

Looks matter! A Comparative Analysis of Image Use on Chinese and Western Municipal Websites

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Abstract – *The use of images on municipal websites plays a pivotal role in shaping first impressions of local governments and cities. However, our understanding of image usage on municipal websites and its relationship to culture remains limited. This study presents a comparative analysis of image use on 100 Chinese and 100 Western municipal websites, focusing on quantity, image types, and photo themes. The findings reveal distinct patterns: Chinese municipal websites tend to incorporate a significantly higher number of images, prominently featuring icons, posters/infographics, and QR codes, whereas on Western municipal sites relatively more drawings, logos, and photos are shown. These differences suggest that Western municipal websites adopt a text-centric approach, utilizing images primarily for aesthetic and affective purposes. Conversely, Chinese municipal websites adopt an image-centric approach, leveraging images for informative and navigational purposes. Moreover, in terms of photo themes, Western websites predominantly showcase themes related to families and daily life of residents, while Chinese counterparts emphasize government activities and urban development. These disparities reflect differing approaches to audience understanding: sender-responsible in the West and audience-responsible in China. Understanding these distinctions is vital for tailoring municipal websites to specific cultural groups, enhancing user engagement, and effectively communicating the city or government's image to diverse audiences.*

Index Terms – *Cultural differences, image use, municipal websites, photo themes, website design*

INTRODUCTION

Images serve as fundamental tools of visual communication, playing a crucial role in website appeal and user experience. Within mere 50 milliseconds, users can form initial impressions of a webpage's visual appeal [1], as images often being the primary element that captures their attention. Extensive research has explored

the impact of images used on commercial and tourism websites, focusing on factors like webpage appeal [2], purchase intentions [3,4], and trust [5] for commercial websites, as well as perceived risk and image of the destinations [6, 7] and intention to visit [8] for tourism websites. These studies have underscored the significant influence of images on user perceptions.

The influence of cultural differences adds a layer of complexity to how images are perceived and utilized. Cultural nuances play a crucial role in interpreting images and determining their effectiveness on websites. Studies have demonstrated that while certain visual attributes like facial characteristics may possess universal appeal across cultures, the functions and interpretation of images can vary significantly [5]. Research indicates that webpages with culturally aligned content, including culturally appropriate images, may receive higher first impression ratings from specific cultural groups [9]. However, in the context of tourism websites, incongruent cultural elements can paradoxically enhance destination image and travel intent [10]. From this perspective, the use of images should be evaluated within a specific genre and targeted cultural audiences.

There remains a lack of comparative analysis of images usage on municipal websites across cultures. Images used on municipal websites have the potential to shape the initial impression of a city or a local government since municipal websites often serve as the first point of contact for residents, businesses, and visitors [11]. They not only showcase content visually, but also play a crucial role in enhancing functionalities, bolstering credibility, and portraying local vitality, values, and culture.

There is also a gap in our comprehensive understanding of the disparities in image use between Chinese and Western municipal websites. Existing literature primarily limits to cultural differences in the thematic depictions of photos (i.e., visual representation) between Chinese and Western websites (refer to [12] for a literature review). While certain studies, such as Callahan's work [13], have endeavored to compare depictions in images and correlate them with cultural frameworks like Hofstede's dimensions

[14], many of these relationships are either weak or contradictory.

Therefore, this study presents an in-depth comparative analysis of image use on the homepages of 100 Chinese and 100 Western municipal websites. By examining the quantity of images, image types, and themes depicted on photos, we aim to answer the following three questions:

- 1) Are similar or different numbers of images utilized on the homepages of Chinese and Western municipal websites?
- 2) What are the primary types of images employed on their respective homepages?
- 3) What distinct themes are portrayed through the depictions of photos on these websites?

BACKGROUND

Existing literature has extensively examined cultural differences in image use between Chinese and Western websites, focusing primarily on quantity, types, and photo themes. This section will delve into the key findings within these three aspects.

I. Quantity

The quantity of images pertains to the total number of images used on a website. Wang *et al.* [15] conducted a comparative analysis of website design attributes across US and Chinese small- and medium-sized enterprises (SMEs). They assessed the number of images (including graphs, and pictures, but no logos) displayed on the homepages. Their study revealed no significant variance in the quantity of images. Conversely, Goyal *et al.* [16], Cermak [17], and Capece and Di Pillo [18] observed that Chinese governmental or commercial websites exhibit the higher number of images when compared to those from other countries or even their English versions. These differences were attributed variedly to distinct cultural dimensions such as Hofstede's high masculinity or collectivism, as well as Hall's high context and polychronic time perceptions which emphasize non-verbal cues for effective communication [19].

II. Image types

Image types refer to different categories of images used on a website. Wang *et al.* [15] observed that company logos were more prevalent on American websites compared to Chinese ones, suggesting that US companies prioritize their online identity. Hsieh and Dai Hong [20, 21] discovered that Taiwanese local government websites featured more cute style illustrations than their Australian and UK counterparts, contradicting the expected image of a solemn local authority. An's study [22] of global service corporations in six countries revealed that illustrations were also more common in Eastern cultures, while photos were more prevalent in Western cultures. Notably, the highest percentage of Chinese websites contained

illustrations, suggesting a preference for metaphoric and artistic visual expression, which aligns with the indirect, implicit communication style of Eastern cultures. However, these studies primarily focused on the presence or absence of specific image types, without comparing their quantities or proportions within total images, lacking a full picture of how different image types are utilized in the two groups.

III. Photo themes

Photo themes denotes the thematic portrayal of photos on websites. Previous studies have highlighted that Chinese websites often portray photos reflecting Hofstede's cultural dimensions of collectivism or high-power distance, showcasing leaders, large groups of people, elders, ceremonies, iconic symbols, accomplishments, and monuments. In contrast, Western websites tend to feature photos aligning with dimensions of individualism and low-power distance, such as scenes of daily life, nature, young individuals, and smaller groups [20, 21], [23-25]. However, existing research primarily focused on the head counts and specific objects without considering the broader context of these photos, particularly within the genre of municipal websites and their role in shaping the image of local governments.

In summary, prior studies either lacked a comprehensive overview of image use on Chinese and Western websites or failed to provide culturally informed explanations for the observed differences, especially within the genre of municipal websites. To address these gaps, our study conducted an in-depth analysis of image use on Chinese and Western municipal websites. Our aim is to explore similarities and differences in image quantity, types, and photo themes, while offering a broader contextual and cultural perspective to elucidate our findings.

METHODOLOGY

I. Sample selection

We created a corpus comprising 297 Chinese municipal websites and 231 Western municipal websites selected from the third-tier level of governance systems, encompassing municipal, local, prefectural, or borough levels across different administrative structures.

Chinese municipal websites were sourced from the comprehensive list of 297 municipalities provided by the Chinese Ministry of Civil Affairs. For Western counterparts, we focused on three prominent Anglo-Saxon nations (Australia, the U.K., and the U.S.). Given the decentralized nature of Western governance systems leading to a higher number of municipal entities with smaller populations, we limited our selection to big Western municipalities exceeding 200,000 inhabitants, resulting in a comparable set of 231 municipalities (Australia: 29, U.K.: 181, U.S.: 93).

Subsequently, we randomly sampled 100 Chinese and 100 Western municipal websites from our dataset. Due to technical problems, 2 Chinese and 4 Western municipal websites could not be accessed. We replaced them with new randomly selected ones.

II. Data collection

We gathered images from the homepages of 100 Chinese and 100 Western municipal websites using Python's Requests and BeautifulSoup packages for automated image retrieval. However, during this process, we noticed variations in how icons were displayed across pages, utilizing different methods like 'img' tags, pseudo elements, or third-party libraries. To ensure accuracy, we manually counted the icons and corrected the total number of images accordingly. This data was collected in June 2022.

III. Data analysis

Using content analysis, we examined image types and themes present in the collected data. Initially, we eliminated duplicate images and categorized them into seven distinct types:

- 1) Drawings: Artistic or technical representations created using tools such as pencils, pens, brushes, or digital tablets. They can range from simple sketches to detailed illustrations;
- 2) Icons: Simplified graphical representations used to indicate programs or services, typically small in size;
- 3) Logos: Symbols or graphic marks representing organizations, businesses, brands, or awards;
- 4) Photos: captured using cameras or other imaging devices, depicting real-world scenes, people, objects, and events;
- 5) Posters/Infographics: Visual representations of information designed to convey complex ideas or messages in an engaging and understandable format, combining text, graphics, and images;
- 6) QR codes: Two-dimensional barcodes containing encoded information, scanned and decoded using smartphones or imaging devices;
- 7) Others: Images do not belong to aforementioned categories.

Furthermore, we delved into the depicted themes within the 'Photos' category. We categorized the themes of photos into nine categories based on preliminary analysis and existing literature:

- 1) Leaders/Inspections;
- 2) Families;
- 3) Urban projects/Work/Meeting;
- 4) Celebration/Gallery/Expo;
- 5) City scene/Monument/Scenery;
- 6) Daily life;
- 7) Nature;

- 8) Leisure/Sports activity;
- 9) Others.

To ensure consistency, An intercoder reliability test was conducted on 125 photos (10% of the total photos) yielding a Cohen's kappa coefficient of .730, indicating moderate coder agreement [26]. Subsequently, all photos were categorized by the first author according to the code scheme.

RESULTS

In this section, we initially outline the quantity difference between the homepages of Chinese and Western municipal websites. Subsequently, we analyze the types of images utilized in each group. Lastly, we explore the specific variations in photo themes.

I. Quantity

To assess the quantity difference of images, we employed an independent samples Welch's t-test. As illustrated in Table 1, Western municipal websites exhibited a significantly lower number of images on their homepages compared to their Chinese counterparts. Notably, Chinese municipal websites featured nearly three times as many images as Western municipal websites. Our analysis revealed that the use of images predominantly characterized Chinese municipal websites.

TABLE 1. WELCH T-TEST ANALYSIS ON IMAGE QUANTITY DIFFERENCE.

	Western websites (N = 100)	Chinese websites (N = 100)	Test findings
	Mean (SD)	Mean (SD)	
Image Quantity	38.00 (31.82)	81.28 (18.39)	$t = -11.777$, $p = .000$, Cohen's $d = -1.67$

Note: Effect size: Cohen's $d > |1.3| =$ Very large effect[27].

II. Image types

In terms of differences in image types, we first calculated the percentage of different image categories used in each group (see Figure 1) and then conducted a chi-square test of independence to examine the association between cultural groups and the usage of different image types (see Table 2).

Our analysis revealed that the types of images used on municipal websites significantly differ between the two cultures. A post-hoc z-test on the adjusted residuals with Bonferroni correction identified significant differences between the two groups in all categories except 'Others'.

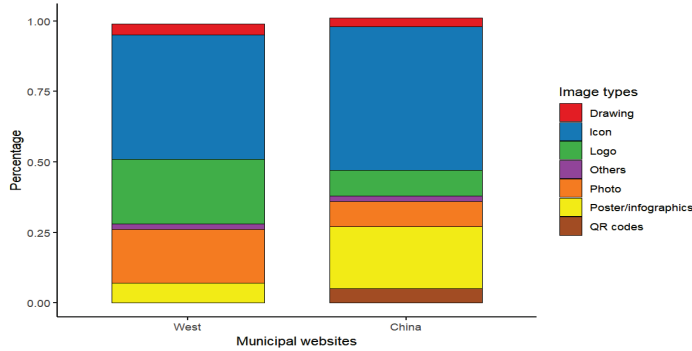


FIGURE 1. PERCENTAGE OF IMAGE TYPES.

TABLE 2. CHI-SQUARE ANALYSIS ON IMAGE TYPE DIFFERENCES.

	Western websites N = 100				Chinese websites N = 100				Test findings
	n	%	Expected value	Adjusted residual	n	%	Expected value	Adjusted residual	
Drawing	107	3.7	82	-3.31	188	2.5	213.0	3.31	$\chi^2 = 865.883, df = 6, p < .001, \text{Cramer's } V = .290$
Icon	1270	44.4	1402	-5.82	3778	50.9	3646.0	5.82	
Logo	664	23.2	369	19.36	665	9.0	960.0	-19.36	
Photo	548	19.2	344	13.36	698	9.4	896.0	-13.36	
Posters/Infographics	214	7.5	503	-16.70	1597	21.5	1308.0	16.70	
QR codes	2	0.1	94	-11.35	336	4.5	244.0	11.35	
Others	55	1.9	60	-0.72	160	2.2	155.0	0.72	
Sum	2860	100			7422	100			

Note: Effect size: Cramer's $V > .22 = \text{Large effect}$ [28]

A distinct pattern emerged in the image usage between Western and Chinese municipal websites. Western sites exhibited a higher proportion of 'Drawings', 'Logos', and 'Photos', compared to their Chinese counterparts. Notably, photos and drawings were commonly featured as hero images or alongside news articles (see Figure 2). Local symbolic logos and social media company logos were also prevalent on Western municipal websites. In contrast, Chinese municipal websites favored a higher proportion of 'Icons', 'Posters/Infographics', and 'QR codes.' Icons were predominantly used either independently or in conjunction with text to navigate users to subsections. Particularly noteworthy was the prevalence of posters or infographics on Chinese sites, combining images with text or data to highlight information (see Figure 3). Additionally, QR codes were frequently employed on Chinese municipal websites, facilitating user access to other municipal media platforms.



FIGURE 2. EXAMPLES OF PHOTOS AND DRAWINGS IN WESTERN MUNICIPAL WEBSITES. (SOURCE: LEFT: WWW.CITYOFIRVINE.ORG; RIGHT: WWW.WESTMINSTER.GOV.UK)



FIGURE 3. EXAMPLES OF POSTERS AND INFOGRAPHICS IN CHINESE MUNICIPAL WEBSITES. (SOURCE: LEFT: WWW.SUINING.GOV.CN; RIGHT: WWW.JLSY.GOV.CN)

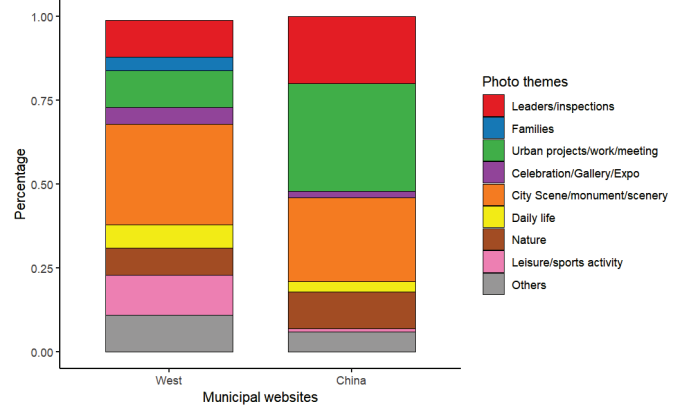


FIGURE 4. PERCENTAGE OF PHOTO THEMES.

TABLE 3. CHI-SQUARE ANALYSIS ON PHOTO THEME DIFFERENCES.

	Western websites N = 100				Chinese websites N = 100				Test findings
	n	%	Expected value	Adjusted Residual	n	%	Expected value	Adjusted Residual	
Leaders/Inspections	63	11.5	88	-3.94	138	19.8	113	3.94	$\chi^2 = 206.231,$ $df = 8, p < .001,$ Cramer's $V = .407$
Families	22	4.0	10	5.34	0	0.0	12	-5.34	
Urban projects/Work/Meeting	58	10.6	124	-9.01	224	32.1	158	9.01	
Celebration/Gallery/Expo	27	4.9	19	2.37	17	2.4	25	-2.37	
City Scene/Monument/Scenery	166	30.3	150	2.05	175	25.1	191	-2.05	
Daily life	38	6.9	26	3.38	20	2.9	32	-3.38	
Nature	44	8.0	52	-1.62	75	10.7	67	1.62	
Leisure/Sports activity	68	12.4	32	8.72	5	0.7	41	-8.72	
Others	62	11.3	47	3.15	44	6.3	59	-3.15	
Sum	548	100			698	100			

Note: Effect size: $V > .22 =$ Large effect [28].

III. Photo themes

To begin with, we analyzed the frequencies of various themes under the ‘Photo’ category (see Figure 4) and subsequently conducted a chi-square test of independence to assess differences in the portrayed themes of photos across the two groups (see Table 3).

Our analysis revealed that themes of photos were associated to distinct cultural groups. A post-hoc z-test on the adjusted residuals with Bonferroni correction identified significant differences between the two groups in all categories except ‘Celebration/Gallery/Expo’, ‘City scene/Monument/Scenery’, and ‘Nature’. In other words, both Western and Chinese municipal websites prominently

featured photos depicting urban activities, heritages, and landscapes.

On the other hand, Western municipal websites exhibited a higher prevalence of photos showcasing themes related to ‘Families’, ‘Daily life’, and ‘Leisure/Sports activities’ (see Figure 5). By contrast, Chinese municipal websites displayed a greater number of photos highlighting ‘Leaders/Inspections’ and ‘Urban projects / Works / Meetings’ (see Figure 6).’



FIGURE 5. EXAMPLES OF WESTERN PHOTOS DEPICTING FAMILIES AND DAILY LIFE. (SOURCE: LEFT: WWW.BLACKTOWN.NSW.GOV.AU; RIGHT: MY.SPOKANECITY.ORG)



FIGURE 6. EXAMPLES OF CHINESE PHOTOS DEPICTING LEADERS AND MEETINGS. (SOURCE: LEFT: WWW.ZS.GOV.CN; RIGHT: WWW.JLSY.GOV.CN)

DISCUSSION

I. Main findings

This study conducted a comparative analysis of image use on 100 Western and 100 Chinese municipal websites, focusing on quantity, types, and photo themes. In terms of quantity, our findings reveal that Western municipal websites feature significantly fewer images compared to their Chinese counterparts. Regarding image types, Western municipal websites tend to utilize a higher proportion of drawings, logos, and photos, while Chinese municipal websites display a higher percentage of icons, posters, infographics, and QR codes. When examining the thematic depiction of photos, similarities and differences emerged between the two groups. Both Western and Chinese municipal websites commonly display photos depicting urban activities, heritage sites, and landscapes. However, a notable distinction arises that Western municipal websites exhibit a higher proportion of photos showcasing families and everyday lives of residents, while Chinese municipal websites prioritize photos related to government activities and urban development efforts.

II. Text-centric vs. image-centric approach

The identified differences on image quantity and types suggest that Western municipal websites primarily rely on text-based content over rich images. This observation is corroborated by Alsaffar et al.'s study [29], which suggests that compared to Chinese users, Western users tend to prioritize textual information over images, implying that an abundance of images may be viewed as distracting. Images, such as drawings and photos, are sparsely used for decorative and aesthetic purposes.

In contrast, Chinese municipal websites adopt an image-centric approach [30], utilizing images for informative and functional purposes. Given Chinese users' inclination towards visual content, it is logical to incorporate more

images to cater to their preferences. Additionally, Cui et al.'s study [31] highlights Chinese users' preference for websites with broader structures and more options displayed on the homepage, prompting the widespread use of icons and QR codes to offer more navigational options. Notably, posters or infographics, integrating graphics with text or data, are frequently employed on Chinese municipal websites. These clickable visual elements serve as digital banners, reminiscent of the dazzling and intricate neon signs lining the streets of Hong Kong. Just like the neon signs, these posters and infographics, not only capture users' attention but also offer additional navigational options. The preference for posters and infographics may also stem from the distinctive Chinese writing system [23]. Just as Chinese calligraphy is considered an art form, the pictorial Chinese characters can be viewed as elements of images.

III. Themes related to residents vs. governments

In terms of photo themes, our study diverges from previous research [20, 21], [23-25], as we encountered challenges in assessing factors such as cuteness or the number of individuals depicted in the photos. Nonetheless, our findings partially support the observation that Western municipal websites tend to feature more photos depicting the families and daily lives of residents, whereas Chinese municipal websites favor photos showcasing government activities or urban development. These photos often serve as focal points or accompany news articles, implying different prioritization of public topics.

The observed differences suggests that municipal websites from the two cultural contexts aim to communicate distinct messages. For Western municipal websites, photos depicting families and daily life highlight the impact of local government policies on residents, while photos of government activities or urban development on Chinese websites underscore the local government's responsibility and diligence. This contrast may stem from differing approaches to audience understanding [32]. Western communication tends to be sender-responsible, wherein senders set the agenda by considering audience needs and expectations, whereas Chinese communication follows an audience-responsible approach, wherein senders present what they believe the audience needs to know without necessarily considering audience preferences.

IV. Implications

A previous study comparing image use in user manuals of Chinese and Western household appliances found that Western images are more functional, while Chinese images tend to be more entertaining [33]. Interestingly, our analysis of municipal websites reveals a seemingly contradictory trend. Western municipal websites employ less but affective images, while Chinese municipal websites utilize more images for informative and

navigational functions. These disparate findings prompt us to wonder the relationship between image use and communication channels or purposes. Future research could delve into image usage across various media platforms and its impact on target audiences. Additionally, when analyzing photo themes, it's crucial to consider the medium's context and communicative objectives. Evaluation should not only focus on 'what' photos depict, but also on 'how' they are depicted and their integration with textual content [34].

For web designers and policymakers, our study offers insights into culturally distinct image use strategies. In an increasingly globalized world, when localizing municipal websites for specific cultural groups, these findings can serve as a valuable guideline for implementing tailored image use strategies.

V. Limitations

While our study conducted a comprehensive content analysis encompassing 200 municipal websites, it is important to acknowledge the difficulty of categorizing some photos seemingly covering several themes into distinct categories. Moreover, our investigation overlooks the impact of diverse image use strategies on users' performance and preferences across varying cultural contexts. It is interesting to see whether culturally (in)congruent images can influence users' first impressions of a webpage or a city within mere 50 milliseconds.

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