

Why translated terms get locked in: network externalities, switching costs and path dependence in terminological choice

Hanzhong Zhang, Peixuan Li*

College of International Studies, National University of Defense Technology, Nanjing, China

*Corresponding Author. Email: 2806795988@qq.com

Abstract. The replacement of translated terms has long been explained in terms of "established usage", but this explanation merely restates the outcome that requires explanation. Drawing on path dependence theory, this paper conceptualizes translated terms as coordination goods characterized by network externalities and examines how lock-in emerges, how it is sustained, and under what conditions it can be broken. The findings show that the value of a term increases with the scale of its use, while incumbent terms accumulate switching costs through learning, the existing literature, and institutional endorsement. Together, these factors turn terminological choice into a coordination game with multiple equilibria, in which the winning term is not necessarily the more accurate one. The contrasting cases of Internet and laser illustrate this mechanism: the recommended Chinese rendering of Internet introduced in 1997 failed to achieve lock-in in actual usage, whereas "激光" (jīguāng, laser), coined in 1964, displaced earlier alternatives within a few years. The difference between the two cases can be explained by three conditions: critical mass, the coercive force of institutional standards, and the word-formation advantages of the new term. On this basis, the paper proposes three criteria for correcting terminological lock-in and discusses their implications for terminological standardization and translators' choices.

Keywords: translated terms, path dependence, network externalities, switching costs, terminological standardization

1. Introduction

The history of translated terminology is replete with counterexamples. Some translated terms gain widespread acceptance soon after they are introduced and subsequently face little challenge, while others are theoretically more precise and have even received official endorsement from authoritative institutions but never become part of everyday usage. "激光" (jīguāng, laser) exemplifies the former, whereas "因特网" (yīntèwǎng, Internet) exemplifies the latter.

In July 1997, the China National Committee for Terms in Sciences and Technologies issued its recommended Chinese equivalents, designating lowercase internet as "互联网" (hùliánwǎng) and uppercase Internet as "因特网" (yīntèwǎng). The accompanying note explained that the latter specifically referred to the

network that had evolved from ARPANET¹. This distinction was theoretically clear: the generic term and the proper name were assigned separate functions, with no overlap in reference. Yet more than two decades later, "互联网" remained the most commonly used Chinese term for that network, while "因特网" had receded into certain standards documents and earlier specialist literature². The recommended term was not incorrect; it simply failed to gain widespread usage^{1,2}.

At the other end of the spectrum is "激光" (jīguāng, laser). Following the invention of the first laser in 1960, several Chinese terms emerged, including "光受激发射放大器" (light amplification by stimulated emission of radiation), "光量子放大器" (light quantum amplifier), and "光激发器" (optical excitation device), as well as transliterations such as "莱塞" (láisè) and "雷射" (lěishè). These alternatives were widely regarded in academic circles as cumbersome and awkward. In October 1964, the editorial office of *Light Amplification by Stimulated Emission of Radiation Information* wrote to Qian Xuesen to ask him to propose a name. Qian suggested "激光". In December of the same year, the *Third Academic Conference on Light Quantum Amplifiers*, held in Shanghai, adopted his proposal. The journal was subsequently renamed *Laser Information*, and "激光" soon became the standardized Chinese term³. The transition from competing alternatives to a single dominant term took only a few years.

These two cases raise the same question: what determines the fate of a translated term? The conventional answer in terminology studies is "established usage". This answer is not wrong, but it merely restates the phenomenon that needs to be explained: a term becomes established because everyone uses it, and everyone uses it because it has become established. Explaining why a translated term becomes locked in, and why such lock-in can sometimes be reversed, requires a mechanism that captures both the scale of usage and the costs of switching. Path dependence theory in economics provides precisely such an analytical framework.

This paper addresses three questions. First, why does the value of a translated term, as a distinctive type of product, increase with the scale of its use? Second, how does lock-in emerge and sustain itself, and how should its efficiency be assessed? Third, under what conditions can lock-in be broken?

The remainder of the paper is organized as follows. Section 2 reviews research on translated terminology and path dependence theory. Section 3 develops the analytical framework. Section 4 describes the process through which lock-in emerges. Section 5 presents a comparative analysis of the cases of Internet and laser. Section 6 examines the consequences of lock-in and proposes criteria for correcting it. Section 7 discusses the relationship between the proposed framework and translation norm theory, as well as the limits of its applicability. Section 8 concludes the paper.

2. Literature review

2.1. Existing approaches to research on translated terminology

Research on translated terminology has generally followed three approaches. The first focuses on principles, examining criteria such as univocity, conciseness, systematicity, and motivation, and evaluating the merits of

¹ Information Science Terminology Review Group, China National Committee for Terms in Sciences and Technologies, "Chinese Naming of 'Internet'", China Terminology (1998), <https://www.term.org.cn/CN/Y1998/V0/I01/21>.

² China Youth Daily, "A Mark of the Times: New Developments in Chinese Loanwords (Part 1)", 19 January 2009, http://www.cyol.net/zqb/content/2009-01/19/content_2513561.htm.

³ Science China, "The Origin of the Chinese Name 'Laser'", accessed 19 October 2026, https://www.kepuchina.cn/article/article_info?business_type=100&ar_id=130545.

specific translated terms accordingly. The second concerns standardization, relying on terminology committees to issue recommended terms and address inconsistencies such as multiple translations for a single term and identical terms with different referents. The third examines acceptance and dissemination, investigating how particular translated terms spread through society and why some gain popularity while others fail to survive.

Of these three approaches, the first two have generated the most substantial body of research, while the third remains the least developed. Research on principles establishes criteria for what constitutes a "good translation", while standardization provides answers concerning what terms should be used. Neither, however, can explain an empirical fact: translated terms that meet established criteria do not necessarily gain widespread acceptance, while widely used terms do not necessarily meet those criteria. Scholars in terminology studies have not been unaware of this problem. One scholar has observed that a term "fails if it is translated well but nobody uses it"; conversely, "if a term is poorly translated, or even incorrect, but everyone uses it, established usage can eventually make it acceptable". The same scholar further notes that once a translated term has become widespread, "correcting potential translation errors can be extremely difficult"⁴. These observations already point to the roles of scale and inertia, but they do not yet provide a mechanism to explain them.

2.2. Path dependence and lock-in

Path dependence theory originated in research on the selection of technological standards. Using the QWERTY keyboard as an example, David argues that a technology may prevail because of early contingencies and increasing returns rather than superior efficiency. Once the number of users exceeds a certain critical threshold, the cost of switching to a better technology may become so high that no one is willing to bear it, thereby locking in an inefficient outcome [1]. Arthur further identifies four sources of increasing returns: economies of scale, learning effects, coordination effects, and adaptive expectations. He demonstrates that when these effects are present, markets can exhibit multiple equilibria, with small historical events determining which equilibrium ultimately prevails [2].

Research on network externalities is particularly relevant to the problem of translated terminology. Katz and Shapiro observe that when the value of a product depends on the number of other users adopting the same product, positive feedback emerges in the market: the more users a product has, the more valuable it becomes, which in turn attracts additional users [3]. Farrell and Saloner conceptualize standards selection as a coordination game and demonstrate that, in the presence of network externalities, users' expectations about what others will choose often exert a greater influence on their decisions than their own assessments of technological superiority [4]. Klemperer highlights another dimension of the problem: when consumers have already invested in learning an existing product, switching to a new one entails additional switching costs. Consequently, even if the new product is superior, a transition may not occur [5]. Schelling's earlier analysis also suggests that solutions to coordination problems often depend on a salient focal point rather than on the persuasive force of an argument [6].

It should be noted that lock-in theory itself remains contested. After closely examining the QWERTY case, Liebowitz and Margolis argue that the term "lock-in" is often used too loosely. An inefficient lock-in can be identified only when the benefits of switching to a superior alternative demonstrably exceed the costs of switching, yet the market still fails to make the transition. Otherwise, what is described as lock-in may simply

⁴ "An Interview with Professor Wei Xiangqing: 'Terminology Translation' Is Not Merely 'Translating Terms'", China Terminology, <https://www.term.org.cn/CN/news/news252.shtml>.

represent a normal market response to switching costs [7]. This criticism is particularly important for the present study, as it requires an explicit efficiency criterion for identifying lock-in rather than treating every instance of inertia as evidence of it.

2.3. Research gap and positioning of the present study

Considered together, these two strands of research reveal a clear gap. Research on translated terminology has accumulated substantial normative knowledge about how terms should be translated, but has devoted relatively little attention to the mechanisms that explain why a particular term prevails over its alternatives. Path dependence theory offers a well-developed analytical toolkit, yet it has rarely been applied to translated terminology. Studies that occasionally invoke the term "path dependence" generally use it to describe methodological inertia within a particular field of research rather than the process through which translated terms themselves become locked in.

The present study addresses this gap by conceptualizing translated terms as coordination goods characterized by network externalities. It explains the emergence and persistence of dominant terms through scale effects and switching costs, assesses whether a particular instance of lock-in warrants intervention according to an efficiency criterion, and ultimately proposes operational criteria for correcting such lock-in. This approach does not replace normative research; rather, it supplements it with an empirical dimension that has long been missing: for standardization efforts to be effective, they must first account for how the market for translated terms operates.

3. Analytical framework

3.1. Translated terms as coordination goods

A key difference between translated terms and ordinary vocabulary is that the former depend almost entirely on tacit agreement among users to function. No matter how precise a term coined by an individual may be, it cannot serve as a communicative tool unless at least one other person uses it. The value of a translated term therefore does not reside inherently in the linguistic sign itself, but rather in the community that uses it: the more people use a term, the more likely readers are to understand it, the more willing authors are to adopt it, and the more likely publishers are to accept it. This is a classic example of network externalities.

Network externalities have a direct consequence: terminological choice becomes a coordination game. Both Party A and Party B prefer to use the same term as the other party, because communicative value arises only when their choices are consistent. When choosing between "Term A" and "Term B", the payoff from mutual agreement exceeds that of each party independently insisting on the term it considers more accurate. Such games typically have multiple equilibria. Which equilibrium ultimately prevails depends on each party's expectations about the other's choice, rather than on an independent assessment of the relative merits of the available terms. In Schelling's terms, what is needed is a focal point [6].

Where do focal points come from? In terminological choice, they are generally established by three factors: early emergence, which gives a term an initial user base; recommendation by an authoritative institution, which lends it legitimacy; and ease of word formation, which makes it convenient to use in new contexts. All three differ from "accuracy". Accuracy concerns the correspondence between a translated term and the concept expressed in the source language, whereas a focal point concerns the convenience it offers users in coordinating their choices.

3.2. Three sources of switching costs

If network externalities were the only factor involved, the market for translated terms should frequently shift from one equilibrium to another that offers greater benefits, since later entrants could always propose better alternatives. In practice, however, this does not happen, owing to switching costs. The costs of switching translated terms arise from at least three sources.

The first is learning costs. Readers have already established an association between a term and its referent. Adopting a new term requires them to establish this association anew. For specialist readers, it also means having to maintain two sets of correspondences between terms and concepts in memory.

The second is literature costs. Published papers, textbooks, existing databases, and terminology banks are all built around established terms. Adopting a new term creates a gap between the existing literature and new publications that can be bridged only through explanatory notes or other forms of clarification. These costs increase with the volume of accumulated literature and therefore rise monotonically over time. This is a key reason why terminological lock-in becomes more entrenched as time passes.

The third is institutional costs. Industry standards, examination syllabi, textbook approval procedures, and journal submission guidelines may all prescribe a particular translated term. Once a term has been officially designated, individuals who adopt a new alternative risk violating institutional requirements. Institutional costs are distinctive in that they can push a term past the critical threshold overnight, but they can also lock a term in place just as quickly.

3.3. Critical mass and multiple equilibria

Combining network externalities with switching costs yields a dynamic picture of terminological choice. Let (p) denote the proportion of users adopting a particular translated term. Its utility consists of two components: one reflects the intrinsic quality of the term, including its accuracy and conciseness, and is denoted by (q) ; the other reflects the communicative convenience generated by the scale of its use and increases with (p) . When (p) is small, the second component is close to zero, and terms compete primarily on quality. Once (p) exceeds a certain threshold, however, the growth of the second component outweighs the differences in quality. The stronger term becomes increasingly dominant while the weaker one loses ground, until the former monopolizes usage.

This threshold is the critical mass. Its position depends on two factors: the magnitude of the quality difference and the level of switching costs. The greater the quality difference and the lower the switching costs, the lower the critical mass required for a superior term to prevail. Conversely, even when the quality difference is substantial, sufficiently high switching costs may keep the market in an inferior equilibrium for an extended period.

This framework distinguishes between two fundamentally different mechanisms of terminological choice (see Table 1). Under a quality-driven mechanism, a term's market share is a function of its accuracy. Under a scale-driven mechanism, its market share is a function of its historical starting point. In practice, the two mechanisms often coexist; the central question is which one predominates.

Table 1. Two mechanisms of terminological choice

Comparison criterion	Quality-driven mechanism	Scale-driven mechanism
Basis for success	Quality of correspondence between the translated term and the source-language concept	Initial scale of usage and coordination expectations

Table 1. Continued

Number of equilibria	A single optimal solution	Multiple equilibria, with history determining the outcome
Switching costs	Low; the translation can be changed at any time	High; costs increase over time
Difficulty of correction	Low; the issue can be resolved through debate	High; external intervention is required

4. The formation and persistence of lock-in

4.1. The competition phase: multiple translated terms coexisting

When a new concept first enters the Chinese language, no established translation is usually available. Consequently, different individuals or groups independently propose their own terms. At this stage, the market for translated terms approximates perfect competition: different proposals compete with one another, and their relative merits in terms of accuracy, conciseness, and ease of pronunciation can be distinguished. Users select terms according to their own judgments. This phase is characterized by a large number of competing terms, frequent changes, and mutual substitutability, with no single term occupying an irreplaceable position.

The duration of this phase depends on two variables: the speed at which the concept spreads and the degree to which naming authority is concentrated. The faster the concept spreads, the sooner a particular term may be used for large-scale communication, and the shorter the competition phase becomes. Similarly, the more concentrated the naming authority is—for example, when an authoritative institution intervenes promptly—the more likely a single term is to prevail before confusion becomes widespread. Conversely, if the concept spreads slowly and no institution steps in to establish a common term, the competition phase may persist for an extended period, and the resulting confusion itself may become the norm.

4.2. The critical threshold: which term crosses it first

The competition phase does not end when a particular argument prevails, but when the proportion of users adopting a particular term exceeds the critical mass. Once this threshold is crossed, positive feedback takes effect: the larger the user base, the more convenient the term becomes, prompting more people to adopt it. At the same time, the relative value of competing terms declines, and their users face increasing communicative pressure to switch. This process is self-reinforcing and difficult to reverse once it begins.

Crucially, the term that crosses the critical threshold first is often the "first mover" rather than the optimal choice. The first mover may simply have been adopted by an influential media outlet, happened to appear in a widely circulated textbook, or been entered into a particular information retrieval system earlier than its competitors. These events have no intrinsic connection to terminological quality, yet they determine the initial competitive position. Under positive feedback, that initial advantage is amplified. What Arthur calls "small historical events" manifests itself in terminological choice as a series of contingent adoption events [2].

4.3. The lock-in phase: rising costs of correction

Once lock-in has occurred, the cost of correcting it increases over time. This is because literature costs, one of the three switching costs discussed above, are cumulative. With each passing year, the established term becomes embedded in another year's worth of publications, textbooks, standards, and databases, increasing the

cost of modifying these resources to accommodate a replacement. This explains a common puzzle: why do terminological problems become harder to resolve the longer they persist? It is not necessarily that later users are unwilling to make a change, but rather that the cost of doing so continues to rise.

Another characteristic of the lock-in phase is the subtle shift in evaluative criteria. During the competition phase, the question is "Which term is more accurate?" Once lock-in sets in, the question becomes "Which term is more widely used?" The former is a judgment of quality, whereas the latter is a description of existing practice. When widespread usage itself becomes the justification for choosing a term, questions of quality recede from the discussion. This shift is precisely what the terminology principle that "what exists is justified" purports to describe. In essence, however, it does not demonstrate that the established term is justified; rather, it reflects a substitution of evaluative criteria.

4.4. The efficiency of lock-in

Is all lock-in undesirable—Not necessarily. Liebowitz and Margolis remind us that lock-in may simply represent a rational market response to switching costs [7]. Determining whether a particular instance of lock-in is inefficient requires a cost-benefit comparison: how much social benefit would be gained by replacing the existing term with a superior alternative, in terms of more accurate understanding, greater ease of derivation, and clearer correspondence with the source-language term, and how much would the change cost in reprinting, rewriting, retraining, and reader relearning? Only when the benefits of adopting a superior term exceed the costs, yet the market still fails to make the transition, can the situation be classified as inefficient lock-in. If the benefits are smaller than the costs, lock-in is instead efficient. In such circumstances, forcing a correction would amount to spending society's resources to achieve a degree of terminological uniformity that is not worth the expense.

This distinction has practical implications. Terminological standardization efforts often tend to advocate replacing a term as soon as it is found to be less than ideal, without accounting for the social costs of the change. Under the framework proposed here, the burden of proof falls on those advocating replacement. They must demonstrate that the benefits of the change genuinely exceed the switching costs and that the persistence of the existing term results not from prohibitive switching costs, but from a failure of coordination.

5. Comparative case studies: internet and laser

5.1. Internet: why the recommended term failed to become entrenched in usage

When Internet entered the Chinese language, it was initially used directly in its alphabetic form. Subsequently, various Chinese renderings emerged, including "互联网" (hùliánwǎng), "国际互联网" (guójì hùliánwǎng), and "英特网" (yīngtèwǎng) (see note 2). In July 1997, the China National Committee for Terms in Sciences and Technologies issued its recommended terminology, designating lowercase internet (used generically) as "互联网" and uppercase Internet (used specifically) as "因特网" (yīntèwǎng). It explained that the character "因" was chosen instead of "英" for two reasons: it complied with the prescribed conventions for selecting Chinese characters in transliteration, and it avoided confusion with the existing name "英特尔" (Yīngtè'ěr, Intel) (see note 1). This naming decision took both accuracy and differentiation from existing translated names into account and was carefully considered from a terminological perspective.

In actual usage, however, this division was not observed. The public and the media generally used "互联网" to refer to the network. As the expression "互联网+" (Internet Plus) became increasingly common in policy documents and corporate discourse, the scale of usage of "互联网" expanded further, while "因特网"

gradually receded into specialist literature and certain standards documents. The recommended term was not explicitly rejected; it was simply bypassed.

From the perspective of the framework proposed in this paper, this outcome is unsurprising. First, by the time the recommended terminology was issued, "互联网" was already widely used in the media, and its user base was approaching or had even exceeded the critical threshold. As a later entrant, "因特网" faced considerable difficulty in reversing the existing positive feedback. Second, the recommended terms issued by the committee were advisory rather than mandatory. They lacked the coercive force necessary to tip the balance through institutional switching costs. By contrast, established usage in the media and corporate sector served as the actual engine of scale expansion. Third, the recommendation required users to distinguish between a generic term and a proper name. Although theoretically sound, this distinction was difficult to maintain in everyday communication. Ordinary users had neither the need nor the patience to distinguish between "an internet" and "the Internet". Consequently, the more familiar and earlier-established generic term displaced the proper name.

5.2. Laser: correcting terminological lock-in within four years

The case of laser presents the opposite pattern. The first laser was developed in 1960, and China produced its first laser in 1961. Nevertheless, Chinese terminology remained inconsistent for an extended period. Competing expressions included "光受激发射放大器" (light amplifier by stimulated emission), "光量子放大器" (light quantum amplifier), "光激发器" (optical excitation device), and "光量子振荡器" (light quantum oscillator), alongside transliterations such as "莱塞" (láisè) and "雷射" (léishè) (see note 3). These terms were either excessively long or liable to cause misunderstanding. For example, "镭射" (léishè) could easily be mistaken for a term associated with radium, the radioactive element.

In October 1964, the editorial office of Light Amplification by Stimulated Emission of Radiation Information wrote to Qian Xuesen, asking him to propose a Chinese name for laser. In his reply, Qian suggested "激光" (jīguāng), explaining that the expression "光受激发射" was seemingly too long and cumbersome to pronounce. In December of the same year, the Third Academic Conference on Light Quantum Amplifiers was held in Shanghai and adopted his proposal. The journal was subsequently renamed Laser Information (see note 3). Thereafter, "激光" and "激光器" (jīguāngqì, laser device) became the standard terms in academic papers and news reports, and the earlier alternatives rapidly fell out of use.

Why did terminological correction succeed at this particular moment? Three conditions were present simultaneously. First, the critical threshold had not yet been crossed. Laser research in China was still in its early stages, and the user base was limited to a small number of research institutions. Although numerous competing terms existed, none had achieved a dominant scale of usage, so the sunk costs of switching were low. Second, institutional authority was brought to bear. The academic conference adopted a formal resolution, and the specialist journal changed its name, effectively creating a binding constraint within the academic community and leaving individual users little room to continue using the old terms. Third, the new term offered clear advantages in word formation. The two-character term "激光" conveys the underlying mechanism of stimulated emission while readily supporting further derivation. Compounds such as "激光器" (laser device), "激光测距" (laser ranging), "激光通信" (laser communication), and "激光医学" (laser medicine) could be formed naturally. By contrast, even deriving related terms from "光量子放大器" was cumbersome.

5.3. Comparison of the two cases

Placing the two cases side by side reveals a clear contrast (see Table 2). The recommended Chinese rendering of Internet was theoretically more precise but lost out to a generic term that had gained wider acceptance earlier and was easier to use. The new term for laser, by contrast, offered advantages in conciseness and derivational productivity and emerged at a time when the user base was still small and institutional intervention remained feasible. It therefore prevailed rapidly. The decisive variables were not terminological accuracy alone, but the combination of usage scale, institutional authority, and the word-formation advantages of the new term.

Table 2. Comparison of lock-in factors in the two cases

Factor	Internet ("因特网")	Laser ("激光")
Competing terms	"互联网", "国际互联网", "英特网", and others	"莱塞", "雷射", "光量子放大器", and others
Scale of usage at the time of naming	Existing terms were already widely used and had approached or crossed the critical threshold	Usage was limited to a small number of institutions, with no term yet established at scale
Institutional authority	Advisory recommendation without coercive force	Academic conference resolution and journal renaming, creating a binding constraint
Word-formation properties of the new term	Required a distinction between a generic term and a proper name that was difficult to maintain in everyday usage	Readily supported derivation and had strong combinatory potential
Outcome	The recommended term was bypassed, and the generic term occupied the position intended for the proper name	Replacement was completed within a few years, and the old terms fell out of use

6. Consequences of lock-in and criteria for corrective intervention

6.1. The redistribution of communication costs

Lock-in is not merely a trivial matter of "different names"; it can substantially increase communication costs. When the same concept is referred to as "因特网" in academic texts and "互联网" in media and policy documents, readers must determine for themselves whether the two terms refer to the same thing. This judgment must be repeated whenever readers move between different text types, and the cumulative burden can be considerable. If both terms are used interchangeably within the same text, readers may also mistakenly assume that they refer to different entities.

These costs are diffuse and difficult to detect: they do not fall on any single party but are distributed across the entire readership. Consequently, it is difficult for any one party to perceive the full extent of the problem and initiate change. By contrast, the costs of replacing a term are highly concentrated, as publishers, journal editors, and textbook authors must bear the immediate expenses of implementing the change. This asymmetry—dispersed costs and benefits on the one hand, and concentrated replacement costs on the other—means that corrective intervention in terminological choice inherently lacks a strong driving force.

6.2. Terminological contamination and knowledge transfer

Another consequence of lock-in is terminological contamination: once a suboptimal translated term becomes established, it spreads through derivation, compounding, and collocation, contaminating an entire set of vocabulary items derived from it. Transliterated terms are particularly susceptible to this problem. If "镭射" (léishè) were to become the generic term for laser, every compound associated with lasers would risk carrying the misleading association with radium implied by the character "镭".

Once such contamination has taken hold, correction involves more than replacing a single word; an entire family of terms must be revised, multiplying the costs.

Terminological contamination can also cause substantive losses in knowledge transfer. A translated term serves as the entry point through which readers encounter an unfamiliar concept. If that entry point is misleading, readers must subsequently revise the initial understanding they have formed. In professional education, such corrections often do not occur until students encounter the original-language term, and the misunderstandings that develop in the meantime may go unnoticed.

6.3. Three criteria for corrective intervention

Drawing together the preceding analysis, three criteria can be proposed to determine whether a translated term warrants correction and when such correction should take place.

First, the scale criterion: Has the existing term crossed the critical threshold? If not, the window for correction remains open, and intervention can be implemented at the lowest cost and with the highest probability of success. If the threshold has already been crossed, it becomes necessary to assess whether institutional intervention can reverse the existing positive feedback. Otherwise, corrective efforts are likely to prove futile. The success of laser terminology reform lay in its occurring before the critical threshold was reached, whereas the failure to establish "因特网" reflected the missed opportunity to intervene at the appropriate stage.

Second, the benefit criterion: Do the communication losses and the spread of terminological contamination that replacement would prevent outweigh the costs of implementing the change? This criterion requires proponents of replacement to provide an estimate rather than relying solely on theoretical judgments about relative terminological merits. The assessment must account for the costs of revising existing literature, rewriting textbooks, and enabling readers to learn the new terminology; it cannot consider only the relative merits of the terms themselves.

Third, the institutional criterion: Is there an institutional mechanism capable of imposing binding constraints? When a recommendation is merely advisory and carries no coercive force, the practical effectiveness of corrective intervention depends on whether the recommended term can leverage the recommendation to gain a sufficiently large user base. By contrast, the likelihood of success increases substantially when a decision is supported by an academic community resolution, a mandatory standard, or unified textbook terminology. The power of institutions lies not in the correctness of their decisions as such, but in their ability to change everyone's expectations simultaneously.

Taken together, these three criteria provide a framework for determining the appropriate timing of intervention rather than a simple classification of terms as right or wrong. The success of terminological correction depends to a considerable extent on whether intervention occurs at the right time and through the right mechanisms. This also explains why terminological standardization efforts often require considerable effort yet yield disappointing results: intervention may come too late, or recommendations may lack the institutional support needed to make them effective.

7. Discussion

7.1. Relationship to translation norm theory

The analysis presented in this paper can be connected to translation norm theory. Norm theory examines why translations take particular forms, among which expectancy norms refer to readers' expectations regarding the characteristics of translated texts. Once established, these expectations in turn constrain translators' choices. Terminological lock-in can be understood as a specific manifestation of expectancy norms at the lexical level: when a particular translated term becomes what readers expect, translators may have little choice but to retain it, even when they are aware of a more accurate alternative, because adopting a different term entails the risk that readers will not understand it.

This connection yields a theoretical insight. Beyond the social mechanisms of reward and punishment associated with conformity, expectancy norms can also sustain themselves for a straightforward economic reason: adhering to a norm reduces communication costs, whereas deviating from it entails switching costs. Norms are therefore not merely a question of what should be done, but also of whether doing so is economically worthwhile. Viewed from both perspectives, "established usage" in norm theory is no longer an endpoint of explanation, but an equilibrium that can be analyzed.

7.2. Limitations of the theory

Three limitations of the present analysis warrant attention. First, treating translated terms as homogeneous coordination goods is a simplification. In practice, the strength of network externalities varies considerably across types of terminology. Terms used in mass media, such as "互联网", exhibit particularly strong network externalities, whereas specialized terms used within professional communities, such as certain chemical names, exhibit weaker ones. Lock-in involving the latter is therefore more susceptible to correction by the relevant academic community. The conclusions of this paper are more applicable to the former.

Second, the treatment of "accuracy" in this paper is relatively rudimentary. The merits of a translated term cannot be assessed along a single dimension. Accuracy, conciseness, motivation, and ease of pronunciation may conflict with one another, and different groups may assign different weights to these criteria. When the very notion of a "superior" term is contested, the cost-benefit analysis loses a clear benchmark.

Third, the number of case studies is limited. Although the two cases suffice to illustrate the proposed mechanism, they do not support statistically generalizable conclusions. Testing the general applicability of the three criteria would require a larger sample of translated terms and data on their usage frequencies. This represents a promising direction for future research.

8. Conclusion

Drawing on path dependence theory, this paper explains why translated terms become locked in, how the efficiency of such lock-in can be assessed, and under what conditions corrective intervention is possible. The findings can be summarized in three points. First, translated terms are coordination goods characterized by network externalities. Their value increases with the scale of their use, making terminological choice a coordination game with multiple equilibria in which the winning term is not necessarily the more accurate one. Second, lock-in is sustained by three types of switching costs: learning costs, literature costs, and institutional costs. Among these, literature costs accumulate over time and constitute the fundamental reason why lock-in becomes increasingly entrenched. Third, the success of corrective intervention depends on three conditions: whether intervention occurs before the critical threshold is crossed, whether the benefits of replacing a term

exceed the costs of implementing the change, and whether an institutional mechanism exists that can impose binding constraints.

For terminological standardization, the implication is that the effectiveness of a recommended term depends not on whether it is more accurate, but on whether it is introduced early enough, supported by appropriate institutional mechanisms, and convenient for derivational use. For translators, the implication is that choosing an established term over competing alternatives is often not a compromise, but a rational calculation of communication costs. However, when an established term is demonstrably misleading and the window for correction remains open, translators should provide a traceable explanation in the text rather than continue using the term without comment.

The limitations of this study should also be acknowledged. Owing to constraints in case selection and data availability, the paper does not quantify the usage frequencies of translated terms, nor does it establish precise thresholds for the three proposed criteria. The multidimensional nature of "accuracy" is also acknowledged but not incorporated into the model. Future research combining corpus-based frequency statistics with records of term adoption in terminology databases may enable more rigorous testing and refinement of these criteria.

References

- [1] David, P. A. (1985). Clio and the economics of QWERTY. *The American Economic Review*, 75(2), 332–337.
- [2] Arthur, W. B. (1989). Competing technologies, increasing returns, and lock-in by historical events. *The Economic Journal*, 99(394), 116–131. <https://doi.org/10.2307/2234208>
- [3] Katz, M. L., & Shapiro, C. (1985). Network externalities, competition, and compatibility. *The American Economic Review*, 75(3), 424–440.
- [4] Farrell, J., & Saloner, G. (1985). Standardization, compatibility, and innovation. *The RAND Journal of Economics*, 16(1), 70–83. <https://doi.org/10.2307/2555589>
- [5] Klemperer, P. (1995). Competition when consumers have switching costs: An overview with applications to industrial organization, macroeconomics, and international trade. *The Review of Economic Studies*, 62(4), 515–539. <https://doi.org/10.2307/2298075>
- [6] Schelling, T. C. (1960). *The strategy of conflict*. Harvard University Press.
- [7] Liebowitz, S. J., & Margolis, S. E. (1995). Path dependence, lock-in, and history. *Journal of Law, Economics, & Organization*, 11(1), 205–226. <https://doi.org/10.1093/oxfordjournals.jleo.a036867>