Corridors of Power:

How Beijing uses economic, social, and network ties to exert influence along the Silk Road

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Technical Appendix

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A-1. Public diplomacy definitions, theory, and proxy measures

This report is a continuation of the work of three previous AidData reports to examine the inputs and outcomes of Beijing's public diplomacy overtures in the 25 countries of the East Asia and Pacific (EAP) and 13 countries of South and Central Asia (SCA) regions. As such, where appropriate and with the permission from the lead author, we have included excerpts from the Technical Appendices from these precursor reports as it pertains to conceptual frameworks and methods that the research team has borrowed, adapted, and extended in the context of this report. The three foundational reports include:

- Custer et al. (2018) report, *Ties That Bind: Quantifying China's Public Diplomacy and its Good Neighbor Effect*; http://docs.aiddata.org/ad4/pdfs/Ties_That_Bind--Technical_Appendix.pdf;

- Custer et al. (2019a), *Silk Road Diplomacy: Deconstructing Beijing's Toolkit to Influence South and Central Asia*; http://docs.aiddata.org/ad4/pdfs/Silk_Road_Diplomacy_Technical_Appendix.pdf;

- Custer et al. (2019b), *Influencing the Narrative: How the Chinese government mobilizes students and media to burnish its image*; http://docs.aiddata.org/ad4/pdfs/Influencing_the_Narrative_Technical_Annex.pdf.

A-1.1 Public diplomacy definition and theory

This study uses the following definition of public diplomacy: *a collection of instruments used by state and non-state actors from a 'sending' country with at least some intention of influencing the perceptions, preferences, and actions of foreign citizens in a 'receiving' country in favor of the 'sending' country's values, culture, and worldview.*

The People's Republic of China (PRC), along with other foreign powers, engages in public diplomacy as a means to win over foreign publics and advance its national interests. We hypothesize that a foreign power (the sending country) initiates public diplomacy overtures in order to catalyze a chain reaction whereby citizens and leaders in a second country (the receiving country) move along a continuum of increasing favorability—from growing awareness and attraction to greater alignment and solidarity—such that they are willing to hold opinions and take action in accordance with the sending country's interests. In the previous *Silk Road Diplomacy* report, we enumerated various economic, foreign policy, security, and reputational aims the PRC has for its relations with the SCA region.

To operationalize this definition of public diplomacy, Custer et al. (2018), Custer et al. (2019a), and Custer et al. (2019b) focused on activities targeting various possible target audiences in a receiving country: public officials, the general public, and relevant socioeconomic or political sub-groups. Moreover, they argue that PRC leaders typically draw upon a toolkit comprising five public diplomacy instruments: informational diplomacy, cultural diplomacy, exchange diplomacy, financial diplomacy, and elite-to-elite diplomacy. Table A-1 provides a breakdown of these five categories with illustrative (though not exhaustive) example activities.

Table A-1: Taxonomy of public diplomacy instruments and illustrative activities

Public diplomacy instrument	Illustrative activities
Cultural diplomacy	Illustrative activities: Chinese cultural events (culture weeks, culture months, culture years, China tourism years, friendship years, friendship conferences, and culture festivals), cultural exhibition tours, Chinese cultural centers, key cultural projects designated by select Chinese government bodies, Confucius Institutes, Confucius Classrooms, sports activities through the External Sports Communication Center, and state-sponsored film festivals.

Informational diplomacy	Illustrative activities: Efforts to help Chinese media establish or expand their presence in the 'receiving' country (e.g., Chinese state-sponsored media bureaus, television broadcasting by CCTV, CGTN and CNC World, radio broadcasting by China Radio International, Chinese-language print media), training foreign journalists in China and organizing/sponsoring tours of foreign reporters to China, op-eds by Chinese senior leaders published in foreign media, interviews with Chinese senior leaders published or aired in receiving country, and press briefings/media interviews of senior leaders following state visits and international conferences.
Elite-to-elite diplomacy	Illustrative activities: Establishing embassies/consulates in country; inbound and outbound high-level visits by government officials and/or military officials; joint military exercises; and People's Liberation Army Navy (PLAN) naval port calls.
Exchange diplomacy	Illustrative activities: Political party exchange programs, political party development activities, providing training to various actors (civilian government officials, military officials, etc.), sister city programs, student or professional scholarships to study in China, student and professional exchange programs, setting up overseas campuses of Chinese universities, and provision of Chinese medical teams.
Financial diplomacy	Illustrative activities: Providing direct support to national budgets, debt relief/ restructuring, humanitarian relief programs (emergency response), and investments in infrastructure within the receiving country.

Source(s): Custer et al. (2018); Custer et al. (2019a)

Public diplomacy activities are not the only interactions that individuals from receiving countries have with sending countries. In this respect, it is entirely possible that the positive response a sending country is able to generate via its public diplomacy activities could be easily supplanted or undercut by its actions or policies in other spheres that generate a negative response. For example, some of the goodwill that China may be able to cultivate with foreign publics through cultural or peer-to-peer exchange programs may be undercut by negative headlines about human rights abuses or maritime incursions.

Generally, we view much of the above theory as likely holding true at the subnational level within countries, yet recognize that receiving countries are not monolithic and may hold varying degrees of appeal for a foreign power to expend energy in winning over a specific locality. For example, some communities may be strategically advantageous, due to the potential gains from natural resource endowments, connections to political leaders, proximity to borders or disputed regions, etc. Other communities may appear to be economically efficient targets, primarily of interest because they are located in densely populated, urban areas supported by advanced physical and digital infrastructure that make them easier to reach or perhaps may have socio-economic attributes that make them predisposed to view the PRC favorably.

Although we would hypothesize that communities receiving more PRC public diplomacy activities would view Beijing more positively, some scholarly work is beginning to point to the fact that there may be limits to the geographic reach of discrete public diplomacy overtures or aid projects and that influence may 'degrade' or 'decay' with increasing distance (Brazys and Dukalskis, 2019). Meanwhile, some communities may be predisposed to view the PRC more or less negatively by virtue of specific demographic attributes (i.e., social, economic, political), varying regardless of experience or exposure to public diplomacy activities (Custer et al., 2018). Moreover, as described in this report, a foreign power's ability to convert public diplomacy inputs into realized influence with other countries is neither straightforward, nor guaranteed.

A-2. Subnational analysis of Chinese public diplomacy

For our analysis of which communities were most likely to receive the PRC's public diplomacy efforts (see Chapters 2 and 3), we first used AidData's geocoded 1.0 methodology to code the locations of the following instruments: state-directed financing from Beijing that met our criteria (financial diplomacy), Confucius Institutes and HSK testing centers (cultural diplomacy), and sister cities (exchange diplomacy). Table A-2 provides a brief description of each, along with the data sources. There was insufficient subnational location information and variation to include measures of elite-to-elite diplomacy or informational diplomacy in our subnational analysis.

Geocoding refers to the process of "assigning a single data point with a corresponding latitude and longitude" (AidData, 2017). AidData's geocoding methodology was originally derived from the UCDP Geo-referenced Event Dataset Codebook Version 1.0 (Sundberg et al., 2010). This was adapted to enable coding of aid and public diplomacy investments and ultimately became the inspiration for the International Aid Transparency Initiative standard (AidData, 2017). Please refer to documentation of AidData's geocoding methodology for more information: http://docs.aiddata.org/ad4/files/geocoding-methodology-updated-2017-06.pdf.

Table A-2: Public diplomacy measures included in the subnational analysis

Variable name	Description	Data source(s)
State-directed financing, 2000-2017 (financial diplomacy)	Financial diplomacy emphasizes four categories of state-directed financing that Custer et al. (2019a) deemed most relevant to the lens of public diplomacy and foreign influence: (i) infrastructure financing, (ii) humanitarian aid, (iii) budget support, (iv) debt relief. AidData tracks a broader set of Chinese official finance investments which include categories of investment that are not reflected here. That said, in the South and Central Asia region financial diplomacy constitutes the preponderance of overall Chinese official finance dollars (96%) and projects (72%). AidData estimates US$132.6 billion in Chinese official finance dollars and 1198 projects committed to the region between 2000-2017 (Custer et al., 2021b), as compared to $126.7 billion and 865 projects in Chinese financial diplomacy.	Custer et al. (2019a), adapted and extended from the Chinese Official Finance Data for 2000-2014 to capture additional years.
Sister cities, 2000-2018 (exchange diplomacy)	The number of sister or friendship cities formed by signing formal agreements. China set up the first sister city in the SCA region in 1984 in Pakistan. We consider all cities set up between 1984 and 1999 in the year 2000 (as a historical baseline).	China International Friendship City Association (CIFCA)
Confucius Institutes, 2004-2018 (cultural diplomacy)	The first CI was opened in Seoul in the year 2004, and therefore data spans the period 2004-2018. The first CI in the SCA region was in Uzbekistan in 2005.	Hanban Website; China Foreign Affairs Yearbooks
Hanyu Shuiping Kaoshi (HSK) testing centers (as of 2019)	Beijing has opened up an estimated 260 HSK testing centers throughout the SCA region to facilitate Mandarin language proficiency testing often required for scholarships and study abroad opportunities	Hanban Website

We then combined ADM-2 (district) level shapefiles for all 13 SCA countries (Afghanistan, Bangladesh, Bhutan, India, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan, and Uzbekistan). For the Maldives, we use OCHA ADM-2 boundaries, found on Humanitarian Data Exchange. For all other countries, we

used the district-level shapefiles from geoBoundaries (Runfola et al., 2020). We standardized all shapefiles into the WGS 84 coordinate reference system. The shapefile for Kazakhstan had an invalid geometry that we fixed in R. Kyrgyzstan does not have the capital city, Bishkek, in district-level shapefiles, so we appended Bishkek as its own district using its boundaries from the ADM-1 shapefile. Our full district level shapefile has 2097 districts.

AidData's geocoded data on test center and Confucius Institute locations can be treated as point data, which we spatially joined with ADM-2 boundaries to create indicators of which districts contain test centers and Confucius Institutes. For sister cities we included coordinates for both the SCA city and Chinese city in our data. We spatially joined this data into our district dataset to create an indicator of whether each district has a sister city relationship with a Chinese city. For financial diplomacy, we used a dataset of geocoded Chinese financial diplomacy projects, focusing on the value in real US dollars of all financial projects within each district in each year.

A-2.1 Clustering analysis

Focusing on Cultural Diplomacy, Exchange Diplomacy, and Financial Diplomacy, we sought to categorize subnational patterns in Beijing's allocation of these public diplomacy investments. Varying combinations of these forms of public diplomacy, or public diplomacy repertoires, allow us to examine how China varies its approach across countries within SCA.

To conduct this categorization, we used hierarchical clustering analysis. Within each country, we calculated Pearson's correlation coefficients between our three key forms of public diplomacy across districts. This allows us to calculate a dissimilarity matrix, which we use as our input for hierarchical clustering analysis with the hclust function in R. When we plot the results in a dendrogram, we show how countries break down into three groups (see Figure A-1). Bhutan, Maldives, and Turkmenistan are excluded due to insufficient variation in public diplomacy allocations for correlation coefficients to be calculated.

Figure A-1: Dendrogram of PRC subnational public diplomacy

Country
hclust (*, "average")
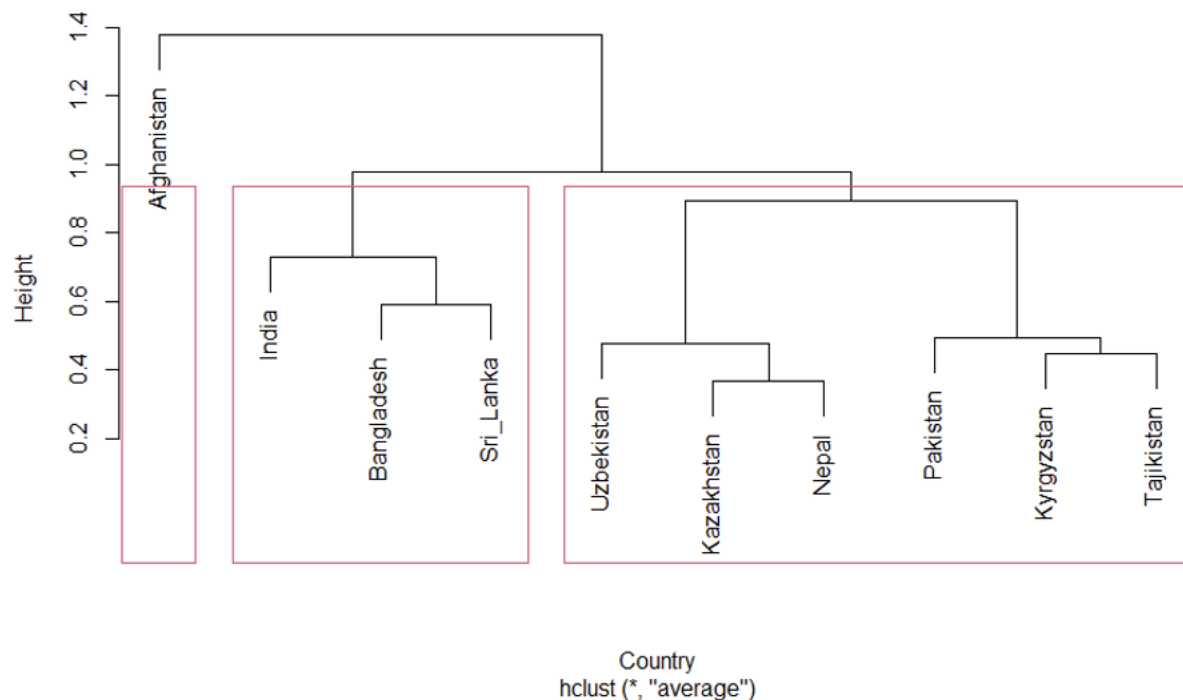
A-2.2 Covariates of Chinese public diplomacy

In conducting bivariate and multivariate analysis of Beijing's subnational public diplomacy, we considered a variety of variables to examine possible drivers of Chinese public diplomacy allocations.

Population: Total population in each district, measured as the sum of the population in all 1 km grid cells in the WorldPop dataset within each district (Tatem, 2017).

Night lights: The average night lights value in each district, based on the data that harmonizes data from the DMSP and VIIRS satellites (Li et al., 2020).

Border: An indicator of whether the district falls on a land border.

Capital: An indicator of whether the district contains the country's capital city.

Petroleum deposits: Indicator of whether the district contains a petroleum (oil or natural gas) deposit (Lujala et al., 2007).

Oil pipeline: Indicator of whether the district contains an oil pipeline. This comes from data purchased from Energy Web Atlas in October 2021.

Natural gas pipeline: Indicator of whether the district contains a natural gas pipeline. This comes from data purchased from Energy Web Atlas in October 2021.

Leader birthplace: Indicator of whether the district contains a birthplace of the country's leader at some point between 2000 and 2018.

A-2.3 Bivariate correlations of PRC subnational public diplomacy and covariates

Using Pearson's correlation coefficients, we considered possible correlations between each form of public diplomacy and our covariates. These bivariate correlations allow us to understand which variables are strongly correlated with each other. Across the Extract, Nudge, and Avoid groups, we also find that variables are correlated in similar ways. The results are visualized in Figures A-2, A-3, A-4, and A-5.

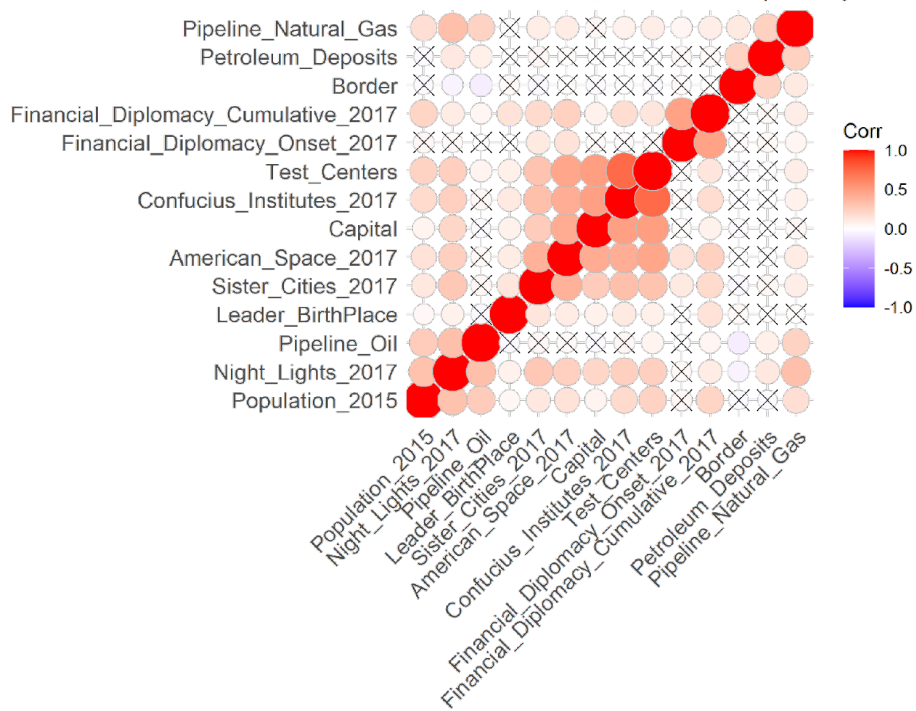## Figure A-2: Correlation matrix—all, 2017 public diplomacy and covariates

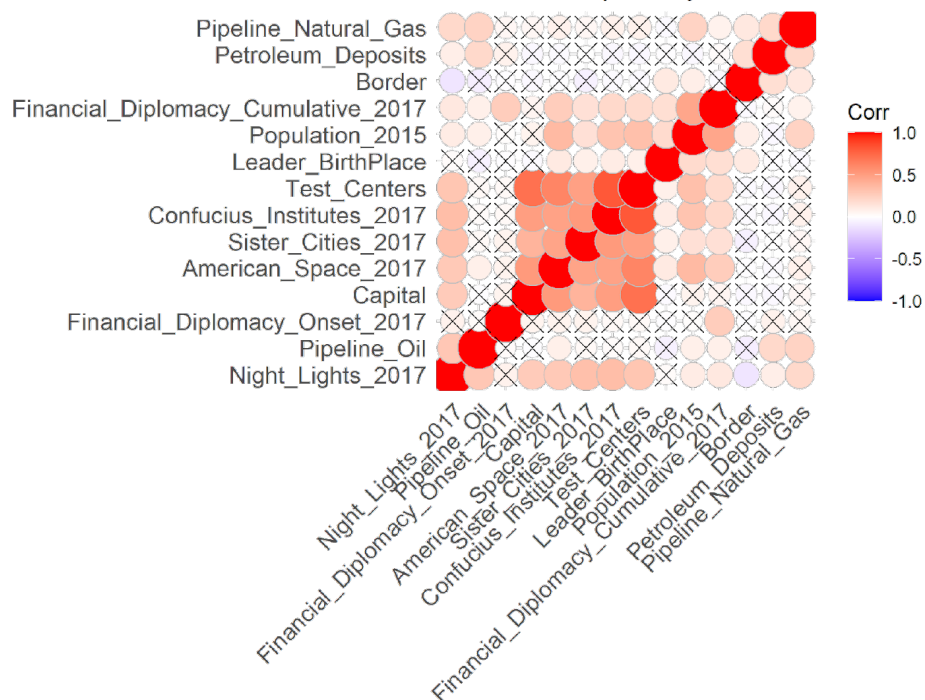## Figure A-3: Correlation matrix—extract, 2017 public diplomacy and covariates

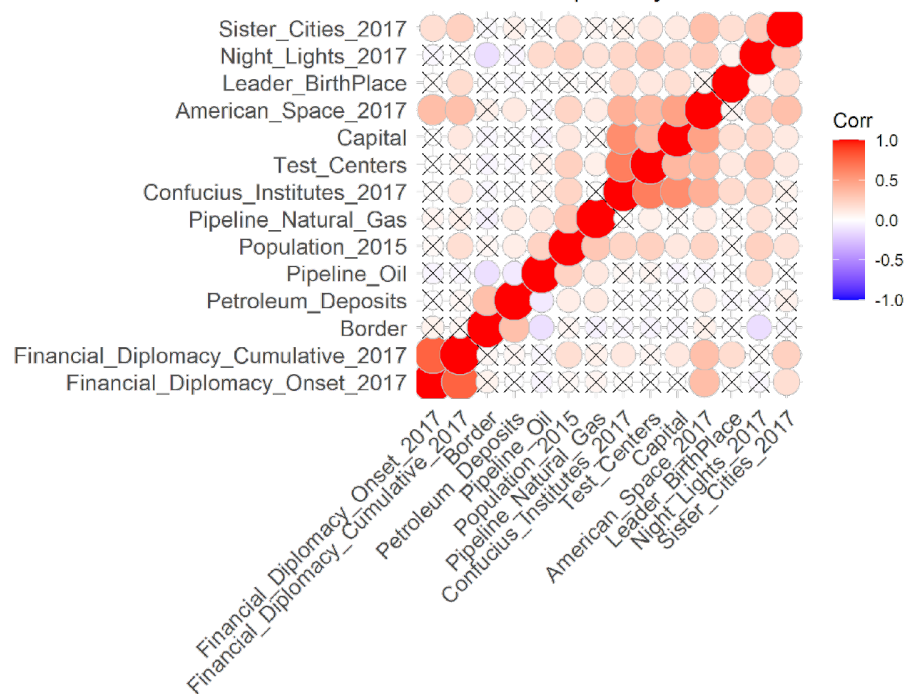**Figure A-4: Correlation matrix—nudge, 2017 public diplomacy and covariates**

Figure A-5: Correlation matrix—avoid, 2017 public diplomacy and covariates

A-2.4 Regression analyses

Three different kinds of regression analysis inform the analysis in Chapter 2. First, we used spatially lagged dependent variable models, in order to account for spatial autocorrelation (Anselin & Bera, 1998; Brass et al., 2020). We present the results of this modeling in Table A-3, with effects decomposed from Total Effects into Direct Effects and Indirect Effects using the impacts function from the spdep R package (Bivand et al., 2005).

Table A-3: Impact measures from spatially lagged dependent variable model

	Direct	Indirect	Total
Population, standardized	0.214***	0.015+	0.227***
Night lights, Standardized	0.017	0.002	0.023
Petroleum deposit	0.122	0.011	0.168+
Pipeline, oil	-0.084	-0.006	-0.090
Pipeline, natural gas	0.104+	0.007	0.111+

Second, we conducted more standard regression analysis. Table A-4 displays linear regression results for all SCA districts, with model specifications that do not include fixed effects or clustered standard errors, clustered standard errors by country, country fixed effects with standard errors clustered by country, and country fixed effects with standard errors clustered by district. These models reveal that the subnational correlations we observe, aside from Population, are not robust to fixed effects or clustering standard errors.

Table A-4: District regressions

	Dependent variable: Financial diplomacy, standardized			
	(1)	(2)	(3)	(4)
Population, standardized	0.215***	0.215*	0.330	0.330*
	(0.023)	(0.121)	(0.209)	(0.185)
Night lights, standardized	0.019	0.019	0.040	0.040
	(0.024)	(0.021)	(0.028)	(0.028)
Petroleum deposit	0.124	0.124	0.091	0.091
	(0.091)	(0.116)	(0.114)	(0.131)
Oil pipeline	-0.085	-0.085	-0.028	-0.028
	(0.063)	(0.060)	(0.083)	(0.060)
Natural gas pipeline	0.109**	0.109**	-0.004	-0.004
	(0.054)	(0.053)	(0.098)	(0.081)
Constant	-0.022	-0.022		
	(0.027)	(0.021)		
Fixed effects	None	None	Country	Country
Clustered errors	No	District	Country	District
Observations	2,097	2,097	2,097	2,097
R^2	0.053	0.053	0.103	0.103
Adjusted R^2	0.051	0.051	0.095	0.095
Residual std. error	0.974 (df = 2091)	0.974 (df = 2091)	0.951 (df = 2079)	0.951 (df = 2079)

| Note:	*p<0.1; **p<0.05; ***p<0.01

Since most regression analyses focus on average effects across entire samples, we argue that it is also necessary to consider that relationships may vary over space within SCA. Such spatial heterogeneity may yield regression results without statistically significant effects, despite the existence of important relationships that vary across local contexts. To examine this possibility, we estimate geographically weighted regressions (Fotheringham et al., 2002). Results are displayed in Table A-5.

Table A-5: Summary of GWR coefficient estimates at data points

	Min	1st Qu.	Med	3rd Qu.	Max	Global
Intercept	-0.395	-0.066	0.081	0.186	3.419	-0.022
Population	-0.076	0.057	0.420	0.546	6.616	0.215
Night lights	-0.146	-0.032	0.002	0.014	0.292	0.019
Petroleum deposit	-0.402	0.043	0.071	0.124	0.589	0.124
Pipeline, natural gas	-0.373	0.021	0.071	0.105	0.268	0.109
Pipeline, oil	-0.992	-0.278	-0.119	-0.086	0.403	-0.085

Table A-5 is interpreted by checking whether the global (OLS) estimate is within the interquartile range of estimated coefficient values (1st Quartile-3rd Quartile). If the Global estimate is outside the interquartile range, then there is tentative support for a spatially heterogeneous relationship. This table shows that *Night Lights*, *Petroleum Deposits*, *Pipeline, Oil*, and *Pipeline, Natural Gas* all may have spatially heterogeneous relationships. Figure A-6 visualizes each of these variables below.

Figure A-6: Geographically-weighted regressions: Which variables are associated with more or less subnational public diplomacy?
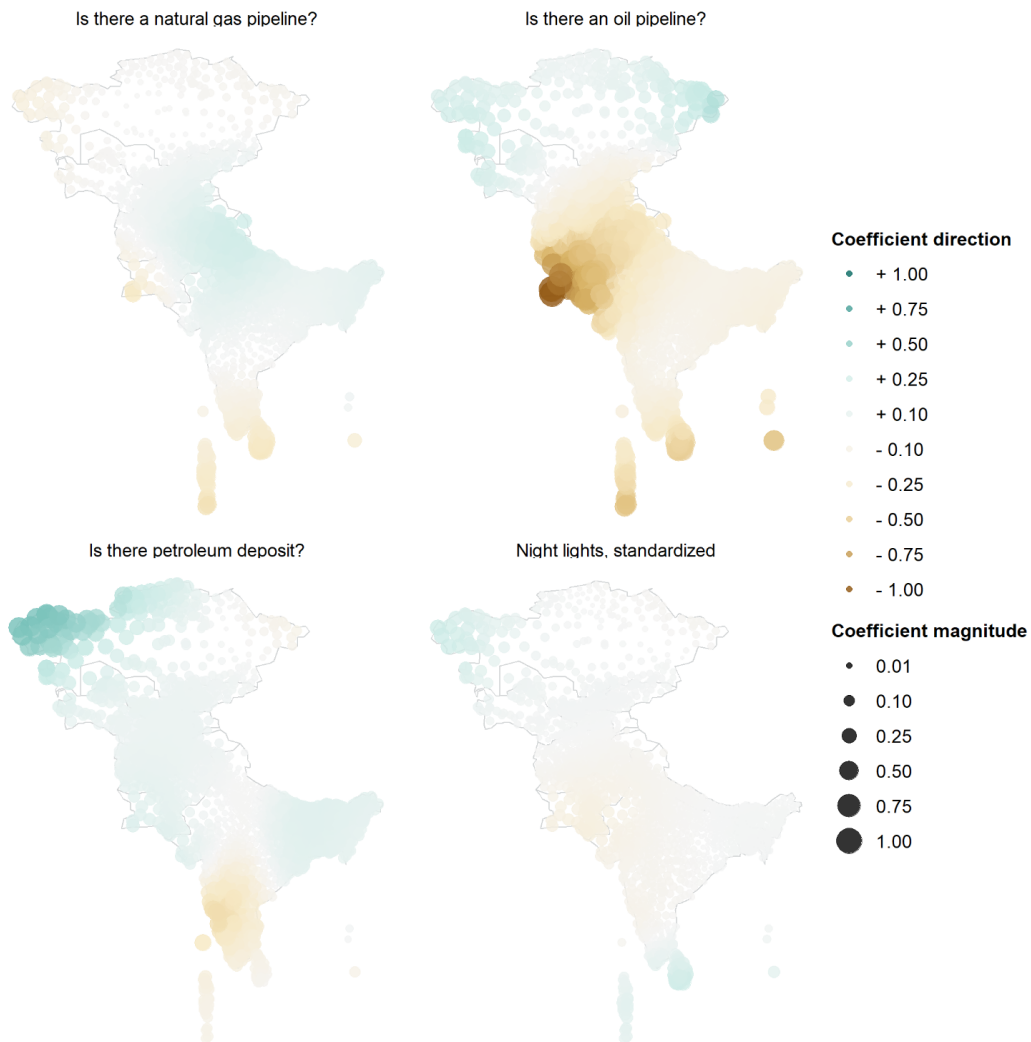
A-3. Educational cooperation and language and cultural promotion

For this report, our research team collected a substantial amount of supplemental data to gain additional insights on the PRC's efforts to build social ties with SCA countries. These supplemental variables are identified below, along with a brief description and data sources.

Table A-6: Supplemental data on educational cooperation, language and cultural promotion, and city diplomacy

Variable name	Variable description	Data source(s)
PRC educational assistance (2000-2017)	Our estimates of PRC educational assistance projects includes all projects with and without financial dollar values from AidData's Global Chinese Development Finance Dataset, version 2.0 (Custer et al., 2021) that met the following criteria: (i) tagged as a "Scholarships/training in the donor country" in the "Flow Type" column; (ii) contained an Education Sector code; and/or (iii) contained elements of the project description that met our text search criteria of terms related to: "language, scholarship, education, educational, training, proficiency, university, exam, trainees, skills, courses, Confucius, school, scholar, student, linguistic, seminar". We did not identify any known educational assistance projects with Bhutan.	AidData. Global Chinese Development Finance Dataset, 2000-2017. Version 2.0. Custer et al. (2021).
PRC, US, UK, Russia study abroad visa requirements for foreign students (as of 2021)	This information only reflects the published requirements for student visas, and does not include requirements and fees imposed by destination universities themselves. Although the information for visa requirements was primarily collected from government sources, we supplemented this information with third-party sites documenting visa requirements to confirm areas where the destination country did not have specific requirements. For example, this included studyinrussia.ru for Russia and usatraveldocs.com for the US.	Embassy, consular, and central government websites of the PRC, US, UK, and Russia. Third-party websites.

Language of instruction at Chinese higher education institutions (as of 2021)	AidData staff compiled a composite list of China's most prestigious universities, based on a number of globally recognized university rankings lists. These included: Shanghai Ranking's Academic Ranking of World Universities (ARWU), the Informatics Institute University Ranking By Academic Performance (URAP), QS World University Rankings, US News and World Report Rankings, Times Higher Education World University Rankings. We then supplemented this comprehensive list with additional universities from ChinaAdmission's list of Chinese Universities with the highest share of international students to ensure that we captured all Chinese universities that are likely destinations for foreign students. Using this list, our research assistants used official university website sources to identify the type of university and language of instruction. Research assistants assigned the institutions to four categories: "University" for institutions of higher education with a broad topical focus; "Science" institution for institutions of higher education with a topical focus on technology, engineering, agriculture, mining, etc.; "Medical" for institutions of higher education with a topical focus on medicine; or "Other" for institutions of higher education with a topical focus that does not fall into the other three categories. Research assistants then recorded if the university offers courses in English and/or Russian, full programs in English and/or Russian, and the level of both courses and programs (Undergraduate/Graduate).	Web scraped from public websites by AidData
PRC scholarships (2000-2018)	The team collected data on the number of Chinese Government Scholarships announced for recipient countries in SCA. There were five countries for which no scholarship announcements were found on the Chinese embassy site or on other official sources; the data was thus not available (NA). These were Bhutan, India, Maldives, Sri Lanka and Tajikistan. For other countries, where the number of scholarships were reported over a span of time, we divided this total by the number of years to get the count for individual years. For example, if in October 2014, China announced 500 scholarships to Sri Lanka over the next 5 years, we would record 100 scholarships per year starting 2015.	Embassy websites, Chinese government sources, Custer et al. (2019)
Indian scholarships (as of 2021)	The research team collected data on the types of study abroad scholarship programs offered by the Indian government that referenced one or more SCA countries as eligible to apply.	Indian Council for Cultural Relations and Ministry of External Affairs (MEA) websites
Confucius Institutes and Classrooms (2004-2018)	The data includes the number of Confucius Institutes and Confucius Classrooms in each of the SCA countries, as well as the years they were opened and instances of closure. The data was geocoded in-house using AidData's geocoding methodology.	Hanban Annual Reports
American Spaces (1928-2018)	The American Space data includes the number of American Spaces in each SCA country, the years they were opened and instances of closure. The data was geocoded in-house using AidData's geocoding methodology.	US Department of State and Embassy websites

Rossotrudnichestvo and Russkiy Mir centers (1965-2018)	Russkiy Mir centers are Kremlin-sponsored entities which promote Russian language and culture around the world. The Federal Agency for the Commonwealth of Independent States Affairs, Compatriots Living Abroad, and International Humanitarian Cooperation, commonly known as Rossotrudnichestvo, also promotes Russian language at its centers of science and culture worldwide. The data includes the number of Russian cultural centers in each of the SCA countries, as well as the years they were opened in. The data was geocoded in-house. We recorded opening dates back to 1965, however this data does not account for Russian cultural centers that closed prior to data collection.	Russian official government websites, web-scraping of social media sites
Indian cultural centers (as of 2018)	The data includes the number of Indian cultural centers in each of the SCA countries, as well as the years they were opened. This data does not account for Indian Cultural Centers that closed prior to data collection.	Official Indian government websites, the Indian Council for Cultural Relations (ICCR)
British Councils (1948-2018)	The data includes the number of British Councils in each of the SCA countries, as well as the years they were opened. This data does not account for British Council centers that closed prior to data collection.	British Council websites
Language policy (as of 2021)	The team collected qualitative data on policies and legislation related to official language(s) and foreign language learning in the SCA countries from official government websites and related media articles.	Government websites and media articles from Factiva Dow Jones News and Analysis
HSK testing centers (as of 2019)	This data includes all identified HSK testing centers, collected from http://www.chinesetest.cn. Student researchers recorded the center name, type, and location. Research assistants then recorded latitude and longitude data. Location was determined based on exact address, the center point of the host institution/university if no exact address was listed, or the center point of the host city if the host institution could not be located. This data does not account for HSK testing centers that closed prior to data collection.	Office of Chinese Language Council International, Hanban website
Content-sharing partnerships	This data was originally created by Emily Feng (2018) for her article in the Financial Times. We validated this data, extended it, and fixed some errors in the mapping of partnerships to countries.	Emily Feng (2018), supplemental web scraping by AidData
Sister cities (2000-2018)	Sister city arrangements are often brokered by third party organizations, such as the China International Friendship Cities Association (CIFCA), which helps pair Chinese cities or provinces with cities and provinces abroad.Our team collected this data from the official list of Chinese sister city relationships, and then manually added georeference data via desk research. For instances of sister regions and provinces, we used the coordinates for the provincial/ regional capital as the geocoding input.	CIFCA database

A-4. Analysis of network ties between SCA elites and the PRC via Twitter

A-4.1 Identifying SCA elites on Twitter

The starting point for our list of SCA elites on Twitter was AidData's in-house Listening to Leaders sampling frame which includes the names and contact information for approximately 100,000 host government officials, development partner representatives, civil society leaders, private sector representatives, parliamentarians, and independent experts from think tanks, universities, and media from 141 countries and semi-autonomous territories. This includes all 13 countries in the SCA region. The global sampling frame was originally developed in 2010, and was subsequently updated in 2014, 2017, and again in 2020.

Rather than employing the convenience samples often used by market research firms, AidData identifies sampling frame members using institution maps of the positions within government agencies and organizations that discharge functions relevant to our research questions, followed by a search for the contact information of individuals holding these positions. For the 2020 wave of the Listening to Leaders Survey, our research team spent nearly two years updating the sampling frame. For more information on how the Listening to Leaders sampling frame was constructed, see the technical appendix of Custer et al., (2021a): https://docs.aiddata.org/ad4/pdfs/Listening_to_Leaders_2021_Technical_Appendix.pdf.

For this analysis, we included 5 of the 6 Listening to Leaders stakeholder groups: mid- to senior- executive branch officials, civil society leaders, private sector leaders, university/think tanks/media, and parliamentarians. We excluded development partners. We then supplemented this list by: cross-checking to ensure that it included the current chief executive and any cabinet-level officials within the government, incorporating known political parties and major domestic media outlets in each country.

We then used a Python script ('get users') to manually check this list of names and organizations against the Twitter API to identify which matched known user accounts. For any matches, a research team member reviewed the list of handles generated to verify whether one or more of them matched the profile of the individual leader or organization in question. Any handles that had fewer than 20 status updates, were not from the country of interest, as well as descriptions and/or location information that did not match expectation were dropped from consideration. For the remaining handles, we used a combination of the description and a manual check of the Twitter account itself to confirm that the account was held by the leader or organization of interest. Altogether this process substantially reduced the list, as not all leaders have a Twitter presence.

In addition to the base of Listening to Leaders names, we further supplemented our list of SCA leaders and organizations on Twitter by leveraging the Python script to query and capture additional relevant user accounts that matched keyword search queries such as government, ministry, parliamentarian, MP, minister, among others, paired with the country in question. To identify potential SCA organizations that may have a specific emphasis on China, such as a friendship organization between two countries, we also conducted key word searches using combinations of China, Chinese, Mandarin, Confucius, and the country in question.

This process yielded 2,273 active Twitter accounts associated with SCA public, civil society and private sector leaders or organizations across 12 SCA countries. No accounts were identified in Turkmenistan, which was to be expected, given the government's ban on use of Twitter. This number was further reduced to 1,864 accounts that follow or are followed by another account in our sample of leaders.

A-4.2 Identifying PRC-affiliated accounts on Twitter

To identify our list of PRC-affiliated accounts, we used a different multi-step process. We first developed a list of: (i) Chinese state-owned media outlets and senior PRC journalists with an international or regional focus; (ii) PRC embassies, consulates, ambassadors, and senior diplomatic staff assigned to SCA countries; (iii) Chinese state-owned enterprises with a presence in SCA countries; (iv) externally-focused Chinese government agencies or senior diplomats based in China (since Twitter is officially blocked within China, these would be the most likely actors to be using the social media channel to reach those outside of the country).

Taking this list of names of individuals and organizations, we conducted a manual desk search and then used the Python script ('get users') to identify matches of these names against active Twitter user accounts via the Twitter API and conducted a verification process similar to that used for the SCA elites. In addition, we conducted search queries of the Twitter API using key word searches. Finally, we conducted a final cross-reference of the active PRC-affiliated Twitter accounts identified by Schliebs et al. (2021) relevant to the SCA region and included any handles that we had missed through the previous steps. Schliebs et al. focus primarily on PRC official diplomatic accounts and state-backed media accounts, triangulating their list of PRC diplomats from three primary sources: the Alliance for Securing Democracy's Hamilton Dashboard, the Associated Press Global Investigation team, and their own in-house process.

This process yielded 115 active Twitter PRC-affiliated accounts relevant to the SCA region.

A-4.3 Scraping follower networks and mentions networks

The follower network was created using the Twitter API. We used the API to collect the following and follower information of everyone in the list of Twitter handles we identified. To collect the mentions data, we used the API's full archive search function, but we had to work around several limitations:

1. The API returns a maximum of 500 tweets at a time.

2. Each API query has a limit of 1024 characters.

3. We had 2500 queries available for use.

We used a number of methods to circumvent these constraints. First, we collected the full timeline of all the users in our network that had less than 3200 tweets (the maximum number of tweets returned by the API's get timeline function). Next, for users with over 3200 tweets, we separated them into groups that had an overall length of 500 characters for both the "for:" and "to:" arguments in the Twitter query. This allowed us to have a more targeted query and limited the number of tweets returned by the API. This method created 33 "from:" groups and 30 "to:" groups, for a total of 990 combinations or queries. Using the pagination returned by the API, we were able to collect all the tweets for these queries. There were only two combinations that did not return the full timeline of tweets using this method.

For both the follower network and mentions network, scraped data was converted into edge lists that were converted into network objects in R using the statnet suite of packages. We also used our scraped data to incorporate some attributes of individual handles. Descriptive plots of both networks were produced with the ggnetwork package in R (Briatte, 2016).

A-4.4 Community detection analysis

Networks can be too complex to see clear patterns of sub-graphs visually. We therefore use community detection analysis to identify how the full follower network divides into sub-graphs. This is a valuable technique for us to sort through the noise and identify how Twitter handles cluster together (Bedi & Sharma, 2016).

There are many forms of community detection analysis. Key for our selection of community detection algorithms is the fact that the follower network is a directed network. Community detection is particularly complex for directed networks, and there are fewer options for community detection algorithms on directed networks than undirected networks (Malliaros & Vazirgiannis, 2013). For directed networks, the walk trap algorithm is a prominent and intuitive option (Pons & Latapy, 2005). Users specify a number of steps, and then the algorithm randomly walks that number of steps from each node in the network. Common nodes across walking paths are considered to share a community. In our case, we select two steps for our walk trap community detection algorithm. This is a substantively meaningful choice. On Twitter, aside from promoted and algorithmically-generated tweets, a user's timeline mainly includes tweets posted by the handles that they follow and tweets that are liked or retweeted by those handles. This means that a user mainly sees tweets from the handles they follow and the handles that those handles follow. This corresponds with two steps in the follower network.

We do not conduct community detection analysis with the mentions network because the raw descriptive visualization illustrates key patterns so clearly. In addition, it is far less clear what two steps in the mentions network actually means. There is no clear way to discern whether multiple steps through the mentions network are tracing a

given topic spreading through the network or if the mention from handle A to handle B refers to a completely different topic than the mention from handle B to handle C. Lacking substantive meaning from community detection analysis and possessing a clear descriptive visualization, we therefore do not conduct community detection analysis on the mentions network.

A-4.5 Brokerage analysis

For both the follower and mentions networks, we employ Gould and Fernandez (1989) brokerage analysis, as implemented in statnet (Handcock et al., 2003). Recognizing that there are several types of brokerage, we focus on gatekeepers and representatives in our analysis. Gatekeepers ($broker_G$) mediate ties from an in-group member (I) to an out-group member (O) (I → $broker_G$ → O). Representatives ($broker_R$) mediate ties from an out-group member (O) to an in-group member (I) (O → $broker_R$ → I). We define the group as whether or not the handle is Chinese. Therefore, in the follower network, SCA representatives and Chinese gatekeepers filter the SCA tweets that Chinese elites see. SCA gatekeepers and Chinese representatives filter the Chinese tweets that SCA elites see. In the mentions network, brokers filter *interactions*, rather than *information*.

Gatekeeper and representative measures account for two things. First, they count the number of times a given actor fills a gatekeeper or representative role. Second, the measures adjust for the number of alternative actors that fill the gatekeeper or representative role. This adjustment is important because actors are more important brokers when there are fewer possible alternative brokers.

# A-5. Analysis of citizen and leader perceptions of the PRC

A-5.1 Gallup World Poll as a proxy for citizen approval/disapproval of foreign powers

In this report, we utilize the Gallup World Poll (GWP) as our barometer of citizen approval of foreign powers. Gallup provides annual public opinion data from 2006 to 2020 on a variety of topics, including opinion on world leadership including: China, Russia, India (not available for all years), and the US. The poll is designed to be representative of 95% of the adult, civilian, non-institutionalized population. Each year essentially represents one wave of questions that were administered at various times throughout the year in each country. For details on the sampling methodology (nationally representative surveys with standardized questionnaire instruments), see GWP's detailed description on their website at https://www.gallup.com/services/177797/country-data-setdetails.aspx.

We used the following GWP question: "Do you approve or disapprove of the job performance of the leadership of [insert foreign power]?" Respondents could select approve, disapprove, don't know, or refuse to answer. We constructed two variables for analysis: we coded an answer as '1' if the respondent replied approve and '0' otherwise; then we coded an answer as '1' if the respondent replied disapprove and '0' otherwise. We dropped all "don't know" responses.

Similar to what was done with the analysis of subnational Chinese public diplomacy, we also conducted hierarchical clustering analysis of approval of PRC leadership in SCA countries. These results are shown in Figure A-7.

Figure A-7: Dendrogram of perceptions of Chinese leadership

Approval of China

hclust (*, "average")
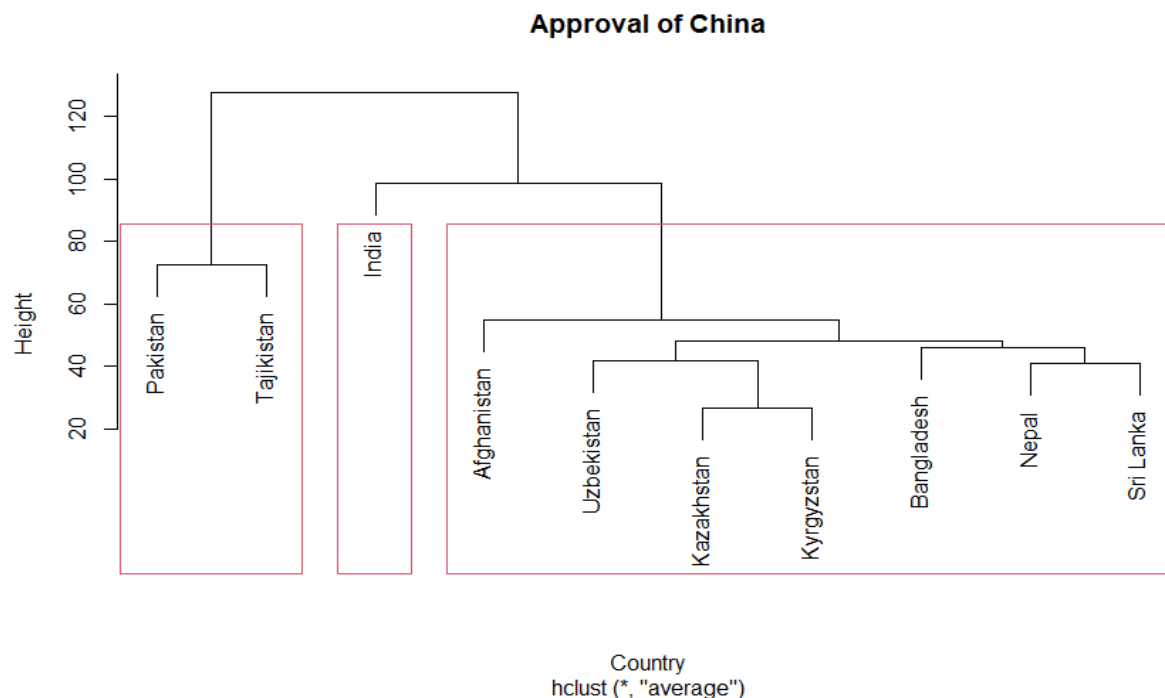
A-5.2 Replication exercise

In Chapter 5, we replicated an analysis of the impact of elite visits on public opinion conducted by Goldsmith et al. (2021). We conduct this replication exercise using the original dataset and codes[1] but limiting the sample to visits from Chinese officials to SCA host countries. The limited sample includes three visits to Kazakhstan and one to India between 2010 and 2017. The model behind Figure A-8 is an ordinary least squares (OLS) regression with the treatment variable and visit-specific fixed-effects. A detailed explanation of the method can be found in the original paper.

Figure A-8: Relationship between high-level visits by PRC leaders and SCA citizen approval rates

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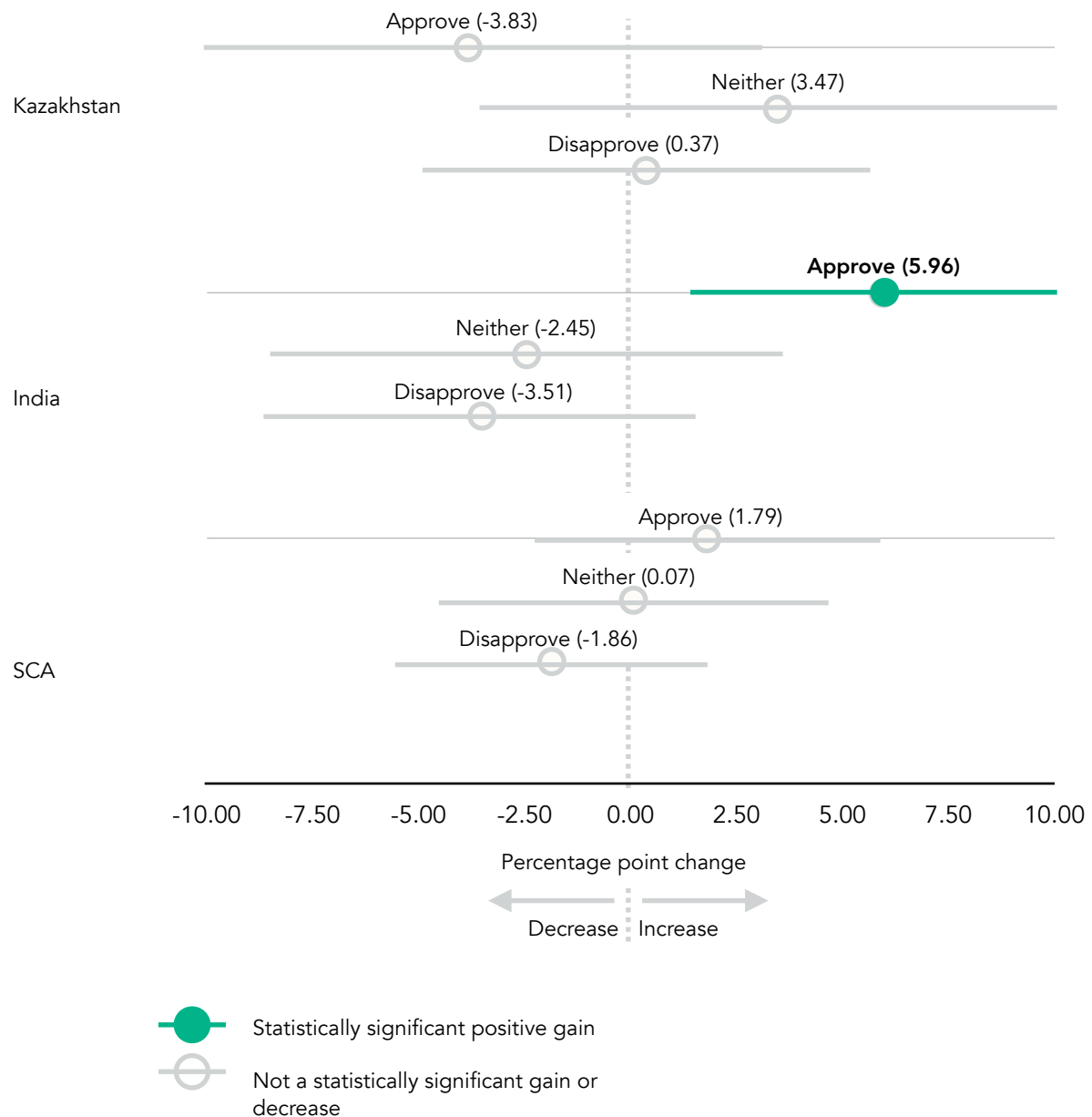
[1] These documents are available at Goldsmith & Horiuchi (2018)

A-5.3 AidData snap poll survey of policy elites as a proxy for leader perceptions of foreign powers

Policymakers in low- and middle-income countries have substantial influence over a multitude of decisions that shape the trajectory of their country's development and relations with foreign powers. Yet, most nationally representative surveys conducted in low- and middle-income countries focus on the general public, rather than policymaking elites. The few elite surveys that do exist usually rely on convenience samples, which lack a systematically defined population of interest, making it difficult to evaluate the extent to which respondent views are generally representative of the individuals from whom we want to hear. Moreover, most publicly available surveys seldom ask questions specific to countries' experiences of public diplomacy activities conducted by foreign powers.

AidData is a market leader in fielding large-n surveys of policymakers in low- and middle-income countries in a consistent and comparable manner. A comparative advantage of our surveys is that they leverage a global sampling frame developed in 2010 and updated for each survey wave (in 2014, 2017, and 2020). As described previously, rather than employing the convenience samples often used by market research firms, AidData identifies sampling frame members using institution maps of the positions within government agencies and organizations that discharge functions relevant to our research questions, followed by a search for the contact information of individuals holding these positions.

In this report, we leveraged a portion of our in-house Listening to Leaders sampling frame for South and Central Asia to conduct a snap poll survey of public, private, and civil society leaders to understand their perceptions of foreign powers, exposure to public diplomacy activities by these powers, and attitudes towards foreign language learning. We fielded the snap poll survey to the following stakeholder groups from AidData's sampling frame: (i) officials from host government agencies; (ii) representatives of development partners operating in-country; (iii) leaders of civil society organizations and non-governmental organizations; (iv) leaders of private sector companies; and (v) independent experts from universities, think tanks, and media.

Between June and August 2021, 6,024 SCA elites successfully received the invitation to participate in the snap poll survey in their email inboxes. Survey recipients were sent a tailored email invitation to participate that included a unique link to the online questionnaire. Some email invitations did not reach their intended recipients because their emails were no longer operational or because of their security settings, which blocked suspected spam emails. Of these, 159 leaders answered the survey, for a response rate of 3 percent. It is worth noting that individual-level participation rates to email surveys and elite surveys tend to be lower than that of household surveys. Respondents had the option to take the online survey in either English or Russian languages.

AidData mitigates potential bias in our surveys in three ways: (1) developing a robust sampling frame of individuals who represent our target population of interest; (2) collecting data to monitor the demographics of those who receive an invitation versus those who respond to the survey to assess representativeness; and (3) using non-response weights when computing aggregate statistics (e.g., arithmetic means) from the survey results.

A-5.3.1 Snap poll weights

In light of this relatively low response rate and imperfect information about the representativeness of our sample vis-à-vis the sampling frame (i.e. the population of interest), we use a weighting scheme to mitigate the potential for bias in our results. We employ non-response weights to account for unit non-response (or survey non-response) and to redress potential bias deriving from it. To generate non-response weights, we take the following steps. First, we estimate the probability of survey response by using a logistic regression. For all members of our sampling frame, we have information on their gender, country, and stakeholder group (e.g., host government officials, development partners). We use all these predictors to estimate the probability of survey response for each member of the sampling frame. Second, we take the inverse of the estimated probability to arrive at the final nonresponse weights used for our analysis, following the method adopted in the 2018 and 2021 Listening to Leaders reports (Custer et al. 2018; Custer et al., 2021). Lastly, we cap the upper bound of the weights at two standard deviations from the mean.

A-5.3.2 Snap poll survey questionnaire

Notes about the survey, usually explaining display logic, will be italicized and in red (like this section). Anywhere where the survey pipes in information, it will be indicated in red font, unitalicized.

Section: Introduction

Q1. Which of the following countries did you work in **for the longest time** between 2016 and 2020?

If you did not work in any of these countries, please select "None of the above"

- Afghanistan

- Bangladesh

- Bhutan

- India

- Kazakhstan

- Kyrgyzstan

- Maldives

- Nepal

- Pakistan

- Tajikistan

- Turkmenistan

- Uzbekistan

- None of the above

Hereafter, the country chosen in Q1 is simply referred to as 'country' in the text

Section: Demographics

Q2. Which type of organization in country did you work with for **the longest time** between 2016 and 2020?

- Government Agency, Ministry or Office

- Development Partner (e.g., World Bank, United Nations)

- Non-Governmental Organization or Civil Society Organization

- Private Sector

- Academia, Think Tank or Media

- Other (Please specify): _____

Q3. Please select the sector in which you have worked for the longest time between 2016 and 2020. (Please select one sector.)

- Economy and finance

- Social and education

- Environment

- Agriculture and rural development

- Governance

- Infrastructure

- Defense and security

- Foreign policy

- Other (Please specify): _____

Section: General Perceptions towards Foreign Powers

Q4. What is your overall opinion of the following countries?

India only appears if not selected as country in Q1

	0 = Very unfavorable	1 = Somewhat unfavorable	2 = Somewhat Favorable	3 = Very favorable	Don't know/ Not sure
India					
China					
Russia					
United States					

If the respondent selected Somewhat favorable or Very favorable for one or more foreign powers:

Q5a-d. In general, what contributes to the favorable image of [foreign power] in country?

Please select up to 3 options.

- Shares a common language and/or cultural similarities with country

- Shares colonial and/or historic ties with country

- Has demonstrated an attractive development model

- Presents good economic opportunities for country

- Treats country as an equal partner

- Engages with country fairly and transparently

- Ensures regional security

- Other (please specify): _____

If they select Somewhat unfavorable or Very unfavorable for any of the countries:

Q6. In general, what contributes to an unfavorable image of these countries in country?

Please select up to 3 options.

These countries…

- Do not share a common language and/or cultural similarities with country

- Share colonial and/or historic ties with country

- Has demonstrated an unattractive development model

- Present few good economic opportunities for our people

- Do not treat country as an equal partner

- Do not engage with country transparently and fairly

- Threaten regional security

- Other (please specify): _____

Section Visibility and Exposure to Public Diplomacy Activities

For all respondents except those that selected India during country selection:

In the next few questions, we would like your views on the extent to which India, Russia, China and the United States carry out public diplomacy activities in country.

Public diplomacy refers to a country carrying out activities to influence the perceptions, preferences, and actions of foreign leaders and citizens. The country engaging in public diplomacy may do so as a means to improve its reputation among foreign publics and advance its national interests.

For respondents that selected India in country selection:

In the next few questions, we would like your views on the extent to which Russia, China, and the United States carry out public diplomacy activities in country. [Note: Respondents from India were unable to evaluate the public diplomacy activities of their own country with other SCA countries]

Q7a-d. Please indicate the degree to which [foreign power] engages in the following types of activities in country on a scale of 0-3.

	0 = Not at all active	1 = Somewhat active	2 = Quite active	3 = Very active	Don't know/ Not sure
Promote culture and language (e.g., language centers, cultural events)					
Strengthen relations among the general public (e.g., exchange students, scholarships)					
Strengthen relations among elites (e.g., visits by government and military officials)					

Engage with traditional and online media (e.g., journalist exchanges, interviews with media in country)					
Provide financial assistance through grants and loans (e.g., aid, foreign direct investment)					

Q8. We have asked you about the public diplomacy activities of a very specific set of countries. Is there another country that engages very actively in public diplomacy in country? If yes, you will be asked to select the country in the next question.

- Yes

- No

If the respondent answered yes to the previous question:

Q9. Which country, excluding those we have asked about, engages most actively in public diplomacy in country?

- Respondents have a full list of UN recognized countries and the option to enter another country.

If the respondent chose one or more foreign powers as Very active or Quite active in "Promoting culture and language", they are presented this question:

Q10b. You said that [foreign power] is active in promoting culture and language in country.

Responses options are shown for China only.

Please select **ALL** answers that apply.

In this question, participation can mean attending, viewing, experiencing or being a part of any of these activities.

	Which of these activities do you think citizens most often participate in?	Have you ever participated in the following activities?
Confucius Institutes and Confucius classrooms		
Cultural events (e.g., Chinese New Year, food festivals)		
Chinese entertainment (e.g., Chinese ballet, martial arts, films)		

Religious exchanges (e.g., sponsoring Buddhist conferences, exchanges of monks)		
Other (please specify): _____		
None of the above		

If the respondent chose one or more foreign powers as Very active or Quite active in "Strengthen relations among the general public", they are presented this question:

Q11b. You said that [foreign power] is active in promoting people-to-people ties with the general public in country.

Please select **ALL** answers that apply.

Responses options are shown for China only.

In this question, participation can mean attending, viewing, experiencing or being a part of any of these activities.

	Which of these activities do you think citizens most often participate in?	Have you ever participated in the following activities?
Students from country pursuing higher education in China		
Students from country pursuing exchange programs in China		
Satellite campuses of Chinese universities		
Scholarships to study in China		
Humanitarian volunteers (e.g., Chinese medical teams)		
Sister cities (i.e., agreement between towns, cities or provinces to promote cultural and commercial ties, for example Beijing and Delhi)		
Sporting events and athletic meets organized by China		
Other (please specify): _____		
None of the above		

If the respondent chose that one or more foreign powers as Very active or Quite active in "Strengthen relations among elites", they are presented this question:

Q12b. You said that [foreign power] is active in promoting people-to-people ties with official counterparts in country.

Please select **ALL** answers that apply.

In this question, participation can mean attending, viewing, experiencing or being a part of any of these activities.

	Which of these activities do you think citizens most often participate in?	Have you ever participated in the following activities?
Visits by Chinese government officials to country		
Visits by country government officials to China		
Visits by military officials of China or country		
Party exchanges (communist party official visits)		
Training programs hosted by China for government officials and bureaucrats		
Training programs hosted by China for military officials		
Joint military exercises		
Other (please specify): _____		
None of the above		

Q13b. You said that [foreign power] is active in engaging with traditional and online media in country.

Please select ALL answers that apply.

In this question, participation can mean attending, following or consuming any of these activities.

	Which of these activities do you think citizens most often participate in?	Have you ever participated in the following activities?
Presence of Chinese state-owned traditional media in country (e.g, Xinhua, CGTN)		

Chinese leaders giving interviews and press briefings to country media outlets		
Chinese leaders publishing op-eds in country media outlets		
Journalists from country participating in exchanges or visits organized by China		
Media outlets in country featuring Chinese sponsored content and advertising		
Media outlets in country re-publishing Chinese news content (e.g., through content sharing partnerships)		
Chinese and country media jointly producing content for television, radio or print		
Chinese leaders using social media such as Twitter, TikTok, WeChat, YouTube channels and Facebook pages		
Other (please specify): _____		
None of the above		

If the respondent chose that one or more foreign powers was Very active or Quite active in "Provide financial assistance through grants and loans", they are presented this question:

Q14b. You said that [foreign power] is active in providing financial assistance in country.

Please select ALL answers that apply.

Responses options are shown for China only.

In this question, participation can mean attending, following or consuming any of these activities.

	Which of these activities do you think citizens most often participate in?	Have you ever participated in the following activities?
Building transportation infrastructure (e.g., ports, highways)		
Building social infrastructure (e.g., hospitals and schools)		
Providing financial aid for humanitarian purposes (e.g., emergency/disaster response and reconstruction)		
Building and gifting structures with cultural or historic significance (e.g., government building, temple)		
Providing telecommunication equipment for security and development		
Other (please specify): _____		

None of the above		

Section: COVID-19 Response

India is only a response option if the respondent does not select it in Q1

Q38. Reflecting on the year 2020, which of the following countries adapted their diplomacy efforts most effectively in response to the COVID-19 pandemic?

- India

- Russia

- United States

- China

- None of these countries adapted their diplomacy efforts effectively

Section: Influence in Foreign Languages

You have made it to the final section of the survey. This section focuses on the interest in learning new languages in country.

Q17. Please rate your fluency in the following languages on a scale of 0-4:

	0 = No knowledge at all	1 = Basic or beginner level	2 = Intermediate level	3 = Advanced level	This is my native language
English					
Russian					
Mandarin Chinese					

Q18. Please rate your interest in increasing your fluency in the following languages on a scale of 0-3:

Response options only shown so long as "this is my native language" was not selected in the previous question.

	0 = No interest at all	1 = Slight interest	2 = Quite a bit of interest	3 = High interest	Don't know/ Not sure
English					
Russian					
Mandarin Chinese					

Q19a-c. Thinking of [insert language] as a foreign language, which of the following statements would you most agree with? (Please select one)

I would like to learn English because...

- It is an official requirement of my job.

- It would help me to advance professionally.

- It provides me access to a new culture and entertainment options.

- Other (Please specify): _____

Section: Closing

The final question was only asked about China and the United States

Q20a-b. To be viewed more favorably among citizens and elites in country, which areas of public diplomacy should [foreign power] focus on in the next four years?

- Promote culture and language (e.g., language centers, cultural events)

- Strengthen relations among the general public (e.g., exchange students, scholarships)

- Strengthen relations among elites (e.g., visits by government and military officials)

- Engage with traditional and online media (e.g., journalist exchanges, interviews with media in country)

- Provide financial assistance through grants and loans (e.g., aid, foreign direct investment)

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