




## ARTICLE

# Translation Strategies and Equivalences of Culture-Bound Elements in “A Brief History of Time: From the Big Bang to Black Holes”

Xiaoping Zhang <sup>\*</sup> , Hazlina Abdul Halim , Lay Hoon Ang 

Department of Foreign Languages, Faculty of Modern Languages and Communication, Universiti Putra Malaysia, Serdang 43400, Selangor, Malaysia

## ABSTRACT

Translation is more than the transfer of the words between source language texts and target language texts; as a matter of fact, it is a bridge between cultures embedded in those texts. This is particularly true when translating popular science texts, where scientific precision in those science texts must coexist with the cultural resonance in their translated texts. Hawking’s (1988) *A Brief History of Time* has introduced complex scientific ideas to readers worldwide, making it an excellent case study for analyzing how cultural elements are handled in translation. This paper explores the specific translation of culture-bound elements from English to Chinese in 《时间简史 (Shíjiān Jiǎngshǐ)》, translated by Wu Zhongchao and Xu Mingxian. Using Newmark’s framework, this research examines how translators navigate linguistic and cultural nuances to make the text both faithful to the original and engaging for Chinese readers. The findings provide fresh perspectives on the role of culture in the translation of popular science texts, contributing valuable insights into the broader field of translation studies. This research highlights the interplay between language, culture, and science, advocating for meticulous translation strategies to maintain the integrity and intent of the original work.

**Keywords:** Equivalence; Translation Strategies; Culture-Bound Elements; Hawking’s Popular Science Book; Language Learning

### \*CORRESPONDING AUTHOR:

Xiaoping Zhang, Department of Foreign Languages, Faculty of Modern Languages and Communication, Universiti Putra Malaysia, Serdang 43400, Selangor, Malaysia; Email: 1476711868@qq.com

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# 1. Introduction

Translation is not just about swapping one language for another; it is about transferring meaning, context, and culture. This idea became central in translation studies with the emergence of the “cultural turn” in the late 20th century, which highlighted the deep connection between language and cultural identity. Language, as a cultural product, is more than a tool for communication—it reflects history, beliefs, and traditions. As such, translating a text is an act of cultural negotiation. Consequently, cultural factors significantly influence translation outcomes, as they shape both the source text’s intent and the target audience’s reception.

Popular science works act as an important medium for disseminating scientific knowledge. And those kinds of works tend to unify elements in those two academic disciplines. In the essay titled “Popular Science Books Have Never Been More Important,” it is indicated evidently that popular science writing is worthy of attention<sup>[1]</sup>. Olohan considered in 2016 that translation traditionally focused on literary translation, poetry translation and drama translation. And the translation of science has been neglected in translation studies over the past years<sup>[2]</sup>. This study focuses on the translation of culture-bound elements in Hawking’s *A Brief History of Time*, a book that has captivated global audiences with its lucid explanations of the universe’s mysteries<sup>[3]</sup>. First published in 1988, the book has been translated into over 40 languages, making it a fascinating case for exploring how cultural and linguistic barriers are overcome. In line with what has been found out in this book as mentioned above, many cultural factors and expressions are found have to be dealt with quite appropriately. However, most of them have failed to draw enough academic attention as it is a difficult task for translator to overcome those cultural and linguistic barriers due to their weak interest in scrutinizing the profound implications in those science texts. As opposed to this, the Chinese translation by Wu Zhongchao & Xu Mingxian has provided a unique perspective on how cultural nuances are preserved or adapted<sup>[4]</sup>.

Using Newmark’s translation strategies, this study examines how culture-bound elements in the book were rendered in Chinese<sup>[5]</sup>. It explores how the translators navigated linguistic differences and cultural expectations to make the text both accurate and meaningful for Chinese readers. By doing so, this paper is hoped to contribute to the broader

discussion on cultural adaptation in translation, especially in scientific literature.

## 2. Literature Review

### 2.1. Translation and Culture

The relationship between translation and culture has been a focal point of scholarly debate, evolving from linguistic-centric views to more holistic, culture-oriented approaches. Early theories, such as Catford’s linguistic approach, viewed translation as a linguistic substitution process, defining it as “the replacement of textual material in one language with equivalent material in another”<sup>[6]</sup>. This view, however, ignored the cultural depth of language. House described translation as the reproduction of a text in the source language into an equivalent text in the target language<sup>[7]</sup>. This suggests that translation is a process of substitution, where the translator replaces one language with another while maintaining the original meaning.

Halliday argued for a broader perspective, presenting translation as a holistic process of transferring meaning from one cultural context to another<sup>[8]</sup>. Nida and Taber further expanded this idea, indicating that translation should aim for “the closest natural equivalent,” emphasizing both meaning and style<sup>[9]</sup>. Their works underscored the necessity of understanding the cultural underpinnings that shape linguistic expressions.

Vermeer’s Skopos Theory shifted the focus to the translator’s role as a cultural mediator<sup>[10]</sup>, while Newmark reinforced this by defining culture as “the way of life and its manifestations peculiar to a community using a particular language as its means of expression”<sup>[11]</sup>. These perspectives stress that translation is not just about linguistic accuracy but also about cultural understanding.

Furthermore, Faiq suggested that translation serves as a cultural bridge, fostering mutual understanding between disparate cultures<sup>[12]</sup>. This aligns with Tylor’s definition of culture as a “complex whole” that includes knowledge, beliefs, art, and customs in 1871<sup>[13]</sup>. In view of Al-Hassan’s studies pertaining to this definitive elaboration, the basic aim for the translators in translating those texts is to enrich target language linguistically and culturally to concretize the relevance between cultural implications and the linguistic constituents in those science texts<sup>[14]</sup>. In the studies released

in 2020, Zhang believed that language interprets and records culture, and translation is a shifting process of both different languages and cultures<sup>[15]</sup>. Tukhtarova et al. argued that the organization of language is influenced by different cultural features<sup>[16]</sup>. Alpysbayeva & Ashymkhanova emphasized that the cultural content and target readers' response to the source culture are the main factors that decide the translation process<sup>[17]</sup>.

Thus, translation becomes an act of cultural interpretation, requiring translators to consider the social and historical context of both languages.

## 2.2. Equivalence in Translation

Equivalence remains a central concept in translation studies, reflecting the delicate balance between fidelity to the source text and adaptability to the target culture. Nida introduced the concepts of formal equivalence (which focuses on direct translation) and dynamic equivalence (which prioritizes cultural and contextual adaptation)<sup>[18]</sup>. Formal equivalence prioritizes the structure and content of the source text, while dynamic equivalence focuses on replicating the original's spirit and intent in the target text. House expanded on this with overt and covert translation, where the former emphasizes linguistic accuracy and the latter cultural adaptability<sup>[7]</sup>.

Similarly, Newmark distinguished between semantic translation, which focuses on meaning, and communicative translation, which ensures readability<sup>[19]</sup>. Baker further categorized equivalence into grammatical, textual, and pragmatic levels, emphasizing the need for coherence and cultural sensitivity<sup>[20]</sup>. These theories collectively underscore the translator's role in bridging linguistic and cultural divides.

Moreover, Snell-Hornby challenged earlier linguistic approaches, advocating for an integrated view that considers cultural, situational, and historical factors<sup>[21]</sup>. This holistic perspective aligns with the growing recognition that equivalence extends beyond words to encompass the underlying cultural and ideological messages embedded in texts.

Furthermore, Karismawati et al. argued that the cultural gaps on translation could be narrowed down with reference to their practical relevance to functional equivalence<sup>[22]</sup>. In the same year, Li highlighted the status of functional equivalence on the accurate translation of complex cultural expressions<sup>[23]</sup>. Later, Wang investigated the function of equivalence

on the translation of culturally nuanced language<sup>[24]</sup>.

Thus, the cultural equivalence of the translation in the context of science translation is a long-term attention to be paid to it by translation scholars in translation studies, especially when the issues to be addressed in this research context are related to the accurate transmission of the cultural implications in those science texts.

## 2.3. Translation Strategies

Translators use various strategies to handle culture-bound elements. Baker stressed the importance of adapting contextually and pragmatically the translations to fit the cultural context<sup>[20]</sup>, while Venuti introduced domestication and foreignization strategies<sup>[25]</sup>. Domestication makes a text more accessible to the target audience by aligning it with their culture, while foreignization preserves the original cultural elements, keeping the text "exotic"<sup>[25]</sup>. These strategies highlight the translator's dual role as both a cultural mediator and a linguistic interpreter.

Meanwhile, Vinay and Darbelnet proposed two categories of translation methods: direct (e.g., borrowing, calque) and oblique (e.g., modulation, adaptation)<sup>[26]</sup>. These strategies help translators maintain the balance between linguistic accuracy and cultural relevance. Borrowing, for instance, allows for the retention of culturally significant terms, while adaptation modifies elements to resonate with the target audience's cultural norms.

In summary, translation strategies are not merely technical tools but reflective of deeper cultural and ideological considerations. The choice of strategy depends on the specific challenges posed by the source text and the cultural expectations of the target audience, underscoring the translator's critical role in bridging linguistic and cultural divides.

## 3. Method

This study employs a qualitative comparative approach, focusing on the translation strategies used in *A Brief History of Time* and its Chinese version by Wu Zhongchao & Xu Mingxian. The methodology includes the following components:

1. Textual Analysis: A detailed examination of the source text to identify culture-bound elements, including idiomatic expressions, proper nouns, scientific terminology,

and culturally specific references. Each identified element is analyzed in the context of the source text's intended meaning and cultural implications.

2. Framework Application: Newmark's translation strategies are applied to categorize the different techniques used by the translators<sup>[5]</sup>. These strategies include transference, cultural equivalence, descriptive equivalence, and paraphrase. Each translation decision is examined considering its effectiveness in preserving both scientific accuracy and cultural resonance.

3. Comparative Analysis: A systematic comparison of English and Chinese texts is conducted to evaluate how different translation strategies impact readability, clarity, and cultural relatability for Chinese readers. Particular attention is given to how complex scientific ideas are conveyed without losing their intended meaning.

4. Contextual Assessment: The study considers the broader cultural and historical contexts that may have influenced the translators' choices. This includes examining the translators' backgrounds, the publication contexts, and the target audience's cultural expectations.

5. Data Synthesis: The findings are synthesized to determine best practices for translating culture-bound elements in popular science literature. Patterns in the use of translation strategies are identified, and their implications for cross-cultural communication are discussed.

### 3.1. Overview of the Source Text and the Target Text

Hawking's *A Brief History of Time* is one of the most famous and influential popular science books ever written<sup>[8]</sup>. First published by Bantam Dell Publishing Group, the book spans 256 pages and has captivated readers worldwide. In this groundbreaking work, Hawking presents complex scientific ideas—such as the structure, origin, development, and ultimate fate of the universe—in a way that is accessible to a general audience by using non-technical language. The book's success was phenomenal, selling over 25 million copies globally<sup>[27]</sup>. Many readers believe its widespread appeal stems not only from its fascinating subject matter but also from Hawking's remarkable personal journey. Diagnosed with a severe neurodegenerative disease, Hawking defied overwhelming challenges to continue his scientific work, making his insights even more inspiring.

The Chinese version, 时间简史 was undertaken by Wu Zhongchao & Xu Mingxian and published by Hunan Science & Technology Press in 2010<sup>[4]</sup>. Comprising 243 pages, this edition remains the only officially recognized translation available in mainland China. Wu Zhongchao, having studied cosmology under Hawking for over 30 years, has played a crucial role in translating almost all of Hawking's major works into Chinese. His deep understanding of both Hawking's theories and the cultural nuances of the Chinese language ensures that the translation remains faithful to the original while making the text more relatable to Chinese readers.

### 3.2. Newmarks' Translation Procedures

Newmark's extensive classification of translation strategies continues to be a cornerstone in the field<sup>[5]</sup>. His framework, which includes ten key strategies—such as transference, cultural equivalence, descriptive equivalence, and paraphrase—provides translators with practical tools for handling culture-bound elements effectively. These strategies help maintain a delicate balance between staying true to the original text and ensuring cultural relevance for the target audience. For instance, descriptive equivalence enhances clarity by offering additional context, making culturally specific terms more understandable for readers unfamiliar with the source culture.

By applying this structured approach, translators can gain deeper insights into their choices, assess the effectiveness of different strategies, and refine their techniques for cross-cultural communication—especially in the realm of popular science literature, where both accuracy and accessibility are crucial.

## 4. Results and Discussion

This section explores how the theoretical frameworks discussed in this study come to life in practice. By examining specific examples from *A Brief History of Time* and its Chinese translation, it demonstrates how various translation strategies help navigate cultural and linguistic challenges. The selected examples focus on key culture-bound elements and the techniques used to ensure cultural equivalence.

Beyond just identifying these strategies, the discussion assesses their effectiveness in maintaining the scientific pre-

cision and cultural depth of the original text while ensuring accessibility for the target audience. Through this analysis, the study sheds light on the translator's vital role as a bridge between languages and cultures. It highlights the delicate balance between staying faithful to the original text and adapting it in a way that resonates with the cultural and linguistic expectations of the readers.

### Example 1

ST: One of the first to be discovered is a star that is orbiting around Sirius, the brightest star in the night sky. (p. 95)

TT: 围绕着天狼星转动的那个就是最早被发现的白矮星之一，天狼星是夜空中最亮的恒星。(p. 109)

The translation of "Sirius" into Chinese as Celestial Wolf Star demonstrates a thoughtful cultural adaptation, reflecting traditional Chinese beliefs that associate wolves with danger and mystery. The translators applied Newmark's cultural equivalence strategy<sup>[5]</sup>, replacing the foreign term with a phrase that resonates more deeply with Chinese readers, both linguistically and emotionally. In ancient Chinese culture, it was believed that when Sirius and the Sun rose together, it signaled the arrival of summer and the associated hot weather. By aligning this scientific fact with local mythology, the translation preserves both the factual accuracy and cultural relevance of the original text.

Across different cultures, Sirius has held special significance, often linked to its connection with dogs. Known as the Dog Star, this celestial body appears frequently in folklore and mythology. Its name has two widely accepted origins. One theory traces it back to ancient Greek beliefs, where Sirius was thought to emit a strong influence that made dogs behave erratically during the peak of summer—an idea that led to the term dog days. Another explanation suggests that the phrase comes from the observation that only mad or rabid dogs would venture out in the scorching summer heat, further reinforcing Sirius's link to canines.

In Chinese culture, Sirius is referred to as 犬星 (Quǎn Xīng), which directly translates to "Dog Star." This naming reflects the deep-rooted connection between Sirius and canines, a link that transcends geographical and cultural boundaries. Across various civilizations, Sirius has long been associated with dogs, underscoring the universal human tendency to find meaning in celestial bodies. This enduring connection highlights the profound influence of astronomical

phenomena on cultural beliefs and mythology, illustrating how observations of the night sky have shaped human narratives and traditions throughout history.

In ancient China, the wolf was often seen as a symbol of ferocity and danger. Many Chinese idioms featuring wolves carry negative connotations, such as 声名狼藉 (shēng míng láng jí, meaning 'notorious'), 狼狈为奸 (láng bèi wéi jiān, which means 'in cahoots with bad people'), and 引狼入室 (yǐn láng rù shì, meaning 'to invite a wolf into one's home'). Sirius, the brightest fixed star in the night sky, shines nearly twice as brightly as the second-brightest star, Canopus. In ancient times, people believed its intense blue-white light could harm the eyes. Because of its striking brilliance and the superstitions surrounding it, Sirius was often viewed as an unlucky star and was symbolically linked to the wolf, a creature representing danger and misfortune in Chinese culture.

This association is also deeply rooted in Chinese poetry. This association is also reflected in Chinese poetry. For instance, the renowned poet Qu Yuan once wrote, '青云衣兮白霓裳，举长矢兮射天狼' (Translation: Wearing clothes as beautiful as clouds and rainbows, I raised my bow and shot at Sirius) reflecting the star's ominous symbolism. Centuries later, Su Shi echoed this sentiment in his famous verse, 会挽雕弓如满月，西北望，射天狼 (Translation: I would draw the sculpted bow to a full moon, gaze northwest, and shoot the Celestial Wolf). Similarly, Li Bai expressed a militaristic spirit in his verse, 天狼正可射，感激无时闲 (Translation: It was the time to shoot Sirius and witness the military's excitement). These poetic works illustrate the cultural significance of Sirius in ancient China. More than just a celestial phenomenon, it was imbued with powerful symbolic meanings—representing danger, resilience, and the indomitable spirit of defiance.

### Example 2

ST: But unless human nature changes radically, it is difficult to believe that some visitor from the future wouldn't spill the beans. (p. 181)

TT: 除非人性得到彻底改变，非常难以相信，某位从未来飘然而至的访客不会贸然泄露天机。(p. 238)

The phrase "spill the beans" is a well-known English idiom meaning to reveal a secret. In Chinese, it is translated as 泄露天机, which carries a similar connotation of disclosing confidential or hidden information. One theory about the

phrase's origin traces it back to ancient Greece, where beans were reportedly used as a form of secret voting—white beans signifying yes and black beans no. In this context, spilling the beans could literally expose the outcome of a vote before it was officially announced.

Another theory suggests that the phrase emerged in early 20th-century America, where bean was a slang term for head or knowledge. Initially associated with horse racing to describe unexpected outcomes, it later appeared in a 1907 baseball context to refer to disrupting the status quo. Over time, its meaning broadened, and it became a widely used expression in politics and everyday conversations to signify the act of revealing a secret or unintentionally disrupting a stable situation.

In translating this idiom into Chinese, translators Wu and Xu employed the cultural equivalent strategy, rendering it as 泄露天机 (xiè lòu tiān jī) which means “to reveal a divine secret”. The term 天机 (tiān jī) carries a deep cultural significance in Chinese, referring to the hidden laws of the Tao that should never be disclosed. This idea is rooted in Taoist philosophy, as expressed in *In Tao Te Ching*, where Laozi writes, ‘人法地，地法天，天法道，道法自然’ (Translation: Humans follow the Earth, the Earth follows the Heavens, the Heavens follow the Tao, and the Tao follows its natural order). This verse highlights the belief that all things in the universe, including human existence, are governed by the Tao's inherent order. In traditional Taoist thought, revealing these divine secrets was seen as inviting misfortune from the heavens.

Hence, by selecting 泄露天机 as the translation, the two translators not only preserved the core meaning of spill the beans but also aligned it with the cultural and philosophical worldview of Chinese readers. Furthermore, the four-character structure of 泄露天机 mirrors the rhythmic and aesthetic conventions of classical Chinese expressions, enhancing its fluency and acceptability. This example shows how cultural equivalence can be an effective translation strategy, ensuring that idioms remain meaningful and relatable to the target audience while preserving their original essence.

### Example 3

ST: But Flamsteed took the case to court and, in the nick of time, won a court order preventing distribution of the stolen work. (p. 220)

TT: 可是佛莱姆斯蒂德告上了法庭，在最紧要关头赢得了法庭的判决——不得发行这部剽窃的著作。(p. 238)

This example illustrates the translation of the English idiom “in the nick of time.” Historically, the word “nick” referred to small notches or cuts made on a tally stick, which was used to record accounts or game scores. During competitions, each point earned was marked with a notch, and when a player scored the winning point just before time ran out, it was called “the nick in time.” Over time, the phrase evolved to mean something happening at the very last moment, often to prevent disaster or seize an opportunity. Today, “in the nick of time” is a commonly used idiom to describe narrowly avoiding trouble or taking action just before it's too late.

The phrase gained further recognition in 1995 with the release of the American political action thriller *Nick of Time*, directed by John Badham and written by Patrick Sheane Duncan. When translated into Chinese, the film's title appeared in various versions, including 千钧一发 (Hang by a Hair), 致命时刻 (A Fatal Moment), and 要命的决定 (A Fatal Decision). Each translation conveys the sense of urgency and high stakes from the original title, but with subtle differences in nuance. For instance, 千钧一发 (Hang by a Hair) highlights extreme peril, whereas 致命时刻 (A Fatal Moment) and 要命的决定 (A Fatal Decision) emphasize life-and-death consequences.

Another instance of translating the idiom “in the nick of time” resulted in 最紧要关头 (A Critical Moment), a phrase that effectively conveys a sense of urgency in a given situation. While this translation captures the high stakes involved, it does not fully reflect the original idiom's nuance of narrowly achieving success or avoiding disaster at the last possible moment. In some cases, an alternative translation such as 千钧一发 (Hang by a Hair), might be more appropriate, as it better emphasizes the idea of imminent peril and a last-minute rescue.

This example highlights the complexities of translating idiomatic expressions. While multiple translations can accurately convey urgency, achieving precise cultural and contextual equivalence requires careful consideration of both language and situational factors. By evaluating these different interpretations, translators can ensure their choices align with the intended impact of the original phrase and resonate with the target audience.

### Example 4

ST: The earth stood at the center, surrounded by eight spheres that carried the moon, the sun, the stars, and the five planets known at the time, Mercury, Venus, Mars, Jupiter, and Saturn. (p. 3)

TT: 地球处于正中心, 八个天球包围着它, 这八个天球分别携着月亮, 太阳, 恒星及五个当时已知的行星: 水星, 金星, 火星, 木星, 土星。(p. 4)

In ancient China, people sought to understand the universe through a fascinating system known as the Five Elements theory. This philosophy, deeply embedded in traditional thought, explained how everything in existence—both natural and celestial—was interconnected. The Five Elements—Metal, Wood, Water, Fire, and Earth—weren't just abstract concepts; they represented fundamental forces that shaped life and the cosmos. Each element was associated with a distinct color: Metal with white, Wood with cyan, Water with black, Fire with red, and Earth with yellow. These associations extended beyond nature and into the way the Chinese named planets.

For example, Mercury, the small, dark gray planet appeared black to ancient Chinese observers, aligning it with the element of Water. Since Water was symbolized by black in the Five Elements system, Mercury was aptly named 水星 (Shuǐ Xīng), meaning “Water Planet.” This logical yet poetic approach to naming celestial bodies was upheld by Wu and Xu (2010) in their studies and translations. By weaving together philosophy, observation, and tradition, the Five Elements theory offers a beautifully unique way of seeing the universe—one that continues to inspire even today.

The names of planets have long been shaped by mythology, philosophy, and observation. In Western traditions, Venus takes its name from the Roman goddess of love and beauty, who was known as Aphrodite in Greek mythology. The Greeks envisioned her emerging gracefully from the sea, symbolizing charm and allure. Similarly, ancient Chinese astronomers gazing at Venus saw its dazzling white glow and linked it to the element of Metal in the Five Elements theory. This led to the planet's Chinese name, 金星 (Jīn Xīng), or “Metal Planet.”

Mars, with its striking red hue, naturally evoked images of fire, war, and bloodshed. In Roman mythology, it was named after the god of war, Mars, reflecting themes of violence and power. The ancient Chinese, too, saw this fiery red color and associated it with the element of Fire. As

a result, Mars became 火星 (Huǒ Xīng), or “Fire Planet.” This symbolic connection, preserved in translations by Wu and Xu, highlights how both Western and Eastern traditions recognized Mars as a planet of intensity and conflict.

Jupiter, the largest planet in our solar system, was named after the mighty Roman god Jupiter—Zeus in Greek mythology—the ruler of the heavens and the bringer of thunder. In ancient China, astronomers noticed a cyan tint in Jupiter's appearance, which aligned with the element of Wood in the Five Elements theory. This gave rise to its Chinese name, 木星 (Mù Xīng), or “Wood Planet.” The connection captures both Jupiter's grandeur and its deep-rooted significance in traditional cosmology.

By blending mythology, celestial observation, and philosophical thought, different cultures have given planets names that reflect both their physical traits and symbolic meanings—creating a timeless bridge between science and storytelling.

Saturn, the second-largest planet in our solar system, carries a name steeped in Roman mythology. It is named after Saturn, the god of time, wealth, and agriculture. In mythological tales, Saturn is often depicted as fleeing from Jupiter after being overthrown, symbolizing the passage of power and time. Ancient Chinese astronomers, on the other hand, observed Saturn's soft yellowish glow in the night sky. Following the principles of the Five Elements theory, they associated this color with the element of Earth. This led to Saturn's Chinese name, 土星 (Tǔ Xīng), or “Earth Planet.”

Looking at these planetary names from both traditions, we can see two distinct cultural perspectives at play. The English names are drawn from Roman mythology, reflecting gods and their legendary stories. Meanwhile, the Chinese names are deeply rooted in the Five Elements theory, emphasizing the natural world and cosmic balance. Despite these differences, cultural equivalence is possible through thoughtful translation. By understanding the underlying philosophy behind each naming system, we can preserve meaning while allowing each culture to maintain its unique perspective on the universe.

### Example 5

ST: The visible stars appear spread all over the night sky, but are particularly concentrated in one band, which we call the Milky Way. (p. 42)

TT: 可见的恒星散布在整个夜空中, 但在一条被称为

银河的带上显得格外集中。(p. 46)

The Milky Way, human's home galaxy, gets its name from its stunning appearance—a luminous band stretching across the night sky when viewed from Earth. Its origins are deeply woven into ancient mythology, reflecting how different cultures interpreted this celestial marvel.

In ancient Greek mythology, the Milky Way is tied to a dramatic tale involving Hera, the queen of the gods. As the goddess of marriage and family, she held the highest status among the Olympians. However, her husband Zeus, known for his many affairs, fathered a child, Heracles, with a mortal woman. Wishing to grant his son immortality, Zeus secretly placed the infant at Hera's breast while she slept so that he could drink her divine milk. When Hera awoke and discovered the deception, she furiously pushed the baby away. At that moment, droplets of her milk spilled across the heavens, forming the glowing band of stars we now call the Milky Way. This legend has been celebrated in Western art, with numerous paintings depicting the moment of divine milk scattering across the sky, immortalizing the galaxy's mythological origins.

In Chinese mythology, the Milky Way is known as 银河 (Yín Hé), or "Silver River". This name reflects the galaxy's bright, shimmering presence in the night sky. The Milky Way is believed to have been created by 王母娘娘 (Wáng Mǔ Niáng Niáng), the Queen Mother of the West, a powerful celestial goddess. According to legend, she took a golden hairpin from her head and waved it across the sky, forming a turbulent river of stars. This cosmic river symbolized a divine boundary—a bridge between the heavenly and mortal realms. The Silver River became the setting for many folktales, including the famous Cowherd and Weaver Girl legend, where two lovers are separated by the celestial river and can only reunite once a year.

Despite originating from different mythologies, both Western and Chinese traditions saw the Milky Way as more than just a galaxy—it was a divine creation, a celestial story written in the stars. The Greek legend views it as an accidental result of divine power, while the Chinese myth presents cosmic relationship between mortals and immortals. Despite their distinct origins, both names resonate with their respective cultural contexts.

When translating the name 'Milky Way' into Chinese as 银河 (Yín Hé), the translators employed the strategy of cul-

tural equivalence. This approach ensures that the term aligns with the cultural understanding of the target audience while preserving the original meaning. By bridging the mythological and cultural nuances, the translation makes the concept accessible and meaningful to readers in both cultures.

#### Example 6

ST: If they were, say, a million times more common than this, then the nearest black hole to us would probably be at a distance of about a thousand million kilometers, or about as far away as Pluto, the farthest known planet. (p. 125)

TT: 譬如说, 如果它们的密度比这个普遍大一百万倍, 则离我们最近的黑洞可能是大约在十亿千米远, 或者大约是已知的最远的行星—冥王星那么远。(p. 139)

In ancient Greek mythology, Pluto was the god of the underworld, ruling over the realm of the dead. Unlike the typical grim and fearsome image of the underworld, Pluto symbolized a more nuanced and balanced perspective—governing not just death, but also the natural cycle of the afterlife. Pluto was first discovered by Clyde Tombaugh at the Lowell Observatory in the United States in 1930. Its name was carefully chosen to reflect its dark and distant nature—orbiting nearly 6 billion kilometers from the Sun in a world of perpetual twilight. This eerie remoteness made it the perfect celestial counterpart to the Greek underworld.

In Chinese culture, there was no pre-existing equivalent for the name 'Pluto.' Translators Wu and Xu employed the paraphrase procedure to create a culturally meaningful name for the planet. Drawing upon the Chinese concepts of Yin and Yang, they incorporated the symbolic dualism central to traditional Chinese philosophy. According to Yin-Yang theory, 阳界 (Yáng Jiè) represents the world of the living, while 阴界 (Yīn Jiè) signifies the realm of the dead. These concepts were further expanded with the introduction of Buddhism into China, which influenced the evolution of the Yin concept to include broader ideas of the afterlife. This led to the emergence of the term 幽冥 (Yōu Míng) or 冥界 (Míng Jiè), both referring to the netherworld or the realm of souls and ghosts.

Unlike other planets, Pluto had no pre-existing name in Chinese culture. When Wu & Xu translated its name, they needed to create a culturally meaningful term that resonated with traditional Chinese philosophy.

Drawing upon the Chinese concepts of Yin and Yang,



they incorporated the symbolic dualism central to traditional Chinese philosophy. According to this belief system, 阳界 (Yáng Jiè) represents the world of the living, bright and active, while 阴界 (Yīn Jiè) signifies the realm of the dead, shadowy and mysterious.

With the arrival of Buddhism in China, these ideas evolved further, incorporating broader interpretations of the afterlife. This led to the term 幽冥 (Yōu Míng) or 冥界 (Míng Jiè)—both referring to the netherworld, the unseen realm of spirits and souls. Thus, Pluto was aptly named 冥王星 (Míng Wáng Xīng), which means "King of the Netherworld Planet." This naming preserves the mythological essence of Pluto while adapting it to the cultural and linguistic framework of Chinese tradition.

This example highlights the translators' skillful application of cultural adaptation and paraphrasing techniques. By leveraging existing Chinese philosophical concepts, they successfully bridged the cultural gap, ensuring that the translated name resonates with Chinese readers. It also demonstrates how translation is not merely a linguistic exercise but a cultural mediation process, bringing together distinct mythological and philosophical traditions to create a meaningful equivalence in the target language.

#### Example 7

ST: In the next chapter but one I will try to increase the order in our neck of the woods a little further by explaining how people are trying to fit together the partial theories I have described to form a complete unified theory that would cover everything in the universe. (p. 173)

TT: 我试图在下面各章再增加一些我们头脑的有序度, 解释人们如何将我描述过的部分理论结合在一起, 形成一个完备的统一理论, 这个理论将适用于宇宙中的万物。(p. 195)

'Neck of the woods' is a distinctive English idiom with a rich history rooted in early American pioneer life. The phrase first appeared in *The Times* in 1839 and was later elaborated upon in the book *Americanisms: The English of the New World* by M. Schele de Vere described how American pioneers used the phrase to refer to settlements in remote, forested areas, particularly in the Southwest<sup>[28]</sup>. Over time, the expression's meaning expanded. Today, the expression "neck of the woods" is a common way to refer to a neighborhood, town, or region—essentially, any place where someone resides. Interestingly, the phrase can also be abbreviated to

'neck' in informal contexts. For instance, one might ask, 'What are you doing in this neck?' Here, 'neck' serves as a shorthand for 'neck of the woods,' retaining the phrase's original connotation of a specific locality.

In the context of Wu & Xu's translation, the idiom 'neck of the woods' was encountered in the sentence, '...or about ten million million million times the increase in order in your brain.' In this instance, the phrase metaphorically refers to the area of the brain. Recognizing the metaphorical and contextual meaning, Wu & Xu translated the phrase into 头脑 (tóu nǎo), meaning 'brain.' Their translation not only preserved the essence of the idiom but also enhanced contextual coherence of the passage, aligning it with its scientific context.

This example underscores the importance of contextual analysis in translation. By tracing the idiom back to its specific application within the text, Wu & Xu ensured that their translation preserved both the idiom's essence and its intended meaning. It demonstrates the translators' ability to navigate the challenges of idiomatic expressions, adapting them in a way that resonates with the target audience while maintaining fidelity to the source text.

## 5. Conclusions

Modern translation studies increasingly acknowledge the crucial role of culture-bound elements in translation process. These elements, deeply embedded in the source culture, pose unique challenges for translators striving to bridge linguistic and cultural divides. Hawking's *A Brief History of Time* serves as a compelling example of a work that seamlessly blends science and literature, combining intricate scientific concepts with engaging storytelling. This dual nature makes it an ideal subject for examining how translation strategies can effectively handle culture-bound elements.

This study takes a fresh approach by applying Newmark's translation strategies to analyze how culture-bound elements are rendered in *A Brief History of Time*. Through a comparative analysis of the original English edition (1988) and its Chinese version, *时间简史* (shí jiān jiǎn shǐ, 2010)<sup>[3, 4]</sup>, the findings demonstrate that Newmark's strategies play a crucial role in achieving equivalence. These methods ensure not only the accurate transmission of scientific knowledge but also cultural resonance, allowing the

translated text to remain accessible and meaningful to Chinese readers.

The findings of this study highlight both the theoretical and practical importance of Newmark's translation strategies in tackling the challenges of achieving equivalence in translation. By applying techniques such as cultural equivalence, descriptive equivalence, and paraphrasing, translators can skillfully navigate the complex relationship between language and culture in popular science texts. This research not only reinforces the effectiveness of Newmark's framework but also deepens our understanding of how translation equivalence can be maintained in texts that blend scientific discourse with literary elements.

Ultimately, this study contributes to the ongoing conversation on translation equivalence, providing valuable insights into the translation of culture-bound elements in popular science literature. It underscores the need for flexible, context-aware strategies that facilitate cross-cultural communication, helping to enhance global appreciation of influential works like Hawking's *A Brief History of Time*.

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Conceptualization, resources, data curation, and writing—original draft preparation, X.Z.; writing—review and editing, supervision, H.A.H. and L.H.A. All authors have read and agreed to the published version of the manuscript.

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## Institutional Review Board Statement

This study was conducted in accordance with the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of Universiti Putra Malaysia. All procedures involving human participants adhered to the ethical standards of the institutional committee.

## Informed Consent Statement

The informed consent of this study has already been obtained from all participants of this study.

## Data Availability Statement

The data used in this study are available from the science texts to be studied in this study.

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## Conflicts of Interest

The authors of this article declare no conflict of interest.

## References

- [1] Smith, A., 2023. Popular Science Books Have Never Been More Important. Financial Times. Available from: <https://www.ftchinese.com/interactive/135012/en> (cited 15 January 2025).
- [2] Olohan, M., 2016. Science, Translation and the Mangle: A Performative Conceptualization of Scientific Translation. *Meta*. 61, 5–21. DOI: <https://doi.org/10.7202/1038682ar>
- [3] Hawking, S., 1988. *A Brief History of Time: From the Big Bang to Black Holes*. Bantam: New York, NY, USA.
- [4] Hawking, S., 1988. *A Brief History of Time* [in Chinese]. Trans., by Wu, Z., Xu, M., 2010. Hunan Science & Technology Press: Changsha, China.
- [5] Newmark, P., 2010. Translation and culture. In: Lewandowska-Tomaszczyk, B., Thelen, M. (eds.). *Łódź Studies in Language: Meaning in Translation*. Peter Lang: Frankfurt am Main, Germany. pp. 171–182.
- [6] Catford, J.C., 1965. *A Linguistic Theory of Translation: An Essay in Applied Linguistics*. Oxford University Press: Oxford, UK.
- [7] House, J., 2001. Translation Quality Assessment: Linguistic Description versus Social Evaluation. *Meta*. 46(2), 243–257.
- [8] Halliday, M.A.K., 2006. *Linguistic Studies of Text and Discourse*, Vol. 2. A&C Black: London, UK.
- [9] Nida, E.A., Taber, C.R., 1982. *The Theory and Practice of Translation*. E.J. Brill: Leiden, Netherlands.
- [10] Vermeer, H., 1986. Translation as cultural transfer [in German]. In: Snell-Hornby, M., (ed.). *Linguistic Transcoding or Cultural Transfer? A Critique of Translation Theory in Germany*. In: Bassnett, S., Lefevere, A. (eds.). *Translation, History and Culture*. Pinter: London, UK. pp. 79–86.

- [11] Newmark, P., 1988. *A Textbook of Translation*. Prentice Hall: New York, NY, USA.
- [12] Faiq, S., 2004. *Cultural Encounters in Translation from Arabic*. Multilingual Matters: Clevedon, UK. DOI: <https://doi.org/10.21832/9781853597459>
- [13] Tylor, E.B., 1871. *Primitive Culture*. John Murray: London, UK.
- [14] Al-Hassan, A., 2013. The Importance of Culture in Translation: Should Culture be Translated?. *International Journal of Applied Linguistics & English Literature*. 2(2), 96–100. DOI: <https://doi.org/10.7575/aiac.ijalel.v2n.2p.96>
- [15] Zhang, Y., 2020. A Study of Cultural Translation from the Perspective of Cultural Fax. *Open Access Library Journal*. 7(6), 1–12. DOI: <https://doi.org/10.4236/oalib.1106450>
- [16] Tukhtarova, A., Issakova, S., Toxanbayeva, T., et al., 2021. Linguocultural Deviations in Russian Translation of the Novel “Twilight” by S. Meyer. *International Journal of Society, Culture & Language*. 9(2), 189–202.
- [17] Alpysbayeva, A., Ashymkhanova, S., 2021. Translation of the Culture-Specific Items in Jumabayev’s “Men Jastarğa Senemin” into English and Russian. *International Journal of Society, Culture & Language*. 9(2), 19–28.
- [18] Nida, E.A., 1964. *Towards a Science of Translating: With Special Reference to Principles and Procedures Involved in Bible Translating*. Brill: Leiden, Netherlands.
- [19] Newmark, P., 1981. *Approaches to Translation*. Prentice Hall International: New York, NY, USA.
- [20] Baker, M., 1992. In *Other Words: A Course Book on Translation*. Routledge: London, UK.
- [21] Snell-Hornby, M., 1988. *Translation Studies: An Integrated Approach*. John Benjamins: Amsterdam, Netherlands. DOI: <http://dx.doi.org/10.1075/z.38>
- [22] Karismawati, A., Yuliasri, I., Hartono, R., 2021. The Use of Cultural Filter to Achieve Functional Equivalence in English-Indonesian Translation of Dindal’s Chicken Little: The Sky is Falling. *English Education Journal*. 11(2), 308–317. DOI: <https://doi.org/10.15294/eej.v11i1.45173>
- [23] Li, Y., 2021. Nida’s Translation Theory of “Functional Equivalence” and Its Application in Chinese Herbal Medicine Translation. *Advances in Literary Study*. 9(1), 11–15. DOI: <https://doi.org/10.4236/als.2021.91002>
- [24] Wang, Y.Q., 2024. A Study of the English Translation of Chinese Buzzwords from the Perspective of Functional Equivalence Theory. *International Journal of Languages, Literature and Linguistics*. 10(3), 283–286. DOI: <https://doi.org/10.18178/ijlll.2024.10.3.527>
- [25] Venuti, L., 1995. *The Translator’s Invisibility*. Routledge: London, UK.
- [26] Vinay, J.P., Darbelnet, J., 1995. *Comparative Stylistics of French and English: A Methodology for Translation*. John Benjamins: Amsterdam, The Netherlands. DOI: <https://doi.org/10.1075/btl.11>
- [27] McKie, D., Munshi, D., 2007. *Reconfiguring Public Relations: Ecology, Equity and Enterprise*. Routledge: London, UK.
- [28] De Vere, M.S., 1872. *Americanisms: The English of the New World*. Kessinger Publishing: Whitefish, MT, USA.