

Article

A Visual Analysis of the Linguistic Characteristics and Cross-Cultural Logic of the Xi'an Silk Road

Lezi Dong^{1,*}

¹ School of English Studies, Xi'an International Studies University, Xi'an, Shaanxi, China

* Correspondence: Lezi Dong, School of English Studies, Xi'an International Studies University, Xi'an, Shaanxi, China

Abstract: To conduct a comprehensive and in-depth analysis of the linguistic characteristics and cross-cultural logic of the Xi'an Silk Road, this study employs the web-based reading and analysis environment (Voyant Tools), and takes the *Global Edition of China Daily* as its primary case study, systematically analyzing and visually presenting the data from macro to micro, and static to dynamic perspectives. Through tracing the relevant news reports from May 26, 2001 to December 31, 2025, the findings of this study reveal that the linguistic characteristics of the Xi'an Silk Road mainly embody stage differences, content diversity, correlative significance, and trend consistency. However, the typical deficiencies are identified, including superficial content, narrative localization, dispersed channels, and one-sided evaluation. The study proposes strategies to deepen the linguistic connotation and innovative expression, transform the narrative paradigms and audience orientation, integrate the diverse channels with intelligent technology, and construct a multidimensional evaluation and feedback mechanism.

Keywords: linguistic characteristics; cross-cultural logic; visual analysis; Xi'an Silk Road; Voyant Tools

1. Introduction

As the starting point of the ancient Silk Road, Xi'an witnessed the historical prosperity of cultural exchanges and mutual learning between Eastern and Western civilizations. Although the narrative carriers of the Silk Road are diverse, the news discourse of mass media (especially authoritative external propaganda media) is its most systematic and sustained representation in the public sphere, directly affecting the cognition of international audiences. Therefore, in order to focus on institutionalized narrative and achieve large-scale, diachronic analysis, this study selects the *Global Edition of China Daily* (www.chinadaily.com.cn) as the core corpus, to directly examine how China's official led international communication constructs the narrative of Xi'an Silk Road, complementing and dialogue with narrative forms such as museum exhibitions and urban landscapes discussed in literature.

This study constructs a multi-level analytical framework: using the visual analysis method of digital humanities as a means, taking the "symbolic narrative" logic of cultural space production as the core interpretive perspective, and analyzing the broad language and symbolic system that carries this logic. These three dimensions collectively point to a core issue: how contemporary narratives of the Xi'an Silk Road are visually represented in media discourse, and what cross-cultural communication logic and tension they contain.

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2. Literature Review

2.1. Visual Analysis and Digital Humanities Methodologies

Scholarly interpretation of the Silk Road has evolved from traditional textual and historical analysis to incorporate visual examinations of its materiality and spatiality, employing advanced technological methodologies. Applying Laser-Induced Breakdown Spectroscopy (LIBS) and random forest algorithms to analyze the brightness and discriminate the sources of Tang Dynasty white porcelains excavated from Xi'an [1]. Similarly, at the macro-spatial level, visual and perceptual analysis has become crucial for understanding the contemporary transformation of Silk Road [2].

2.2. Cultural-Spatial Logic of Xi'an's Silk Road

The contemporary exhibitions engage in a selective visual re-presentation and logical re-framing of narratives [3]. China's Belt and Road Initiative reshapes geopolitical and geoeconomic relations in Nepal, which also transforms the sociopolitical, cultural, and material fabric of areas that were once peripheral [4]. Longitudinal analysis of BRI scholarship reveals the evolving interpretation and visualization of the "sustainability" concept [5]. Xi'an's development must reconcile multiple logics: historical preservation, ecological sustainability and socio-economic benefits [6].

2.3. Linguistic and Symbolic Systems in Silk Road Narratives

The virtual museum offers interactive features. For example, Afrasiyab was an ancient city located on the Silk Road, the project uses digital tools to preserve and display these historical objects [7]. A micro-linguistic system to reveal underlying social structures, cultural psychology, and power relations, is highly instructive [8]. In Xi'an's Silk Road context, similar micro-linguistic/symbolic systems might be found in: inscriptions on foreign religious artifacts, linguistic remnants in communities of foreign merchants, terminology in trade contracts, or the selection and arrangement of specific vocabulary in contemporary tourism commentary texts. The visual presentation of these linguistic symbols (e.g., in stele carvings, shop signs, digital guide texts) is a key entry point for decoding the logic of cultural contact, adaptation, and identity formation.

Existing research has enriched our understanding of the Silk Road from material, spatial, and symbolic perspectives. However, there is still room for expansion in terms of methodology and focus in existing research. On the one hand, pure linguistic research on the Silk Road mostly focuses on rhetorical analysis of historical language contact or contemporary policy discourse, and rarely systematically examines language features within the dual framework of visualization and cross-cultural logic. On the other hand, research on using digital humanities tools for visual text analysis is common in the fields of literature or history, and its application to international communication and urban narrative research is still in its infancy. More importantly, most media analysis focuses on comparing communication effects or frameworks, while research that organically integrates quantitative text mining, visual presentation, and deep cultural spatial logic criticism is still rare.

In view of this, this study attempts to integrate and focus on methodology: using Voyant Tools as a technical intermediary, to quantitatively and visually analyze the long-term reports of the *Global Edition of China Daily* on the Xi'an Silk Road. The ultimate goal is not to stay at data description, but to deeply decode the cross-cultural narrative logic contradictions and opportunities hidden behind them through language characteristics.

3. Data Sources and Research Methods

3.1. Data Sources

3.1.1. Basic Search

The first news report on the Silk Road by the *Global Edition of China Daily* was "Continents drifting closer" on May 26, 2001. Therefore, the research data for this study are drawn from the news reports on the Xi'an Silk Road released on *Global Edition of China Daily* between May 26, 2001 and December 31, 2025.

The initial search using the keyword "Silk Road" in the *Global Edition of China Daily* yielded 39,976 results. Then, by adding "Xi'an" in the "At least one of these words" full text, a refined search yielded 3,222 results, accounting for 8.06% of the total search results.

3.1.2. Advanced Search

By further selecting the sources of "China Daily" and "Duplication Removal", 217 results were ultimately retrieved. It is evident that the news coverage of the Xi'an Silk Road by *Global Edition of China Daily* possesses certain advantages in both quantity and quality, with a wide coverage and focusing on international exchange and cooperation. Therefore, by parsing the linguistic characteristics and cross-cultural logic of *Global Edition of China Daily's* coverage, the unique linguistic and cross-cultural system of the Xi'an Silk Road will be constructed, which combines Xi'an's historical heritage with its contemporary vitality.

3.1.3. Temporal distribution

The temporal distribution of the news reports illustrates the shifts in thematic focus, and correlates with developmental stages and key events of the "Belt and Road" initiative, as shown in Figure 1.

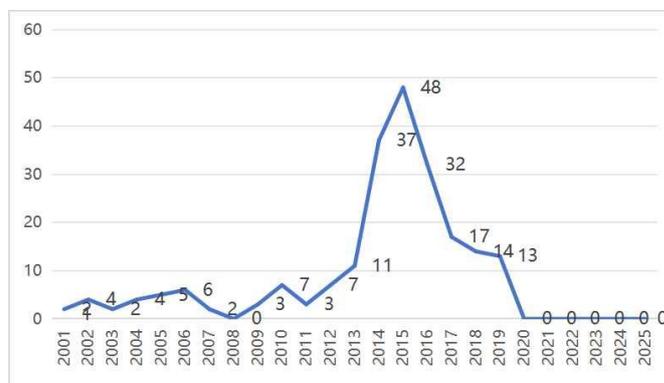


Figure 1. Statistics on the Number of Annual News Reports on the Xi'an Silk Road .

Period of Incubation (2001–2012): although the Xi'an Silk Road was covered within the international news landscape by the *China Daily Global Edition*, a sustained and systematic reporting trend had not yet coalesced.

Boom period (2013–2015): the number of news reports on the Xi'an Silk Road rose sharply, peaking at 48 in 2015. *Global Edition of China Daily* responded quickly and began to conduct exploratory reporting, constructing a narrative framework to form international attention points.

Adjustment period (2016–2019): the number of reports on the Xi'an Silk Road demonstrated a steady but declining trend. Among them, the Silk Road-related expositions and forums held in Xi'an became a regular news source. Especially in March 2016, with the approval of the Party Central Committee and the State Council, the China East-West Co-

operation and Investment and Trade Fair was officially renamed the Silk Road International Exposition, which is held in Xi'an in mid-May every year and has played an important role in promoting the high-quality development of the Silk Road.

Transformation period (2020–2025): the global COVID-19 pandemic resulted in the reduction in on-site interview activities, and a shift in international attention. It was also because in the post-pandemic era, relevant international reports no longer simply pursued quantity, but focused more on niche areas such as "small yet beautiful" stories about people's livelihood, youth exchanges, and technological cooperation in response to the complex and changing international public opinion environment.

3.2. Research Tools

To answer the research question, this study used Voyant Tools (<https://voyant-tools.org>), a robust text analysis platform for quantitative analysis and visual presentation, in the following steps: first, identify the core thematic vocabulary field of the report through the 'word cloud'; Secondly, analyze the narrative relationship structure between core concepts through the 'link' diagram; Finally, track the narrative focus shift of key symbols over time through a 'trend' chart. These steps collectively aim to visually reveal the surface language features of the text and the underlying narrative and cross-cultural logic from three dimensions: word frequency, relationship, and dynamics.

3.2.1. Cirrus

To quickly grasp the linguistic and cultural core theme of the Xi'an Silk Road, the emotional tone or discussion focus of the text through the types of high-frequency words is shown in Figure 2.



Figure 2. Cirrus of the News Report Title of the Xi'an Silk Road.

Among the top five high-frequency words, "road" (appearing 44 times) and "silk" (appearing 34 times) reflect the core theme of the Xi'an Silk Road; "Xi'an" (appearing 35 times) reflects the geographical node; "trade" (appearing 16 times) reflects the key content; and "new" (appearing 16 times) reflects the characteristics of the era.

3.2.2. Links

To effectively compensate for the deficiencies of relying solely on cirrus, some words may have low frequency but strong relevance, potentially playing a crucial connecting role, as shown in Figure 3.

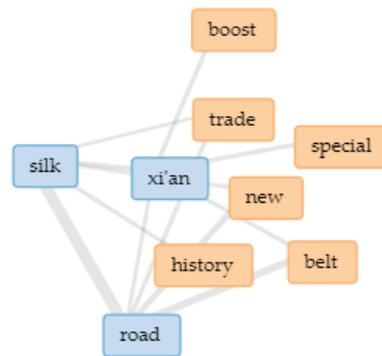


Figure 3. Links of the News Report Title of the Xi'an Silk Road.

First of all, the words highly linked with "road" are "silk", "belt", "new", "trade", and "xi'an" in order; Secondly, the close linkage with "silk" are "road", "Xi'an", "new", "history", and "trade" sequentially; However, "road", "silk", "belt", "boost", and "special" is highly correlated with "xi'an" respectively. Therefore, through the links analysis, the sub-themes and their associated circles of the Xi'an Silk Road are deeply revealed.

3.2.3. Trends

To dynamically track the relative frequency changes of individual high-frequency words in different stages of the Xi'an Silk Road, as well as the correlation between multiple high-frequency words, the trend analysis is shown in Figure 4.



Figure 4. Trends of the News Report Title of the Xi'an Silk Road.

Taking "Xi'an" as an example, its relative frequency increased from the initial value of 0.0020464 to 0.0027285, then further increased to a maximum of 0.0040928 and remained stable, before rapidly decreasing to 0.0013643. It then increased to 0.0034106, subsequently decreased to a minimum of 0.0006821, somewhat recovered to the initial point of 0.0020464, and then decreased again to 0.0013643, finally recovering to the initial value. In addition, there is a significant synchronous trend (positive correlation) between "Xi'an" and "road" as well as "silk". Therefore, trend analysis enables dynamic observation of the development and evolution of the Xi'an Silk Road.

Based on the above visualization analysis, this study identified significant features and evolutionary patterns of media coverage on the Xi'an Silk Road at the linguistic level. However, further critical examination reveals several deep-seated communication logic dilemmas hidden beneath these surface language features.

4. Discussion

Based on the language data patterns revealed by the aforementioned visualization analysis, this section provides a critical interpretation and attribution. Specifically, the imbalance between abstract concepts and specific cultural symbols in high-frequency words (as shown in Figure 2) points to the problem of superficial content; The closed structure dominated by myself in the core concept linking network (as shown in Figure 3) reflects the limitations of narrative positioning; The lack of a stable cultural mainline (as shown in Figure 4) due to the drastic fluctuations in the number of reports and focus vocabulary with the policy cycle is closely related to the fragmented channel and one-sided evaluation operation model.

4.1. Content Superficiality

Currently, some of the English-language content regarding the Xi'an Silk Road used in the *Global Edition of China Daily* (www.chinadaily.com.cn) remains at the level of simple presentation and explanation, lacking in-depth exploration of its historical context, cultural connotations, and contemporary value. This superficiality may be attributed to the inherent complexity of cross-cultural communication. To avoid obstacles to understanding caused by cultural differences, communicators often choose to simplify cultural content, emphasizing visual impact and spectacle, while weakening the depth and richness of cultural expression. However, while this simplification lowers the acceptance threshold, it can also easily result in a one-sided understanding and stereotypical impression of the Xi'an Silk Road.

4.2. Narrative Orientation

The superficiality of the above content often stems from deep narrative perspectives and logic. When communication sticks to the narrator's orientation, content production becomes difficult to go beyond simple information statements, thus exacerbating the superficiality of appearances. Although the *Global Edition of China Daily* attempts to introduce external perspectives, the overall language still adopts a "narrator-oriented" narrative approach, lacking sufficient consideration for the cultural background, cognitive framework, and information acceptance habits of the target audience. Western mainstream media primarily narrates from the perspectives of tourism, religion, food, and other aspects.

4.3. Channel Fragmentation

Although the *Global Edition of China Daily* has established a pattern, diversely participating in the cross-cultural dissemination of the Xi'an Silk Road, the issue of fragmented channels remains prominent, which potentially contributes to scattered resources and mixed voices, thereby diminishing the overall effect. Many contents have merely undergone simple language translation without targeted adaptation and optimization based on the characteristics of different platforms and audience preferences, making it difficult to achieve a seamless experience across platforms and cultures in conveying the Xi'an Silk Road narrative.

4.4. One-sided Evaluation

Global Edition of China Daily primarily focuses on metrics such as exposure and click-through rate of the Xi'an Silk Road, lacking in-depth evaluations of cognition, attitude, and behavioral change. This one-dimensional evaluation is difficult to adapt to the interactive requirements of the new media environment and to comprehensively and deeply assess the communication effectiveness and make strategic adjustments. Multidimensional international communication evaluation needs to be based on a deep understanding of the target audience, including their cultural background, values, media usage habits,

and information preferences, conducting in-depth analysis and data-driven audience insights at the micro level.

5. Conclusions

(1) To rectify the content superficiality identified in this study—manifested as an overreliance on generic policy terms (e.g., "road", "trade") and a lack of contextualized, deep cultural symbols, the *Global Edition of China Daily* must implement a glocalized reencoding strategy. First, it is imperative to conduct deep semiotic excavation to enrich narrative substance, transforming static symbols into dynamic carriers of civilizational dialogue, addressing the very depth deficit revealed by the lexical analysis. Second, the communication should leverage multimedia formats (e.g., documentary shorts, interactive maps, podcast series) to create immersive narratives, employing multimodal storytelling to translate depth into engagement. Third, the narrative must actively construct bridges between Xi'an's heritage and global contemporary discourse, linking historical trade routes to modern debates on sustainable connectivity, in order to amplify the narrative's international resonance and influence.

(2) To address the issues of internalization of narrative positioning and disconnection from the target audience, the narrative paradigm should be shifted from "sender-oriented" to "audience-oriented". Firstly, there should be a change in narrative perspective, by identifying the intersection of "big themes" and "concrete, relatable entry points". The protagonist of the narrative should be people, rather than abstract concepts. Secondly, there should be a transformation in the discourse system, using logic and language that are comprehensible and easily accepted by the international community to communicate Chinese stories. Avoid using domestic-specific political acronyms, and prefer general vocabulary and visual language. Thirdly, there should be a shift in communication posture, actively initiating public discourse that can trigger global discussion, thus achieving a leap from one-way dissemination to mutual recognition.

(3) To integrate dispersed communication channels and carry out platform customization, it is necessary to further promote multi-party cooperation and technological empowerment. Firstly, the channel integration and collaborative communication should be strengthened, by establishing a resource sharing platform and collaborative communication mechanism to form a joint force for the international communication of the Xi'an Silk Road. Secondly, the application of emerging media platforms and technologies should be enhanced, such as short video platforms, social media, virtual reality, and augmented reality technologies, to provide immersive and interactive communication experiences. Thirdly, the audience data resource is mined by artificial intelligence and big data technologies, enabling personalized recommendations and customized communication, thereby improving the precision and effectiveness of international communication of the Xi'an Silk Road.

(4) To scientifically evaluate the effectiveness of the international communication of the Xi'an Silk Road, it is necessary to establish a comprehensive evaluation system and feedback mechanism. Firstly, an evaluation system that goes beyond simple reading volume and follower count should be constructed, paying more attention to evaluation indicators that can reflect the depth of communication, such as the reprint and citation rate of mainstream overseas media, sentiment analysis of overseas netizens' comments, and online visits and inquiries to the Xi'an Silk Road-related tourism, cultural, and academic resources guided by content. Secondly, the feedback mechanism to regularly conduct special overseas communication effectiveness and public opinion analysis should be established, and timely adjust communication strategies and content production. Thirdly, the best practices and lessons learned from international communication should be systematically collected, providing reference and lessons for the cross-cultural exchanges and dissemination of the Xi'an Silk Road.

Data Availability Statement: Data will be made available on request.

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Conflicts of Interest: The author declares no conflicts of interest.

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