

A Study of Metaphor System Based on Discourse Dynamics Approach—In the Case of New Energy Reports in *China Daily*

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Abstract: Against the backdrop of increasingly complex global energy transitions and geopolitical shifts, this study systematically examines the metaphorical framing in China's new energy discourse, with a specific focus on its institutionalization phase in 2024. Grounded in the Discourse Dynamics Approach to Metaphor and drawing on Complex Dynamic Systems Theory, six systematic metaphors (Machine, Journey, Organism, Competition, Construction, Space) in *China Daily*'s new energy reports are analyzed in this research. Employing a mixed-methods approach that combines corpus analysis with metaphor trajectory visualization, the study reveals that by 2024, China's new energy discourse had reached a stage of high institutionalization, characterized by a layered and synergistic metaphorical ecosystem where technical-temporal framing (Machine and Journey) operates in parallel, ecological and competitive metaphors strategically alternate, while institutional and spatial metaphors provide foundational narrative support. This pattern demonstrates how metaphors have transformed from persuasive tools into standardized cognitive mechanisms for internal coordination and external communication, reflecting the maturation of China's new energy policy into a maintenance phase. The findings reveal that metaphorical systems function as a vehicle for institutionalized discourse, whereby established cognitive frameworks are transmitted and reinforced in the practice of policy implementation.

Keywords: Systematic Metaphor; Discourse Dynamics Approach; New Energy Discourse

1. Introduction

The study of metaphor has undergone a significant theoretical evolution, shifting from a focus on conceptual universality to an emphasis on dynamic and context-based analysis. The introduction of Complex Dynamic Systems Theory (CDST) catalyzed the development of the Discourse Dynamics Approach to Metaphor^[1]. This approach reconceptualizes metaphor as a self-organizing system shaped by interaction with discourse goals and sociocultural contexts^[2], emphasizing the empirical study of linguistic metaphors in real discourse. Central to this paradigm is the concept of "metaphor trajectory"^[3], which tracks the diachronic evolution of metaphoric expressions, moving beyond static snapshots to capture their dynamic life in discourse. Building upon this dynamic turn, Liao Meizhen proposed a comprehensive theoretical framework for analyzing metaphorical discourse grounded in CDST^[4]. This framework conceptualizes metaphor as a dynamic and adaptive phenomenon operating at both micro and macro levels of discourse organization.

Numerous studies have employed the complex systems approach to metaphor to examine the meaning-making systematicity of metaphorical language, constituting the complex systems turn in metaphor research. For instance, in educational discourse, researchers have observed that classroom discourse often exhibits developing systematic metaphors, revealing the cognitive coordination process through which teachers and students use familiar concepts to communicate unfamiliar ones^{[5][6]}. In conflict resolution discourse, researchers have found that corpora frequently contain several types of systematic metaphors reflecting the cognitive styles of different parties towards the topic: when the variety of systematic metaphors decreases, the cognitions of the parties converge, facilitating reconciliation; whereas a surge in the variety of systematic metaphors often indicates entrenched disagreement^{[1][7][8]}. In medical discourse, the development of systematic metaphors reveals the effectiveness of doctor-patient communication. For example, cancer diagnosis and treatment discourses often contain developing WAR metaphors, where systematic metaphors indicating escalating conflict can

diminish patients' morale, while those indicating camaraderie have an encouraging effect^{[9][10]}. Within the context of China's policy discourse, recent research has begun to apply these frameworks. For example, Shan Liyang, in the coding phase, made an initial attempt to integrate micro-level systematic metaphors, meso-level metaphor scenarios, and macro-level metaphorical narratives into a hierarchical descriptive tool^[11]. Using the metaphorical construction of the BRICS concept in English newspapers as an example, she examined the meaning-making systematicity of metaphorical language in the context of public discourse. Liu and Sun have explored metaphorical constructions in poverty alleviation discourses^[12], while Shan has applied complex systems theory to analyze media narratives^[11]. These studies collectively affirm the value of a dynamic perspective in uncovering the ideological and cognitive underpinnings of public discourse.

However, despite these advancements, two critical gaps remain. First, while existing studies often provide synchronic analyses or short-term diachronic observations, there is a scarcity of longitudinal research that traces the complete institutionalization process of a metaphorical system over a critical period. Second, and more specifically to the current study, while most research focuses on the emergence and evolution of metaphors, few have systematically documented what our data reveals as a final, stabilized state in the case of China's new energy discourse: institutionalization. Here, metaphors appear to have completed their evolution, functioning not as persuasive devices but as entrenched, ritualized components of the policy narrative.

This study aims to address these gaps by conducting a focused longitudinal analysis of the metaphorical system in *China Daily's* new energy discourse, with a specific concentration on its institutionalized phase in 2024. By narrowing the temporal scope to this pivotal year, the research offers a deep dive into the structure and function of a stabilized metaphorical ecosystem.

The present study moves beyond describing metaphorical evolution to explicitly modeling the structure of an institutionalized system, identifying the specific hierarchical and synergistic relationships between metaphors in a mature policy discourse. Besides, it leverages the metaphor density trajectory visualization not merely to track change over time, but to delineate the operational architecture of a metaphorical system at a point of maturity, revealing how different metaphor types perform their assigned functions to form a cohesive system.

2. Theoretical Framework

As *Figure 1* shows, the present research is grounded in an integrated theoretical framework that synthesizes Cameron's Discourse Dynamics Approach to Metaphor and Liao Meizhen's Complex Dynamic Systems Theory (CDST)-based metaphorical discourse analysis. While both frameworks offer valuable insights into metaphor analysis, this study identifies specific theoretical and methodological gaps that necessitate an innovative approach.

Cameron's Discourse Dynamics Approach provides a robust methodology for analyzing metaphor in real discourse contexts. The approach emphasizes the importance of identifying metaphor vehicles - the actual linguistic expressions used in discourse - and examining their systematic patterns^[13]. Cameron and Maslen stress the dynamic nature of metaphor in discourse, arguing that metaphors evolve through interaction and adapt to communicative needs^[14]. However, when viewed through the lens of Complex Dynamic Systems Theory (CDST)—which emphasizes the bidirectional, recursive interactions between different levels of a system—a potential limitation of Cameron's model comes into focus. Its essentially linear, two-stage procedure (from linguistic identification to discourse interpretation) may not fully capture the recursive feedback loops between micro-level metaphorical expressions and the macro-level discourse patterns they both constitute and are shaped by. In other words, the model's analytical sequence risks separating metaphor identification from discourse analysis in a way that overlooks their continuous, mutual influence.

Complementing this approach, Liao's CDST-based framework offers a sophisticated understanding of metaphor as a dynamic, adaptive phenomenon operating across multiple levels of discourse organization. Drawing on Larsen-Freeman's Complex Dynamic Systems Theory, Liao conceptualizes metaphor as exhibiting emergent properties, non-linear development, and adaptive behavior within discourse ecosystems. Her framework emphasizes hierarchical organization and density analysis, providing tools to examine how metaphors create coherence and thematic emphasis across extended discourse. Nevertheless, while Liao's framework excels in mapping the internal structural dynamics of metaphorical systems, its primary focus on intra-discursive and cognitive mechanisms—inherent to its

CDST foundation—results in a less systematized treatment of the broader sociocultural contextual factors that Cameron’s approach centrally prioritizes. This theoretical orientation is evident when contrasting Liao’s emphasis on “hierarchical organization” and “density analysis” as internal system properties with Cameron’s explicit mandate to situate metaphor use within its “sociocultural context” and to examine how it is shaped by “discourse goals” and the “sociocultural situatedness of the participants”^{[1][2]}. This distinction echoes a wider scholarly conversation about the challenge of fully integrating hard systems modeling with thick contextual description^[15]. Thus, Liao’s model, for all its analytical power in describing the behavior of metaphorical systems, offers fewer dedicated analytical tools for directly connecting that behavior to the specific external sociocultural pressures, historical contingencies, or immediate rhetorical situations that Cameron’s dynamic approach is designed to capture.

The current study innovates beyond these foundational approaches through several key theoretical integrations. First, it reconceptualizes the relationship between metaphor vehicles and systematic metaphors as a dynamic, bidirectional system rather than a linear analytical process. This integration addresses what Semino et al. identify as the “micro-macro disconnect” in metaphor research^[9], creating what Gibbs and Cameron term a “social-cognitive dynamics” of metaphor performance^[2]. Second, the framework introduces methodological innovation through density trajectory visualization, which operationalizes Larsen-Freeman’s concept of “retrodiction” in complex systems^[16] - understanding a system’s behavior by tracing its development patterns over time.

The theoretical innovation is further substantiated by incorporating Musolff’s work on metaphor in political discourse^[17], which demonstrates how metaphors become conventionalized through repeated use in specific discourse communities. This complements Zinken’s concept of “discourse metaphors”^[18] by providing a methodological tool to track their institutionalization processes. The integration of these perspectives enables what Steen advocates as a “three-dimensional” approach to metaphor analysis^[19], examining linguistic, conceptual, and communicative dimensions simultaneously.

Methodologically, the density trajectory visualization technique represents a significant advancement beyond traditional metaphor analysis. While previous research has employed frequency counts and basic distribution analysis^{[20][21]}, the current approach enables real-time tracking of multiple systematic metaphors’ co-evolution. This methodology builds on Gibbs’ call for more dynamic approaches to metaphor analysis that can capture the “temporal unfolding” of metaphorical patterns in discourse^[22].

The integrated framework offers several analytical advantages. It maintains Cameron’s emphasis on empirical grounding in actual language use while incorporating Liao’s systematic attention to hierarchical organization. It captures what Cameron and Deignan term the “emergence of metaphor” in discourse^[5] while visualizing the systemic coherence that Liao identifies as crucial for discourse organization. Furthermore, it enables the investigation of what Ritchie^[7] describes as metaphor’s “contextual activation” across different discourse segments.

By bridging these theoretical perspectives and methodological approaches, the current framework provides a more comprehensive understanding of how metaphors function as both products and shapers of discourse. It offers a multidimensional analytical tool that can capture the complex interplay between individual metaphorical expressions and the larger systematic patterns they constitute in real-world communicative contexts, addressing what has been identified as a significant challenge in contemporary metaphor research^{[9][22]}.

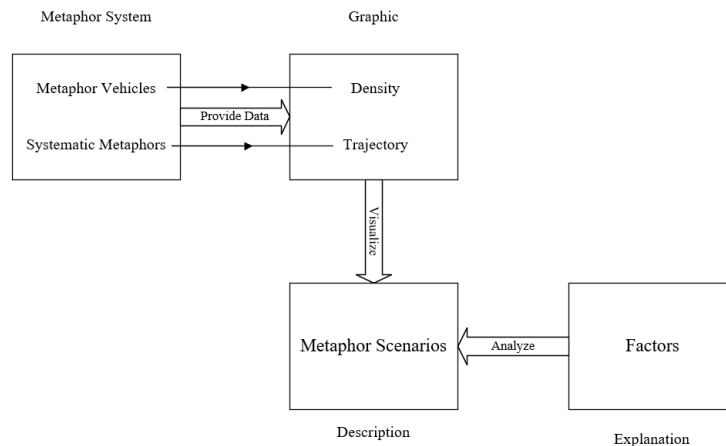


Figure 1: Theoretical framework of the study.

3. Method

3.1. Research Tools

This study employs a suite of specialized software tools to ensure a comprehensive and systematic analysis of metaphorical patterns in *China Daily*'s energy discourse. Web Scraper is utilized to collect news articles from *China Daily*'s online platform, constructing a structured database for further analysis. This tool enables efficient extraction of textual data while maintaining metadata such as publication dates and article sections, ensuring the corpus is both representative and chronologically organized. Wmatrix, a corpus analysis tool, performs semantic annotation using the UCREL Semantic Annotation System (USAS), identifying overused semantic domains related to “energy” (e.g., Environmental Science, Power, War). This step helps narrow down potential metaphorical expressions by highlighting lexically rich contexts for closer examination. Excel serves as the primary tool for data organization and preliminary analysis. It is used to filter and categorize metaphor candidates retrieved from Wmatrix, as well as to prepare trajectory data for visualization. A key function applied here is the FLOOR function ($=\text{FLOOR}(\text{row number}, 100)$), which groups row numbers into units of 100 to simplify the detection of metaphorical density trends. NVivo, a qualitative data analysis software, supports the detailed annotation of metaphorical language. Researchers use it to manually tag metaphor vehicles (e.g., “battle” “journey”) and their positions within the text, facilitating the extraction and organization of systematic metaphors (e.g., ENERGY TRANSITION AS WAR, RENEWABLES AS A JOURNEY). NVivo's coding features also allow for cross-referencing and validation of metaphor classifications. Finally, Origin is employed for advanced data visualization. It generates metaphor density trajectory plots, where the x-axis represents reference points (e.g., article segments or time intervals) and the y-axis denotes grouped row numbers. Each plot visualizes six trajectories—one per systematic metaphor—across different years. Rectangular overlays highlight regions where metaphors appear consecutively, with the length indicating reference-point continuity and the width showing row-number density. This approach provides an intuitive representation of how metaphorical framing clusters and evolves in the corpus.

Together, these tools form a robust methodological pipeline, enabling rigorous analysis from data collection (Web Scraper) to semantic retrieval (Wmatrix), metaphor annotation (NVivo), and dynamic visualization (Origin), with Excel bridging quantitative and qualitative stages. This integrated framework ensures reproducibility and precision in studying metaphor dynamics across large-scale news discourse.

3.2. Research Object and Corpus Construction

The research object of this study is the systematic metaphorical architecture within China's official discourse on new energy. The corpus comprises news articles and reports published in *China Daily* in 2024, specifically focused on new energy themes. This source was selected for its role as a primary channel for China's official external communication, ensuring the discourse reflects state-sanctioned narratives and policy orientations.

3.3. Research Procedures

3.3.1. Metaphor Identification and Categorization

The data collection process was automated using the Web Scraper browser extension, which facilitated efficient and large-scale extraction of target articles. The collected texts were then processed using Wmatrix, a corpus analysis tool. The primary function was to identify key semantic domains related to “energy”. This step helped pinpoint core vocabulary and contexts for subsequent detailed analysis. Sentences containing the identified key terms were extracted. Their contextual usage was manually examined to ensure relevance to the new energy discourse and to filter out irrelevant instances. The refined text samples were subjected to the Metaphor Identification Procedure. This systematic protocol was applied to distinguish metaphorical expressions from literal language use, ensuring consistency and reliability in the initial tagging process. Metaphors identified through MIP were then coded into systematic metaphors based on established source-target domain mappings. This study focused on six high-frequency systematic metaphors: Journey, Machine, Organism, Competition, Construction, and Space. This coding and pattern analysis were conducted using NVivo qualitative data analysis software. NVivo facilitated the manual annotation of metaphor vehicles, their precise location in the text, and the organization of these instances into the six systematic metaphor categories. Its coding features also enabled cross-referencing and validation of the metaphor classifications, ensuring analytical rigor.

3.3.2. Data Visualization and Trajectory Mapping

The coded data from NVivo was exported to an Excel spreadsheet. Each row represented a single metaphor occurrence, annotated with its systematic metaphor type and its positional reference within the corpus. To manage the large dataset and visualize density trends effectively, the continuous row numbers were grouped into discrete units of 100 using Excel’s FLOOR function (=FLOOR(row number, 100)). This grouping transformed the data into a format suitable for tracking the frequency and clustering of metaphors across the discourse. The processed data was imported into Origin software for trajectory plotting. The x-axis represented the reference points in the text (e.g., article sequence or text segments), and the y-axis represented the grouped row-number units. For each year from 2020 to 2024, six trajectory plots were generated, each corresponding to one of the six systematic metaphors. When a specific metaphor appeared consecutively within a 100-row unit, its trajectory was plotted as a continuous line, visually indicating a cluster of uninterrupted metaphorical framing. To further highlight these dense regions, rectangular overlays were applied. The length of each rectangle spanned the reference points where the metaphor was dominant, and its width covered the relevant row-number range. This method effectively illustrated the frequency, distribution, and clustering patterns of each systematic metaphor, revealing the strategic framing of the new energy narrative throughout the corpus.

4. Results and Discussion

This section presents the findings from the analysis of *China Daily*’s 2024 new energy discourse, revealing a highly institutionalized metaphorical system. The data, visualized through density trajectory plots, demonstrates how six systematic metaphors have stabilized into a mature, hierarchical architecture that functions more for cognitive coordination and ritualistic policy reproduction than for persuasive innovation.

4.1. Systematic Metaphor Frequency and Functional Roles

As shown in Table 1, the quantitative analysis of 1504 valid metaphorical vehicles identified in the 2024 corpus established the following frequency ranking: JOURNEY (293), MACHINE (291), ORGANISM (272), COMPETITION (250), CONSTRUCTION (233), and SPACE (165). This distribution indicates a discourse dominated by temporal progression and technical framing, while all metaphors maintain significant presence, forming a cohesive ecosystem.

Table 1: Frequency of systematic metaphors in 2024 new energy discourses

Rank (Frequency)					
JOURNEY	MACHINE	ORGANISM	COMPETITION	CONSTRUCTION	SPACE
293	291	272	250	233	165

Each metaphor assumed distinct functional roles, consistent with established research on conceptual

metaphors in political and technical discourse:

The JOURNEY metaphor constructed a narrative of inevitable progression and milestone achievement, following Lakoff's observation that "purposes are destinations"^[23] and Charteris-Black's analysis of political discourse as purposeful movement toward goals^[20]. The MACHINE metaphor provided a framework of technical precision, controllability, and systemic operation, reflecting what Nerlich and Jaspal^[24] identify as the mechanistic worldview prevalent in technological policy discourse. The ORGANISM metaphor delivered ecological legitimacy by naturalizing technological growth within sustainable paradigms, aligning with Larson's concept of "ecological modernization" where environmental concerns are framed through growth-oriented metaphors^[25]. The COMPETITION metaphor positioned the energy transition within a global contest for technological and market dominance, exemplifying what Koller describes as the "business is war" metaphor domain applied to emerging industries^[21]. The CONSTRUCTION metaphor emphasized institutional stability, structural integrity, and policy foundations, consistent with Musolff's analysis of political architecture metaphors that create perceptions of stability and permanence^[17]. The SPACE metaphor offered measurable benchmarks through vertical quantification and horizontal expansion, building on Gee's concept of "discourse spaces" where policy achievements are spatially mapped for rhetorical effect^[26].

4.2. Density Trajectory Analysis

The density trajectory visualization for 2024 reveals a strategic recalibration, characterized not by sequential relay but by layered dominance and tactical synchrony.

4.2.1. JOURNEY and MACHINE: The Technical-Temporal Synergy

The JOURNEY metaphor shown in *Figure 2* demonstrated a clear developmental trajectory, with sparse deployment in early discourse (0-800 reference points) transforming into a dense diagonal band in later segments (post-900). This pattern reflects a focus on milestone reinforcement, using temporal framing to stabilize expectations rather than inspire urgency. The MACHINE metaphor shown in *Figure 3* exhibited a pervasive yet strategically intensified presence, with significant density peaks in the early (100-400) and mid-to-late segments (around 1000). This bimodal distribution provided continuous technical narration, punctuated by emphatic mechanistic framing at key explanatory and summary junctures. Together, these two metaphors formed a primary narrative layer, synergistically linking technical process with temporal progression to create a coherent development narrative.

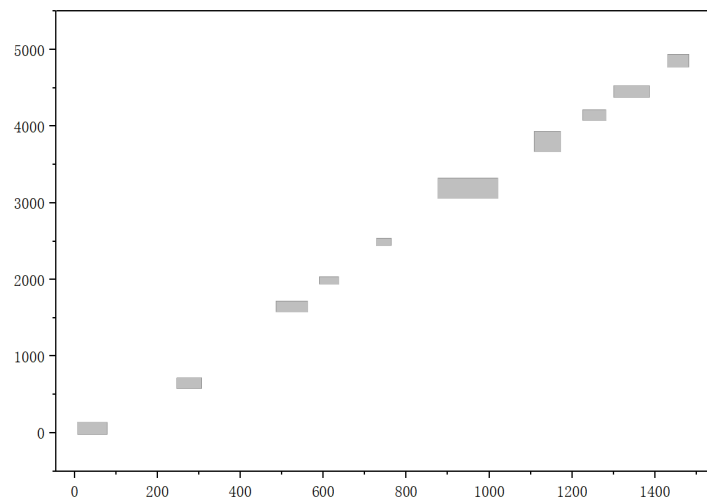


Figure 2: 2024-1 JOURNEY.

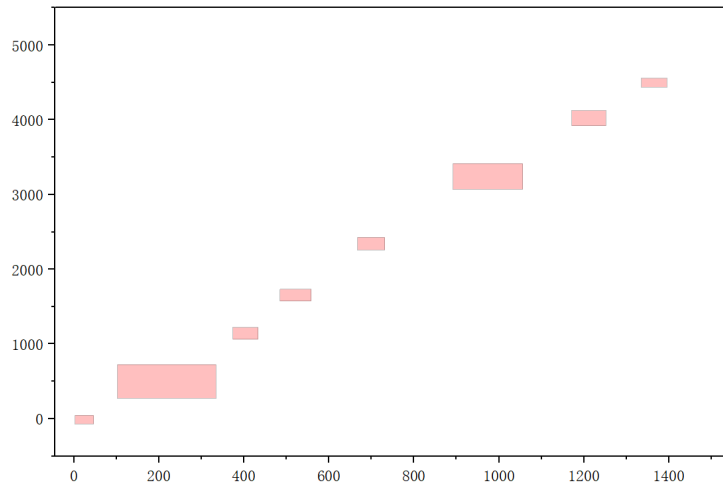


Figure 3: 2024-2 MACHINE.

4.2.2. ORGANISM and COMPETITION: The Ecological-Competitive Balance

While both the ORGANISM and COMPETITION metaphors exhibited a bimodal distribution, their precise clustering patterns and, more importantly, their discursive functions reveal a sophisticated strategy of rhetorical counterbalance rather than simple synchrony.

In Figure 4, the ORGANISM metaphor's density clusters in the initial (0-400) and concluding segments (800-1000), frame the discourse with an overarching theme of natural growth and ecological legitimacy. Its strategic recession during the core technical and policy discussions (400-800) allows other narratives to take precedence. The COMPETITION metaphor, shown in Figure 5, also peaking in the opening (0-300) and late-middle segments (800-1000), serves a distinctly different purpose. Its initial peak establishes geopolitical stakes and competitive urgency, while its later peak often coincides with discussions of global market positioning or technological leadership.

The nuanced "alternation" or balance occurs not in their timing, but in their functional interplay. In segments where both metaphors co-occur, they perform complementary yet distinct roles: the COMPETITION metaphor injects a sense of external pressure and strategic necessity, while the ORGANISM metaphor simultaneously naturalizes the response to this pressure, framing China's competitive actions not as aggressive maneuvers but as an organic and inevitable development within the global ecosystem. This pairing effectively legitimizes ambition through sustainability, offsetting the potentially confrontational tone of competition with the benign, naturalizing narrative of organic growth. This creates a coherent master narrative that China's leadership in the energy transition is both a natural, rightful development and a strategically necessary endeavor.

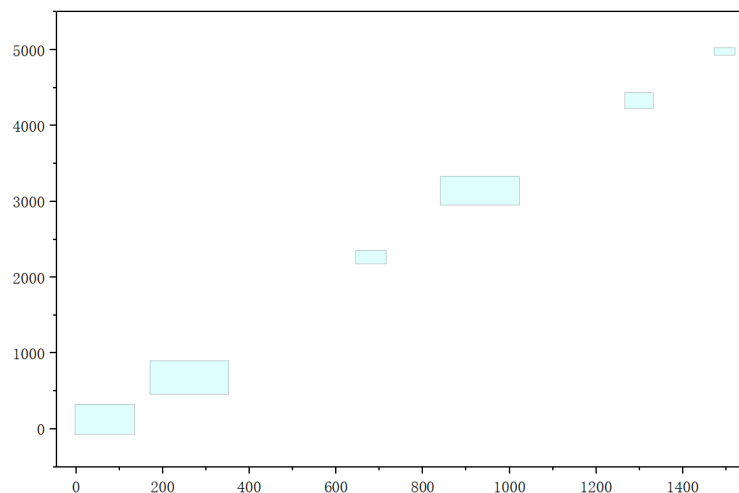


Figure 4: 2024-3 ORGANISM.

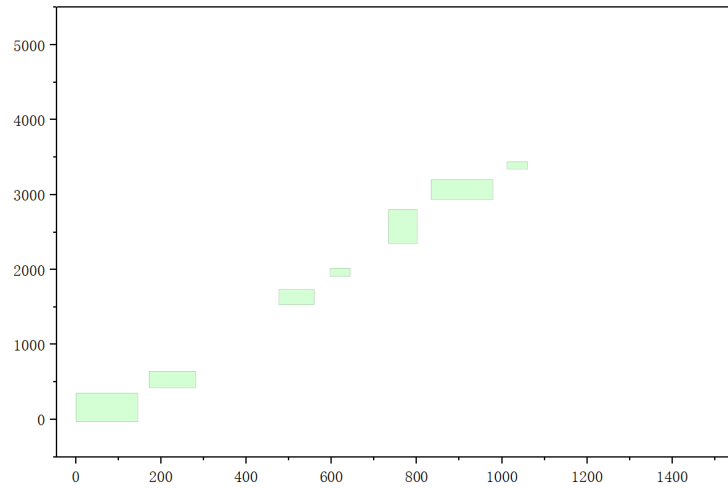


Figure 5: 2024-4 COMPETITION.

4.2.3. CONSTRUCTION and SPACE: The Institutional-Spatial Foundation

As Figure 6 shows, the CONSTRUCTION metaphor showed a bimodal concentration with strategic discontinuity—an initial high-density zone (200-500), a complete absence in the mid-discourse (600-800), and a dispersed return in later stages (800-1400). This pattern reflects its role as a bookended emphasis device, providing strong initial institutional framing and conclusive validation, while receding during detailed implementation discussions. In contrast, the SPACE metaphor in Figure 7 demonstrated a uniformly dispersed deployment throughout the discourse, with consistent size and spacing. This normalization indicates that geographical and quantitative framing had become a fully integrated, routine element of the discourse architecture rather than a strategic emphasis tool.

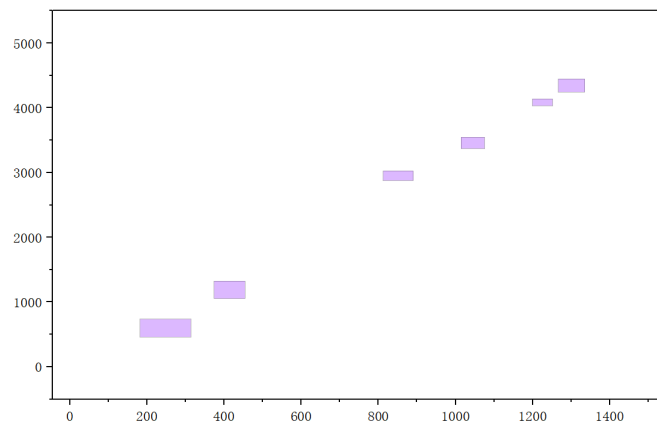


Figure 6: 2024-5 CONSTRUCTION.

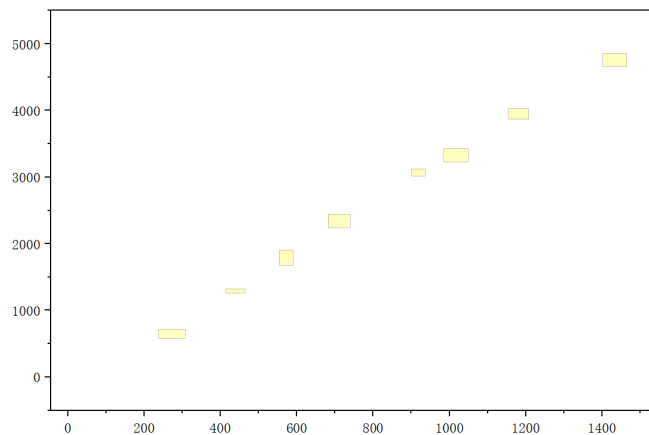


Figure 7: 2024-6 SPACE.

4.3. Discussion: The Institutionalization of Discourse in the Policy Maintenance Phases

As Figure 8 shows, the 2024 metaphorical ecosystem embodies a discourse in its maintenance phase. The operationalized interplay between metaphor—the Technical-Temporal synergy, Ecological-Competitive alternation, and Institutional-Spatial foundation—no longer primarily serves to persuade external audiences or justify new initiatives. Instead, it functions as a ritualized, self-reproducing cognitive framework for internal policy coordination and external signaling of stability and confidence.

Critical convergence points, such as the coordinated elevation of all metaphors at $x=0-400$ and the simultaneous peaking of MACHINE, JOURNEY, and COMPETITION at $x=800-1000$, signify robust narrative alignment. This reflects China's advanced stage of energy transition, where discourse consolidates around demonstrated achievements and established policy paths. The metaphors have transformed into what can be termed “institutionalized cognitive frameworks”—standardized rhetorical patterns that maintain institutional continuity and project comprehensive strategic confidence, marking China's discursive shift from an aspiring newcomer to an established leader in the global energy landscape.

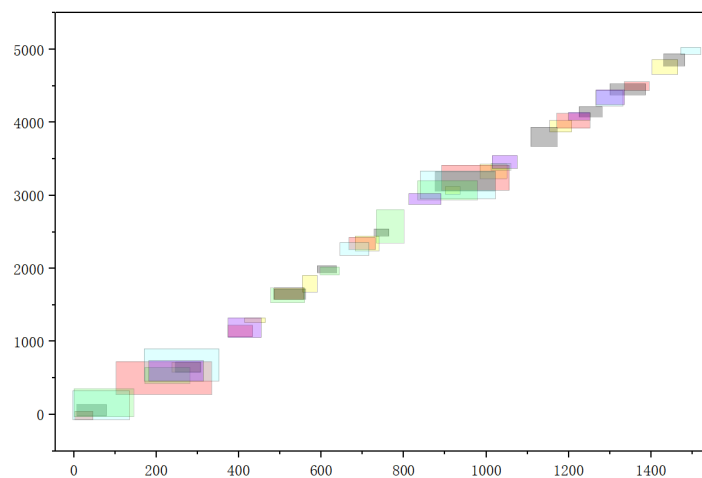


Figure 8: 2024-ALL.

5. Conclusions

This study has undertaken a focused longitudinal examination of the systematic metaphorical architecture within *China Daily's* 2024 new energy discourse. By integrating Cameron's Discourse Dynamics Approach with Liao Meizhen's CDST-based metaphorical discourse analysis, the research has advanced a novel theoretical framework that conceptualizes the micro-macro relationship in metaphor use as a dynamic, bidirectional system. The principal methodological innovation lies in the application of density trajectory visualization, which moves beyond static frequency counts to delineate the operational architecture and synergistic interactions of six systematic metaphors—Journey, Machine, Organism, Competition, Construction, and Space—at a point of maturity.

The findings confirm that by 2024, China's new energy discourse had reached a stage of high institutionalization. The analysis revealed a stabilized metaphorical ecosystem characterized by a clear functional hierarchy: a primary Technical-Temporal Synergy (Machine and Journey) providing a continuous narrative backbone, a strategic Ecological-Competitive Balance (Organism and Competition) legitimizing ambition through sustainability, and a foundational Institutional-Spatial layer (Construction and Space) ensuring structural coherence and measurable benchmarks. This intricate architecture functions not as a set of persuasive tools for external advocacy, but rather as a set of institutionalized cognitive frameworks for internal policy coordination and the ritualistic sustenance of a confident, established strategic narrative.

This study offers a threefold contribution. Theoretically, it extends the application of the discourse dynamics approach by adapting it to model the structure of institutionalized metaphorical systems in mature policy discourse. Methodologically, it demonstrates the efficacy of density trajectory visualization as a tool for capturing the real-time, co-evolutionary dynamics of multiple systematic metaphors within a discourse. Empirically, it provides a new angle to understand how China's new energy

discourse reflects and constructs its transition from an aspiring participant to a confident leader in the global energy landscape.

Despite these contributions, this study is not without its limitations. The exclusive focus on energy-related metaphors and a single corpus from *China Daily*, while providing analytical depth, may overlook complementary metaphors from other semantic domains and the diversity of perspectives in public discourse. Future research could expand the scope to include a wider range of media sources and genres, and engage in cross-linguistic comparisons to determine the universality or uniqueness of the observed metaphorical patterns. Such endeavors would further enrich our understanding of how metaphorical systems evolve and institutionalize across different cultural and discursive contexts.

Acknowledgements

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