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Practice and Effectiveness of Cross-Cultural Communication in Chinese Sci-Fi Cinema: A Case Study of The Wandering Earth Series in Germany Based on Python Sentiment Analysis

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Abstract

In an era of accelerating globalization, film serves as a vital cultural medium, drawing significant attention to its cross-cultural communication efficacy. The rise of the Chinese film industry—exemplified by domestic sci-fi franchises such as The Wandering Earth series—has achieved notable success in the global market. Using Python-based sentiment analysis, this study examines the cross-cultural communication practices and effectiveness of The Wandering Earth series in Germany. Aiming to bridge gaps in existing literature, this research quantitatively processes and deeply mines film review data from German social media platforms and film review websites to analyze the emotional orientation and cognitive structures of German audiences. The research objectives include: analyzing German viewers' reception, core topic perception, and key focus areas; investigating their emotional inclinations toward various themes; and uncovering the underlying interactive mechanisms among political, economic, cultural, and social values driving these emotional tendencies. Ultimately, this study aims to construct an effective adaptive strategic framework for the cross-cultural communication of domestic sci-fi films and elucidate key mechanisms for enhancing cultural communication efficacy. The findings offer a novel paradigm for Chinese cinema's global outreach ("going global") and provide concrete, actionable recommendations for filmmakers and distributors to optimize international box office performance and critical reception.

Keywords

Chinese Sci-Fi Cinema; Cross-Cultural Reception; Overseas Online Film Reviews; Sentiment Analysis

1. Introduction

1.1. Research Background

In today's increasingly globalized world, film as an essential cultural medium plays a pivotal role in cross-cultural communication. The rapid rise of China's film

industry—particularly domestic sci-fi cinema represented by The Wandering Earth series—has attained significant accomplishments worldwide. However, the communicative reception and audience integration of these films within non-Chinese cultural spheres, especially in Western developed nations, warrant deeper investigation.

Taking Germany as an example: as a major European economic power and cultural hub, German audiences exhibit distinct cinematic preferences and aesthetic orientations. Their understanding of science fiction themes, openness to macro-narratives, and interpretation of embedded political, cultural, and social values differ substantially from those of Chinese viewers. Currently, research evaluating the reception of The Wandering Earth series in the German market—particularly quantitative research leveraging sentiment analysis—remains scarce. Existing literature predominantly centers on narrative structures, visual effects technologies, or domestic societal feedback in China, with very few studies systematically dissecting specific emotional feedback from German audiences through a cross-cultural communication lens.

Accordingly, this study addresses this research gap by utilizing Python sentiment analysis techniques to quantitatively process and mine review data from German social media platforms and film review portals, uncovering German viewers' authentic sentiment orientations and cognitive frameworks toward The Wandering Earth series.

1.2. Research Objectives and Questions

The primary objectives of this study are to: (1) analyze German viewers' reception, perception of core issues, and focal points regarding The Wandering Earth series using Python sentiment analysis; (2) examine the characteristics of their sentiment inclinations across distinct themes; (3) expose the underlying interaction mechanisms among political cognition, economic culture, and social values driving these sentiments; and (4) establish an adaptive strategic framework and identify key mechanisms for enhancing the efficacy of domestic sci-fi films' cross-cultural communication.

Specifically, this study addresses the following four research questions:

1) What are the key characteristics of German audiences' reception and core issue perception regarding The Wandering Earth series, and what topics dominate their attention ?

2) What sentiment inclinations do German viewers exhibit across different thematic dimensions ?

3) What deep underlying drivers—encompassing political cognitive structures, economic-cultural backgrounds, and social values—explain these sentiment patterns ?

4) What is the optimal adaptive strategic system and practical pathway for Chinese

sci-fi cinema to achieve effective cross-cultural communication, and what key mechanisms enhance cultural communication efficacy ?

1.3. Research Significance and Contributions

This study enriches and extends the application of cross-cultural communication theory in film studies. By systematically analyzing sentiment data from German viewers, it establishes a cross-cultural communication research framework grounded in big data and sentiment analysis, offering a novel empirical paradigm for future Chinese cinematic exports. Furthermore, it deepens academic understanding of cultural hegemony and mutual learning mechanisms in a globalized era, exploring how Chinese sci-fi cinema can carve out its niche within the global cultural landscape.

Practically, the empirical findings provide actionable recommendations for international distribution strategies. Analyzing German audience reactions to various themes (e.g., collectivism, familial concepts, a community with a shared future for mankind) enables producers and distributors to target audiences precisely, refine marketing strategies, and optimize content presentation, thereby boosting international box office revenue and critical acclaim. Additionally, these insights provide valuable cross-cultural creative experience for Chinese filmmakers, fostering a nuanced understanding of Western psychological and cultural values to craft works with broader international resonance.

2. Literature Review

2.1. Evolution of Sentiment Analysis Techniques

Sentiment Analysis (also known as Opinion Mining) is a prominent branch of Natural Language Processing (NLP) designed to identify, extract, and quantify emotional polarities embedded within text. Its development spans three primary phases: lexicon-based approaches, machine learning-based approaches, and deep learning-based approaches.

Early Phase: Lexicon and Rule-Based Methods. Early sentiment analysis relied heavily on manually or semi-automatically curated sentiment lexicons and syntactic rules. Researchers assigned polarity scores to emotional terms (e.g., "good," "bad," "like," "hate"). For instance, Osgood et al. (1957) laid the groundwork for sentiment lexicon construction through the Semantic Differential Scale. Polarity was determined by calculating the density and intensity of sentiment words in a text. While intuitive, this approach struggles with context dependency and emerging internet slang.

Development Phase: Machine Learning Methods. With advancements in machine learning, researchers framed sentiment analysis as a text classification task, deploying classical algorithms such as Support Vector Machines (SVM), Naïve Bayes, and Maximum Entropy. Utilizing feature engineering (e.g., N-grams, part-of-speech

tagging, syntactic parsing), models captured semantic information more effectively. Pang et al. (2002) pioneered the application of machine learning to movie review sentiment classification, proving its superiority over traditional methods.

Modern Phase: Deep Learning Methods. Recent neural network architectures—including Recurrent Neural Networks (RNN), Long Short-Term Memory (LSTM) networks, and Convolutional Neural Networks (CNN)—have automated feature extraction, eliminating manual feature engineering. Crucially, Pre-trained Language Models (PLMs) such as BERT and GPT (Devlin et al., 2019) have enabled deep contextual comprehension, substantially improving accuracy. Wang et al. (2018) comprehensively surveyed the applications and ongoing challenges of deep learning in sentiment analysis.

2.2. Current State of German NLP Research

As one of Europe's primary languages, German has seen significant progress in NLP. However, compared to English NLP, German NLP still faces resource gaps and unique linguistic hurdles.

Linguistic Characteristics and Challenges: German is renowned for complex syntax, extensive compound words (Komposita), and rich inflectional paradigms. These traits complicate tokenization, part-of-speech tagging, and lexicon construction. For example, the sentiment polarity of a long compound noun requires evaluating multiple constituent elements. Moreover, colloquialisms, abbreviations, and informal internet slang in casual writing further challenge analysis models.

Existing Resources and Literature: Tools such as SpaCy and NLTK provide built-in support for German processing (e.g., tokenization, POS tagging, named entity recognition). German sentiment lexicons like SentiWS supply essential baseline resources. Shared datasets, such as the GermEval corpus (Wiegand et al., 2015), support model training and benchmark evaluations. Nevertheless, German sentiment analysis remains concentrated in domain-specific sectors (e.g., finance, healthcare), leaving cultural product reviews (such as film critiques) under-researched.

3. Research Methodology

3.1. Data Collection

Review data concerning The Wandering Earth film series were gathered from German platforms—including Moviepilot, Filmstarts, and Zeit Online—covering the period from 2019 to 2024. Extracted fields included publication date, rating scores, and text comments. Because raw review text is unstructured, systematic preprocessing was performed to enhance feature extraction and sentiment accuracy. Entries containing only emojis, duplicate posts, or lacking substantive commentary were filtered out, resulting in a compiled small-scale German online film review corpus comprising 256 valid entries and 7,803 total words.

3.2. Data Preprocessing and Cleaning

Using Python NLP libraries, the corpus underwent standardized text cleaning according to the following pipeline: lowercasing, removal of punctuation and special characters, preservation of German umlauts (ä, ö, ü, ß), tokenization, removal of standard stop words (while intentionally retaining negations and degree adverbs), and lemmatization. Post-cleaning, the effective text corpus yielded 4,822 processed words, presenting a standardized, focused, and noise-reduced dataset preserving critical modifier context.

3.3. Feature Extraction and Discourse Classification

As Halliday (1985) notes, text classification systems are predominantly realized through lexical choices. Analyzing high-frequency content words (nouns and adjectives) exposes a text's core focal points and underlying speaker attitudes. Using Python, word frequency distributions were generated alongside part-of-speech (POS) pie charts, frequency bar charts, and word clouds. Semantic clustering of high-frequency words ultimately yielded three principal feature dimensions.

3.4. Sentiment Analysis

Sentiment analysis extracts, quantifies, and infers subjective emotional orientations within natural language text. This study implements a hybrid sentiment analysis framework combining lexicon-driven methods with machine learning classifiers to elevate both the precision and fine-grained resolution of German sentiment polarities.

4. Findings

4.1. Feature Distribution

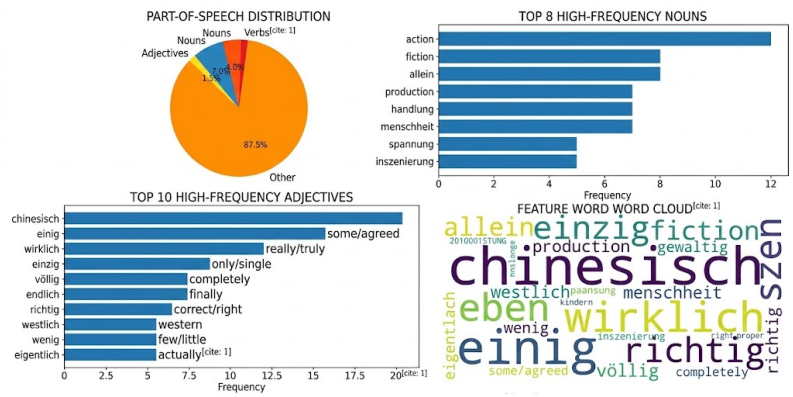
Using Python, POS distribution pie charts, high-frequency word bar charts, and word clouds were constructed from the cleaned dataset (see Figure 1).

The POS pie chart reflects the linguistic structure of the commentary corpus. A key observation is that auxiliary/functional word categories (articles, prepositions, conjunctions, pronouns) account for 87.5% of the total, indicating that German audience reviews favor complete grammatical structures and logical argumentation over fragmented, impressionistic commentary. Among content words, adjectives comprise 7.0%, serving as the primary drivers of subjective evaluation. Nouns account for 4.0%; this concise proportion demonstrates that discussion topics are highly concentrated around a few core entities. Verbs make up the lowest share at 1.5%, implying that comments prioritize static evaluation ("what it is" / "how it is") over dynamic plot recount ("what happened").

The bar charts and word cloud visually highlight specific high-frequency terms. Based on semantic categorization, three primary feature dimensions were extracted:

1) Macro-Narratives and Collective Destiny: High-frequency nouns such as Menschheit (humanity) and allein (alone/lonely) capture the central tension of The Wandering Earth—the existential crisis of global humanity alongside a heroic, tragic sense of fighting alone. Comments in this dimension center on global cooperation, survival crises, and self-sacrifice.
2) Industrial Attributes and Genre Cognition: High-frequency nouns including Action (action), Fiktion (fiction/sci-fi), Produktion (production), and Inszenierung (direction/staging) reveal that German viewers evaluate the film as an industrial product through standardized genre benchmarks (visual effects, pacing, scale). Produktion reflects a uniquely German focus on technical execution, budget scale, and craftsmanship, while Inszenierung underscores interest in directorial execution and visual narrative techniques.
3) Cultural Identity and Perception of Authenticity: High-frequency adjectives such as chinesisch (Chinese), westlich (Western), wirklich (real/authentic), and richtig (right/proper) demonstrate the cultural lenses applied by viewers. Chinesisch is the single most frequent adjective, showing that the film's Chinese cultural framing left a strong impression, prompting comparisons with traditional Hollywood tropes. The presence of westlich confirms frequent cross-cultural comparative analysis, while wirklich and richtig reflect critical evaluations of internal narrative logic, scientific plausibility, and emotional credibility.

Figure 1. Feature Distribution—including POS Distribution, Top High-Frequency Nouns, Top High-Frequency Adjectives, and Keyword Word Cloud



4.2. Sentiment Orientation Analysis

Based on the 256 annotated German reviews across the three thematic dimensions, sentiment polarities were systematically categorized into positive, neutral/mixed, and negative orientations (see Table 1). While German viewers widely acknowledge China's film industry advancements, notable divergence appears regarding narrative logic, cultural expression, and political metaphors.

4.2.1. Sentiments on Macro-Narratives and Collective Destiny

German audiences display complex emotional responses toward the "community with a shared future for mankind" narrative.

Positive (23.80%): Viewers praise the grand scope and global perspective, citing expressions like "rettung erd multinational unterfang" (saving Earth is a multinational endeavor), "menschheit steht zusamm" (humanity stands together), and "kollektiv gerettet" (saved collectively). These reviews appreciate the departure from individualistic Western hero tropes.

Negative (9.50%): Critics target narrative hollows and excessive melodrama, using terms like "seelenlos" (soulless), "pathos tropft jed eck" (pathos dripping from every corner), and "wirr handlung" (confused plot).

Neutral/Mixed (66.70%): The majority endorse the overarching premise but question its execution, characterized by comments like "größenwahnsinnig aber interessant" (megalomaniacal but interesting) and "konzept gut, umsetzung schwach" (good concept, weak execution).

4.2.2. Sentiments on Industrial Attributes and Genre Cognition

Viewers applaud China's cinematic engineering and technical prowess, though opinions diverge on genre integration and story cohesion.

Positive (31.60%): High praise is directed at visual effects: "visuell beeindruckend" (visually impressive), "cgi kreativität technik sup stell hollywood abgehängt" (CGI and technical creativity superior, leaving Hollywood behind), and "effektspektakel" (spectacle of effects).

Negative (15.80%): Criticisms highlight CGI fatigue and narrative weakness: "übermäßig einsatz cgi schnell ermüdet" (excessive CGI usage quickly exhausts the viewer) and "effekt gewaltig aber handlung wirr" (powerful effects but chaotic plot).

Neutral (52.60%): Viewers frame the film as acceptable "popcorn cinema" (Popcorn-Kino)—technically accomplished yet artistically conventional.

4.2.3. Sentiments on Cultural Identity and Perception of Authenticity

Reviews reflect high cultural sensitivity and ideological scrutiny regarding Chinese cultural elements and state messaging.

Positive (18.20%): Audiences appreciate cultural novelty: "chinesisch weg anders frisch" (the Chinese path is different and fresh) and "nicht amerikan all rett müss sondern chines" (not Americans saving everyone, but Chinese).

Negative (27.30%): Strong resistance emerges against perceived state propaganda: "china propaganda übelst" (Chinese propaganda at its worst), "nationalistisch passag" (nationalistic passages), and "unterschwellig kollektiv all kommunismus gut" (subliminal messaging that collectivism and communism are good).

Neutral (54.50%): Viewers acknowledge distinct cultural gaps while remaining receptive: "kulturell unterschied sein haarsträubend prämiss" (cultural differences lead to hair-raising premises).

Table 1. Sentiment Polarization Across Thematic Dimensions

Thematic Dimension	Positive (%)	Neutral / Mixed (%)	Negative (%)
Macro-Narratives & Collective Destiny	23.80%	66.70%	9.50%
Industrial Attributes & Genre Cognition	31.60%	52.60%	15.80%
Cultural Identity & Perception of Authenticity	18.20%	54.50%	27.30%

4.3. Summary of Findings

4.3.1. Summary of Feature Distribution

1) Focus on Characterization vs. Macro-Narrative: Discussions balance individual character arcs against broader collective concepts (Menschheit).
2) Shift from Technical Merit to Industrial Examination: Evaluations extend beyond visual effects (Action) to encompass total production caliber (Produktion), directorial execution (Inszenierung), and genre placement (Fiktion).
3) Pervasive Cultural Identity: Cultural framing (chinesisch vs. westlich) acts as a persistent interpretative filter across all dimensions.
4) Analytical and Rational Tone: Reviews lean heavily on objective analysis, logical evaluation, and structural critiques rather than raw emotional expression.

4.3.2. Summary of Sentiment Polarities

1) Technical and industrial advancements are widely acknowledged, with visual effects seen as rivaling or exceeding Hollywood benchmarks.
2) Character development and narrative logic draw the strongest criticisms, driven by friction between Chinese collective tropes and Western individualistic norms.
3) Cultural translation barriers trigger noticeable "propaganda sensitivity," inducing negative reactions to perceived political subtext.
4) Audiences categorize the franchise primarily as standard sci-fi disaster/popcorn cinema—granting high marks for entertainment value while rating artistic narrative depth lower.

5. Discussion

5.1. Deep Motivations Underlying German Audience Sentiment

The sentiment patterns observed among German audiences stem from complex intersections of political cognition, economic-cultural framing, and social values. Reviews represent a active "decoding" process through local cultural filters, as modeled by Stuart Hall's (1980) Encoding/Decoding framework. Divergent interpretations highlight the "cultural discount" encountered during international transmission.

5.1.1. Political Cognition: Sensitivity to "Collectivism" and "State Propaganda"

Negative reactions within the cultural identity dimension stem from heightened historical sensitivity toward state-driven collectivism. Germany's twentieth-century

historical experiences foster skepticism toward nationalist or collective propaganda. Terms like "propaganda," "nationalistic," and "communism" reflect deeply rooted political filters.

German viewers often interpret macro-narratives of global unity not as benign sci-fi premises, but as covert ideological exports. This aligns with Galtung's (1971) Structural Theory of Imperialism, where cultural products are scrutinized for latent central-state ideology. Narratives emphasizing total self-sacrifice and state-directed crisis management contrast sharply with Western sci-fi conventions grounded in individual agency, personal liberty, and anti-authoritarianism.

5.1.2. Economic Culture: Dual Standards for "Industrial Products" vs. "Art Films"

The contrast between high marks for visual effects and critiques of narrative structure reflects Germany's film culture. Long accustomed to mature Hollywood production values, German audiences readily applaud technical benchmarks that match Hollywood standards.

However, German film critique also emphasizes auteur depth, narrative complexity, and logical rigor. Labeling the film an Effektspektakel or Popcorn-Kino functions as a double-edged sword: it acknowledges high technical completion as an industrial product while signaling perceived shortcomings in artistic depth.

5.1.3. Social Values: Friction Between "Individual Freedom" and "Collective Sacrifice"

Core German social values—individual autonomy, critical inquiry, and pluralism—clash with cinematic depictions of absolute collective sacrifice. Plotlines requiring total subordination to central directives can strike individualist viewers as alienating.

German audiences expect disaster narratives to emphasize personal dilemma, moral ambiguity, and grassroots self-organization. Accusations of "hollow narratives" or "excessive pathos" highlight a misalignment in emotional framing: viewers interpret emotional peaks as engineered tools for collective narratives rather than organic character choices, creating emotional distance.

5.2. Adaptive Strategic Framework and Practical Pathways for Cross-Cultural Communication

5.2.1. Narrative Strategy: Balancing "Collective Supremacy" with "Humanistic Concern"

Softening Explicit Ideological Symbols: Minimize overt state-centric or nationalistic symbolism to mitigate audience "propaganda sensitivity".

Emphasizing Universal Values and Humanistic Depth: While collective cooperation remains a signature element of Chinese storytelling, international versions should balance macro-level goals with individual moral dilemmas, personal agency, and

psychological realism. Incorporating universal structures—such as Joseph Campbell's (1949) "Hero's Journey"—can foster cross-cultural resonance while preserving thematic scope.

5.2.2. Marketing Strategy: Precise Positioning and Differentiated Promotion

Segmented Market Targeting: Move beyond monolithic concepts of "Western markets" by tailoring campaigns to regional cultural preferences. In Germany, marketing should emphasize high-concept sci-fi mechanics, world-building, and technical craft over abstract ideological themes.

Localized Distribution and Engagement: Collaborate with local film critics, sci-fi authors, and media influencers to frame discussions within familiar cultural contexts. Promotional assets (trailers, posters) can align cinematic themes with locally relevant discourses, such as environmental stewardship or technological ethics (Wasko, 2003).

5.2.3. Integration of Technology and Art: Unifying Narrative with Visuals

Elevating Script Rigor and Character Depth: To resolve the contrast between visual Polish and narrative critique, production cycles must invest heavily in script development, character consistency, and internal scientific logic.

Nuanced Emotional Pacing: Replace overt melodrama with restrained, character-driven emotional arcs that align with Western cinematic expectations. Creators should anticipate international decoding patterns during the initial script encoding phase.

5.3. Key Mechanisms for Enhancing Cultural Communication Efficacy

Elevating cultural communication efficacy requires transitioning from a one-way "cultural output" model to a two-way "mutual cultural learning" paradigm.

1) Establishing Intercultural Dialogue Over Monologue: Rather than unidirectional messaging, Chinese sci-fi should actively engage global cinematic conventions, entering thematic dialogues with classic Western sci-fi. Framing shared human challenges fosters receptivity without sacrificing core cultural values.
2) Integrating Industrial Standards with International Co-Production: Sustainable outreach relies on building internationally competitive industrial infrastructure. This involves integrating global talent, pursuing joint productions, and adhering to international technical standards. Technical and commercial parity allows cultural subtext to be received more fluidly.

Overcoming Stereotypes and Ideological Barriers: Addressing audience biases requires a consistent pipeline of high-quality releases over time. By embedding Chinese cultural perspectives within universal themes (e.g., survival, tech ethics, familial bonds), films can achieve soft cultural communication and lower ideological friction, echoing Galtung's (1971) insights on non-confrontational cultural influence.

6. Significance and Limitations

By utilizing empirical user review data, this study provides actionable insights into the reception of Chinese sci-fi cinema abroad. However, limitations exist, including a modest sample size and potential subjectivity during manual sentiment annotation. Future research may expand upon these findings by conducting larger-scale cross-cultural comparative studies to further illuminate the international reception of Chinese cinema.

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