

RESEARCH ARTICLE

Perceptions of social credit systems in Southeast Asia: An external technology acceptance model

Wiebke Rabe¹  | Genia Kostka² 

¹University of Bremen, Bremen, Germany

²Freie Universität Berlin, Berlin, Germany

Correspondence

Genia Kostka, Freie Universität Berlin, Berlin, Germany.

Email: g.kostka@fu-berlin.de

Abstract

Digital data have become a valuable resource for autocratic governments seeking to influence societal behaviours. The rise of social credit systems in China has garnered a great deal of attention, with some even referring to them as 'Orwellian' surveillance systems. This study expands on previous research that has found surprisingly high levels of acceptance of social credit systems in China to the Southeast Asian region. Through an online opinion survey conducted in Thailand, Indonesia, Malaysia and the Philippines, we discovered that citizens in these countries exhibit higher acceptance rates of social credit systems than opposition rates, although lower than those observed in China. Moreover, we find that acceptance rates would decline significantly if the technologies supporting these systems originated from China. By introducing an external technology acceptance model, we provide an explanation for these findings based on citizens' attitudes towards their domestic situation and their perceptions of China's potential benefits to their countries. Interestingly, most of the 'China Threat' perceptions do not translate into opposition against Chinese social credit system technologies, except for military risks. Instead, citizens' negative views are primarily influenced by specific technology-related risks. These findings contribute to the existing literature on the acceptance of government-run social credit systems and public perception in the context of international relations.

1 | DATA AS A RESOURCE OF BEHAVIOURAL STEERING

Digital data have become a valuable resource for autocratic governments seeking to influence societal behaviours. The rise of social credit systems (SCSs) in China has garnered a great deal of attention, with some even referring to them as 'Orwellian' surveillance systems. China's central government has invested significant resources over the past few years to build a national SCS. Yet, these systems remain limited to experimental and early-stage regional pilot projects seeking to incentivise participating citizens for their so-called trustworthy behaviour while punishing untrustworthy behaviour (Creemers, 2018). Although these systems currently exist only domestically, there has

been speculation about their appeal to other countries (Hacyakupoglu, 2021; Polyakova & Meserole, 2019). This research examines the willingness of citizens from beyond China to embrace government-run SCSs within their countries. Specifically, we investigate whether acceptance rates would alter if these technologies were supplied by China, as well as the factors that affect citizens' views of externally provided SCS technologies.

Governments beyond China have increasingly integrated reputational systems into their legal frameworks, a process that advancements in big data analytics have facilitated (Dai, 2020). In addition, there has been growing global interest in Chinese surveillance and public security technology platforms, with China emerging as a major supplier of digital infrastructure and technologies worldwide.

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This expansion includes cloud services, telecommunications networks, facial recognition cameras (e.g. Su & Flew, 2021) and submarine fibre optic cables (Geri, 2023). For instance, 'safe city' project platforms, found in around 80 countries, offer comprehensive solutions for data collection and analysis (Greitens, 2020). In Malaysia, Chinese technology companies have a strong presence in providing surveillance cameras (Carrozza & Bruni, 2023). In Venezuela, the government has engaged ZTE, a Chinese company, to develop a database known as *carnet de la patria*. This card compiles personal data regarding citizens' income, employment and state benefits and is utilised for grocery purchases and healthcare access (Berwick, 2018). In Uganda, Chinese tech company technicians have helped the government monitor the digital communication channels of political opponents, as documented by Feldstein (2019).

Importantly, as Chinese tech companies expand their overseas operations, they have adopted the slogan of the central government's new policy framework, the Digital Silk Road, triggering geopolitical concerns, especially in the US (Cheng & Zeng, 2023). The Digital Silk Road is part of the Belt and Road Initiative (BRI), launched in 2013 by China's central government to enhance China's overseas infrastructure provision. Southeast Asia is particularly crucial as it is located along the 21st Century Maritime Silk Road (MOFA, 2015).

Against this background, we conducted an online opinion survey in four selected Southeast Asian countries—Thailand, Indonesia, Malaysia and the Philippines—and gathered a total of 6204 respondents. Based on descriptive statistics and regression analysis, we find that citizens in all four countries tend to display surprisingly favourable views of government-run SCSs. However, if social credit system technologies were provided by China, citizens' acceptance rates decrease significantly. Interestingly, this opposition stems not from citizens' general negative perceptions of China but rather from their concerns about the inherent risks associated with the specific technology. Furthermore, citizens who hold positive views of Chinese SCSs believe that China can bring benefits to their countries, but their perceptions of their domestic situation also play a role. By linking the increasing academic interest in global public perceptions of China (e.g. Sautman & Yan, 2009, 2014; Wang & Elliot, 2014; Yeremia, 2022) with the literature on privacy calculus theory and the privacy paradox (e.g. Barth & de Jong, 2017; Dinev & Hart, 2006), as well as the burgeoning literature on SCSs (Creemers, 2018; Kostka, 2019; Liu, 2019, 2022), our study contributes by presenting an external technology acceptance model.

Policy Implications

- The implementation of data protection laws is vital to protect citizens from data misuse. This is particularly important as citizens generally have positive views of surveillance technologies, despite being aware of potential risks but often lacking detailed information.
- China's military activities in the South China Sea, along with the potential negative environmental impacts of its economic involvement in the region, may influence Southeast Asian citizens' acceptance of Chinese technologies.
- For countries aiming to enhance their economic and political presence in Southeast Asia, offering tangible benefits is crucial for gaining acceptance from citizens in the region.

2 | LITERATURE REVIEW

2.1 | Government-run social credit systems in China

The Chinese government has recognised the potential of big data as a valuable resource for influencing societal behaviours through SCSs. These systems, developed by state agencies at both the central and the local levels of government, have garnered attention and even been labelled as 'Orwellian'. However, their current application is limited to provincial and local pilot projects (62 projects as of 2022) (Drinhausen & Brussee, 2021; Li & Kostka, 2022), which vary in their scope of application and embeddedness in social life (Creemers, 2018; Liu, 2019), such as the Hangzhou government's *Qianjiang Score* (钱江分) and the *Jasmine Score* (茉莉分) of the Fuzhou provincial government. While some projects are less technologically intensive, as in Rongcheng (Gan, 2019), more advanced technology is used in Shenzhen (Creemers, 2018). These systems operate based on reward-and-punishment mechanisms using blacklists, redlists, or scoring indices (Engelmann et al., 2021). For example, failure to comply with legal judgments may result in a prohibition on purchasing luxury goods or using high-speed railways and aeroplanes (Knight & Creemers, 2021). By contrast, contributions to society, such as donations or volunteering activities, may be rewarded (Knight & Creemers, 2021). However, the level of citizen participation in social credit systems across the country is relatively low, with only 7% of respondents reporting awareness of being part of a government-run pilot project, according to a survey by Kostka (2019).

The incorporation of diverse aspects of daily living and the use of 'alternative data' (Liu, 2022) in government-run SCSs makes China's credit systems more comprehensive than financial credit systems in other countries. The party-state has afforded extensive opportunities to generate, amass and analyse individuals' behavioural data to determine the 'trustworthiness' of their actions (Chen & Cheung, 2017). As a result, trustworthiness seems to function alongside the existing legal structure (Von Blomberg, 2020), with neither national nor local legislation providing adequate personal data protection, as observed by Chen and Cheung (2017). The process of datafication, which transforms societal behaviour into a data source, may lead the country to become a 'data state' that uses data to control its citizens, as posited by Cheung and Chen (2022).

While SCSs have inherent risks, studies have revealed significant approval levels among Chinese citizens (Kostka, 2019; Liu, 2022), demonstrating the general support for surveillance technologies in China (Su et al., 2022). Citizens with higher socio-economic status (Liu, 2022), including wealth, education and urban residency, tend to exhibit greater approval (Kostka, 2019). Liu (2022) also suggests that older citizens, those with higher levels of political trust and non-members of the Chinese Communist Party are more likely to approve of SCSs (Liu, 2022). The positive perceptions may stem from a lack of awareness about the potential drawbacks of SCSs, attributable to the government's tight information control (Xu et al., 2022). Xu et al.'s (2022) experimental study indicates that exposure to Western media can lead to more critical views among informed citizens. Conversely, citizens are likely to have less favourable opinions of SCSs once they gain user experience (Liu, 2022). Despite high approval rates, research has identified a 'participation gap' in SCSs, driven by factors such as limited awareness, reluctance to maintain scoring systems, uncertainties about calculation analytics, questions of voluntariness, unappealing benefits and data privacy concerns (Li & Kostka, 2022).

2.2 | Analytical framework

To analyse the public perception of Chinese SCSs technology outside of China, we draw on insights from the literature on public opinion in international relations, especially the economic interest hypothesis (Naoui, 2020), political elite communication (e.g. Sautman & Yan, 2009) and cost–benefit calculations (e.g. Wang & Elliot, 2014). We complement these perspectives with studies on the privacy calculus theory (e.g. Dinev & Hart, 2006) and the privacy–security tradeoff literature (Davis & Silver, 2004). This allows us to develop an external technology acceptance model that specifically addresses public acceptance of technology when it is provided by a foreign entity.

2.2.1 | Perceived domestic situation

First, we investigate citizens' perceptions of their domestic situation. The economic interest hypothesis in International Political Economy posits that economic hardship may lead to more protectionist sentiments regarding globalisation (Naoui, 2020). In a study on Mexico and Cuba, Hearn (2012) finds that individuals display less positive attitudes towards China if they fear economic competition. Examining seven African countries, Wang and Elliot (2014) confirm that the influx of Chinese workers is viewed negatively. Armony and Velásquez (2015) conducted a study on Mexico, Chile and Argentina, revealing that citizens who perceive a decline in their national economy and personal economic situations also hold negative perceptions of Chinese influence (Armony & Velásquez, 2015). Based on these findings, we hypothesise the following: *Acceptance of Chinese social credit system technologies (CSCST) is higher among citizens who perceive their domestic economy to have improved over the past 5 years (H.1).*

Research has shown that individuals who have trust in their government institutions are more likely to hold positive views of other countries (Armony & Velásquez, 2015). This trust implies a belief that these institutions can protect them from potential external threats. The relevance of public trust in government institutions is also reflected in the literature on technology acceptance. Pavone and Degli Esposti (2012) find that citizens who trust their countries' institutions are more receptive to new technologies. Therefore, we propose the following hypothesis: *Acceptance of CSCST is higher among citizens who show higher levels of trust in their government institutions (H.2).*

We also examine political elite communication. In their study on elite messages about European integration, Gabel and Scheve (2007) find that negative messaging from elites decreases public support for European integration. Flores (2018) confirms that political elites also shape public opinion towards social groups. Using a study of public perception of China in nine African countries, Sautman and Yan (2009) argue that the national discourses of China among ruling and opposition elites are the main determinants of country-level variations in perception. Therefore, we propose the following hypothesis: *Acceptance of CSCST is higher among citizens who perceive their government as holding positive views about China (H.3).*

2.2.2 | Benefit–risk perceptions towards China

Existing research has shown that citizens believe China may bring benefits to their countries, especially

economic benefits and such beliefs are associated with more positive views of China (e.g. Wang & Elliot, 2014). China, as a donor country and investor, is perceived in a positive light, not only as a business partner (Wang & Elliot, 2014) but also for providing everyday products at an accessible price (Sautman & Yan, 2009). However, studies have also identified concerns among citizens regarding China's global presence, such as environmental degradation risks (Armony & Velásquez, 2015; Wang & Elliot, 2014), low-quality products, business practices that do not adhere to national laws (Wang & Elliot, 2014), low pay and safety risks for workers in Chinese mining projects (Sautman & Yan, 2009). In our analytical framework, we incorporate benefit options (i.e. *employment opportunities; cheap products; good-quality products; infrastructure provision; economic growth; more services; other benefits; no benefits*), as well as risk factors (*economic risks; military risks; environmental risks; risks to democracy; workers' safety risks; cultural risks; other risks; no risks*). Based on this, we propose the following two hypotheses: *Acceptance of CSCST is higher among citizens who perceive China as bringing benefits to their countries (H.4)*. Conversely, *acceptance of CSCST is higher among citizens who do not perceive China as posing risks to their countries (H.5)*.

2.2.3 | Perceived technology risks

Lastly, we draw on the literature on the privacy calculus theory (e.g. Dinev & Hart, 2006) and the privacy–security tradeoff (Davis & Silver, 2004). SCSs use technologies that collect vast amounts of personal data, which

range from simple forms to more advanced technologies like facial recognition cameras and cloud platforms for digital data (Creemers, 2018). Dinev and Hart (2006) have shown that privacy concerns can diminish citizens' willingness to share information online (Dinev & Hart, 2006), and Kostka et al. (2021) similarly find that data privacy concerns explain public disapproval of certain technologies, such as facial recognition cameras. Other studies have indicated that individuals may trade off personal privacy for perceived personal benefits (Cottrill & Thakuriah, 2015), such as sacrificing civil liberties in exchange for enhanced security and safety (Davis & Silver, 2004). Furthermore, the functionality of SCSs relies on utilising personal behavioural data as a means to influence and shape citizens' behaviours (Weinmann et al., 2016), which can potentially transform into political repression (Xu, 2021).

We incorporate three technology-specific risk perceptions into our model, which consider China as a hypothetical external technology provider: *risk of data privacy violation; risk of Chinese influence on behaviour; and risk of political repression*. Our hypotheses for these technology-related risk perceptions are as follows: *Acceptance of CSCST is higher among citizens who do not perceive Chinese social credit system technology to bring risks of data privacy violations (H.6)*, *risks of Chinese influence on behaviour (H.7)* and *risks political repression (H.8)*.

We also include sociodemographic control variables in our model, namely age, gender, education and income. Figure 1 provides an overview of the analytical framework of our external technology acceptance model.

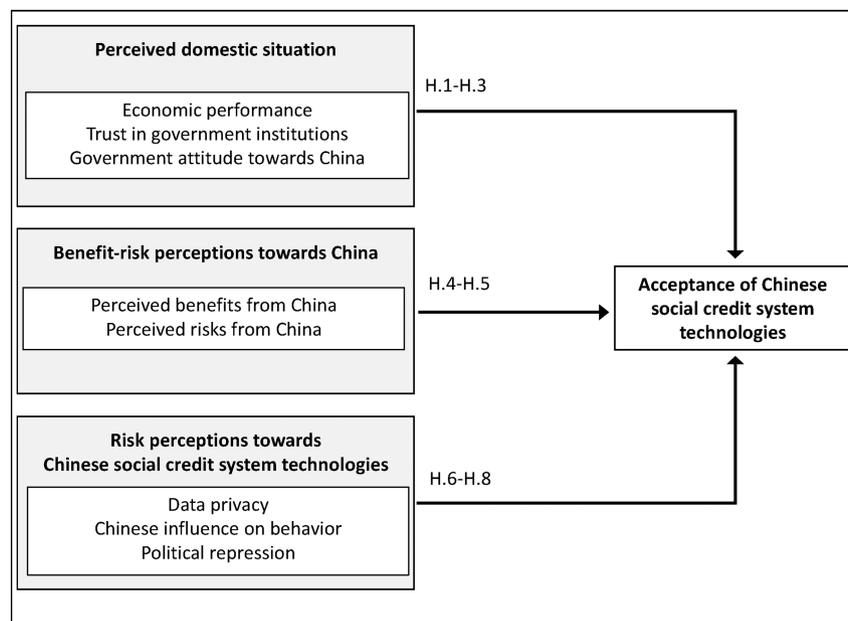


FIGURE 1 Analytical framework.

3 | METHOD AND DATA

3.1 | Country selection

We selected four Southeast Asian countries: Thailand, Indonesia, Malaysia and the Philippines. These countries present interesting cases because they strive to balance their economic and political interests while navigating the dynamics between China and the United States.

The relationship between Thailand and China has strengthened since Thailand's military junta rose to power in 2014, resulting in somewhat cooler relations with the US (Hewison, 2018; Suorsa & Thompson, 2017, p. 69). However, the historical complexities of the China–Thailand relationship, marked by China's support for the Communist Party of Thailand during the Cold War and contrasting US military and economic support, should not be overlooked (Hewison, 2018, p. 119; Suorsa & Thompson, 2017, pp. 66–67). Currently, Thailand appears to be employing a hedging strategy between China and the US (Suorsa & Thompson, 2017, pp. 68–69). In economic terms, China's foreign direct investment (FDI) in Thailand reached USD 9.9 billion by 2021 (MOFCOM et al., 2022), with Thailand also ranking as the third-largest recipient of Chinese exports based on pre-pandemic data from 2019 (WITS, 2019). The Thai military junta has also welcomed the increase in Chinese tourism, viewing it as an indication of support for its rule (Hewison, 2018, p. 121).

Indonesia, despite having territorial disputes with China in the Natuna Sea (Darmayadi & Purnamasari, 2022, pp. 45–46), continues to strengthen its economic cooperation with China (Zhou, 2023). As of 2021, China's FDI in Indonesia reached USD 20 billion, the highest among the four countries (MOFCOM et al., 2022). However, President Joko Widodo's efforts to boost Chinese investments in Indonesia have faced domestic opposition (Anwar, 2019, p. 158). A 2017 survey revealed that Indonesians view China's expanding economic influence with scepticism and harbour resentment towards ethnic Chinese citizens in Indonesia (Anwar, 2019, p. 157).

Despite the territorial conflicts between China and Malaysia in the South China Sea (Gerstl, 2020), Malaysia seems to have accepted China's regional architecture (Abuza, 2020, p. 116). Although Malaysia has canceled some Chinese investment projects recently (Gerstl, 2020), Chinese FDI in Malaysia amounted to USD 10.4 billion in 2021 (MOFCOM et al., 2022). Former Prime Minister Mahathir revised Malaysia's earlier stance on Chinese Belt and Road endeavours, considering them as a financial opening (Abuza, 2020, p. 122), while Chinese investments have also been politically instrumental for Malaysia as a source of economic development (Freedman & Bekele, 2022).

The China–Philippines relationship is ambiguous. In 2016, the Philippines won a territorial dispute in the South China Sea at the Permanent Court of Arbitration in The Hague (Phillips et al., 2016). However, the Philippines also wanted to become a founding member of the Asian Infrastructure Investment Bank, initiated by China and is part of the Regional Comprehensive Economic Partnership (RCEP) (Palanca & Ong, 2019, p. 94). Under former President Rodrigo Duterte, the Philippines pursued a strategy of appeasement to attract Chinese investment (Arugay & Baquisal, 2023, p. 35; Manantan, 2019, p. 643). Yet, by 2021, the country had the lowest Chinese FDI among the four countries, totalling USD 0.88 billion (MOFCOM et al., 2022). The Philippines continues to seek favourable relations with both China and the US in an effort to gain benefits from both sides (Mantan, 2019).

The interplay between security-related concerns and economic interests, along with the strategic positioning of the four countries amid the great power rivalry between China and the US, presents a compelling context for analysis.

3.2 | Survey data and analysis

We conducted an online public opinion survey in March 2021 in the four Southeast Asian countries by using an international survey company. The survey was carried out in English in the Philippines and Malaysia and was professionally translated into Thai and Indonesian. The survey company utilises its own panels and collaborates with websites and platforms for open sampling. Survey participants were unaware of the survey's topic when they opted in and were rewarded for taking part in the survey (among others, taxi vouchers and shopping gift cards).

We employed a nonprobability sampling method and established quotas based on age (18–64) and gender, derived from population census data. We excluded invalid respondents from the final sample population, including speeders, respondents who failed consistency checks, individuals who used a login ID more than once and those who did not complete the survey. As a result, we achieved a completion rate of valid answer sheets of 85.3% and a final sample population of 6204 respondents (Thailand: 1544 respondents; Indonesia: 1554 respondents; Malaysia: 1543 respondents; Philippines: 1563 respondents). Among the respondents, 50.3% identified as 'male,' 49.5% as 'female,' and 0.2% as 'other.' Table S1 describes the sample populations in each country. Tables S2 and S3 provide summary statistics of the demographic variables, as well as our dependent and independent variables.

The questionnaire comprised 36 questions that were grouped into subthemes. For our dependent variable of citizens' acceptance of Chinese SCS technologies,

respondents received a three-sentence but non-leading introduction. The introduction was intentionally kept as short as possible to mirror the reality of limited general knowledge among citizens regarding SCSs: 'China is currently implementing national and local social credit scoring systems. Positive behavior, such as buying environmentally friendly products, increases the credit score and is rewarded. Negative behavior, such as not paying for bills, can be punished.' In our inquiry, we focused on a general system that does not require the replication of local Chinese pilot projects. However, we included the most important aspect: providing rewards or punishments based on perceived positive and negative behaviours. It is worth noting that the examples mentioned in our study do not necessarily mirror the actual Chinese pilot projects. Following the introduction, respondents were asked 'Would you accept or oppose if a social credit system is being introduced in the country you live in?' They were presented with Likert-scale answer options ranging from 1 to 5 (1 = Strongly oppose; 2 = Somewhat oppose; 3 = Neither oppose nor accept; 4 = Somewhat accept; 5 = Strongly accept). Subsequently, respondents were asked, 'Would you accept or oppose if the technology for a credit scoring system is being provided by Chinese firms?' using the same Likert-scale options.

We analysed our data by using descriptive statistics for both questions to compare citizens' acceptance rates of SCSs with their acceptance of Chinese SCS technologies. In addition, we employed ordered logistic regression to test our external technology acceptance model. Table 1 provides a summary of our variables, measurements and hypotheses.

4 | RESULTS

4.1 | Citizens' acceptance of social credit systems and Chinese social credit system technologies

We find that citizens in all four countries are more inclined to accept than oppose the implementation of government-run SCSs in their countries. Among the respondents, 50% would strongly or somewhat accept an SCS in their respective countries, while only 15% indicated strong or somewhat strong opposition. Although acceptance rates were generally higher than opposition rates across all countries, there are slight variations (Figure 2): In Thailand, citizens displayed the highest level of positivity, with 56% of respondents stating they would strongly or somewhat accept SCS in their country. The acceptance rates are slightly lower in the Philippines (52% of respondents) followed by Malaysia (47%), and the lowest in Indonesia (45%). Only 13% of our respondents in Thailand would strongly or somewhat oppose an SCS, followed by Indonesia (15%), and Malaysia and the Philippines (17% each).

In terms of citizens' acceptance of China providing technologies for SCSs in their countries, there is still a tendency for more positive than negative attitudes across all countries. However, the acceptance rates are much lower compared with the previous question: While over 50% of respondents expressed acceptance for SCSs in their countries, now only 37% would strongly or somewhat accept if China provided these technologies. By contrast, 22% of respondents state they would strongly or somewhat oppose the introduction of Chinese SCS technologies (an increase from the 15% opposition rates for SCSs).

We also observe significant variations across countries and changes in the figures above. As displayed in Figure 3, the Philippines experienced a notable decline in acceptance of a Chinese SCS, with only 34% of respondents indicating strong or somewhat strong acceptance (down from 52% for SCSs). Conversely, 28% of those surveyed expressed strongly or somewhat strong opposition to a Chinese SCS (up from 17% for SCSs). This change resulted in the Philippines having the lowest acceptance rate among the four countries.

In Thailand, citizens hold the most positive attitudes towards Chinese SCS technologies. However, the acceptance rates have also significantly decreased. While 56% of respondents express acceptance for SCSs in general, only 44% would strongly or somewhat strongly accept a Chinese SCS in Thailand. While there has been an increase in the proportion of citizens holding neutral positions, there has also been a rise in the share of citizens who would strongly or somewhat strongly oppose a Chinese SCS (17% compared with 13%). Moreover, acceptance rates among citizens in Indonesia and Malaysia have decreased. In Indonesia, only 37% of the respondents indicated strong or somewhat strong acceptance of having Chinese SCS technologies in their countries (down from 45%), while 22% expressed negative opinions (up from 15%). Similarly, in Malaysia, acceptance rates of Chinese SCS technologies dropped to 35% (down from 47%), and 23% of respondents expressed strong or somewhat strong opposition to having a SCS in their country (up from 17%).

These comparative findings suggest that citizens do not inherently hold positive attitudes towards SCSs. However, it does make a difference where the technologies used in such systems originate, as public opinion becomes more critical if they are provided externally from China.

4.2 | Explaining citizens' acceptance rates of Chinese social credit system technologies

By using the software R, we conducted an ordered logistic regression to examine the effects of three sets of factors on citizens' acceptance rates of Chinese

TABLE 1 Measurements and hypotheses.

Category and survey questions	Measurements	Hypotheses
Perceived domestic situation		
Economic performance <i>Compared to 5 years ago, do you think the economy of the country you live in is doing...?</i>	1 = Much worse, 2 = Somewhat worse, 3 = Remain the same, 4 = Somewhat better, 5 = Much better	<i>Acceptance of Chinese social credit system technologies (CSCST) is higher among citizens who perceive their domestic economy to have improved over the past 5 years ago (H.1)</i>
Trust in institutions <i>How much do you trust institutions in the country you live in, such as government and police?</i>	1 = Not at all, 2 = Very little, 3 = Neutral, 4 = Somewhat, 5 = A lot	<i>Acceptance of CSCST is higher among citizens who show higher levels of trust in their government institutions (H.2)</i>
Government attitude towards China <i>How do you perceive the government's attitude of the country you live in towards China?</i>	1 = Very negative, 2 = Somewhat negative, 3 = Neutral, 4 = Somewhat positive, 5 = Very positive	<i>Acceptance of CSCST is higher among citizens who perceive their government as holding positive views about China (H.3)</i>
Benefit–risk perceptions towards China		
<i>What kind of benefits do you believe China brings to the country you live in?</i>	Employment opportunities cheap products good-quality products education benefits economic growth more services no benefits For all listed above: 0 = No, 1 = Yes	<i>Acceptance of CSCST is higher among citizens who perceive China as bringing benefits to their countries (H.4)</i>
<i>What kind of risks do you believe China brings to the country you live in?</i>	Economic risks military risks environmental risks risks to democracy workers' safety risks cultural risks no risks For all listed above: 0 = No, 1 = Yes	<i>Acceptance of CSCST is higher among citizens who do not perceive China as posing risks to their countries (H.5)</i>
Risk perceptions towards Chinese social credit system technologies		
<i>What would be the main potential risks if a Chinese firm were providing the technology for a social credit score system in the country you live in?</i>	Data privacy risks risk of Chinese influence on behaviour risks of repression / no risks For all listed above: 0 = No, 1 = Yes	<i>Acceptance of CSCST is higher among citizens who do not perceive Chinese social credit system technology to bring risks of data privacy violation (H.6), risks of Chinese influence on behaviour (H.7), and risks of political repression (H.8)</i>
Socio-demographics		
Gender	1 = Male, 2 = Female	
Age	In years (open)	
Education	1 = I don't have a formal education, 2 = High school diploma, 3 = Vocational training, 4 = Bachelor's degree, 5 = Master's degree, 6 = Master's degree or higher	
Income	1 = Low income, 2 = Low-middle income, 3 = Middle income, 4 = Middle-upper income, 5 = Upper income	

SCSs: *perceptions towards the domestic situation, benefit–risk perceptions towards China and perceived risks associated with Chinese social credit system technologies.* We included controls for age, gender, education and income. The results of our ordered logistics regression analysis are presented in [Figure 4](#) as odds ratios, where values greater than 1 indicate a positive relationship, values less than 1 indicate a negative relationship and values equal to 1 indicate no relationship. [Table S4](#) reports the variance inflation factors (VIFs).

First, we examined citizens' perceptions of their domestic situation and their acceptance of Chinese SCS technologies. Our findings reveal a significant and positive association between citizens' view of their domestic *economic performance* and their acceptance rates of Chinese SCSs. This association is particularly strong and positive in Thailand, Indonesia and the Philippines and strong and significantly positive in Malaysia. These findings support H.1: *Acceptance of CSCST is higher among citizens who perceive their domestic economy to have improved over the past*

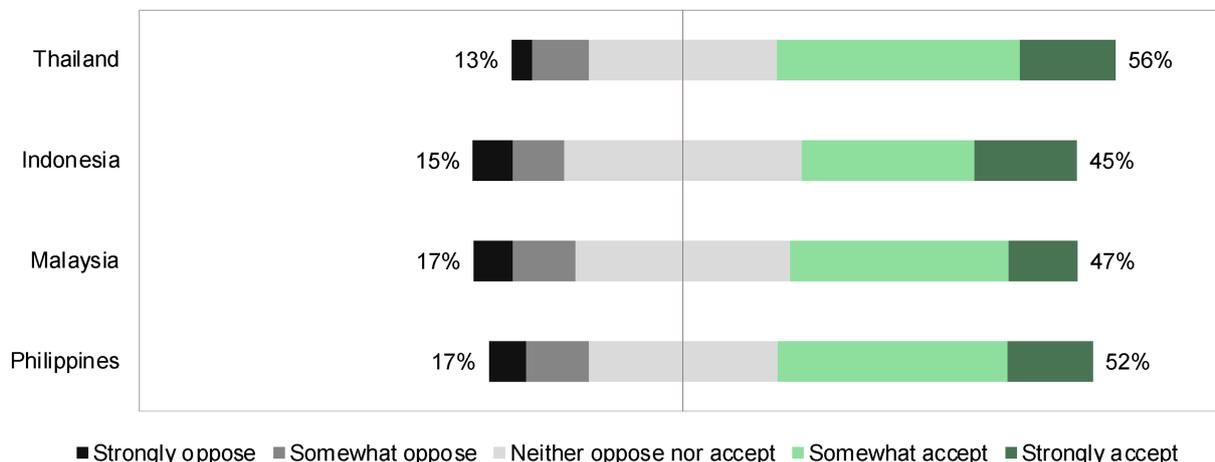


FIGURE 2 Citizens' acceptance rates of social credit systems in Southeast Asian countries (in percentage of respondents by country). Survey question: *Would you oppose or accept if a social credit system was introduced in the country you live in?*

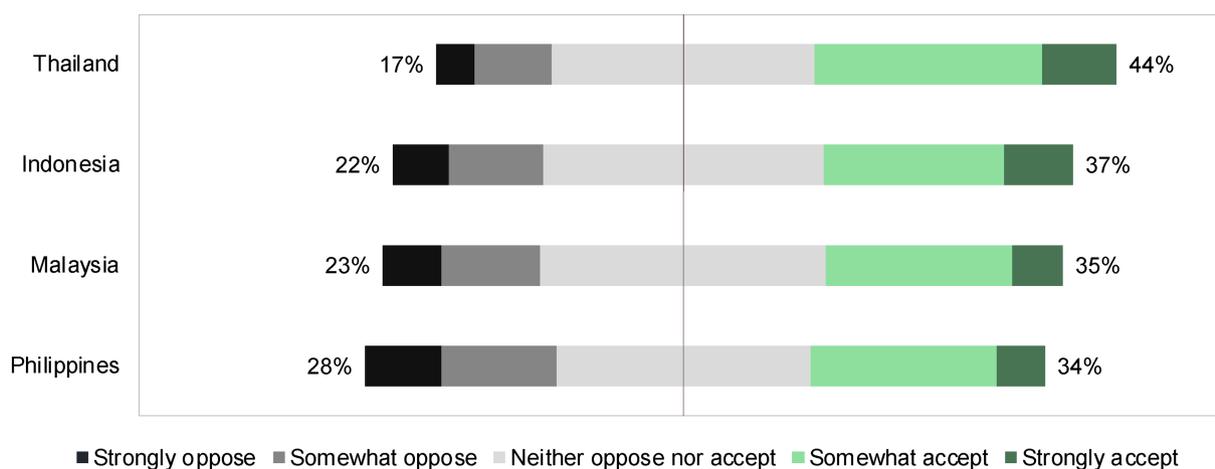


FIGURE 3 Citizens' acceptance rates of Chinese social credit system technology in Southeast Asian countries (in percentage of respondents by country). Survey question: *Would you accept or oppose Chinese firms providing technology for a credit scoring system?*

5 years. In addition, the results indicate that citizens' trust in domestic institutions is very strongly, significantly and positively associated with their perceptions of Chinese SCSs in all countries, except for Indonesia. Thus, we find support for H.2 except for Indonesia, namely that acceptance of CSCST is higher among citizens who show higher levels of trust in their government institutions. The analysis of citizens' perceptions regarding their government's attitude towards China shows a very strong, significant and positive association with citizens' acceptance of Chinese SCSs. This finding supports H.3: Acceptance of CSCST is higher among citizens who perceive their government as holding positive views about China. In conclusion, our analysis indicates that citizens' perceptions of their domestic situation play a significant role in shaping their views on the acceptance of China providing SCS technologies to their countries, except for Indonesia and its trust in institutions.

Secondly, we investigated citizens' perceptions of China bringing benefits and risks to their countries

and their acceptance of Chinese SCS technologies. Our findings indicate that six of the seven benefit factors show significant levels of positive association. In all four countries, citizens who perceive China to bring economic growth opportunities, employment opportunities, and products of good quality are also more likely to be in the group of citizens who would accept Chinese SCS technologies. Infrastructure provision by China is significantly and positively associated with acceptance rates in all countries except the Philippines, while service provision is significantly and positively associated with acceptance rates of Chinese SCSs in all countries except Indonesia. Therefore, we find supporting evidence for H.4: Acceptance of CSCST is higher among citizens who perceive China as bringing benefits to their countries. However, it is important to acknowledge that the perceived benefits of Chinese infrastructure provision have no effect on acceptance rates of Chinese SCS technologies in the case of the Philippines, and the perceived benefits of service provision do not seem to matter in the case of Indonesia. Figure 5 illustrates

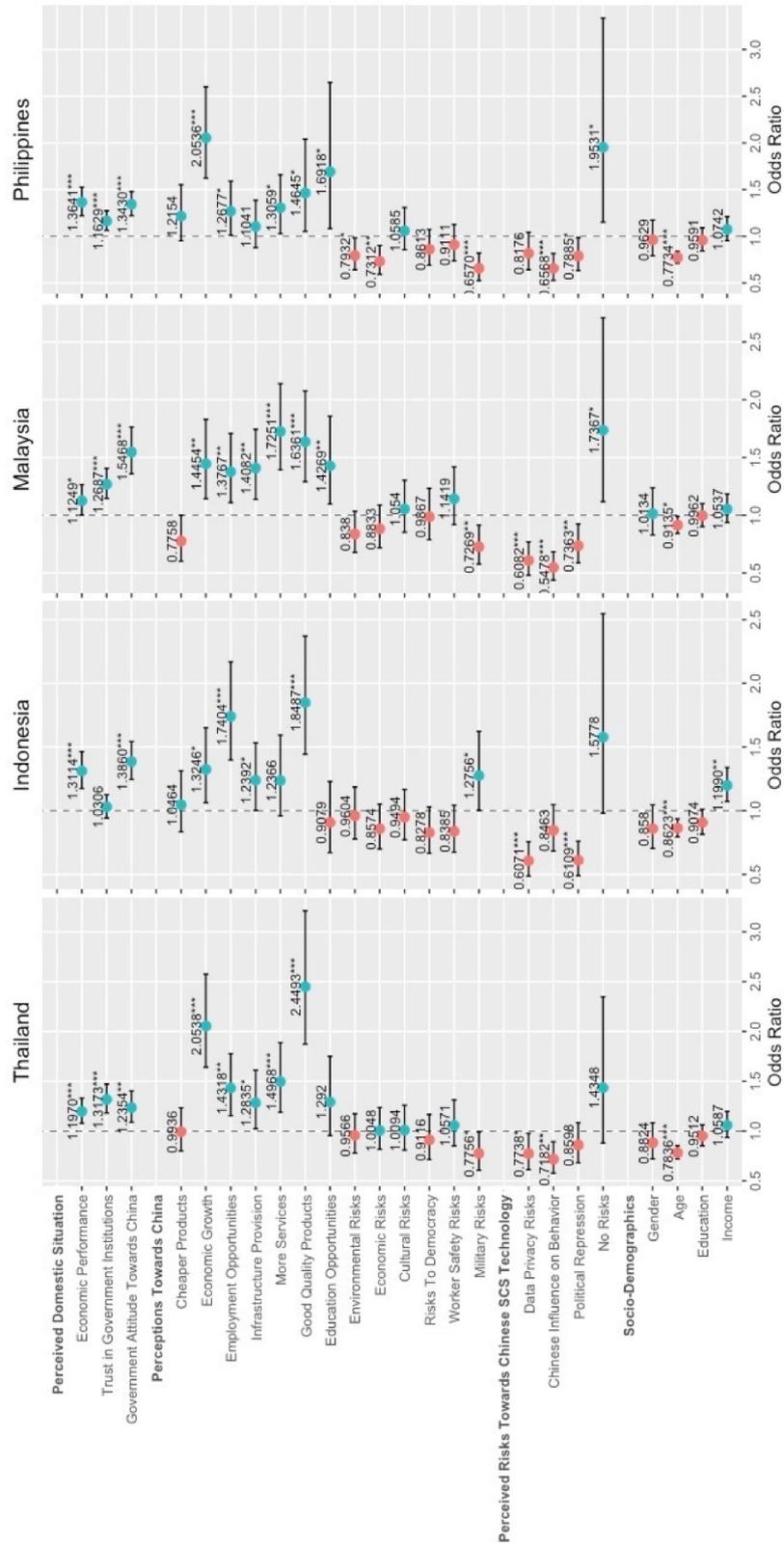


FIGURE 4 Ordered logistic regression: citizens' acceptance of Chinese social credit system technologies. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

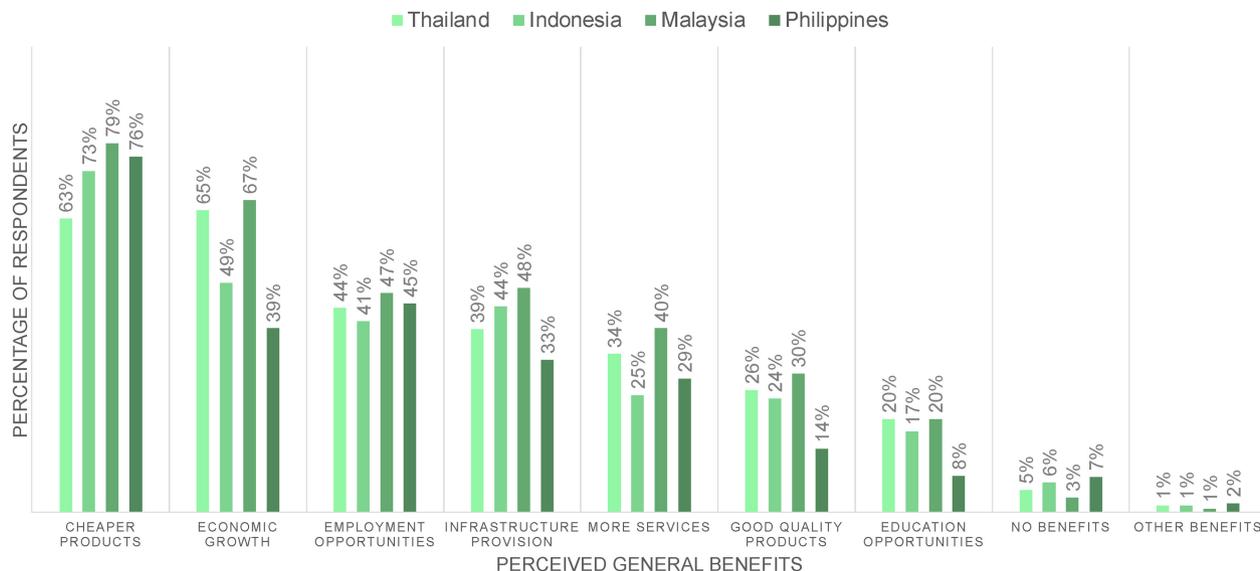


FIGURE 5 Perceived benefits of China among citizens in Southeast Asian countries (percentage of respondents by country and type of benefit). Survey question: *What kind of benefits do you believe China brings to the country you live in?*

the percentages of respondents selecting each benefit factor as important to their countries.

While most of the aforementioned benefit factors demonstrate a positive association with citizens' acceptance of Chinese SCS technologies across the four countries, we do not find significant associations with most of the potential risk factors. The exception is perceived *military risks*, which show a significant and negative relationship with citizens' acceptance of Chinese SCSs in all countries except Indonesia. Furthermore, *environmental risks* and *economic risks* are significantly and negatively associated with respondents' acceptance rates of Chinese SCSs only in the Philippines. As a result, we cannot confirm H.5 except for *military risks* in Thailand, Malaysia and the Philippines and additionally for *economic* and *environmental risks* in the Philippines: *Acceptance of CSCST is higher among citizens who do not perceive China as bringing risks to their countries*. Thus, despite a notable portion of citizens expressing concerns that China would bring risks to their countries (see Figure 6), most of these perceived risks do not have a significant negative effect on citizens' acceptance rates of Chinese SCSs.

Lastly, we investigated specific factors related to technology acceptance and the acceptance of Chinese SCS technologies. We find that perceived risks of *data privacy violation* resulting from China providing SCS technologies are significantly and negatively associated with acceptance rates of Chinese SCSs in all countries except for the Philippines. Similarly, perceived risks of *external influence on citizens' behaviour* are significantly and negatively associated with acceptance rates of Chinese SCS technologies, except for Indonesia. In addition, perceived risks of *political repression* show

a significant and negative association with acceptance rates of Chinese SCS technologies, except for Thailand. Therefore, we find varied support for H.6–H.8: full support for Malaysia and partial support for Thailand, Indonesia and the Philippines: *Acceptance of CSCST is higher among citizens who do not perceive Chinese social credit system technologies to bring risks of data privacy violation* (H.6 except for the Philippines), *risks of Chinese influence on behaviour* (H.7, except for Indonesia) and *risks of repression* (H.8, except for Thailand). Figure 7 summarises the percentages of respondents across the four countries who believe Chinese SCS technologies would bring specific technology-related risks to their countries.

Among our sociodemographic control variables, only age shows a significant association with citizens' acceptance rates of Chinese SCSs. Younger citizens are more likely than older citizens to accept Chinese SCS technologies. In Indonesia, higher income is also associated with higher acceptance rates of Chinese SCS. However, we do not find a strong association between gender and education and citizens' views of Chinese SCS technologies.

5 | DISCUSSION

Our study makes several important contributions. Previous research suggests that Chinese citizens hold surprisingly positive views of SCSs, with 80% of respondents expressing favourable attitudes towards them (Kostka, 2019; Liu, 2022). Our study reveals that while such positive attitudes towards SCSs are considerably lower in other Asian countries, they remain relatively high at an average

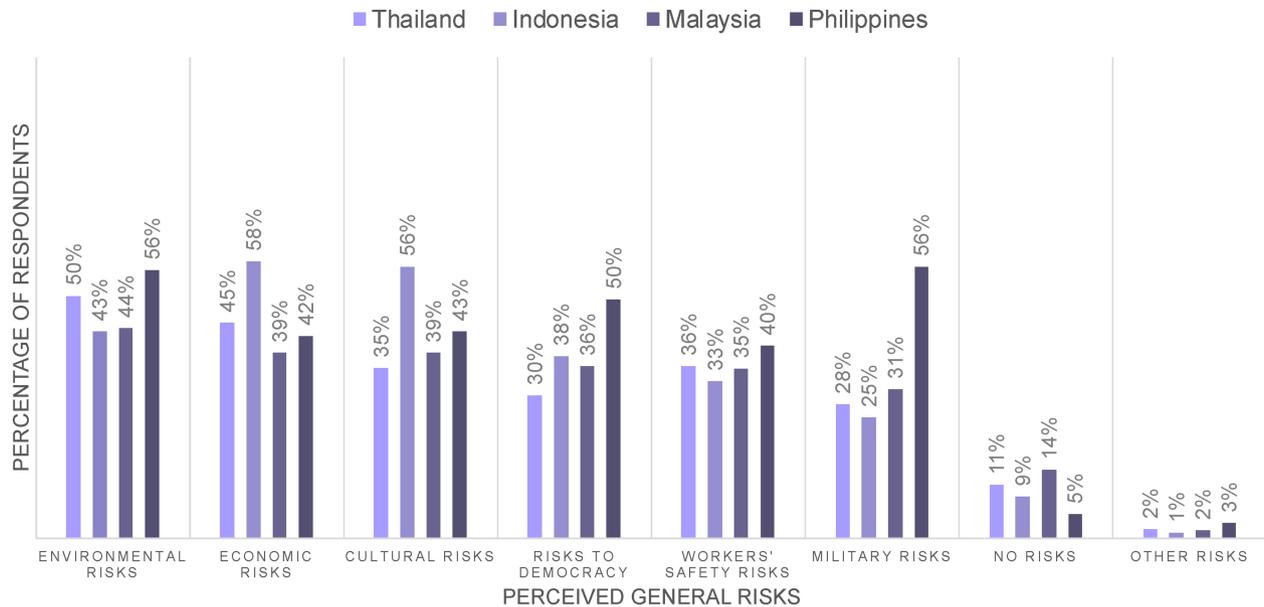


FIGURE 6 Perceived risks of China among citizens in Southeast Asian countries (percentage of respondents by country and type of risk). Survey question: *What kind of risks do you believe China brings to the country you live in?*

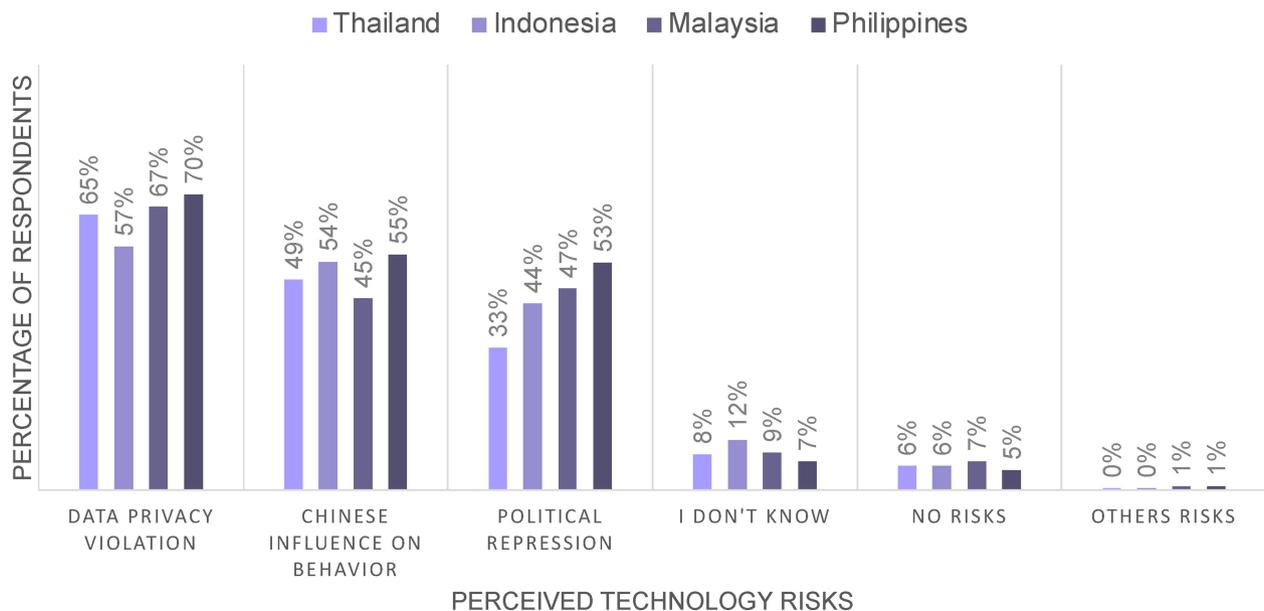


FIGURE 7 Perceived risks of Chinese social credit technology among citizens (percentage of respondents by country and type of technology risk). Survey question: *What would be the main potential risks if a Chinese firm provided the technology for a social score system in the country you live in?*

of 50%, compared with a much lower opposition rate (15%). Furthermore, our findings highlight that knowing the provider of SCS technology has a significant impact on public perception. Notably, if the provider is from China, attitudes in all four countries surveyed become more negative. In the Philippines, for example, positive views would drop from 52% to 34%. Research has noted rising threat perceptions towards China in Southeast Asia (Silver et al., 2019; Yeremia, 2022), and our study acknowledges that the 'China factor' may lead to a decline in favourable attitudes towards technology adoption.

Moreover, our research reveals that the perception of the local environment is a significant predictor of the adoption of external technologies. Therefore, our findings underscore the importance of the economic interest hypothesis (Armony & Velásquez, 2015; Hearn, 2012; Naoi, 2020), trust in government institutions (excluding Indonesia) (Armony & Velásquez, 2015; Pavone & Degli Esposti, 2012) and elite mass communication (Gabel & Scheve, 2007; Sautman & Yan, 2009).

We also observed that perceptions of general benefits provided by China positively spill over into citizens'

acceptance of China as a technology provider. This is consistent with prior studies on public opinion in international relations, which have highlighted the importance of China bringing economic growth (Sautman & Yan, 2009; Wang & Elliot, 2014). Our findings also align with previous studies that concern among respondents regarding the potential risks China could pose to their countries (Armony & Velásquez, 2015; Wang & Elliot, 2014). Interestingly, most of these risks have no effect on how citizens view Chinese SCS technologies; the exception is military risks, which exhibit a negative relationship with citizens' acceptance rates of Chinese SCSs, except in Indonesia. In the Philippines, perceived environmental and economic risks also harm citizens' acceptance rates of Chinese SCS technologies. Thus, citizens seem to weigh economic benefits more heavily than risks related to the environment, workers' safety, or political freedom when making a cost–benefit calculation.

By contrast, we found that two of three technology-specific risk factors exhibit statistical significance in all four countries. Although the privacy calculus theory on technology acceptance posits that concerns regarding data privacy and surveillance would not impede the acceptance of certain technologies (Davis & Silver, 2004), we do not find support for the theory in our four country cases, nor did we find the existence of the privacy paradox in our study. The finding that technology-specific risks, rather than most of the perceived general threats from China, are significantly and negatively associated with citizens' approval of Chinese SCSs is particularly noteworthy. Since technology-specific factors in our study are relevant in all of the four countries, regardless of their differing relations with China, we propose the hypothesis that technology-specific risks play an important role in citizens' acceptance of external technology. This acceptance is not solely influenced by geopolitical considerations or general, long-term threats posed by the external technology provider. Further research could also examine other countries and technologies to validate this hypothesis.

Our findings have some limitations. Firstly, our results may lean towards higher acceptance rates due to 'coverage bias' (Van Dijk, 2005), as the survey excluded citizens without internet access. Additionally, the rewards-based recruitment scheme for survey participants might have contributed to high acceptance rates. It is also possible that citizens may have expressed lower acceptance rates if they had been better informed about the potential risks associated with SCSs. Furthermore, our survey did not differentiate between different ethnic groups (e.g. Thai and Muslim societies or Indonesian and ethnic Chinese communities in Indonesia). Varying societal understandings of concepts like 'privacy' and 'social credit' could have influenced the participants' responses, and the translations of these concepts into other languages may have altered their meanings. Kitiyadisai (2005) notes that the concept of 'privacy' in Thailand has historically carried a more negative connotation than in European or

North American contexts. As the survey was structured and distributed through online channels, we were unable to provide clarifications. Further experimental research incorporating vignettes could explore whether more information about SCSs affects acceptance rates. In-depth interviews might yield insights into divergent conceptual understandings, including among societal groups not covered in this study.

6 | CONCLUSION

Based on an online opinion survey, this article reveals that citizens in Thailand, Indonesia, Malaysia and the Philippines exhibit high levels of acceptance towards the still hypothetical implementation of Chinese SCS technologies in their countries. These high acceptance rates correlate significantly with the perception that China offers economic opportunities, while concerns about non-traditional security threats do not significantly diminish citizens' positive attitudes towards Chinese SCSs in most cases. Younger citizens, in particular, are more likely to view the provision of SCSs by Chinese companies to their countries positively. In addition, citizens who view their countries' domestic situations positively are more likely to have positive views of Chinese SCSs, while specific risks associated with the technology may lead to lower levels of acceptance.

Citizens' positive attitudes towards SCSs, which reward or penalize behaviours beyond legal frameworks and social norms, highlight the need for governments to enact data protection laws. These laws should delineate boundaries for the collection, storage, use and transfer of citizens' data and ensure transparency about how and why data is being collected. Similarly, the establishment of oversight bodies, along with accessible contact points for individuals, is important for adequately addressing the risks of data misuse. Although citizens generally have positive views of SCSs, their views might shift with greater awareness of the associated risks. The situation calls for measures to enhance citizens' awareness of the risks of digitalisation and data collection. Further research is essential to identify potential gaps that SCSs could fill in these four countries and to consider alternative solutions for these gaps.

While most risk factors did not significantly alter positive attitudes towards SCSs, military risks and environmental risks did have an impact. As China continues to expand its digital overseas investment, it may need to mitigate territorial tensions in the region to reduce perceptions of fear and ensure adherence to high environmental standards in its overseas investment activities. Finally, as the four Southeast Asian countries navigate the complex dynamics of great power involving China and the US, it is important for non-regional countries seeking regional influence to demonstrate how their bilateral relations can tangibly benefit the lives of the

region's citizens. Our findings suggest that such tangible benefits are critical for garnering citizen support for their presence in the region.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Wiebke Rabe  <https://orcid.org/0000-0003-2800-2596>

Genia Kostka  <https://orcid.org/0000-0002-3696-9513>

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AUTHOR BIOGRAPHIES

Wiebke Rabe is an Assistant Professor of International Relations at the University of Bremen. Her research focuses on China's overseas investment, in particular on the global distribution of natural resources and international data politics.

Genia Kostka is a Professor of Chinese Politics at the Freie Universität Berlin. Her research focuses on China's digital transformation, environmental politics and political economy. Her most recent research project explores how digital technologies are integrated into local decision-making and governance structures in China (ERC Starting Grant 2020–2025).

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Table S1.

Table S2.

Table S3.

Table S4.

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