Tech Jobs</i> <i>Chinese Tech Companies</i> <i>Tech Business & Industry</i> <i>Corona Pandemic</i> <i>Health Tech</i> <i>Smartphones & Gadgets</i> <i>Science, Surveillance</i> <i>Internet Censorship</i> <i>Resources</i> <i>Education</i> <i>Environment</i> |
| South Korea | <i>Blockchain & Crypto</i> <i>Corona Pandemic</i> | <i>Big Tech & Social Media</i> <i>Smartphones & Gadgets</i> |

| | | |
|--|---|---|
| | <i>Cyberattacks</i> <i>Geopolitics & Conflict</i> <i>Tech Infrastructure</i> <i>Tech Trends & Innovation</i> | <i>Tech Jobs</i> <i>Self-Driving Cars & Automobile Industry</i> <i>Chinese Tech Companies</i> <i>Start-Ups</i> <i>Space Exploration</i> <i>Energy</i> <i>Transportation</i> <i>Natural Disasters</i> <i>Tech Governance</i> <i>AI Development & Competition</i> <i>Health Tech</i> <i>Sports</i> <i>Science</i> <i>Surveillance</i> <i>Internet Censorship</i> <i>Resources</i> <i>Environment</i> <i>Education</i> <i>Military Tech</i> <i>Music</i> <i>Tech Business & Industry</i> |
|--|---|---|

4.2 China: Competitor and threat in global tech

Beginning with China, it stands out that the country is frequently discussed in relation to *Cyberattacks*, *Geopolitics & Conflict* (Figure 8). It is the most distinct meta-frame for China, compared to the other Asian countries (Table 4). On average, over 18% of all tweets fall into this meta-frame over the years, reaching even over 30% for 2019 and 2020. This likely coincided with discussions around cybersecurity concerns and the growing global influence of Chinese communication technology companies such as Huawei, which faced a ban in the USA in those years. This meta-frame includes emphasis frames relating to the geopolitical competition with the USA (e.g., Political Allegations and Tech Involvement with China; US-China Tech War), state-sponsored hacking and cyber espionage (e.g., China & Cyber Security: Hacking & Cyber Attacks), AI development (e.g., China & AI), drones, and other technologies for security and warfare (e.g., Chinese Drones & Surveillance). Concrete examples are news media headlines in tweets such as Computerworld: China rejects hacking ‘insinuations’ after spy ring revealed, Google begins to warn users if their accounts are targeted by “state-sponsored attacks”, or China says U.S. hacking accusations lack technical proof.

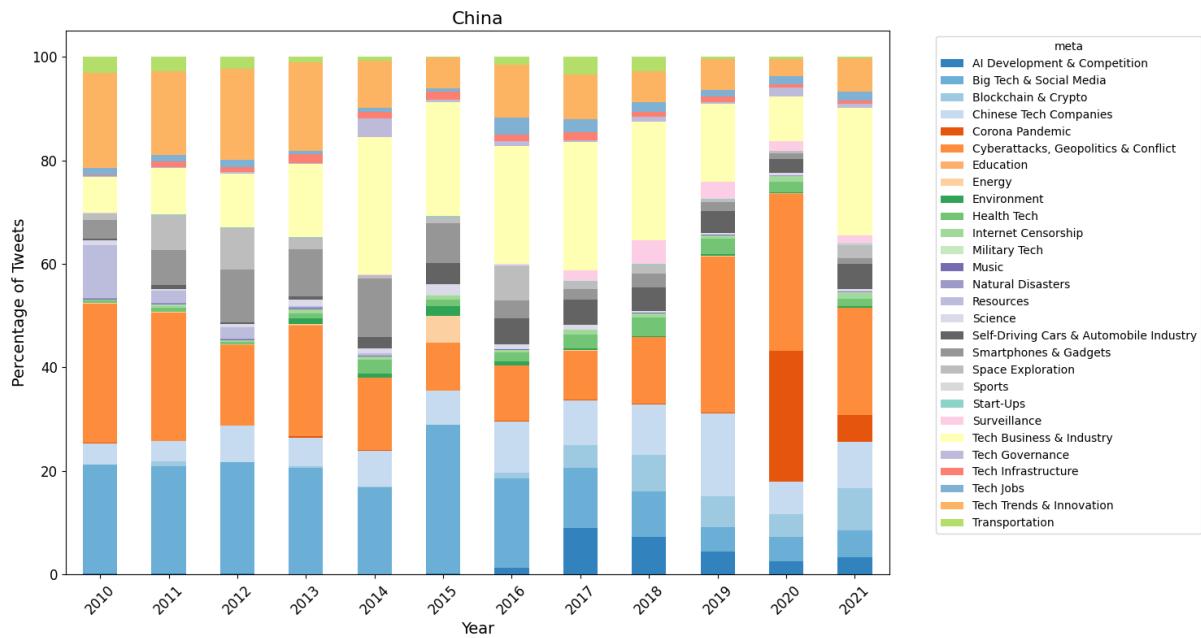


Figure 8. Meta-frames China (2010-2021).

Other tweets point to China as an ideological antagonist to the West, not only in technology related issues:

We are at an inflection point as democratic values are attacked here & abroad. We have the capacity, ingenuity, & money to bolster our democracy, counter China's growing influence, & lead the world on justice tech that safeguard our ideals. The only question is: will we?

Taken together, China is often portrayed as a competitor or antagonist to other world powers in the tech domain, which is seen as a critical site in geopolitical competition. Relatedly, another distinct meta-frame is *AI Development & Competition*, peaking in 2017 and 2018; this primarily includes tweets about China's growing technological capabilities and its government's proclamation to achieve AI dominance.

Another meta-frame specific to China is *Surveillance*, which thematises the use of technology for collecting information about populations by monitoring them and invading their privacy. While it only accounts for 1.1% on average of all tweets over the years, that is still significantly more than for any of the other countries (e.g., for India that is merely 0.01%). An example is:

China's Robot Police Use Facial Recognition to Catch Criminals #Geek #Tech

Furthermore, China is more likely to be connected to questions of governmental control over technology and especially the meta-frame *Internet Censorship* (0.68% on average over the years, peaking in 2017 and 2021; the issue is virtually absent for any of the other countries). Examples are:

China's tech giants bow to Beijing censorship demands

NY Times Tech: China's Censorship Machine Takes On the Internet

Overall, these observations resonate with previous studies (Mahoney, 2023; Nguyen & Hekman, 2022) that find a risk-centric and negative political discourse about the country and its tech policies. If technology is not portrayed as tool of oppression in political contexts, then its potentials for resistance against authoritarianism are highlighted:

#Tech - Meet The Censorship Activists Who Are Scaring **China**'s Government

Academics Launch Fake Site to Get Inside **China** Censorship #tech

Another notable meta-frame centres on *Chinese Tech Companies*, such as Huawei. This includes specific emphasis frames about the growing influence of Chinese tech companies, new partnerships and initiatives, but also geopolitical issues:

Chinese **tech** giant Huawei aids #Iran <http://t.co/Ozz3hzIE> via @WSJ #China #censorship #FreeWeb

China Seeks Answers About NSA/Huawei Report <http://t.co/IGW0eqN7HI> #tech #news

Generally, the framing of China appears to oscillate between highlighting its advances across various tech domains and emphasising different geopolitical risks. Chinese government representatives try to emphasise the positive aspects of the country's technological achievements, as shown in (mostly reposted) tweets by the official spokesperson for the Chinese Foreign Ministry, such as Robot Designed in China Could Help Save Lives on Medical Frontline and similar posts especially during the Corona pandemic. Relatedly, state-affiliated news outlets frequently post about China's progress and the growing capacities of Chinese tech companies, while contributing to the media discourse about a global tech-centred rivalry with the USA:

China just achieved a major quantum feat that may be a big step toward building an unhackable web #tech

Meanwhile, **China** has identified the 23 trillion dollars to be made in green **tech** to combat climate change

Still, several of the most distinct meta-frames reflect a more negative portrayal of China as a tech nation, especially those with a (geo-)political angle. The observed digital orientalist framing practices are in line with previous studies that underscore how techno-scepticism and China-critical, possibly even anti-Chinese, sentiments intersect (Mayer 2019). Another notable -albeit unsurprising- meta-frame is *COVID-19*; China is considered the origin of the virus but also made frequent headlines for the use of technology in addressing the ensuing pandemic.

However, the larger part of tweets relates to business, economy, and innovation-centric emphasis frames. Examples of consistently prevalent meta-frames include *Tech Trends & Innovation* (10% on average over the years), *Tech Business & Industry* (17%), or *Big Tech & Social Media* (15%). Yet, rather interestingly, some related meta-frames reflecting techno-capitalist notions are the least distinct ones for China, such as *Tech Jobs* and *Start-Ups*. These appear more characteristic for the other countries.

4.3 India: Source of labour and market for tech products

For India, the Twitter discourse places noticeably different emphases on what “tech” means in relation to the country. Firstly, mostly negatively connotated or competition-centric meta-frames distinct for China-related tweets are less characteristic for India (Table 4; Figure 9). For example, the meta-frames *Cyberattacks, Geopolitics & Conflict, AI Development & Competition, and Surveillance* are much less pronounced for tech tweets mentioning India; they account on average for only ca. 3.2%, 0.9%, and merely 0.01% of all India tweets over the years, respectively. Generally, meta-frames that are the least distinct for China emerge as characteristic for tech-centric tweets featuring India. This includes *Tech Jobs, Start-Ups, Smartphones & Gadgets, Education, and Sports*.

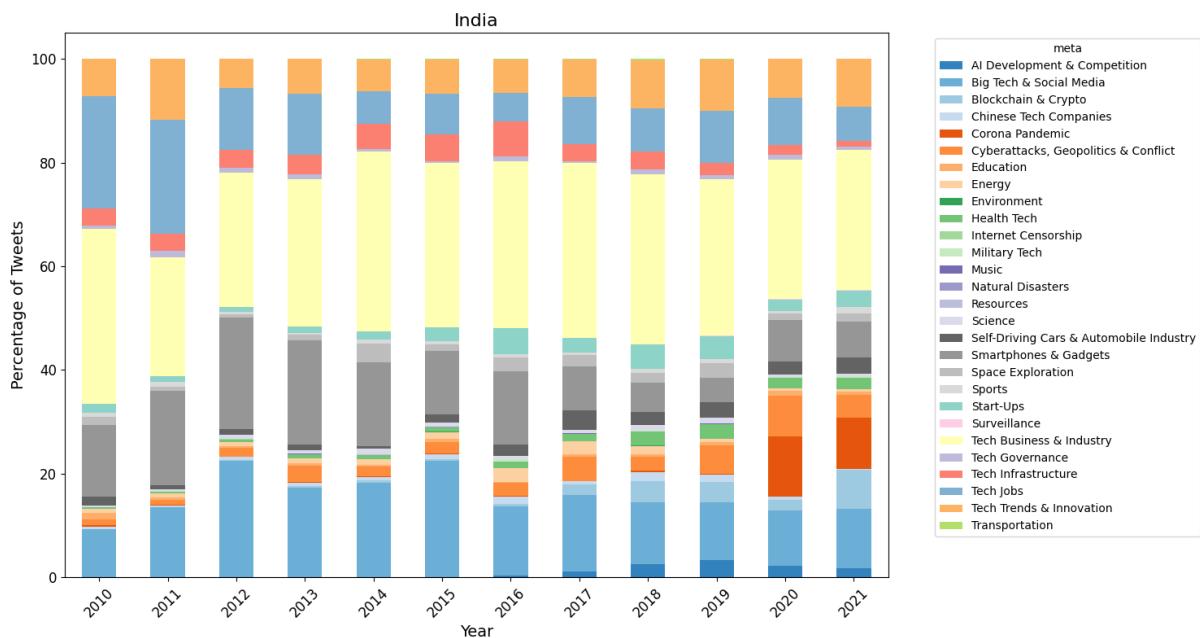


Figure 9. Meta-frames India (2010-2021).

Tech Jobs is the most distinct meta-frame for India, accounting for 10.8% on average of all tweets over time. For comparison, that is only 1.5% for China. Most related tweets advertise IT- and other tech-related vacancies, aiming for Indian labour force or focus on outsourcing. Examples are:

BottomLine ©: **Tech** hiring? **India** outsourcers adding staff as U.S. demand grows

Outsourcing and Offshoring #Outsourcing #Offshoring #Freelance #**India** #**Tech** #Software

However, this meta-frame includes more critical discussions of the outsourcing of “tech tasks” to India as well as incoming migration flows of Indian tech professionals to host countries such as the USA:

I can't say this enough. This whole outsourcing of **tech** support to **India** is a travesty. #fale.

Outsourcing to **India** goes beyond **tech** support: US law firms are outsourcing to India their legal writing

One thing 1st generation immigrant from **India** @KamalaHarris believes is in bringing in more **tech** workers from India into the US ~ the fastest growing immigrant population - flooding west coast schools and filling US tech worker jobs

Parts of the *Tech Jobs* discourse include stereotypes and racist sentiments, sometimes delivered in a seemingly humorous manner:

Had to call **tech** support for my comp. they sent me to **India** where no one understands what I'm saying and asked me to pay for their services

Who decided **India** would be the home of all **tech** support call centers? They don't have computers in Canada?

India, no matter how big your country is, to us all you ever will be is **tech** support

India is perceived as an important source of skilled labour. However, this perception is often accompanied by negative views regarding the quality of Indian tech services and fears in the Global North about losing tech jobs to cheaper alternatives. Unlike China, India is less frequently portrayed as a geopolitical threat. Instead, negative portrayals tend to focus on the implications of its growing population of skilled—and potentially more affordable—tech workers.

More positive framings emphasise the potential of India's vast human resources for the country's future in the global tech economy. Some narratives highlight a shift from India being merely a site for outsourced tech services to becoming a hub for a thriving start-up sector:

India's #digital #infrastructure has been a global case study for modernisation and has amazed large #tech corporations in pvt sectors across the globe

India's vibrant **tech** sector is set to empower a new industrial revolution for the country #DigitalTransformation #MakeInIndia

Similarly, the country is frequently presented as an important market for technology products, as captured in the meta-frame *Smartphones & Gadgets* (12.5% on average of all tweets between 2010 and 2021); this includes tweets about trending digital products and aspirations of tech companies to secure their market share among Indian consumers.

While technology is generally framed as an opportunity for growth in India-centric tech discourses—with the country often portrayed as capable of driving technological progress—these positive framings are contrasted by negative, and at times racist, sentiments, particularly targeting Indian tech labour. This reflects digital orientalist narratives that are somewhat specific to India, distinguishing it from China, where digital orientalism tends to emphasise geopolitical risks. This distinction does not imply that India is irrelevant to global tech politics or digital economic trends. Rather, its perceived role as a source of labour and low-cost services shapes a distinct, quasi-orientalist framing.

Again, it is important to note that most emphasis frames related to India carry a techno-capitalist dimension in the sociotechnical imaginaries they evoke—portraying emerging technologies as engines of economic growth and sources of financial prosperity.

4.4 Japan: An (overestimated?) tech culture closer to the West

Japan-related tech tweets predominantly evoke emphasis frames that seem to portray the country in a mostly positive light. These often focus on technological domains that are considered characteristic of

Japanese industry and consumer culture, such as robotics, automobiles, and video games. On the level of meta-frames, *Self-Driving Cars, Tech Infrastructure, Tech Trends & Innovation, Start-Ups, Music, Energy*, as well as *Blockchain & Crypto* are among the most distinct for Japan (Table 4; Figure 10).

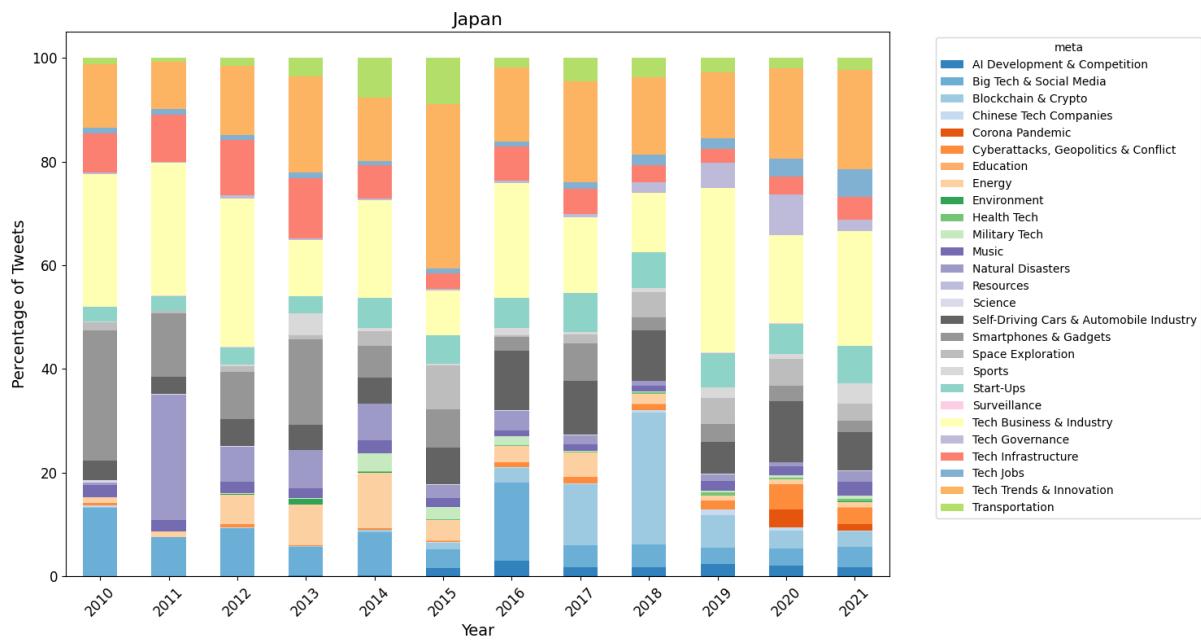


Figure 10. Meta-frames Japan (2010-2021).

The first emphasis frame primarily highlights how Japanese car companies are advancing the development of smart vehicles and how Japanese cities are upgrading infrastructure to accommodate self-driving cars. Averaging 7.1% over the years, this frame is more than twice as likely to be evoked in Japan-related tweets compared to those about any of the other countries. Examples include:

Most shared: Driverless robot taxis to be tested in **Japan**, aim for 2020 Olympics #tech

cnntech: The future is looking good for **Japan's** auto industry #tech

Similarly, Japan is considered a leader in important *Tech Infrastructure*, such as satellites and clean energy that exports innovation to other countries (6.1% of all tweets on average):

Japan pushes to build hi-tech power plants in Malaysia, Myanmar

How **Japan** is reinventing the future of energy <https://t.co/0VWz7rOIIb> #Technology #tech

Using Artificial Intelligence, **Japan** Just Launched A Rocket On The Cheap #tech

Notably, an inspection of relevant tweets reveals that Japan's technology exports are not portrayed as clashing with, for example, the geopolitical or economic interests of the USA. This sets Japan apart from China, whose digital diplomacy is often viewed critically or even with suspicion (Nguyen et al., 2024).

Correspondingly, meta-frames related to geopolitical competition, surveillance, or tech labour are among the least distinct in tweets mentioning Japan (Table 4). One exception is the meta-frame *Military Technology*, which includes discussions of Japan's export of submarine technology as well as a leak involving sensitive information about such military assets. Similarly, references to weaponised drones and government policies aimed at promoting drone development touch on geopolitical themes. However, Japan is not portrayed as a competitor or threat to the global West—unsurprising given its long-standing political and economic integration with the USA and Europe. Notably, the meta-frame *Internet Censorship* is completely absent from Japan-centric tweets.

Another important and distinct meta-frame for Japan is *Trends & Innovation* (16.2% on average), which often relates to industrial robotics and various end-user-oriented technologies in sectors such as entertainment, healthcare, and education. Drones, video games, and automated toilets are frequently discussed in connection with Japan. Similarly, the meta-frame *Transportation*—which includes emphasis frames related to high-speed trains—is almost unique to Japan-related tweets (3.4%, followed only by China at 1.6%).

Some tweets point out that Japanese society and culture are generally seen as prone to innovation and the early adoption of novel technologies, often perceived as playing a pioneering role in global tech trends:

Japan, you are the most high **tech** country out here. Do your thing 😭😭

#**Japan**'s digital revolution is unique due to the constant fusion of tradition with modern day life #**tech**

Japan got a lot of cool advanced **tech** shit

However, this very notion of a tech-savvy Japan is a point of contention for others, who argue that respective framings are either outdated or inaccurate:

Japan used to reign in **tech**. What happened?

Why is **Japan** perceived as an **High Tech** country by people never visit the Island? We who been there knows it is not!

These discussions suggest a form of “soft” digital orientalism, in which certain preconceptions—based on assumed levels of digitalisation and cultural affinity for technological development in Japan—oversimplify more nuanced empirical realities. Such views on Japanese digital culture likely stem from the country's historical positioning as a technology-driven economy in the post-war period and its economic rise during the 1980s and 1990s.

While Japan maintains its global relevance in several technology sub-sectors (e.g., robotics, satellites), other major technology trends are less frequently referenced in Japan-related tweets compared to, for example, those featuring China. The latter is twice as likely to be associated with the meta-frames *AI Development & Competition* (2.4% vs. 1.2% on average) and *Big Tech & Social Media* (15% vs. 6.8%). Still, most meta-frames emphasise Japan's perceived technological capabilities and its importance as a source of innovation—largely without a critical perspective on its geopolitical role. A sociotechnical imaginary centred on technological progress intersects with a possibly overstated affinity for, and degree of, digitalisation in Japan.

4.5 South Korea: Innovation hub and partner of the West

Like Japan, South Korea is considered politically and geopolitically aligned with the Global North, which clearly distinguishes it, especially from China. The most distinct meta-frames in tweets about technology and South Korea include *Blockchain & Crypto*, *Corona Pandemic*, *Cyberattacks*, *Geopolitics & Conflict*, *Tech Infrastructure*, and *Tech Trends & Innovation* (Table 4). The country is frequently associated with trending technologies, its role in developing consumer electronics, the use of technology in managing the COVID-19 pandemic, and tensions with neighbouring countries—most notably North Korea and Japan. Overall, a smaller number of the 28 identified meta-frames dominate tweets about South Korea compared to the other countries (Figure 11).

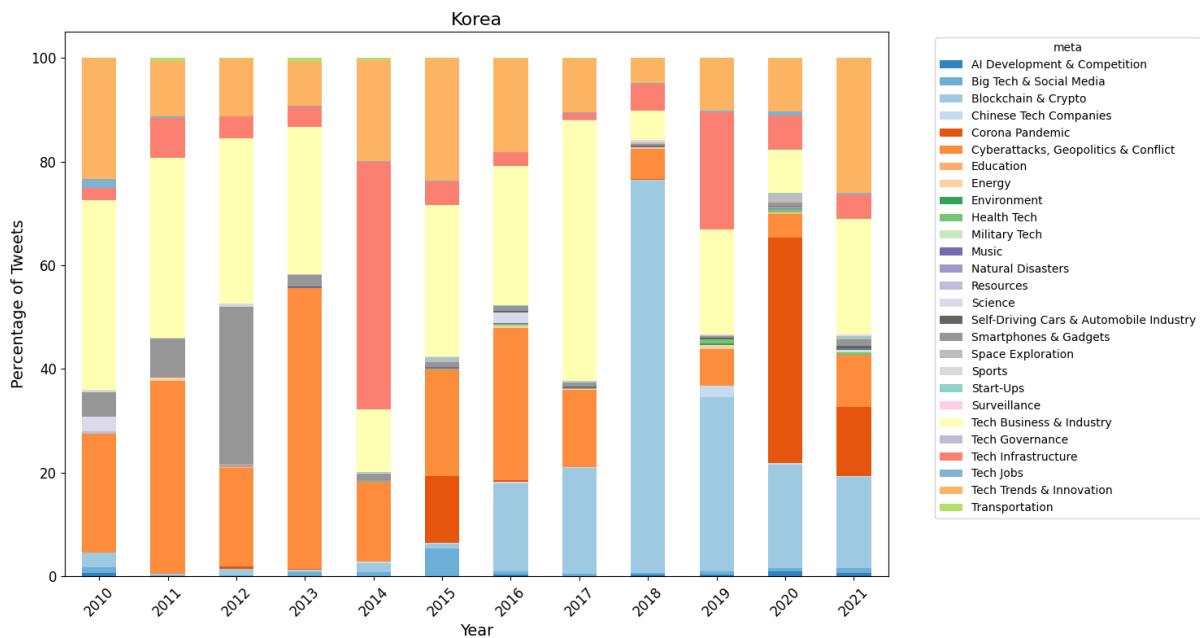


Figure 11. Meta-frames South Korea (2010-2021).

The meta-frame *Blockchain & Crypto* (15.9% on average over the years) covers discussions about how the technology is being introduced across various sectors in South Korea, as well as the government's role in both promoting and regulating its use:

South Korea Brings #Blockchain to Healthcare, but That's Just the Start #tech

South Korea Budgets \$880 Million for Tech Including Blockchain /r/CryptoCurrency

It's Official: South Korea Is Not Shutting Down Bitcoin Exchanges ★ Tech Talk

Blockchain technology became the subject of global hype beginning in 2017, prompting governments worldwide to explore its potential and economic relevance. This meta-frame highlights how novel technological trends are rapidly adopted by a South Korean government widely perceived as tech-friendly, and how the country positions itself as a nurturing environment for technology companies to drive innovation. The tech discourse surrounding South Korea evokes imaginaries of a nation not only capable of leading technological development and adoption, but also socially and culturally predisposed

to embrace such trends with pragmatism. Overall, South Korea is portrayed as a technology hub and a focal point within the global tech economy:

Why **South Korea** is a linchpin for all global **tech**

Tech-savvy nation of **South Korea** has much to offer Western enterprises

Relatedly, South Korea is frequently presented as being at the forefront of developing and implementing key digital infrastructure—most notably widespread mobile networks such as 4G and 5G:

South Korea hatches plans for 5G by 2020, which will let you download an 800MB film in one second #tech

#tech #news 'World's fastest' 4G data launched: **South Korea**'s biggest mobile operator begins offering what it...

The role of the South Korean government is highlighted as a key factor in what is generally perceived as the country's successful digital transformation. Unlike Japan, the image of a tech-savvy South Korea is not visibly contested on Twitter. Critical viewpoints, where they appear, do not question the country's strong economic orientation toward digital technologies. Rather, they focus on how large tech conglomerates—led by powerful family-run groups known as *chaebol*—dominate the tech sector, with negative consequences for domestic industries due to monopolisation and corruption.

As with Japan, South Korea is not portrayed as a competitor or threat in these discussions—unlike China. Its political and economic alignment with the Global North likely influences how South Korea's technological engagement is framed, contributing to a more favourable depiction. This alignment may “shield” the country from the more negative, risk-focused portrayals typical of digital orientalism. The presence of the meta-frame *Cyberattacks, Geopolitics & Conflict* in the South Korea dataset is largely attributable to issue-specific emphasis frames, such as the role of technology in tensions with North Korea and North Korean cyberattacks on South Korean digital infrastructure. Additionally, trade disputes with Japan over technology supplies fall within this meta-frame. Taken together, the connection between the broader sociotechnical imaginary of technology and the national imaginary of South Korea shows notable commonalities with Japan. However, these are shaped by the specific characteristics of South Korea's domestic technology sector and its distinct geopolitical relationships. As with Japan, the meta-frame *Internet Censorship* did not emerge at all in the South Korea-related tweets.

5. Discussion

The present article aimed to address the research question: How do sociotechnical and national imaginaries intersect in social media discourses about Asian countries, and to what extent do these discourses display forms of digital orientalism? The findings of the comparative analysis reveal considerable overlap among the four countries with respect to a techno-capitalist master frame that predefines the focus of emphasis frames, shaping dominant tech narratives and, ultimately, influencing both sociotechnical and national imaginaries. At the same time, there are notable variations across the four countries, with distinct portrayals indicative of digital orientalism.

Concerning SQ1: *What are the dominant emphasis frames pertaining to tech that are associated with Asian countries in Anglophone social media discourses on Twitter?* Trending digital technologies are predominantly framed from an economic, business-centric perspective shaped by techno-capitalist

ideology. Notable commonalities emerge across country-specific tech discourses, particularly an emphasis on business trends, opportunities for economic growth, start-up activity, and global influence in technology markets through innovation and the dissemination of products and services. All four countries are similarly contextualised in this regard. While research on sociotechnical imaginaries typically focuses on individual technologies (Jasanoff & Kim, 2009), adopting a bird's-eye view reveals striking similarities in how diverse tech trends are framed within social media discourse. Arguably, the techno-capitalist "master frame" to some extent predetermines how digital technologies are perceived from the outset, with relatively few substantive differences across ideologically and culturally diverse political systems. Even geopolitics-centric frames often centre on conflicts and tensions that are framed against a predominantly economic backdrop. However, there are important differences between Asian "tech nations" within the tech-capitalist master-frame based on historical and geopolitical grounds.

Hence, regarding SQ2: *What are the differences in the framing of Asian countries in the context of tech?* The findings suggest that differences in the framing of Asian countries depend on their perceived geopolitical alignment as well as their technological capabilities. While tech-related issues vary across countries, distinct emphases emerge at the level of meta-framing. China and technology are often discussed against the backdrop of geopolitical competition and conflict, primarily with the global West as an opponent. China is more frequently associated with risks related to technology use, such as hacking, espionage, and surveillance. This aligns with qualitative studies that have observed a similar negative framing in European and American political discourses (Meyer, 2019; Mahoney, 2023). Notably, China's technological capabilities are rarely questioned; instead, they are often portrayed as a potential threat. At the same time, China is framed as a tech innovator, a disseminator of trends, and a major production hub for technology products. In contrast, the meta-framing of India tends to emphasise its perceived role as a source of tech talent and a site for service outsourcing, as well as its dual position as a growing consumer market and a potential centre for innovation. While India is recognised as playing an important role in the global tech economy, it is less frequently positioned as a geopolitical antagonist to the Global North. This may reflect India's historical positioning as "non-aligned," although some smaller tech-related debates highlight frictions with China in this domain. Japan and South Korea are primarily portrayed as advanced, tech-savvy societies, cultures, and economies. The meta-framing is largely positive, yet also one-sided—potentially exaggerating the extent of tech adoption while downplaying ethical and societal challenges. This reflects both countries' close integration into the Western economic and security community, led by the USA, as well as long-standing national discourses that emphasise their affinity with technology—a theme present for several decades.

As such, framings reflective of digital orientalism clearly emerged from the analysis, illustrating the diverse ways in which reductive portrayals become embedded in discourses around technology and nation states. The perceived potentials of technologies—both beneficial and harmful—and countries' perceived capabilities (or lack thereof) to harness these potentials are intertwined in the portrayal of "tech nations." This underscores how the boundaries between sociotechnical imaginaries and national imaginaries are both fuzzy and porous: they often collapse, as characteristics of technologies become linked to the assumed political, social, and cultural dispositions of the countries in question. Simply put, the positive or negative aspects associated with technology trends (sociotechnical imaginaries) selectively shape the critical portrayal of a given country (national imaginary). When these portrayals are one-sided or biased, they may amount to a form of digital orientalism. However, this is not a one-way dynamic; perceptions of technology are also influenced by how a country is generally viewed to begin with. A case in point is the contrast between China, on the one hand, and Japan and South Korea, on the other. Similar technological trends and ambitions are interpreted in markedly different ways, depending on each country's geopolitical alignment. The same applies to India: it is neither regarded as a direct opponent of the USA and the Global North, nor as a primary driver of innovation. Instead, its image as a tech nation is shaped by its position as an emerging market with vast, yet not fully realised, potential. Importantly, how technologies are imagined and assessed is not limited to the technologies themselves; perceptions of

technological systems can shape views of the associated social entities—and vice versa—both positively and negatively.

To sum up, social media platforms such as Twitter are integral components of contemporary digital public spheres, where tech nations are imagined and evaluated—often from a one-dimensional perspective. These framings are shaped by a complex interplay of sociotechnical and national imaginaries, which mutually influence one another. The resulting portrayals can manifest digital orientalism in various ways—including praise, criticism, or racism—through reductive and stereotypical representations.

6. Conclusion

The study offers empirical insights into a decade of social media discourse about four major Asian countries regarding the complex mutual influences of domestically nurtured tech nationalism and external digital orientalism. As such, it contributes to research on the discursive practices that shape imaginaries, perceptions, and evaluations about nation states and their intrinsic relationship with technologies.

There are several limitations to this study. First off, while large in volume, the data were retrieved via Twitter's now de-funct academic API. The sampling was thus depended on how the API selected tweets from the queried period. The present study can only offer an exploration, and future research should consider expanding the types of media texts for comparative analysis (e.g., news articles, other social media). The focus on English content is another crucial limitation. Hence, all findings must be taken with a grain of salt. Furthermore, the topic modelling approach and other text analytical methods each come with their own biases and limitations. Nevertheless, the study illustrates how computational methods provide a foundation for the critical exploration of discourse at scale and over extended time periods.

Future studies may seek to expand the use of computational methods for empirical analysis by incorporating sentiment analysis, more fine-grained frame analysis through word-level techniques such as word embeddings, and—perhaps most importantly—multilingual text analysis. It is also worthwhile to consider visual media analysis, as social media communication often combines text and imagery (e.g., in the form of memes). Follow-up studies could explore the potential of multimodal media text analysis. Additionally, qualitative methods such as critical discourse analysis may build on the findings of the present study to further examine manifestations of digital orientalism in technology discourses.

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