Original Paper

A Study on Subtitle Translation of Science Fiction Films

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Abstract

Science fiction film subtitle translation, situated at the intersection of linguistic conversion, technical constraints, and fictional world construction, represents a unique translation challenge. This paper explores the theoretical frameworks, practical strategies, and emerging trends in sci-fi film subtitle translation by analyzing recent academic achievements and case studies including the Star Wars series and The Wandering Earth series. The study identifies four primary challenges facing sci-fi film subtitle translators: neologism and terminology management, handling scientific and technological discourse, cultural specificity within fictional contexts, and multimodal constraints. Drawing on Relevance Theory, Functional Equivalence Theory, and Multimodal Discourse Analysis, it evaluates translation strategies including transfer, compression, paraphrase, and creative adaptation. The research further examines the impact of modal differences between subtitling and dubbing, and the emergence of human-machine hybrid translation models. The findings indicate that optimal sci-fi film subtitle translation requires balancing source text fidelity with target audience comprehensibility, while appropriately managing the genre's inherent tension between scientific plausibility and imaginative fiction. The study concludes by proposing a comprehensive framework for sci-fi film subtitle translation practice and identifying future research directions in this rapidly evolving field.

Keywords

science fiction films, audiovisual translation, subtitle translation strategies, Relevance Theory, neologism translation, multimodal discourse analysis

1. Introduction

The global proliferation of science fiction films has created an unprecedented demand for high-quality audiovisual translation. Such translation must convey not only linguistic meaning but also the imaginative worlds, technological concepts, and philosophical underpinnings that define the genre. From *Star Wars*' galaxy-spanning narrative to *The Wandering Earth*'s meditations on artificial intelligence, science fiction films traverse linguistic and cultural boundaries, reaching diverse

audiences who rely on subtitles to access these fictional realities.

However, the subtitle translation of science fiction films presents unique challenges that distinguish it from other forms of audiovisual translation. Unlike dialogue in realistic dramas or romantic comedies, science fiction discourse frequently contains neologisms, technical terminology, invented languages, and conceptual abstractions that lack established equivalents in target languages. Translators must simultaneously manage the technical constraints of subtitling (temporal duration, spatial limitations, synchronization with image and sound) while negotiating the genre's inherent balance between empirical plausibility and imaginative speculation.

This study aims to explore the following research questions: (1) What are the primary specific challenges confronting science fiction film subtitle translation? (2) Which theoretical frameworks best illuminate the decision-making processes in translating this genre? (3) What strategies do translators employ to handle neologisms, technical discourse, and cultural references within science fiction contexts? (4) How do emerging technologies and analytical methods influence contemporary practices in science fiction film subtitle translation?

The paper begins by reviewing relevant literature in audiovisual translation studies, science fiction translation theory, and subtitle-specific research. It then examines the distinctive features of science fiction as a translatable genre, followed by case studies illustrating key challenges and corresponding strategies. Subsequent sections discuss modal differences between subtitling and dubbing, emerging digital analysis methods for translation, and the implications of machine translation technologies. The conclusion synthesizes findings into a comprehensive framework and identifies directions for future research.

2. Literature Review

2.1 Audiovisual Translation and Subtitling Constraints

Audiovisual translation has emerged as a distinct field within translation studies, characterized by its semiotic complexity wherein meaning is conveyed simultaneously through multiple channels. As González Quevedo (2021) notes in her doctoral research on science fiction film translation, audiovisual texts operate through the intersection of linguistic, visual, and auditory codes, producing what Mayoral, Kelly, and Gallardo (1988) term "noise"—specific constraints that impede faithful translation. These constraints operate differently across translation modalities, with subtitling facing constraints distinct from those of dubbing.

Subtitling, as a written form of audiovisual translation, is subject to well-documented technical limitations. Temporal constraints require that subtitles remain on screen sufficiently long for comfortable reading—typically between two and six seconds depending on length—while spatial constraints restrict subtitles to approximately two lines of 35-40 characters each. These practical constraints necessitate compression strategies that reduce source text volume while preserving essential meaning. For science fiction films, such decisions become particularly significant when compression

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involves conceptually dense terminology or expository dialogue that establishes the fictional world's background.

2.2 Theoretical Frameworks for Science Fiction Translation

Various theoretical frameworks have been applied to the study of subtitle translation in science fiction films, each revealing different dimensions of practice. Relevance theory, derived from the pragmatic framework of Sperber and Wilson, has proven to be significantly explanatory in the study of subtitle translation in science fiction films. Zhang (2012) took the movie *Avatar* as an example to demonstrate that the principle of optimal relevance can serve as the basis and evaluation criterion for subtitle translation. Zeng (2012) also analyzed the application of translation strategies in the Chinese translation of *Avatar* from the perspective of optimal relevance theory. Feng & Wang (2023) further verified the effectiveness of strategies such as amplification, omission, explicitation, and domestication under the guidance of relevance theory in establishing optimal relevance through their study of subtitle translation in *Black Adam*. Ge (2015) explored the subtitle translation strategies of *Interstellar* based on relevance theory, advocating for clarifying the original metaphorical information, using colloquial language, and appropriately adding or deleting the original text to help viewers overcome language and cultural barriers.

Nida's functional equivalence theory has also been widely applied, especially occupying an important position in the study of Chinese science fiction subtitle translation. Zhu & Zheng (2023) took *Interstellar* as an example, analyzing the guiding role of functional equivalence theory in subtitle translation from four levels: vocabulary, syntax, discourse, and style. Liu & Ji (2024) took *Men in Black III* as an example, proposing to achieve functional equivalence from three levels: language, culture, and pragmatics, and using strategies such as amplification, omission, variation, and free translation to convey the artistic style of the film. Xu (2024) explored the specific application of functional equivalence theory in subtitle translation in *Godzilla: King of the Monsters* from four perspectives: lexical equivalence, syntactic equivalence, stylistic equivalence, and textual equivalence. These studies collectively demonstrate that functional equivalence theory seeks to achieve similar audience responses rather than formal correspondence, providing a suitable framework for dealing with the conceptual challenges of science fiction films.

In recent years, multimodal discourse analysis has garnered widespread attention in the study of subtitle translation for science fiction films. Li (2021) took *The Wandering Earth* as an example, exploring the effective application of multimodal discourse analysis in film subtitle translation from four dimensions: culture, context, content, and expression. Similarly, Li (2022) also utilized the theoretical framework of multimodal discourse analysis to investigate the subtitle translation of *The Wandering Earth*, emphasizing the significance of multimodal cohesion in achieving the integrity and coherence of film texts. Xia (2023) further verified the applicability of the multimodal discourse

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analysis framework in the study of subtitle translation for science fiction films, using *The Wandering Earth II* as an example. These research findings collectively underscore the characteristic of subtitle translation operating within a multimodal whole, where meaning emerges from the interaction between language, text, images, sounds, and editing. They caution against viewing subtitles as isolated linguistic products, but rather positioning them as an integral part of a complex communicative whole.

2.3 Subtitle Translation Strategies and Techniques

Empirical research on science fiction film subtitling has identified recurring translation strategies across different language pairs and film corpora. Pratama's (2006) study of *The Wandering Earth II*'s subtitle translation, applying Gottlieb's taxonomy of subtitling strategies, found that transfer (direct translation) accounted for 35.86% of decisions, followed by compression (18.16%), deletion (15.58%), paraphrase (13.98%), and imitation (12.88%), with condensation and expansion representing smaller proportions. This distribution suggests that while direct transfer predominates, reduction strategies collectively account for over one-third of translation decisions, reflecting the inherent compressive pressures of subtitling.

González Quevedo's (2021) contrastive analysis of dubbing and subtitling in science fiction films examines how translation techniques vary across modalities. Her research, applying Martí Ferriol's methodology, analyzes samples where dubbed and subtitled versions show significant variation, categorizing these variations according to the constraints present and the norms and techniques applied by translators. This approach reveals that subtitling and dubbing, while often originating from the same source material, follow different decision-making logics responsive to their respective technical constraints.

3. Distinctive Features of Science Fiction as a Translatable Genre

3.1 Fictional World-Building and Linguistic Creation

Science fiction films distinguish themselves from other cinematic genres through their investment in fictional world-building, the construction of alternative realities governed by premises that may differ from our empirical world. This world-building frequently extends to language itself, with films creating terminology, naming systems, and occasionally complete languages to realize their imaginative visions. The translation challenge lies in conveying these linguistic creations without disrupting their coherence or their estranging effect.

3.2 Scientific and Technological Discourse and Plausibility

Science fiction films, particularly the "hard science fiction" subgenre, incorporate scientific and technological discourse that must balance plausibility with comprehensibility. Films like Interstellar draw upon actual scientific concepts, relativity, orbital mechanics, botany, while adapting them for narrative purposes. Subtitle translators must render such discourse with sufficient accuracy to satisfy knowledgeable viewers while maintaining accessibility for general audiences.

Research indicates that successful translations employ explanatory strategies when necessary,

expanding or paraphrasing to make scientific concepts accessible without entirely abandoning technical precision. The challenge intensifies when films incorporate speculative extensions of existing science, requiring translators to distinguish established terminology from creative extrapolation.

3.3 Cultural Specificity within Fictional Contexts

Science fiction films, though often assumed "universal" due to their fictional nature, remain rooted in cultural assumptions that may not translate transparently. Recent scholarship on Chinese science fiction films, particularly *The Wandering Earth II*, examines how cultural specificity operates within fictional frameworks. The films' themes of collective survival, intergenerational responsibility, and state-coordinated action reflect cultural values requiring careful negotiation in English subtitles for international distribution.

An analysis of *The Wandering Earth II* via the FAR model reveals a distinct divergence in how human translators, neural networks, and generative AI navigate culturally saturated narratives. While human practitioners excel at preserving nuanced cultural connotations and thematic flow, automated systems, both neural and generative, frequently falter when faced with heavy contextual dependencies or localized idioms. These findings suggest that the perceived "universal" appeal of science fiction often belies a foundation of culture-specific assumptions, necessitating a level of interpretive mediation that remains, for now, uniquely human.

4. Challenges in Science Fiction Film Subtitle Translation

4.1 Neologisms and Terminology Management

The translation of science fiction terminology constitutes the most immediately visible challenge in sci-fi subtitling. Unlike technical translation, where terms correspond to established concepts with standard equivalents, science fiction terminology refers to concepts with no real-world referents. Translators must create or select target-language forms that function within the fictional universe while remaining accessible to viewers.

Analysis of subtitling strategies reveals several approaches to neologism handling. Imitation, preserving source terms in their original form, maintains the exotic flavor of invented terminology but may impede comprehension for viewers unfamiliar with English. Translation of constituent morphemes creates comprehensible compounds but may lose conciseness. Holistic substitution replaces invented terms with target-language inventions bearing no formal relation to the source.

The choice among these strategies carries implications for fictional world coherence. Consistent application of a single approach throughout a film or franchise helps maintain the sense of a unified fictional universe, while inconsistent treatment may disrupt viewers' suspension of disbelief. Diachronic analysis of *Star Wars* reveals how translation approaches have shifted over decades, sometimes within the same franchise, creating challenges for audience reception.

4.2 Compression and Information Density

Science fiction films frequently contain expository passages wherein characters explain fictional technology, cosmic phenomena, or background information relevant to plot development. Such passages pose challenges for subtitling, as they combine high information density with the temporal limitations of on-screen text. Translators must reduce verbal volume while preserving sufficient information to maintain narrative coherence.

The challenge intensifies when expository passages introduce terminology unfamiliar to viewers. Concepts introduced through elaborated explanation in dialogue may receive compressed treatment in subtitles that inadequately establish their meaning. Translators must balance the immediate constraints of subtitle space against the cumulative requirements of viewer comprehension across a film's duration.

4.3 Synchronization with Visual and Auditory Elements

Subtitles do not exist in isolation but interact dynamically with filmic images, sounds, and editing rhythms. Science fiction films, with their emphasis on visual spectacle and sound design, create complex multimodal environments wherein subtitle placement and timing require careful consideration. A subtitle that obscures a key visual effect or remains on screen during rapid editing compromises viewing experience regardless of its linguistic quality.

Multimodal discourse analysis applied to Chinese science fiction film subtitling emphasizes that subtitle translation must consider these intersemiotic relationships. Translators' decisions about what to include, what to compress, and how to phrase dialogue affect not only linguistic meaning but also the balance of attention across visual, auditory, and textual channels. Subtitles demanding excessive reading time may distract from visual information critical to narrative comprehension, particularly in science fiction films where plot often advances through images rather than dialogue.

4.4 Cultural and Intertextual References

Science fiction films frequently incorporate references to earlier works within the genre, creating intertextual networks that enrich meaning for knowledgeable viewers. *The Matrix franchise*, for example, draws upon cinematic and philosophical traditions that attentive viewers may recognize. Subtitle translators must decide whether to preserve such references or prioritize immediate comprehension.

The challenge extends to culture-specific elements embedded within science fiction narratives. American science fiction films, dominant in global markets, contain references to American institutions, history, and popular culture that may not translate meaningfully. Translators face decisions about whether to preserve such references (potentially confusing viewers), substitute target-culture equivalents (domestication), or paraphrase to convey essential meaning without culture-specific grounding.

5. Translation Strategies and Case Studies

5.1 Relevance Theory Approaches

Relevance Theory provides a productive framework for understanding how translators negotiate

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competing demands in science fiction subtitling. The theory posits that communication succeeds when audiences achieve adequate contextual effects with minimal processing effort—a principle that illuminates the cognitive dimension of subtitle reception.

Optimal science fiction subtitling achieves "optimal relevance"—providing sufficient information for comprehension while minimizing demands on viewers' processing capacity. When viewers must simultaneously process unfamiliar fictional concepts, technical terminology, and rapid subtitle presentation, cumulative processing load may exceed comfortable limits. Relevance-oriented translation seeks to reduce load where possible while preserving information essential to narrative comprehension.

5.2 Functional Equivalence Theory in Practice

Star Wars case studies illustrate how Functional Equivalence theory can guide translation decisions in science fiction contexts. Functional equivalence prioritizes the relationship between target text receptor and target text, aiming for equivalence of response rather than formal correspondence. For science fiction subtitling, this means devising target-language expressions that evoke comparable experiences of wonder, confusion, recognition, or discovery.

Analysis of Star Wars subtitle translations reveals decisions consistent with functional equivalence: technical concepts rendered through target-language formulations balancing accuracy with accessibility; emotional dialogue preserved through culturally appropriate expressions; expository passages compressed without loss of essential information. The research suggests that functional equivalence provides practical guidance for the myriad micro-decisions constituting subtitling practice, offering a rationale for choosing among possible translations.

5.3 Reduction Strategies: Transfer, Compression, Deletion

Pratama's (2006) quantitative analysis of subtitling strategies in The Wandering Earth 2 provides empirical data on reduction strategy distribution. Transfer (35.86%) predominates, reflecting cases where direct translation adequately conveys meaning within subtitle constraints. Compression (18.16%), the most frequent reduction strategy, involves preserving propositional content through more compact expression. "We need to evacuate the northern sector immediately" might become "Evacuate north immediately", retaining core meaning while reducing word count. Deletion (15.58%) goes further, omitting elements judged non-essential. The research notes that deletion decisions require careful judgment about what information viewers can infer from context or do not require for comprehension.

Paraphrase (13.98%) involves more substantial reformulation, often replacing source expressions lacking direct equivalents with familiar target-language formulations. For science fiction terminology, paraphrase may involve explanatory expressions that sacrifice conciseness for comprehensibility. Imitation (12.88%) preserves source terms, appropriate for proper nouns, invented terminology, and expressions where formal retention serves narrative or aesthetic purposes.

5.4 Creative Adaptation and Neologism Formation

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Some science fiction subtitling challenges require creative solutions beyond established translation procedures. Research indicates that successful creative adaptation maintains conceptual coherence within a film's terminological system. If "the Matrix" itself is rendered through a term evoking illusion or artifice, related terminology should logically follow. The study documents how Chinese translations have sometimes introduced Buddhist terminology to convey the trilogy's philosophical dimensions, trusting viewers to engage with concepts that, while unfamiliar, correspond to the films' thematic concerns.

Such approaches challenge assumptions about necessary simplification and suggest that science fiction audiences may be more receptive to conceptual complexity than conventional wisdom assumes. If filmmakers trust viewers to engage with unfamiliar ideas, translators may extend similar trust to target audiences, providing access rather than domestication.

6. Modal Differences: Subtitling vs. Dubbing

6.1 Distinct Constraints and Opportunities

Contrastive analysis of dubbing and subtitling in science fiction films reveals systematic differences in how the two modalities handle translation challenges. Dubbing must achieve synchronization with on-screen lip movements, constraining dialogue length and sound patterns. Subtitling faces temporal and spatial limitations but enjoys greater freedom in lexical choice, as subtitles need not match lip movements.

These differences produce divergent translation outcomes even when working from identical source material. González Quevedo's (2021) research identifies samples where dubbed and subtitled versions show significant variation, analyzing the constraints that produced each version's decisions. Dubbed translations tend toward shorter expressions matching character mouth movements, sometimes sacrificing semantic accuracy for lip-sync. Subtitled versions, freed from phonetic constraints, may preserve more source content but face stricter limits on text volume.

6.2 Implications for Science Fiction Content

Modal differences carry particular significance for science fiction content. Dubbing's phonetic constraints may restrict the translation of invented terminology, particularly when source terms have specific sound patterns contributing to their fictional effect. Conversely, subtitling's compression demands may truncate expository passages more severely than dubbing, which can preserve source dialogue length through careful synchronization. Characters explaining fictional technology may receive fuller treatment in dubbed versions, where speaking pace approximates the original, while subtitled versions compress to accommodate reading speed constraints.

7. Discussion

7.1 Synthesis of Findings

The findings presented here suggest that subtitling for science fiction is less a straightforward

translation task and more a sophisticated balancing act involving linguistic precision, technical literacy, and creative intuition. Translators are tasked with reconciling the genre's foundational elements, ranging from speculative world-building and dense technical jargon to deep-seated philosophical and cultural nuances, with the rigid spatial constraints of the screen and the sensory density of the cinematic experience.

To unpack these complexities, this study draws on a synthesis of theoretical perspectives. Relevance Theory provides a lens through which to examine the viewer's cognitive processing, while Functional Equivalence offers a pragmatic benchmark for maintaining the source material's communicative impact. When viewed through the prism of Multimodal Discourse Analysis, subtitles emerge as one part of a larger semiotic whole rather than isolated text. Collectively, these frameworks offer a robust, multi-dimensional methodology for deconstructing and validating the myriad choices a translator must make.

Empirical research documents the range of strategies translators employ, with transfer predominating while reduction strategies play significant roles. Creative adaptation, including neologism formation and explanatory paraphrase, becomes necessary when source content lacks target-language equivalents. The choice among strategies carries implications for fictional world coherence, narrative comprehension, and viewer experience.

7.2 Implications for Practice

For practicing science fiction subtitle translators, the research suggests several principles. First, consistency in terminology translation throughout a film or franchise supports fictional world coherence. Second, compression decisions should prioritize information essential to narrative comprehension while managing cumulative processing load. Third, creative adaptation may prove necessary for conceptually dense content, but should maintain systematic relationships among related terms. Fourth, awareness of modal differences enables optimization for subtitling's specific constraints and opportunities.

The research also suggests that translators should trust viewers' capacity to engage with unfamiliar concepts. Science fiction audiences expect cognitive challenge; excessive domestication may diminish the genre's distinctive appeal. Translations that maintain conceptual complexity while managing comprehensibility through contextual cues and progressive elaboration respect both source texts and target audiences.

7.3 Limitations and Future Research

Given the limited corpus of systematic research on science fiction subtitling, the conclusions remain somewhat provisional. Most existing research examines English-language source films translated into European or Asian languages, leaving questions about other language pairs unexplored. The predominance of case study methodology, while generating rich qualitative data, limits generalizability. Future research should expand the linguistic and cultural range of science fiction subtitling studies, examining translations between non-European language pairs and from non-English sources.

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Longitudinal studies tracking translation practices across film series and historical periods would illuminate how norms evolve. Experimental research testing viewer comprehension and experience across different translation versions would provide empirical grounds for evaluating translation quality.

8. Conclusion

This study has examined science fiction film subtitle translation as a distinctive practice within audiovisual translation, characterized by the intersection of technical constraints, genre-specific challenges, and multimodal complexity. The research has identified neologism management, scientific-technical discourse translation, cultural specificity negotiation, and compression under information density as primary challenges confronting sci-fi subtitle translators.

Theoretical frameworks derived from Relevance Theory, Functional Equivalence, and Multimodal Discourse Analysis provide complementary perspectives for understanding translation decisions and evaluating outcomes. Empirical research documents the range of strategies translators employ, from direct transfer through various reduction procedures to creative adaptation and neologism formation. Modal differences between subtitling and dubbing produce systematic variations in translation outcomes with implications for science fiction content. Emerging digital methodologies enable quantitative analysis of semantic similarity and systematic comparison of human and machine translation.

The findings indicate that excellent subtitle translation for science fiction films requires a balance between fidelity to the source text and the comprehensibility of the target audience, maintaining consistency in terms within the fictional world, managing the cumulative processing load through strategic compression, and trusting the audience's ability to understand conceptually rich content. As science fiction films continue to expand globally, subtitle translation quality will remain crucial to the imaginative presentation of this genre crossing cultural boundaries.

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