

Original Paper

Research on Image of Beijing Based on Calculation of Semantic Prosody Strength—Take Reports on the Work of the Government (2021-2025) of Beijing as Examples

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Received: May 27, 2025

Accepted: July 22, 2025

Online Published: August 10, 2025

doi:10.22158/assc.v7n4p94

URL: <http://dx.doi.org/10.22158/assc.v7n4p94>

Abstract

A city's projected image, particularly as articulated in official discourse, is a critical component of its public communication. This study examines the self-shaped image of Beijing by analyzing the official English Reports on the Work of the Government from 2021 to 2025 (59,916 tokens; 655 concordance lines of "beijing"). Using a corpus-based approach, we applied the syuzhet sentiment analysis algorithm to measure semantic prosody strength and conducted analysis of variance (ANOVA) to test for significant differences across six thematic categories. The findings reveal that while topics such as macro-level development and positioning appear most frequently, they tend to be described with a more neutral or moderate sentiment. In contrast, discussions related to citizen welfare, social services, and cultural development, though less frequent, are characterized by distinctly positive sentiment. These results indicate that the official reports construct an image of Beijing as a capable leader, an innovative center, and a caring and livable city. This research possesses significant theoretical and practical value. It demonstrates the utility of quantitative semantic prosody analysis for uncovering the city image in official policy discourse, providing a useful reference for future studies in city image construction.

Keywords

beijing image, semantic prosody strength, corpus linguistics, report on the work of the government

1. Introduction

In an increasingly interconnected global environment, cities function as significant actors on the world stage, competing for investment, talent, and influence. In this context, a city's image—the collective representation and perception of a place—has become a vital asset. Anholt (2007) argues that a powerful and positive identity is fundamental for city competitiveness. This idea connects closely with the concept of “soft power,” which Nye (2004) defines as the ability to attract and persuade through cultural and political values rather than coercion. Key cities often act as the primary expressions of a nation's soft power, serving as windows through which the world views its development and aspirations.

Against this global background, China has placed a clear emphasis on communicating its national story to the world. As the nation's capital, Beijing occupies a unique and central position in this effort. It serves not only as the political and cultural heart of China but also as the center for international exchanges, and the center for scientific discovery and technological innovation. Consequently, the image that Beijing presents to the world is deeply intertwined with the broader narrative of China itself. To understand how this image is constructed, it is necessary to examine the official discourse produced by its government. The Reports on the Work of the Government of Beijing stand out as a highly official genre of political communication. These reports serve as more than summaries of past work and future objectives; they communicate a coherent narrative of the government's performance and the city's identity. The language within the reports therefore provides an ideal and direct source for investigating the municipality's official “self-shaped” image.

A considerable amount of scholarship has been dedicated to the image of Beijing. Much of this research has centered on how the city is represented in various forms of media, literary works, or in connection with major historical events like the 2008 and 2022 Olympic Games (e.g., Zhang & Munjal, 2017). These studies, often employing qualitative analytical methods, provide valuable insights into how Beijing's image is constructed from specific perspectives. However, there is less research that systematically examines Beijing's image through its own official discourse. The perspective offered by the Reports on the Work of the Government of Beijing remains an under-explored area.

Furthermore, a methodological gap is apparent. Most existing studies on Beijing's image rely on qualitative interpretation. Corpus linguistics provides a powerful framework for a large-scale, data-driven investigation of language, yet its quantitative potential has not been fully applied to this topic. Moreover, few studies attempted to analyze the image of Beijing by adopting the calculation of semantic prosody strength to statistically measure a large body of official texts.

This study, therefore, addresses the challenge of precisely measuring and interpreting the discursive strategies used in Beijing's official self-representation. By employing a corpus-based quantitative method, it seeks to move beyond qualitative description and provide a systematic analysis of the attitudinal meanings embedded in the official discourse about the image of Beijing.

To fulfill the aims of this study, the following research questions are proposed:

RQ1: What is the overall semantic prosody strength of “beijing” in on the Reports on the Work of the Government of Beijing from 2021-2025, and what are the specific semantic prosody strengths of different semantic preferences?

RQ2: Based on the analysis of the semantic prosody strength, what image of Beijing is constructed in the reports?

This study is expected to be significant in both theoretical and practical terms. Theoretically, it contributes to corpus linguistics by applying a sentiment-analysis-based method to calculate semantic prosody strength, further strengthening its findings with statistical testing (ANOVA). It also extends the application of the extended unit of meaning model to city image research, showing its value in the analysis of strategic discourse.

From a practical point, this research offers empirical, data-driven insights into the analysis of official city image construction. The findings serve as a useful reference for policymakers and communication professionals in Beijing and other cities, helping them to better understand and refine their communication practices. The detailed methodological framework can also be a guide for future academic work in similar areas.

2. Literature Review

The concept of the city image, representing the collective beliefs and impressions held of an urban place, has a rich theoretical history. It originated in the foundational work of Lynch (1960), who defined it through a cognitive concept as a “mental map” shaped by tangible urban elements. This perspective later broadened to include principles from marketing and communication. A critical contribution from this stage was the distinction between the projected image communicated by city managers and the perceived image held by various audiences (Ashworth & Voogd, 1990). Contemporary theories now embrace a more holistic framework. It acknowledges that a city’s image is a complex outcome of the city’s physical “hardware” and its intangible “software,” which includes governance, culture, and citizen experiences (Kavaratzis, 2004, Wang & Tian, 2008). This evolution in theory suggests that a city’s image is shaped by multiple forces. Crucially, as Ashworth and Voogd’s work implies, the projected image communicated through official channels forms a foundational narrative against which other perceptions are often measured. Therefore, a critical analysis of this primary, official discourse is a necessary starting point for understanding the entire image.

The theoretical frameworks above provide a valuable insight for analyzing the extensive scholarship on Beijing’s image. A prominent theme in this research is the role of mega-events and media representation. Studies focusing on the city’s “Dual Olympics” consistently demonstrate a difference between the officially projected global image and the one perceived by international visitors (Lai, 2018; Zhang & Zhao, 2009). Similarly, media-focused analyses show that Western news outlets have often framed Beijing through a political perspective (Xu et al., 2019), while user-generated content from digital platforms like YouTube (Deng & Qu, 2022) and Instagram (Zhan et al., 2025) presents a more

diverse and fragmented public perception.

Moving from mediated to direct perception, another stream of research investigates the image as held by key stakeholders. These studies, which gather data from tourists, residents, or business operators, reveal crucial differences in how aspects like urban authenticity and quality of life are evaluated across these groups (Su et al., 2021). Parallel to these social scientific approaches, research in the humanities explores the city's symbolic identity by tracing its representation in literature and art over time (Niu & Zhang, 2022). Together, these studies help to understand Beijing's image constructed and perceived through different aspects.

While this body of work is comprehensive, a review reveals two clear gaps. First, in terms of data sources, the predominant focus on media reports, social media posts, or stakeholder surveys means that the official, self-constructed image articulated at its source—in official government texts—remains comparatively under-explored. Second, regarding methodology, the reliance on qualitative interpretation or conventional content analysis, while valuable for identifying themes, is not designed to systematically measure the subtle evaluative tones embedded within language. These methods can effectively tell us what is being discussed, but they often struggle to reliably quantify how it is being evaluated. This underlying layer of attitudinal meaning is what linguists refer to as semantic prosody—the aura of positive or negative meaning a word acquires from its patterns of co-occurrence (Louw, 1993).

This study is designed to directly address the identified gaps by building upon the theoretical foundation of the Extended Unit of Meaning (EUM) model, first proposed by Sinclair. The EUM model provides a framework for analyzing language not as isolated words but as meaningful patterns, which include a node word (the word under investigation), its collocations (words that frequently co-occur), its semantic preference (the tendency to co-occur with words from a particular meaning group), and its semantic prosody.

Central to this study is the concept of semantic prosody. Its measurement has evolved from qualitative description to quantitative calculation. While early quantitative approaches often relied on a simple polarity ratio (e.g., counting positive versus negative collocates), recent scholarship has proposed more sophisticated methods. Following the direction of recent works by Li et al. (2022) and Tang et al. (2024), this study employs the established sentiment-analysis-based algorithm. This method calculates the semantic prosody strength (SPS), providing a more fine-grained measurement of the attitudinal coloring of discourse.

By applying this advanced analytical framework to the data source—Reports on the Work of the Government of Beijing—this study aims to make a distinct contribution. It provides a more precise, evidence-based analysis of the attitudinal strategies present in Beijing's official self-portrayal, thereby filling the identified gaps in the existing literature.

3. Methodology

The preceding chapter reviewed the existing literature on Beijing's city image, identifying two primary gaps: a lack of focus on official, self-representing discourse and a reliance on qualitative methods that are not designed to systematically measure attitudinal meaning. To address these gaps, this study develops a specific research methodology that combines a novel data source with a quantitative analytical framework. This chapter details the complete methodological procedure of the study. It begins by outlining the mixed-methods research design, then describes the processes of data collection and corpus construction, and finally explains the step-by-step analytical procedures, including concordance generation, semantic preference classification, and the calculation and statistical testing of semantic prosody strength.

3.1 Research Design

This study employs a mixed-methods research design, integrating qualitative and quantitative approaches in an explanatory sequential manner. The initial qualitative phase involved a content analysis of the corpus to develop a valid semantic preference framework. This framework then guided the subsequent quantitative phase, which used corpus-based tools, the calculation of semantic prosody strength (Li et al., 2022) and statistical analysis to measure semantic prosody strength and test the findings for significance. This design allows the qualitative insights to provide contextual depth for the quantitative results, while the quantitative data offers empirical objectivity to the overall analysis.

$$\left\{ \begin{array}{l} P_{whole} = \frac{\sum_{\forall w \in W} F_w \cdot S_w}{\sum_{\forall w \in W} F_w} \\ P_{positive} = \frac{\sum_{\forall a \in A} F_a \cdot S_a}{\sum_{\forall a \in A} F_a} \\ P_{negative} = \frac{\sum_{\forall b \in B} F_b \cdot S_b}{\sum_{\forall b \in B} F_b} \end{array} \right.$$

Figure 1. Calculation of Semantic Prosody Strength (Li et al., 2022)

3.2 Data Collection and Corpus Construction

The research corpus was compiled from the official English versions of the Work of the Government of Beijing for the years 2021 to 2025. These five reports were downloaded as text files from the official website of the Beijing Municipal Government. This period was selected because it represents the most complete and currently available sequence of official discourse reflecting the city's development during China's 14th Five-Year Plan. After compilation, the corpus was pre-processed using R software to convert all text to lowercase, remove punctuation and numbers, and normalize whitespace. The final

clean corpus consists of 59,916 tokens.

3.3 Analytical Procedures

The analysis of the corpus followed a three-step procedure, moving from concordance generation to qualitative coding and finally to quantitative calculation and testing.

3.3.1 Concordance Lines Generation

The clean corpus was first imported into the software AntConc v4.2.4. A search for the node word “beijing” was conducted using a window span of five words to the left and five to the right (L5/R5). This span was chosen based on both established research in collocation analysis and a preliminary review of the data, which confirmed its sufficiency for capturing the immediate evaluative context. The study finally generated 655 concordance lines.

3.3.2 Semantic Preference Classification

The 655 concordance lines were then qualitatively analyzed to classify them into distinct semantic preference categories. An iterative process of reading and discussion led to the development of a six-category framework.

To ensure the objectivity of this manual coding, inter-coder reliability was established. The process involved two independent coders who, after training, separately coded a random sample of 197 lines (30% of the dataset). The agreement between the two sets of codes was measured using Cohen’s Kappa coefficient. The resulting value of $\kappa=0.85$ indicates “Almost Perfect” agreement according to the benchmarks of Landis and Koch (1977), confirming the reliability and clarity of the classification scheme. Following this verification, the full dataset was coded.

3.3.3 Semantic Prosody Strength Calculation and Statistical Analysis

The final stage of the analysis was quantitative. The Semantic Prosody Strength (SPS) for “beijing” was calculated using the R environment. This study adopted the sentiment-analysis-based calculation for calculating SPS, following the research of Li, Hu, and Tang. The study used the *syuzhet* package to compute the calculation for each of the 655 concordance lines and for each of the six semantic preference categories.

Syuzhet is an open-source sentiment analysis toolkit in R that assigns emotional scores to text based on a well-established English sentiment lexicon, making it widely used for detecting sentiment trends in narrative and policy discourse. Its use in this study is justified by its proven effectiveness in quantifying attitudinal meaning in English-language texts, which aligns with our goal of systematically measuring the evaluative tone in the official English reports of the Beijing government (Jockers, 2015). Despite its general-purpose design, its robustness in policy and narrative text has been demonstrated in recent linguistic studies (Li et al., 2022).

To provide statistical rigor, a one-way Analysis of Variance (ANOVA) was conducted. This test was used to determine if the observed differences in the mean SPS values across the six semantic categories were statistically significant. In the model, *semantic_preference* was the independent variable, and *semantic prosody strength* was the dependent variable, with a significance level set at $p<.05$.

4. Results and Findings

This chapter presents the main findings derived from the analysis of the 655 concordance lines of the node word “beijing”. The chapter is organized into three sections. It begins by defining the six semantic preference categories developed for this study and reporting the frequency distribution of the data across them. The second section details the results of the Semantic Prosody Strength (SPS) calculations. The final section presents the results of the statistical test used to verify the significance of these findings.

4.1 Semantic Preference Categories and Distribution

Before presenting the quantitative results, it is necessary to define the six semantic preference categories that were established through the qualitative coding process. These categories emerged from an inductive analysis of the data and represent the primary thematic domains in which “beijing” is discussed within the corpus. The definition for each category and a representative example are provided below.

Table 1. Definition for Each Category and A Representative Example

| Semantic Preference | | | Definition | Example |
|--------------------------------|--------------------|--|---|---|
| Strategic Capital Functions | Positioning and | | This category includes content related to Beijing’s role as the national capital and its core functions. | ... to the strategic positioning of beijing as the national capital ... |
| Regional Development | and Open | | This category pertains to discourse about Beijing’s role in regional integration (especially the Beijing-Tianjin-Hebei region), its connections to Xiong’an New Area, and its function as a center for international exchange and opening-up. | ... capital and pushed for beijing tianjin hebei coordinated development ... |
| Sci-tech Economy | Innovation and | | This category covers topics of scientific and technological advancement, the digital economy, the financial sector, and general high-quality economic growth. | ... have been made in building beijing into a national innovation ... |
| Urban | Governance and | | This category involves themes | ... with big cities and turned |

| | |
|-----------------------------------|--|
| Livability | of city management, beijing into a more livable ... infrastructure development (e.g., airports, railways), environmental protection (air and water quality), and efforts to make the city more livable and greener. |
| Cultural Development and Heritage | This category includes ... as the national cultural references to Beijing's role as a center beijing has gained more national cultural center, the strength ... preservation of historical heritage (such as the Central Axis), the development of cultural venues (museums, theaters), and the hosting of cultural events. |
| Livelihood and Social Services | This category focuses on ... life expectancy rose to aspects directly related to 82.43 years beijing is among citizen welfare, such as the first ... healthcare (the "Healthy Beijing" initiative), education, employment, income, and social security. |

The analysis revealed a notably uneven distribution of discursive focus across these six categories. As detailed in Table 2, the discourse predominantly centered on macro-level strategy, while themes directly concerning citizen welfare appeared less frequently.

Table 2. Frequency and Percentage of Concordance Lines by Semantic Preference (N = 655)

| Semantic Preference Category | Frequency (n) | Percentage (%) |
|---|---------------|----------------|
| strategic positioning and capital functions | 190 | 29.0 |
| regional and open development | 145 | 22.1 |
| sci-tech innovation and economy | 106 | 16.2 |
| urban governance and livability | 83 | 12.7 |

| | | |
|-----------------------------------|-----|-------|
| cultural development and heritage | 69 | 10.5 |
| livelihood and social services | 62 | 9.5 |
| Total | 655 | 100.0 |

Strategic positioning and capital functions was the most frequent category, accounting for nearly one-third of all instances (29.0%), followed by regional and open development at 22.1%. In contrast, livelihood and social services was the least frequent category, comprising only 9.5% of the data. Figure 1 visually represents this distribution.

Distribution of Semantic Preference Mentions for 'beijing'

Total Mentions (Concordance Lines) = 655

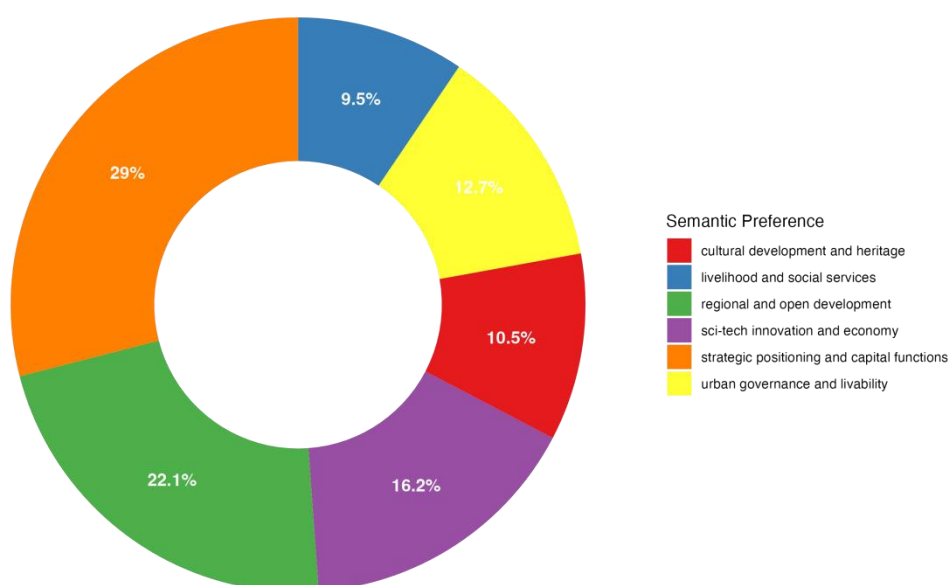


Figure 1. Pie Chart of Distribution of Semantic Preference Mentions for “beijing”

4.2 Semantic Prosody Strength of “beijing”

The central quantitative finding of this study is the Semantic Prosody Strength of the node word “beijing”. As detailed in Chapter 3, the SPS was calculated based on the sentiment-analysis algorithm proposed by Li et al. (2022). The overall SPS for “beijing” across all 655 concordance lines was 0.540, indicating a moderately positive prosody for the node word in the corpus as a whole.

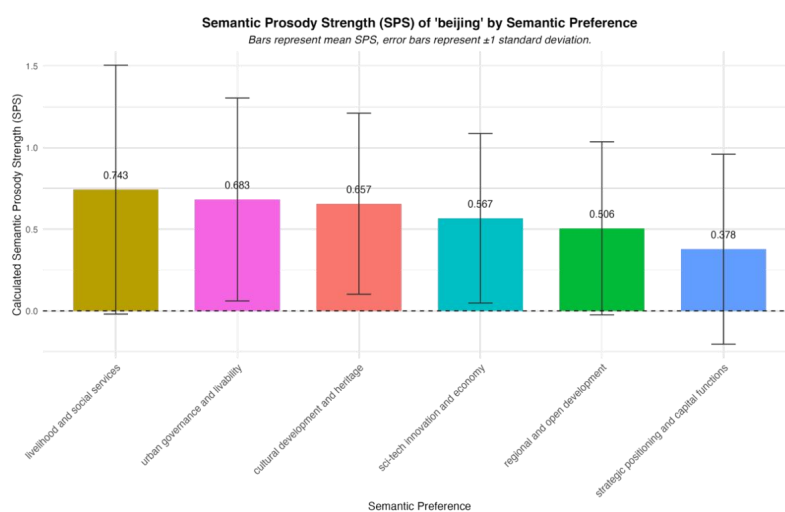
The analysis of SPS within each semantic preference, however, uncovered considerable variation. Table 3 presents a comprehensive summary of these results, including the calculated SPS and the standard deviation (SD), which measures the consistency of sentiment within each category.

Table 3. Statistics for Semantic Prosody Strength (SPS) by Semantic Preference

| Semantic Preference | n | SPS | Std. Deviation (SD) |
|---|-----|-------|---------------------|
| livelihood and social services | 62 | 0.743 | 0.762 |
| urban governance and livability | 83 | 0.683 | 0.622 |
| cultural development and heritage | 69 | 0.657 | 0.555 |
| sci-tech innovation and economy | 106 | 0.567 | 0.519 |
| regional and open development | 145 | 0.506 | 0.530 |
| strategic positioning and capital functions | 190 | 0.378 | 0.582 |

Note: n=Frequency Count, SPS=Semantic Prosody Strength, SD=Standard Deviation.

As shown in the Table, the SPS values varied substantially across the categories. The discourse on livelihood and social services exhibited the highest SPS (0.743), indicating the most strongly positive prosody. Conversely, the most frequent category, strategic positioning and capital functions, possessed the lowest SPS (0.378). Regarding the stability of sentiment, sci-tech innovation and economy was the most consistent (SD = 0.519), while livelihood and social services showed the greatest variation (SD = 0.762). Figure 4.2 provides a visual representation of these findings.

**Figure 2. Bar Chart of Mean SPS with Error Bars**

4.3 Statistical Significance of Differences

To confirm whether the observed variations in SPS across the six categories were statistically meaningful, a one-way Analysis of Variance (ANOVA) was conducted. The results of the ANOVA test were statistically significant, $F(5,649)=6.12, p<.001$.

The obtained p-value is well below the conventional significance level of .05. This result indicates that a statistically significant difference exists in the semantic prosody strength of “beijing” across the six semantic preference categories. The variations reported in section 4.2 are therefore unlikely to be a result of random chance and can be considered a solid basis for interpretation in the following chapter.

5. Discussion

This chapter provides a comprehensive discussion of the research findings presented in Chapter 4. It interprets what the quantitative results reveal about the multi-dimensional image of Beijing as constructed in its official government discourse. The discussion begins by elaborating on the core finding: the multi-faceted city image. It then connects these findings to the previous research on Beijing’s image, before reflecting on the study’s broader implications and acknowledging its limitations.

5.1 The Constructed Beijing Image: A Multi-Faceted and Strategic Portrait

The findings of this study reveal that the official image of Beijing composed of several distinct dimensions, each expressed with varying degrees of emotional intensity. Crucially, the one-way ANOVA test confirmed that these differences in Semantic Prosody Strength across the thematic categories are statistically significant ($p<.001$). This provides a solid statistical foundation for the core argument of this chapter: the multi-faceted portrayal of the city is reflected in the differing levels of positive sentiment across topics. By examining these significant variations, we can deconstruct the key dimensions of the city’s officially projected identity.

First and foremost, the discourse establishes Beijing as an official leader. This foundational dimension of the city’s image is most clearly articulated through the calculated Semantic Prosody Strength (SPS). The category strategic positioning and capital functions, which deals with Beijing’s core role as the national capital, exhibited the lowest SPS of all categories ($SPS=0.378$). This intentionally measured and less emotional tone is a hallmark of institutional discourse. It conveys seriousness and objectivity, projecting an image of a government that is confident in its authority and strategic direction. The power of this narrative does not rely on affective language for persuasion; its weight comes from the authority it represents. This cool and declarative prosody is further reinforced by its high frequency in the corpus (29.0%), making it the most prominent and foundational element of Beijing’s self-portrayal.

In direct contrast to this official image, the discourse simultaneously constructs Beijing as a caring and livable home. This dimension is built upon the strongest positive prosody found in the study. The category livelihood and social services yielded the highest SPS (0.743), followed closely by urban governance and livability ($SPS=0.683$). The intensely positive language used when discussing topics of

citizen welfare—such as healthcare, income, and environmental improvements—reflects the government’s emphasis on public affinity. It creates an emotional connection with residents by framing the government as a people-oriented and responsive provider of a better life. This warmth is accompanied by complexity. The high standard deviation in the livelihood category ($SD = 0.762$) suggests that the discourse is not one-dimensional praise, but rather reflects the complicated realities of social governance. This variation can be interpreted as a sign of sincerity, constructing an image of a government that is not just successful, but also realistic and engaged with the challenges of improving its citizens’ lives.

Finally, bridging the authority and affinity, the discourse projects the image of Beijing as a confident innovator and a vibrant cultural center. These dimensions are articulated with robustly positive, but more moderate, semantic prosody strength. The sci-tech innovation and economy category ($SPS=0.567$) is notable for having the most stable and consistent prosody ($SD = 0.519$), which creates an impression of steady confidence and progress. Meanwhile, the strong positive prosody strength of cultural development and heritage ($SPS=0.657$) conveys a sense of pride and cultural strength. Together, these elements complete the portrait of a capital that is not only a powerful political center and a caring home, but also a dynamic and forward-looking hub of progress and culture.

In summary, the analysis shows that the Reports on the Work of the Government of Beijing present a multi-faceted and strategically balanced identity for Beijing. This identity is carefully shaped through the modulation of semantic prosody across different topics. At its foundation, the city is portrayed as an official leader, grounded in the objective and measured language used for its core strategic functions. Building upon this base, the discourse employs a markedly warmer and more positive prosody to shape the other key dimensions of the city’s identity. It is presented as a caring home, articulated with the empathetic language of public welfare; a vibrant cultural center, expressed with a clear tone of pride in its rich heritage; and a confident innovator, conveyed with the steady and assured language of economic and technological progress. This approach results in an image combining authority, public affinity, cultural richness, and confidence.

5.2 Implications

The findings of this study both complement and extend the existing body of scholarship on Beijing’s image. Previous research has provided valuable insights into how the city’s image is constructed in media or perceived by the public. This study complements that work by offering a detailed, quantitative analysis of the “self-shaped” image at its official source.

For instance, studies of Western media portrayals have sometimes highlighted a focus on political narratives when discussing Beijing (e.g., Xu et al., 2019). Our findings provide a point of contrast, showing that in its self-portrayal, the government dedicates the most positive and emotionally resonant language not to political functions, but to citizen welfare (livelihood and social services). This discrepancy between the self-shaped image and the media-constructed image points to a potentially significant gap between official communication goals and their reception or representation in

international media, a topic worthy of future investigation.

Furthermore, our data provides empirical support for some qualitative observations from prior work. The strong positive prosody found in the cultural development and heritage category quantitatively confirms the view that projecting cultural confidence is a key component of Beijing's image. However, by showing that the prosody of citizen-focused themes is even stronger, our study suggests a hierarchy of discursive priorities that was not previously evident. This research also advances the methodology of city image studies by demonstrating how the calculation of semantic prosody strength, supported by statistical testing, can offer a more precise way to analyze the attitudinal dimension of strategic discourse.

The results of this research carry both theoretical and practical implications. Theoretically, this study validates the utility of a statistically informed approach to semantic prosody analysis, revealing the discursive strategies that would otherwise remain hidden. Practically, the study offers valuable insights for government communication professionals. The Beijing image identified here reflects how different aspects of Beijing's image are associated with varying emotional tones in official discourse, showing leadership in development and warmth in citizen-oriented themes.

5.3 Limitations and Future Work

However, this study is not without its limitations. First, the corpus is limited to a single genre of official discourse, and therefore represents only the "projected image." Future research could compare these findings with analyses of media coverage or public opinion on social media to create a more holistic picture. Second, the analysis is based on the official English translations of the reports. While official, the translation process might alter or lose some of the subtle meanings present in the original Chinese text. Finally, the syuzhet sentiment lexicon is a general-purpose tool. While effective, a domain-specific lexicon could potentially offer an even more fine-tuned analysis in future work. Acknowledging these limitations helps to frame the contribution of this study and paves the way for continued research in this area.

Acknowledgments

This paper is funded by Beijing Municipal Education Commission (Project Number: SM202110005001).

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