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Interorganizational and International Networks For Digital Diplomacy Outreach: A Comparative Study of South Korea and China

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Abstract: *This study introduced an analytical framework for assessing the inter-organizational network system and the web impacts of public diplomacy organizations' sites through the cases of South Korea and China. This study compared interorganizational collaboration networks, the impact of the government agencies' websites, and the sectoral and geographic distribution of information resources offered by the agencies on the web. Social network analysis was employed, and it indicated that the Chinese public diplomacy organizations constructed denser and more strongly connected networks than the Korean public diplomacy agencies. Furthermore, the results suggested that .com was the most popular generic top-level domain, followed by .org, .net, and .edu, for both Korean and Chinese organizations. The source sites that sent links to Korean organizations originated mostly from East Asian (Korea, Indonesia, and Japan) and European countries (Germany and Russia). Information about Chinese culture was spread more widely across diverse countries, including East Asian (China and Japan), North American (Canada), European (United Kingdom, France), and Oceanian (Australia) countries. For both Korea and China, domestic audiences played key roles as information hubs in each network, which illuminates a networked and cooperative form of digital diplomacy outreach in these countries.*

Keywords: Digital Diplomacy; Public Diplomacy; Network Analysis; South Korea; China

1. Introduction

The emerging concept of Public Diplomacy 2.0 highlights the importance of relationship building between the states and the foreign public beyond one-way communication or top-down information provision [1, 2]. During the past decade, the literature on public diplomacy has moved to the new era of "digital diplomacy," which is Internet-based public diplomacy. Furthermore, recent studies on public diplomacy have focused on the impacts of the Internet and how to utilize the full benefits of digital technologies to increase the foreign public's understanding of a nation's policies and strengthen the relationship between a nation and the public [3]. The majority of Asian governments adopted a one-way transmission model of public diplomacy using digital platforms [4]. How to disseminate and present information is critical to influencing target audiences' attitudes and behaviors [5]. Thus, strategic communication and engaging with target audiences via digital communication channels represent important interests of nations, which can result in mutual understanding and shared interests between countries and the public [6].

Recent studies on digital diplomacy have focused on national communication strategies for public diplomacy [7], social media uses of government and public affairs practitioners [8], governments' digital engagement with public [9], and social media networks of embassies and diplomats [10]. However, quantitative empirical research on the performance and impacts of digital diplomacy outreach is lacking [11]. A few studies have adopted computational methods to evaluate digital diplomacy practices and networking performances of diplomacy organizations. These studies explored social media outreach and diplomacy organizations' engagement with the public from a social network perspective [11, 12]. However, these studies have focused

on social media practices and did not identify information spreaders of public diplomacy sites on the web. Because governments' digital diplomacy outreach efforts can be accelerated and augmented by various non-state actors or stakeholders on the web, tracking the flow of information networks and the pattern of information sharing between actors on the web is essential. Moreover, little is known about the network dynamics in the public diplomacy sector beyond a single state.

To address these research gaps, this study aimed to evaluate networking practices of digital diplomacy through the case study of South Korea (hereafter, "Korea") and China from the following two aspects: interorganizational network structure and international information networks. First, the structural characteristics of interorganizational networks between public diplomacy organizations were investigated to assess the efficiency of collaboration in information sharing across organizations. Second, this study explored how the information provided by public diplomacy organizations spread online, in addition to major non-state actors who disseminate the public diplomacy information, and the web impact of governmental sites. Korea and China were selected as they are both emerging cyber powers having digital capabilities, large Internet user communities, and e-government services [12, 13]. The findings help gauge the impact of governments' digital diplomacy practices and information received on the web from the perspective of information users [7, 11, 12]. In addition, this study highlights the role of relevant non-state actors in strengthening the performance of the governments' digital public diplomacy outreach in East Asia.

2. Materials and Methods

2.1 Data Collection

To evaluate the performance of states' digital diplomacy outreach, public diplomacy websites in Korea and China were collected and analyzed. All public diplomacy organizations administered by the government ministries in the sectors of agriculture, education, tourism, culture and information, and foreign affairs were identified. As the purpose of the digital diplomacy outreach is to communicate with the global public, only the websites in English were selected. This resulted in 16 Korean government organizations and 15 Chinese organizations [Table 1, Table 2].

Table 1. A list of Korean public diplomacy organizations

Category	Ministry	Bureau	Site
Foreign Affairs	Ministry of Foreign Affairs	Headquarters (MOFA)	mofa.go.kr/eng
		Korea Foundation	en.kf.or.kr
		Korea International Cooperation Agency (KOICA)	koica.go.kr/english
Culture, Tourism, and Information	Ministry of Culture, Sports and Tourism	Headquarters (MCST)	mcst.go.kr/english
		Korean Culture and Information Service (KOCIS)	kocis.go.kr/eng
		Korea Arts& Culture Service (ARTE)	eng.arte.or.kr
		Korean Film Council (Korean film)	koreanfilm.or.kr/eng
		Korea Creative Content Agency (KOCCA)	kocca.kr/en
		Cultural Portal	culture.go.kr/english.do
		Korea Tourism Organization website#1 (Korea Tourism)	kto.visitkorea.or.kr/eng.kto
		Korea Tourism Organization website#2 (Visit Korea)	english.visitkorea.or.kr
Education	Ministry of Education	Headquarters (MOE)	english.moe.go.kr
		National Institute for International Education (NIIED)	niied.go.kr/eng
		The Academy of Korean Studies (Korean Studies)	intl.aks.ac.kr/english
Agriculture, Food and Rural Affairs	Ministry for Agriculture, Food and Rural Affairs	Headquarters (MAFRA)	mafra.go.kr/english

News and Information	Ministry of Culture, Sports and Tourism	Korea.net	http://korea.net

Interlinks between the public diplomacy agencies were gathered using Webometric Analyst 2.0 with the Bing.com search API on November 14, 2018 [14]. Furthermore, a total of 6,374 web pages that cited the URLs of the government agency sites (2,876 web pages for 16 Korean government sites and 3,498 web pages for 15 Chines sites) were collected and parsed.

Table 2. A list of Chinese public diplomacy organizations

Category	Major ministry	Bureau	Site
Foreign Affairs	Ministry of Foreign Affairs	Central Government Headquarters (MOFA)	english.gov.cn/services fmprc.gov.cn/mfa_eng/
Culture, Tourism, and Information	Ministry of Culture and Tourism of China	Bureau for External Cultural Relations (China Culture; used as headquarters in this study)	en.chinaculture.org
		National Museum of China (China museum)	en.chnmuseum.cn
		China National Academy of Painting (CNAP)	cnap.org.cn/English
		National Art Museum of China (NAMOC)	namoc.org/en
		China National Peking Opera Company (CNPOC)	cnpoc.cn/EN/
		China Arts and Entertainment Group (CAEG)	en.caeg.cn
Education	Ministry of Education	Headquarters (MOE)	en.moe.gov.cn/
		China Scholarship Council	campuschina.org/
		Confucius Institute Headquarters (Hanban)	english.hanban.org
		Confucius Institute	chinesecio.com
Agriculture and Rural Affairs	Ministry of Agriculture and Rural Affairs	Headquarters (MOARA)	english.agri.gov.cn/oe/cp/
News and Information	State Council Information Office	Headquarters (SCIO)	english.scio.gov.cn/
		China Internet Information Center (CIIC)	china.org.cn/index.htm

2.2 Webometric Analysis

First, interorganizational networks of public diplomacy organizations in Korea and China were analyzed. This study explores the interlinks between the 16 Korean and 15 Chinese organizations, respectively. Consequently, 16 x 16 and 15 x 15 matrices were used to generate interorganizational networks, where each link (i,j) has a weight w_{ij}, representing the total number of URL citations each organization received from the other organization. After visualizing the weighted networks using NodeXL, they were dichotomized as $x(i,j)$ greater than or equal to value 1 = 1 and otherwise = 0. While the number of nodes and links was calculated based on the weighted networks, other network measures such as network density, arc reciprocity, outdegree centralization, and indegree centralization were computed using the dichotomized networks.

Second, the citation analysis was employed to explore the flow of international information networks and the web impact of the public diplomacy organizations on the frequency of URLs mentioning the government sites [15]. To identify the type of business and geographical distribution of source sites that sent links to target sites (public diplomacy organizations), top-level domains (TLDs), and country-specific top-level domains (ccTLDs) of the source sites were further classified. Then, network analysis was conducted to compare the characteristics of information networks in Korea and China, composed of government agency sites and TLDs used in sites that cited government sites. Social network indicators, including network density, diameter, degree centralities of TLDs, and ccTLDs, were computed to measure the structure of the information network, and active contents carriers on the entire web using UCInet. UCInet Netdraw was used for network visualization.

3. Results

3.1 Interorganizational Networks for Digital Diplomacy Outreach

To explore interorganizational information networks on the web, interconnections between the public diplomacy agencies' websites in Korea and China were analyzed. The Korean public diplomacy interorganizational network is presented in Figure 1. A node refers to a public diplomacy agency's website in Korea, and a directed link indicates the URL citation of organization A to organization B. Node sizes are proportional to the number of URL citations the government agencies gained. Node colors indicate the category of the organizations. Yellow indicates foreign affairs, light blue refers to tourism and culture, blue refers to education, orange indicates news and information, and pink denotes agriculture sites. The thickness of the link between the nodes corresponds to the number of URL citations. The number of nodes that participated in the network was 16, and the total number of citation links between the organizations was 136. The network density of 0.087 means that 8.7% of the organizations were interconnected in the Korean network.

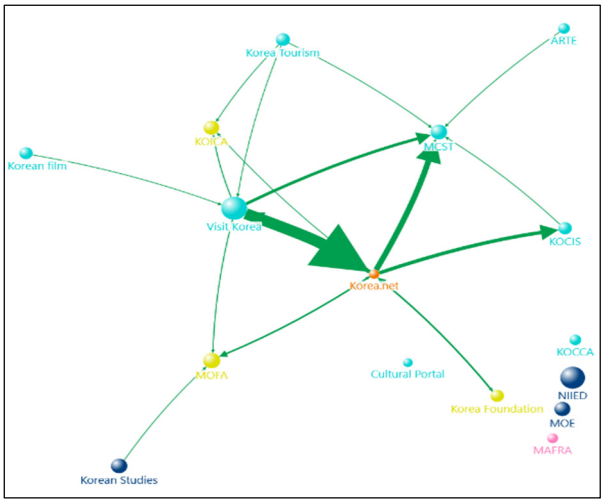

Figure 1. Interorganizational network of Korean public diplomacy organizations

Visit Korea and Korea.net, administered by the Ministry of Culture, Sports, and Tourism (MCST) were strongly interconnected. They cited the websites of MCST many times. Korea.net actively sent links to the Korean Culture and Information Service (KOCIS). Interestingly, the two educational institutes, the National Institute for International Education (NIIED) and the Ministry of Education (MOE) were isolated in the network whereas they had high web visibility. Both out-degree centralization, that is, the extent of inequality in sending the citations links to other organizations (0.333), and in-degree centralization, that is, the extent of inequality in receiving links from other organizations (0.262), were low. The reciprocity in sending links back to the organization that cited an organization was 47.6%.

Figure 2 shows the Chinese public diplomacy interorganizational network. The number of nodes was 15. The number of connections in the network was 740, which is five times greater than that of the Korean network. Furthermore, compared to the Korean interorganizational network, the Chinese public diplomacy organizations also had a denser network with a density of 0.129, showing that 12% of the Chinese organizations were interconnected. These results imply that the Chinese agencies tended to share information more actively between them online and promote other agencies by directing the public to the other relevant public diplomacy sites compared to the Korean agencies.

Interestingly, the central government had many self-loops in the Chinese interorganizational network, meaning that they cited their sources actively on their website. The public diplomacy organizations across the sectors were connected well, and the Ministry of Agriculture and Rural Affairs (MOARA)was the only isolated organization in the network. It is noteworthy that the China Internet Information Center (CIIC) and the central government played critical roles in disseminating information in the network.

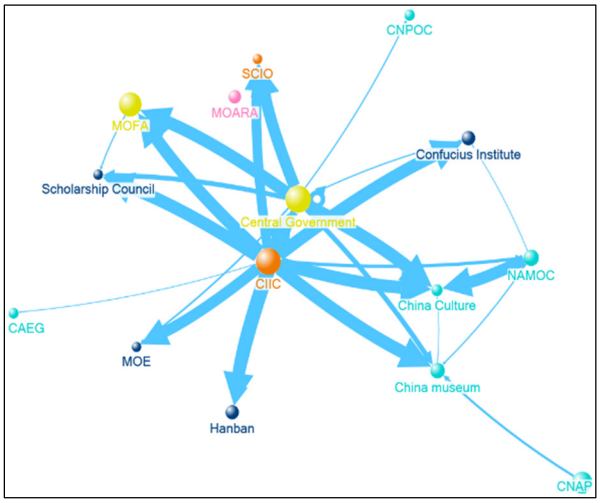

Figure 2. Interorganizational network of Chinese public diplomacy organizations

Furthermore, they were the active information spreaders in Chinese digital diplomacy outreach. Out-degree centralization value was large (0.704), while indegree centralization value was low (0.168). The reciprocity in connection was 7.4%.

3.2 Web Impact of Public Diplomacy Organizations

The hyperlink analysis results indicated the web impact of the Korean and Chinese government sites in terms of the number of domains sending links to government sites. As summarized in Table 3, the Korean organizations in the category of tourism and culture (1,063) had the highest web impact followed by government agencies in education (786), foreign affairs (423), agriculture (28), and news and information (18) sectors.

Table 3. The popularity of public diplomacy sites

Category	Korean organizations		Chinese organizations	
	Web impact	**Mean**	**Web impact**	**Mean**
Foreign Affairs	423 (*N*=3)	141	1,141 (*N*=2)	570.5
Tourism and Culture	1,066 (*N*=8)	132.875	744 (*N*=6)	124
Education	788 (*N*=3)	262	211 (*N*=2)	105.5
Agriculture	18 (*N*=1)	28	96 (*N*=4)	24
News and information	18 (*N*=1)	18	646 (*N*=2)	323

Similarly, the government agencies administered by its Ministry of Foreign Affairs gained the highest number of URL citations (1,141) followed by the Chinese government agencies that provide information on tourism and culture (744). The next influential sites were administered by the organizations that distribute recent news (646) and government agencies in the sector of education (211). The agricultural agency in China (96) had the lowest web traffic. Considering that the number of organizations in each sector may affect the extent of their web traffic, the mean scores of the web impact were also suggested. The education and foreign affairs agencies in Korea gained high numbers of URL citations, whereas the foreign affairs and news and information agencies in China were outstanding in their web impact.

3.3 Diffusion of Promotional Contents on the Web

Next, we explored how government-promoted information and content spread on the web. A total of 2,876 web pages from 1,726 sites linking to 16 Korean government sites were analyzed. A two-mode matrix, composed of 16 Korean government sites and 336 TLDs used for the source sites, was analyzed to explore the interconnection between TLDs and public diplomacy organizations. Figure 3 visualizes the network of Korean government sites and TLDs of source sites.

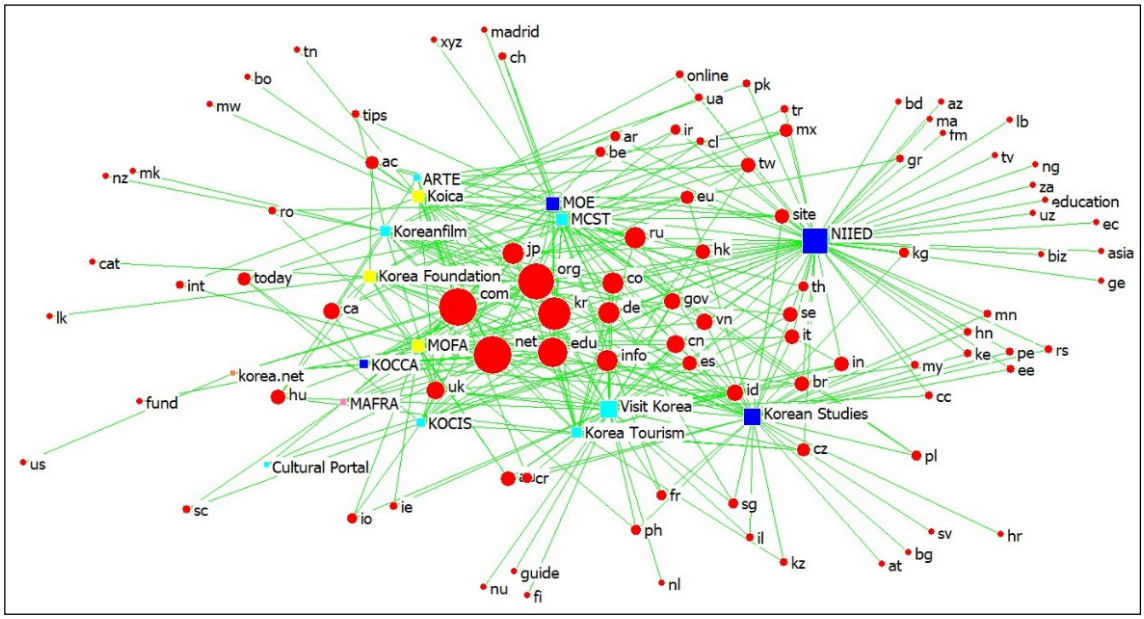

Figure 3. International information network of Korean public diplomacy organizations

While square nodes represent the government sites, circle nodes suggest TLDs of the source sites. Red nodes refer to TLDs, citing government sites. Yellow nodes indicate foreign affairs, light blue nodes refer to tourism and culture, blue nodes refer to education, orange nodes indicate news and information, and pink nodes denote agriculture sites. A tie between government sites and TLDs indicates that a government site received a citation from a source site. A distance between a pair of nodes reflects their geodesic distance. Degree centralization of TLDs was computed to analyze the active source sites. The result indicates a sparse information network with a density of 0.213 and a diameter value of 4.000, which means the shortest length between the most distant pairs of nodes is four steps [11].

A TLD that has a high degree centrality plays a hub in a network that sends many links to government sites [16]. As summarized in Table 4, three generic top-level domains (gTLDs), including .com, .net, and .org were active source sites, followed by .kr, .edu, .jp, and .co. This result suggests that both profit and non-profit organizations; educational sites; and Korean, Japanese, and Columbian sites were centered in the network. According to the results of the degree centralities of ccTLDs, the Korean site was the most active information seeker, followed by domains assigned to Japan, Columbia, Germany, and Russia. Websites originating from the United Kingdom, China, Indonesia, Vietnam, and Canada were also active information distributors of Korean governments' content.

In the case of Chinese public diplomacy organizations, a total of 3,498 web pages from 2,323 sites cited the 15 government sites. A two-mode matrix of the 15 Chinese government sites and 243 TLDs were used to construct the international network. As visualized in Figure 4, the Chinese network was more sparse and smaller than the Korean network with a density value of 0.194 and a diameter value of 4.

State Council (SCIO), an information and news agency, was ironically isolated in the network. In contrast, organizations of tourism and culture were hubs in the network. Similar to the information network of diplomacy organizations in Korea, three gTLDs (.com, .net, and .org), Chinese sites, and educational sites were central in the network of government organizations in China. It is noteworthy that sites administered by governments actively shared the information of Chinese government sites. The results of ccTLDs degree centralities suggest that sites originating from China, Japan, Canada, and the United Kingdom were the main audiences and content carriers of the Chinese government's promotional information. Sites from Australia, Germany, and Italy were also central information distributors in the network.

Table 4. The most frequently appearing TLDs and ccTLDs in public diplomacy networks

	Korea		**China**		**Korea**		**China**	
Rank	TLDs	Degree	TLDs	Degree	ccTLDs	Degree	ccTLDs	Degree
1	com	1	com	0.933	kr (Korea)	0.875	cn (China)	0.533
2	net	1	net	0.8	jp (Japan)	0.5	jp (Japan)	0.533
3	org	0.938	org	0.733	co (Columbia)	0.5	ca (Canada)	0.533
4	kr	0.875	cn	0.533	de (Germany)	0.5	uk (United Kingdom)	0.533
5	edu	0.75	edu	0.533	ru (Russia)	0.5	au (Australia)	0.467
6	jp	0.5	jp	0.533	uk (United Kingdom)	0.438	de (Germany)	0.467
7	co	0.5	ca	0.533	cn (China)	0.438	It (Italy)	0.4
8	de	0.5	uk	0.533	id (Indonesia)	0.375	France	0.333
9	ru	0.5	au	0.467	vn (Vietnam)	0.375	hk (Hongkong)	0.333
10	info	0.5	de	0.467	ca (Canada)	0.375	ru (Russia)	0.333
11	uk	0.438	gov	0.4	br (Brazil)	0.313	cz (Czech Republic)	0.333
12	cn	0.438	it	0.4	it (Italy)	0.313	Europe	0.267
13	id	0.375	fr	0.333	au (Australia)	0.313	USA	0.267
14	gov	0.375	hk	0.333	tw (Taiwan)	0.313	Philippines	0.267
15	vn	0.375	ru	0.333	hk (Hongkong)	0.313	es (Spain)	0.267
16	ca	0.375	cz	0.333	se (Sweden)	0.313	ch (Switzerland)	0.267
17	br	0.313	info	0.333	in (India)	0.313	nl (Netherlands)	0.2
18	it	0.313	eu	0.267	es (Spain)	0.313	br (Brazil)	0.2
19	au	0.313	us	0.267	hu (Hungary)	0.313	pl (Poland)	0.2
20	tw	0.313	ph	0.267	mx (Mexico)	0.25	mx (Mexico)	0.2

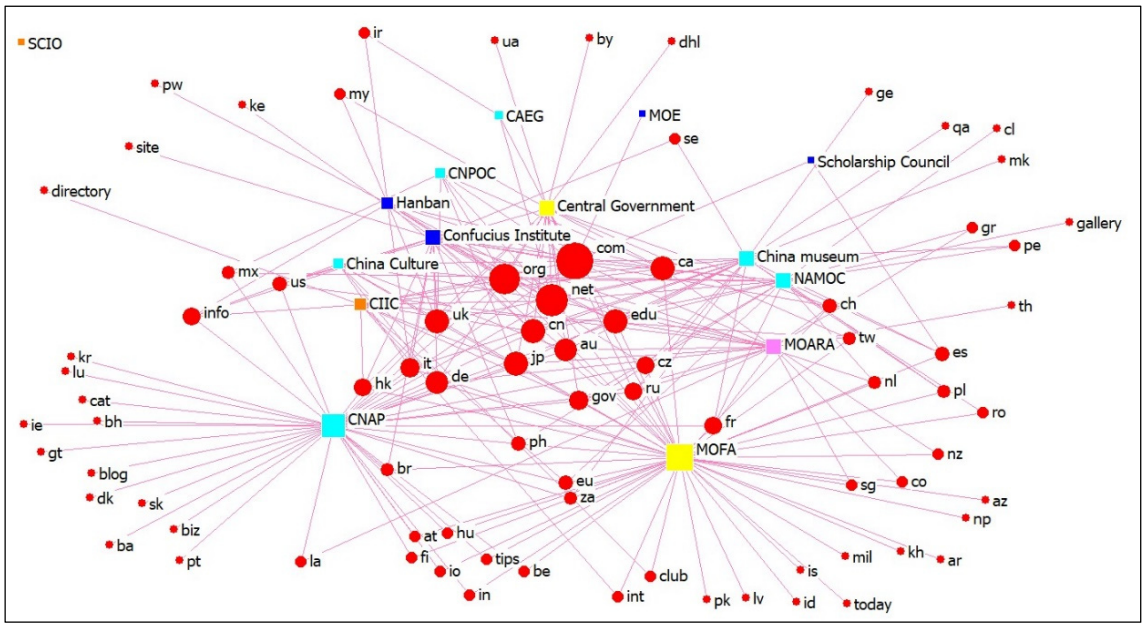

Figure 4. International information network of Chinese public diplomacy organizations

4. Discussion and Conclusions

This study assessed the interorganizational networking performance and the web impact of digital diplomacy organizations, as well as the key non-stake actors in the information diffusion process. Using the cases of Korea and China, this study offered insights into the information system and government agencies' practices for digital diplomacy outreach in the East Asian context, which received relatively low attention.

The results indicate that the Korean and Chinese interorganizational networks were similar in terms of the number of public diplomacy organizations that participated in the network and the extent of inequality in receiving ties from other organizational sites. They were dissimilar in that the Chinese public diplomacy

organizations constructed denser and more strongly connected networks than the Korean public diplomacy agencies. However, it is interesting to note that the Korean agencies show significantly more reciprocated ties between the organizations, while the Chinese agencies' reciprocity in connections was very low at about 7%. Although diplomatic organizations in various sectors were connected well in the Chinese network, the public diplomacy agencies in the sector of culture and tourism were centrally positioned, and they actively cited other culture and tourism sites in the Korean network.

The tourism and culture sector had the largest number of digital outreach venues in both countries. The web impact analysis results showed that tourism and culture agencies and education institutions received the highest web impact in Korea. Foreign affairs sites, tourism and culture agencies, and news and information sites were popular in China. This finding indicates that while soft power is a critical asset in both Korea and China, the public seeks more information regarding politics, policies, and up-to-date information from the Chinese government. This may be attributed to China's authoritarian regime and its controversial approach to Internet policies that often cause cyber wars with other countries such as the United States, as well as trade issues [17, 18].

China represented a larger international network with more citations from the public than Korea. This is consistent with China's stronger global cyber power. China ranked second in the National Cyber Power Index [19]. Furthermore, the key actors in disseminating the information of public diplomacy organizations are similar in the two countries. Profit and non-profit organizations and educational sites actively promoted and shared public diplomacy sites. The most active national player in both networks were their domestic actors. Websites originating from Japan, Canada, the United Kingdom, and Germany were the active information carriers. The Korean governmental sites had a wider range of audiences from South America and countries in the Asia and Pacific region.

This study offered methodological insights from webometric analysis for the assessment of interorganizational information systems and digital diplomacy outreach. It demonstrated the status quo in information collaboration between government agencies. The study also revealed how information of government agencies across various public diplomacy sectors spread on the web, and the extent of information shared, as well as major global audiences who shared information from the governmental sites. This study has some limitations. First, it scrawled automatically the number of pages that cited the URLs of organizations. This only shows the information-sharing activities, but it is hard to interpret how the information was used for particular purposes by the public. Thus, qualitative analysis of audiences and information contents shared on the web need to be verified in future studies. Second, although web traffic varies over time, this study only captured a single time frame [20]. A longitudinal study design would be helpful in future studies.

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Conflicts of Interest: The authors declare no conflict of interest.

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