



The quadrilateral verb as a morphological framework for Arabization: A study of English and French loanwords

Saleh Belhassen^{1*}, Turki Alharbi², Amera Alharbi³, Kholod Sendi⁴

^{1,2,3,4}Saudi Electronic University Riyadh, Saudi Arabia

Abstract

This study aims to systematically analyze the role of the quadrilateral verb form as a primary morphological tool for Arabizing English and French loanwords into Modern Standard Arabic. It specifically investigates the morphological and semantic characteristics of the *af'ala* and *fa'lala* patterns that make them particularly effective for this process, moving beyond general acknowledgment to a focused analysis. Employing a descriptive-analytical methodology, the research analyzes a curated corpus of 50 Arabized terms (25 from English, 25 from French) drawn from contemporary dictionaries and media. The analysis focuses on the mechanisms of phonetic adaptation and morphological transplantation. The findings reveal that the quadrilateral form is a highly productive and systematic tool for Arabization, primarily through transliteration and morphological transplantation. Its success is rooted in its inherent causative semantics, morphological economy, and semantic flexibility, which allow it to assimilate foreign terms while preserving a purely Arabic morphological character. The study also identifies key challenges, particularly regarding the integration of non-Arabic phonemes and the need for a clearer predictive model for pattern assignment *af'ala* and *fa'lala*.

Keywords: Arabization, Morphology, Quadrilateral verb pattern, Linguistic derivation, Word formation, Linguistic borrowing, Modern standard Arabic

Introduction

The Arabic language, in its contemporary journey, navigates the turbulent waters of globalization, characterized by a rapidly accelerating influx of scientific, technical, and cultural terminology from dominant foreign languages, particularly English and French. This constant stream of new concepts poses a fundamental challenge: how can Modern Standard Arabic (MSA) effectively receive, naturalize, and integrate these terms without fracturing its own core phonetic, morphological, and semantic systems? This challenge sits at the critical intersection of language policy—which strives to modernize Arabic while safeguarding its authentic identity—and the practical, daily reality of linguistic practice, where speakers, media, and academic institutions actively create and propagate new lexical items to meet communicative demands.

In response to this challenge, Arabization (*ta'rīb*) has emerged as a primary mechanism for linguistic modernization and cultural preservation. It represents a conscious effort to transfer foreign words and concepts, assimilating them into the "authentic linguistic molds" of Arabic, thereby enabling the language to remain a viable medium for

modern discourse without resorting exclusively to code-switching or undigested borrowing. The success of this endeavor, however, hinges on the availability of morphological frameworks within Arabic that are both flexible enough to accommodate foreign structures and robust enough to maintain the language's grammatical integrity.

The scholarly foundation for understanding Arabic's capacity for lexical renewal is well-established. Seminal works in Arabic linguistics (e.g., Ramadān 'Abd al-Tawwāb, 1999; Tamām Ḥassān, 1979) and Western Arabic linguistics (e.g., Versteegh, 2014; Holes, 2004) have consistently affirmed the inherent morphological flexibility of the root-and-pattern system, qualifying it to absorb and naturalize loanwords. However, these foundational studies have typically discussed Arabic verb forms (*awzān*) in a general sense, acknowledging the quadrilateral verb form (e.g., *af'ala*) as merely one available option among many. They have largely hinted at its potential without undertaking a systematic analysis of the specific morphological and semantic characteristics that elevate it from a mere possibility to a highly effective and often preferred tool. Consequently, these studies lack applied monitoring of the governing mechanisms, the precise "how"—of this

process and the concomitant challenges that arise.

Building on this foundation, scholars like Ahmad Mukhtar 'Umar (2008) noted the absorptive capacity of certain forms, while Tamām Ḥassān (1979) provided a crucial theoretical link by explicitly connecting the causative semantics of the *af'ala* form to modern technical concepts. Yet, their work remained largely theoretical and prescriptive. More recently, from a practice-oriented, empirical perspective, a new wave of scholarship has begun to document the high productivity of the quadrilateral form, particularly in the realm of digital communication (Alrefae & Al-Khanji, 2021; Al-Sharafi, 2020). Furthermore, computational linguistic models have empirically confirmed its predictability as a template for new lexical entries (Darwish et al., 2021). Despite these valuable advances, a significant gap persists: a focused, systematic analysis of the quadrilateral morphological framework itself—its precise mechanisms, the logic governing pattern selection, and a critical evaluation of its challenges—remains underdeveloped.

It is precisely within this research gap that the present study situates itself. This research aims to fill this lacuna by taking the quadrilateral forms *af'ala* and *fa'lala* as its central subject of inquiry. It proceeds from the hypothesis that these forms, endowed with distinct semantic features (such as a propensity for denoting causation and transitivity) and morphological features (like syllabic economy and structural flexibility), constitute a productive and central framework for Arabizing incoming terminology, effectively converting foreign nouns and concepts into sound, fully conjugated Arabic verbs.

The remarkable productivity of this framework is vividly illustrated in contemporary digital discourse, where the *fa'lala* pattern has emerged as an ideal template for deriving verbs from social media and digital platform names. This pattern has become a recognized linguistic phenomenon, where brand names are seamlessly converted into verbs meaning "to use that service or platform." Clear examples Arabized from English include:

- *Fasbaka* (فَسْبَاكَ) from Facebook, meaning to use Facebook or to post on it.
- *Tawtara* (تَوْتَرَ) from Twitter, meaning to tweet or to use Twitter.

- *Watsaba* (وَاتْسَبَ) from WhatsApp, meaning to message via WhatsApp.

This trend is not confined to English; it extends to other languages, such as French, particularly in the Arabic dialects of North Africa, where common verbs are Arabized using the same *fa'lala* pattern:

- *Sarbā* (سَرْبَى) from the French verb "se servir," meaning to serve oneself drinks.
- *Sarkala* (سَرْكَلَ) from the French verb "circuler," meaning to move around or tour.
- *Regela* (رَيْقَلَ) from the French verb "régler," meaning to fix or adjust something.

Thus, the quadrilateral form proves its merit as an effective and dynamic tool for absorbing linguistic novelties, allowing the Arabic language to renew and adapt to modern terminology while maintaining its familiar morphological structure.

Therefore, this study aims to systematically analyze these characteristics, meticulously monitor the mechanisms of Arabization into these forms, and evaluate a curated corpus of Arabized models from both English and French to gauge their efficacy and identify persistent challenges. In doing so, it seeks to contribute to a more principled and empirically grounded process of Arabization, ultimately supporting efforts to renew and develop the Arabic lexicon so it can keep pace with modern developments without sacrificing its authentic identity.

To achieve this, the study is guided by the following research questions:

What morphological and semantic characteristics of the quadrilateral verb forms (*af'ala* and *fa'lala*) make them particularly productive frameworks for Arabizing English and French loanwords?

What are the primary mechanisms (e.g., transliteration, phonetic substitution, syllabic compression) involved in the process of morphological transplantation into these quadrilateral patterns?

What are the key challenges related to phonetic integration and pattern assignments that arise during this Arabization process, and how can they be

addressed to formulate predictive guidelines?

Literature Review

This review is structured to provide a comprehensive overview of the scholarly conversation surrounding the Arabization of loanwords, with a specific focus on the morphological strategies employed. It begins by establishing the broad theoretical foundations that inform this study. It then critically reviews the existing empirical literature, tracing its evolution from foundational observations to contemporary, specialized studies, and culminates in a clear delineation of the research gaps that the current study aims to address.

Theoretical framework

This study is grounded in a confluence of theoretical perspectives from Arabic morphology, language contact theory, sociolinguistics, and computational linguistics. These theories collectively justify the study's focus on the quadrilateral verb, inform the data analysis, and validate the choice of a descriptive-analytical methodology applied to a curated corpus.

The generative power of Arabic morphology

The core theoretical premise is that Arabic morphology is a generative, root-and-pattern system that operates with a high degree of predictability and creativity. The work of Tamām Ḥassān (1979) is foundational here, as he systematically deconstructed the Arabic morphological system, arguing that augmented verb forms (*mazid fih*) are not random but carry specific, predictable semantic functions. His crucial insight that forms like *af'ala* (أفعل) inherently denotes concepts like causation (*ta'diyah*) and inception (*shu'ū*) provides the primary theoretical lens for this study. This explains the intuitive suitability of this form for Arabizing foreign verbs meaning "to make something X" (e.g., to electrify → *akhrraba*). This theoretical link directly informs the study's first research question regarding the morphological and semantic characteristics of the quadrilateral form. Furthermore, the descriptive grammatical works of Ryding (2005) and Wright (2007) provide the precise structural definitions of the *af'ala* and *fa'lala* patterns, offering the formal criteria against which the Arabized terms in the corpus are analyzed. Their formalist approach

complements Ḥassān's functionalist perspective, creating a robust framework for morphological analysis

Language contact and lexical borrowing

The process of Arabization is a specific instance of the universal phenomenon of language contact. The typological framework established by Haspelmath and Tadmor (2009) in their cross-linguistic study of loanwords provides a robust theoretical basis for categorizing the strategies observed in the data. Their classification of adaptation strategies—phonetic, morphological, and semantic—offers the analytical categories for dissecting the Arabization process. Concepts like phonetic substitution (e.g., /p/ → /b/), clipping, and back-formation are not viewed as ad-hoc but as instantiations of universal language contact phenomena. This framework justifies the study's second research question, which seeks to monitor and classify these very mechanisms. Additionally, the work of Myers-Scotton (2002) on the Matrix Language Frame model offers a complementary perspective, suggesting that in code-switching and borrowing, the grammatical frame of the matrix language (here, Arabic) dictates the structure into which embedded language elements (loanwords) must be inserted. The quadrilateral verb pattern can thus be seen as a powerful "morphosyntactic frame" that English and French lexical items must conform to.

The "plat formization" of language and sociolinguistic perspectives

The widespread "verbing" of brand names (e.g., to google, to tweet) is a global sociolinguistic trend that requires a theoretical model beyond traditional linguistics. The work of Zenner et al. (2019) on the "platformization" of language provides a contemporary theoretical model that directly explains the explosive productivity of the *fa'lala* pattern for social media terms in Arabic (e.g., *tawtara*, *fasbaka*). This perspective moves the analysis beyond pure morphology into the realm of sociolinguistics and cultural appropriation, viewing these neologisms as indices of social practice and digital identity. This dimension is further supported by Al-Mansour (2022), who argues that the choice of the *af'ala* form can carry connotations of modernization and active engagement with technology, linking linguistic form

to social attitude. This theoretical angle enriches the analysis of the third research question, particularly the morpho-semantic challenges and the social motivations behind pattern selection, suggesting that Arabization is not merely a linguistic but also a socio-cultural act.

The computational view of morphological templates

Finally, research in computational linguistics provides a modern, practical validation of the theoretical framework. Early studies by Elgibali and Ditters (2007) on the computational processing of Arabic highlighted the challenges and systematicity of its morphology. More recently, advanced neural models by Darwish et al. (2021) demonstrate computationally that Arabic verb patterns like *af'ala* and *fa'lala* function as productive morphological "slots" or templates. This computational perspective theoretically reinforces the core concept of this study: that these forms are pre-existing, predictable molds that can be algorithmically filled with foreign roots. It strengthens the methodological choice of a corpus-based analysis, as it suggests that the Arabization process is rule-governed and systematic enough to be modeled and analyzed descriptively, bridging the gap between theoretical linguistics and natural language processing.

Review of empirical literature

While the theoretical framework establishes the potential of the quadrilateral form, empirical studies document its actual use and productivity. A review of this literature reveals a clear trajectory towards the present study's focus but also highlights significant, interlocking gaps in empirical understanding.

Foundational but non-specialized empirical observations

Early and foundational studies noted the phenomenon but did not specialize in it. Ramadān 'Abd al-Tawwāb (1999), in his broad survey of Arabic philology, empirically observed "verb Arabization" and listed scattered examples of quadrilaterals. However, his work was a general taxonomy of Arabization phenomena, not a focused analysis of the quadrilateral mechanism itself. Similarly, Ahmad Mukhtār 'Umar (2008) provided crucial empirical

examples (e.g., *akhraba*) in his lexicographic work and noted the form's flexibility in principle, but his work was ultimately prescriptive, stopping short of a systematic, data-driven investigation into the mechanisms, frequency, and productivity of the form. These studies confirmed the existence of the phenomenon but left its systematic operation and governing principles largely unexamined, treating the quadrilateral verb as a curious footnote rather than a central character in the story of lexical renewal.

Specialized empirical studies: A converging focus

A new wave of empirical research has begun to apply more rigorous, data-driven methods, providing a direct foundation for this study and converging on the importance of the quadrilateral form. Al-Sharafi (2020) conducted an empirical analysis of digital discourse, providing concrete evidence of the high frequency and creative use of the *fa'lala* form for integrating tech brand names. This study was pivotal in moving from anecdotal observation to documenting the form's rampant productivity in a specific, contemporary register, firmly establishing its connection to the digital age.

Alrefae and Al-Khanji (2021) advanced this further with a quantitative, corpus-based study that demonstrated the statistical dominance of quadrilateral patterns over other verb forms in assimilating English IT terms. Their work provides a crucial methodological model for this study and offers preliminary empirical evidence for the form's systematicity and preference in technical domains.

From a computational perspective, Darwish et al. (2021) offered robust, data-driven validation. Their neural networks empirically confirmed the predictability of patterns like *af'ala* and *fa'lala* as templates for new verbs, treating the Arabization process not as a theoretical possibility but as a computationally tractable problem of pattern assignment.

A recent study by Al-Mansour (2022) introduced a crucial, often-overlooked sociolinguistic dimension. Through empirical survey data, the study argued that the acceptance and perceived naturalness of these Arabized verbs are influenced by extra-linguistic factors such as the speaker's age, educational

background, and exposure to the donor language, moving the discussion beyond the lexicon into the realm of speaker cognition and social acceptance.

Identified gaps in the empirical understanding

Despite these valuable and converging contributions, the current empirical understanding remains fragmented, creating a clear and multi-faceted space for this study's contribution. **Limited Linguistic Scope:** The empirical focus, while sharpening, has remained predominantly on English IT and digital terms (Alrefae & Al-Khanji, 2021; Al-Sharafi, 2020). A significant gap exists for a comparative empirical analysis that includes loanwords from another major donor language like French. Such a comparison is essential to test the robustness and universality of the quadrilateral framework across different phonetic, syllabic, and morphological systems. Does the model hold for a Romance language as it does for a Germanic one?

Insufficient mechanistic analysis: While recent studies note the high productivity of the form, they often do not systematically deconstruct and categorize the specific sub-processes of morphological transplantation. A detailed analysis of the precise rules of syllabic compression, the conditions triggering back-formation versus direct derivation, and the hierarchy of phonetic adaptation strategies is lacking. The show is often reported but not deeply analyzed. **Lack of Challenge-Centric Evaluation:** Existing empirical studies successfully document successful Arabizations but often fail to empirically analyze the challenges and potential failures. There is a scarcity of focused discussion on the persistent ambiguities in pattern assignment (*af'ala* vs. *fa'lala*) or a systematic analysis of the semantic efficacy and potential "meaning drift" of the Arabized verbs compared to their source terms.

Insufficient diachronic and sociolinguistic integration: The empirical data is largely synchronic, providing a snapshot rather than a movie. Studies rarely track the diachronic emergence, evolution, and stabilization of these verbs in the lexicon. Furthermore, while scholars like Al-Mansour (2022) introduce vital sociolinguistic factors, these are not yet fully integrated with a rigorous morphological analysis of a diversified corpus to create a holistic picture.

Contribution of the current study

This study is designed to address these empirical gaps directly in an integrated manner. By constructing a curated, balanced corpus of 50 terms from both English and French, it provides a comparative empirical base that rigorously tests the quadrilateral framework beyond the IT domain. Its descriptive-analytical methodology is specifically geared towards a fine-grained, systematic monitoring and classification of Arabization mechanisms (e.g., transliteration, phonetic substitution, syllabic compression), directly addressing the mechanistic gap. Most importantly, it explicitly builds the analysis of challenges—both phonetic (non-Arabic phonemes, competing transliterations) and morpho-semantic (pattern ambiguity, semantic alignment)—into its core objectives, moving beyond documenting success to critically evaluating the process's pitfalls and limitations. Therefore, this study contributes to the empirical literature by offering a more systematic, comparative, and critically evaluative analysis of the quadrilateral verb as a morphological framework, thereby providing a deeper, more nuanced, and practically useful understanding of its role in the ongoing renewal of Modern Standard Arabic.

Research problem

The relentless influx of scientific, technical, and cultural terminology from English and French into the modern Arabic-speaking world presents a formidable lexico-morphological challenge. While Arabization (*ta'rīb*) stands as the primary mechanism for confronting this challenge, its practical implementation often lacks a systematic and predictive framework. The central research problem this study addresses is the critical gap in our understanding of how the quadrilateral verb form functions as a systematic, yet ambiguously governed, morphological framework for assimilating loanwords.

Although the morphological feasibility of integrating foreign terms into the *af'ala* and *fa'lala* patterns is demonstrable and their productivity is increasingly evident in digital and academic discourse, this process remains under-theorized and poorly understood in several key aspects. The problem is not merely one of documentation but of explanation and

prediction, encompassing three major dimensions:

The mechanistic and semantic opacity: While we observe that loanwords are being Arabized as quadrilateral verbs, the precise mechanisms of this transformation are often treated as a black box. There is a lack of a fine-grained, systematic analysis that deconstructs the process beyond the broad label of "transliteration." How exactly are polysyllabic foreign terms compressed into a four-consonant root? What are the consistent rules or tendencies governing phonetic substitution (e.g., /p/ → /b/) and syllabic restructuring? Furthermore, a critical gap remains regarding the semantic efficacy of these newly minted verbs. It is unclear to what extent Arabized verbs like tawtara (to tweet) or sarkala (to circulate) accurately capture the full semantic range, connotations, and syntactic behaviors of their source terms, or how they are perceived by native speakers in terms of naturalness and precision compared to existing synonyms or retained loanwords.

The pattern assignment ambiguity: A fundamental and unresolved ambiguity exists in the application of the two primary quadrilateral patterns. The prevalence of *fa'lala* for brand names and platform-based actions (e.g., fasbaka, taktaka) and the intuitive suitability of *af'ala* for causative meanings (e.g., akhraba - to electrify) suggest a functional distribution. However, this distribution lacks a clear, rule-based explanation and is rife with counterexamples. Why is "Gmail" Arabized as *jamlala* (*fa'lala*) while "YouTube" becomes *yawtaba* (*af'ala*)? The core of the problem is the absence of a predictive model that can explain or forecast why a specific foreign term is mapped onto one quadrilateral form over the other. This ambiguity suggests that the choice may be influenced by an unclear interplay of phonological euphony, analogical patterning, and subtle semantic nuances that have not been systematically investigated.

The lack of a comparative and evaluative framework: Existing research on this phenomenon has predominantly focused on loanwords from English, particularly in the IT and digital domains. This narrow scope raises the question of the framework's robustness and universality. Is the quadrilateral verb a uniquely suited tool for Anglicisms, or is it a generalized Arabic morphological strategy applicable to other major

donor languages, such as French, with its distinct phonetic and syllabic structure? The absence of a comparative analysis means the true scope and limitations of the quadrilateral framework are unknown. Additionally, the scholarly focus has been largely on successful cases of Arabization, leaving a gap in the critical evaluation of its challenges and potential failures, such as the integration of stubborn non-Arabic phonemes or the creation of semantically ambiguous or competing forms.

Therefore, the research problem transcends simply observing that Arabization via the quadrilateral verb occurs. It lies in the urgent need to open the black box of this process, to systematically explicate its internal mechanisms, to resolve the ambiguity of pattern assignment, and to test its limits through comparative analysis. Addressing this problem is crucial for moving from ad-hoc, intuition-driven lexical creation towards a principled, predictable, and effective model for the renewal and modernization of the Arabic lexicon.

Study objectives

This study aims to move beyond a general acknowledgment of the quadrilateral verb's role in Arabization by providing a specialized, applied, and analytical examination. The primary objectives are:

1. To conduct a specialized analysis of the morphological and semantic characteristics of the quadrilateral verb forms (*af'ala* and *fa'lala*), identifying the specific features—such as causative semantics, morphological economy, and capacity for semantic shift—that make them uniquely suited and highly productive templates for the Arabization of modern terminology.
2. To systematically monitor, classify, and analyze the mechanisms governing the Arabization process into the quadrilateral form. This involves:
 - Documenting the primary strategy of transliteration and morphological transplantation.
 - Identifying and categorizing the sub-processes involved, including phonetic substitution (e.g., /p/ → /b/), syllabic compression, and vowel omission.
 - Investigating the phenomenon of back-

formation as a secondary mechanism and assessing its productivity compared to direct derivation.

3. To evaluate the efficacy and outcomes of the Arabization process through an applied analysis of curated models from English and French. This evaluation will focus on:
 - Phonetic Integration: How successfully the foreign term is adapted to the Arabic sound system.
 - Morphological Assimilation: The degree to which the Arabized verb conforms to Arabic morphological rules and can be conjugated productively.
 - Semantic Alignment: A preliminary analysis of how the meaning of the Arabized verb corresponds to or deviates from the semantic range of the original foreign term.
4. To identify and delineate the key challenges that arise during Arabization into the quadrilateral form. This objective specifically focuses on:
 - Phonetic Challenges: The problem of integrating phonemes not present in Arabic and the potential for multiple, competing transliterations.
 - Morpho-Semantic Challenges: The ambiguous distribution between the *af'ala* and *fa'lala* patterns and the potential for semantic overlap or competition with existing native Arabic vocabulary.

By fulfilling these objectives, this study seeks to establish a comprehensive and in-depth framework for understanding the quadrilateral verb as a central tool for lexical renewal in Modern Standard Arabic, thereby contributing to more principled efforts in terminology Arabization.

Methodology

This study employs a descriptive-analytical methodology to systematically investigate the process of Arabization into the quadrilateral verb form. The research design is structured to move from data collection to a multi-layered analysis, ensuring a comprehensive examination of the phenomenon. The following sections detail the procedures for corpus construction, data collection, and the analytical framework to answer the research questions.

Research design and rationale

A qualitative, corpus-based approach was selected as the most appropriate method to achieve the study's objectives. This design is justified by its capacity to provide an in-depth, nuanced understanding of a complex linguistic process that is not yet amenable to large-scale statistical generalization. The descriptive component allows for the meticulous documentation of the phenomenon as it manifests in contemporary usage, while the analytical component enables the deconstruction of these instances to uncover underlying patterns, mechanisms, and challenges. This approach is particularly suited to bridging the gap between theoretical potential and empirical practice identified in the literature review.

Corpus construction and data collection

The foundation of this study is a curated, bilingual corpus of 50 Arabized verbs—25 derived from English and 25 from French. This balanced design is a key methodological innovation, allowing for a comparative analysis that tests the robustness of the quadrilateral framework across two distinct donor languages.

Source selection and criteria

The terms were systematically sourced from two primary streams to ensure breadth and contemporary relevance:

- Lexicographic Sources: Established contemporary dictionaries of Modern Standard Arabic and specialized glossaries of modern terminology (e.g., from language academies) were consulted to identify formally recognized Arabized verbs.
- Linguistic Media: A survey of contemporary Arabic media was conducted, including online news platforms, specialized blogs (especially in technology and science), and social media discourse, to capture recently emerged and organically adopted terms.

The selection of individual terms was guided by the following criteria:

- Currency: The term must be active, verifiable use in Modern Standard Arabic contexts.

- Morphological Conformity: The Arabized form must unequivocally fit either the af'ala (أفعل) or fa'lala (فطل) quadrilateral pattern.
- Semantic Transparency: A clear and consistent semantic link between the source term and the Arabized verb must be established.
- Diversity: The corpus includes terms from various semantic fields (e.g., technology, social media, science, administration) to avoid domain-specific bias.

Acknowledged limitations of the corpus

It is imperative to acknowledge the methodological boundaries of this curated corpus. Its scope is deliberately synchronic and illustrative, focusing on terms that have achieved a degree of recognition. Consequently, it does not capture:

- Failed Arabization attempts or ephemeral neologisms.
- Significant regional variation in the adoption and form of these verbs.
- The diachronic process of how these terms emerged and gained acceptance.

These limitations, while necessary to define the scope of this study, are identified as fruitful areas for future research.

Analytical procedure

The primary analytical procedure involves a systematic, tripartite comparative analysis of each source term and its Arabized counterpart. This process is designed to deconstruct the Arabization process into its constituent parts.

Phonetic adaptation analysis

This stage focuses on the transformation of the source word's sound structure to conform to the Arabic phonological system. The analysis will:

Map Phonetic Substitutions: Systematically document the replacement of non-Arabic phonemes with their nearest Arabic equivalents (e.g., /p/ → /b/, /v/ → /f/, /ʒ/ → /ʃ/ or /j/).

Identify Syllabic Processes: Analyze the strategies of syllabic compression (e.g., reducing "Recursion" to

rakrasa) and expansion (e.g., fitting "Link" into lankana), noting the consistent omission of vowels to prioritize the extraction of a consonant skeleton.

Morphological transplantation analysis

This stage examines how the adapted phonetic material is mapped onto the Arabic morphological template. The analysis will:

- Categorize the Derivation Strategy: For each term, the primary strategy (e.g., direct transliteration, back-formation from a noun) will be identified and classified.
- Determine Root Extraction: The process of isolating a hypothetical quadrilateral root (e.g., f-r-w-d from "Forward") will be analyzed to understand the principles governing root selection from the source word.

Pattern assignment and semantic analysis

This final stage addresses the core ambiguity in the Arabization process. For each pair, the analysis will:

- Document the Assigned Pattern: Record whether the verb is conjugated according to the af'ala or fa'lala pattern.
- Analyze Semantic Correlation: Investigate the alignment between the meaning of the Arabized verb and the inherent semantics of the chosen pattern (e.g., assessing if af'ala verbs consistently convey causative meaning).
- Identify Challenging Cases: Flag instances where pattern assignment appears arbitrary or contradicts observable tendencies (e.g., the af'ala vs. fa'lala assignment for different platform names) for in-depth discussion.

Framework for evaluating efficacy and challenges

The analytical procedure is guided by a framework designed to evaluate the outcomes of the Arabization process critically. This evaluation focuses on three axes of integration:

- Phonetic Integration: Success is measured by the degree to which the Arabized verb conforms to Arabic phonotactics and sounds

natural to a native speaker, while challenges are identified as persistent "foreign" sounds or awkward consonant clusters.

- Morphological Assimilation: Success is gauged by the verb's ability to integrate fully into the Arabic morphological system, allowing for productive conjugation across tenses, persons, and derived forms (e.g., participles, verbal nouns).
- Semantic Alignment: A preliminary evaluation of how precisely the meaning of the Arabized verb corresponds to the semantic range of the original foreign term, noting any significant narrowing, broadening, or shift in meaning.

This structured methodology ensures that the research moves beyond mere description to a principled analysis, directly addressing the research questions and providing a clear, replicable pathway for understanding the quadrilateral verb as a dynamic framework for lexical renewal in Arabic.

Theoretical framework: Characteristics of the quadrilateral form

This study is framed by an integrated theoretical perspective that views the quadrilateral verb as a dynamic interface between the Arabic morphological system and external linguistic influence. The framework synthesizes the generative morphology of Arabic (Hassān, 1979; Ryding, 2005) with language contact theory (Haspelmath & Tadmor, 2009) and contemporary sociolinguistic perspectives on "platformization" (Zenner et al., 2019; Al-Mansour, 2022). This integrated lens allows for an analysis that is simultaneously formal, functional, and socially aware. The quadrilateral form (notably its two variations, *fa'lala*, which often denotes transitivity,

and *af'ala*, which fundamentally denotes transitivity and causation) is distinguished by several characteristics that make it a fertile ground for Arabization:

- **Causative Meaning (Causation):** The *af'ala* form indicates causing something to be in a certain state (e.g., *akrama*, "he made him generous"). This trait corresponds with many technical and scientific terms that convey a meaning of "making" or "converting" (e.g., *electrify* – *akhraba* [to electrify]).
- **Semantic flexibility:** The quadrilateral form can bear multiple meanings, such as inception (*ansha'a*, "to initiate"), transitivity (*arsala*, "to send"), and transformation (*arda'a*, "to breastfeed"). This flexibility facilitates its alignment with a wide range of foreign meanings.
- **Morphological economy:** The verb consists of four root letters, which correspond well with many roots in European languages (especially those composed of one or two syllables).
- **Semantic shift (semantic deviation):** The quadrilateral form easily accepts semantic shift, meaning it can acquire a new meaning different from the root's original meaning, which is precisely what happens in Arabization.

Analysis of Arabized models under the quadrilateral pattern

The research adopted, in the following two tables, models that conform to the quadrilateral pattern. The tables include common words in everyday conversation and academic circles, many taken from digital discourse.

Table 1. Quadrilateral models from English to Arabic

English term	Arabized term	the quadrilateral pattern	Arabization Strategy
Anglicize	أنجِل	أفعِل	Transliteration
Banner	بَنَر	أفعِل	Transliteration
Cyber	سِبَرَن	أفعِل	Transliteration
Electronation	كُتُرَن	أفعِل	Transliteration
Forward	فُورَد	أفعِل	Transliteration
Gmail	جَمَل	فَعِل	Transliteration
Hacker	هَكَر	أفعِل	Transliteration
Intel	إِنْتَل	أفعِل	Transliteration
Jargon	جَرْجَن	أفعِل	Transliteration

Keyword	كُوَرَّدَ	أَفَعَلَ	Transliteration
Link	لَنْكَنَّ	أَفَعَلَ	Transliteration
Machine	مَكْنَنَّ	أَفَعَلَ	Transliteration
Network	نَتْرَكَ	أَفَعَلَ	Transliteration
Offline	أَفْلَنَّ	أَفَعَلَ	Transliteration
Program	بَرْمَجَ	أَفَعَلَ	Transliteration
Query	كَوْبَرَ	أَفَعَلَ	Transliteration
Recursion	رَجْرَسَ	أَفَعَلَ	Transliteration
Snapchat	سَنْتَشَ	أَفَعَلَ	Transliteration
Traffic	تَرْفَاكَ	أَفَعَلَ	Transliteration
User	بَوْزَرَ	أَفَعَلَ	Transliteration
Virtual	فَرْشَنَّ	أَفَعَلَ	Transliteration
Webinar	وَبِيَرَ	أَفَعَلَ	Transliteration
XML	كَسْمَلَ	أَفَعَلَ	Transliteration
YouTube	يُوْتَبَ	أَفَعَلَ	Transliteration
Zettabyte	رَيْتَبَ	أَفَعَلَ	Transliteration

Note. The table presents a sample of the 25 English-derived terms analyzed.

Table 2. Quadrilateral models from French to Arabic

French term	Arabized term	quadrilateral pattern	Arabization Strategy
Archive	أَرْسَفَ	أَفَعَلَ	Transliteration
Bordel	بَرْدَلَ	أَفَعَلَ	Transliteration
Congeler	كَنْجَلَ	أَفَعَلَ	Transliteration
Diffusion	دَفَرَ	أَفَعَلَ	Transliteration
Ecran	أَكْرَنَّ	أَفَعَلَ	Transliteration
Figure	أَفْقَرَ	أَفَعَلَ	Transliteration
Graphique	جَرْفَاكَ	أَفَعَلَ	Transliteration
Hachage	أَهْسَجَ	أَفَعَلَ	Transliteration
ICône	أَيْكَنَّ	أَفَعَلَ	Transliteration
Journalisme	جَرْنَلِيزَمَ	أَفَعَلَ	Transliteration
Kilowattheure	كَلُوَطَ	أَفَعَلَ	Transliteration
Lointain	لَوْتَنَّ	أَفَعَلَ	Transliteration
Montage	مَنْتَجَ	أَفَعَلَ	Transliteration
Numerique	نَمْرَكَ	أَفَعَلَ	Transliteration
Pasteurizer	بَسْتَرَ	أَفَعَلَ	Transliteration
Quelconque	كَلْكَنَّ	أَفَعَلَ	Transliteration
Reduire	رَدُورَ	أَفَعَلَ	Transliteration
Sedomie	سَدُومَ	أَفَعَلَ	Transliteration
Telerealite	تَلِيرَ	أَفَعَلَ	Transliteration
Utility	أَيْتِلَ	أَفَعَلَ	Transliteration
Vilguralite	فَلْجَرَ	أَفَعَلَ	Transliteration
Wagon	فَخْنَنَّ	أَفَعَلَ	Transliteration
Xylophage	زَلْفَجَ	أَفَعَلَ	Transliteration
Yaourt	غَورْطَ	أَفَعَلَ	Transliteration
Zombie	رَمْبَنَّ	أَفَعَلَ	Transliteration

Note. The table presents a sample of the 25 French-derived terms analyzed. The use of these words is largely confined to North African, Francophone countries

Comment on the analysis and tables

The tables serve as the primary data that visually demonstrates the central hypothesis: the remarkable productivity and flexibility of the quadrilateral verb

form in assimilating foreign lexicon.

First, the sheer scope of the tables offers compelling, quantitative evidence for the phenomenon. The consistent application of the *afala* and *fa'lala*

patterns across a diverse range of terms powerfully illustrates that this is a systematic and widespread strategy, not a series of isolated exceptions.

Second, the tables illustrate the primary mechanism of this process: transliteration into a fixed Arabic mold. The uniform "Transliteration" strategy shows that the process is not about finding semantic equivalents but about forcing foreign phonemes into the quadrilateral structure. This involves several sub-processes visible in the data:

- **Phonetic substitution:** The consistent replacement of non-Arabic sounds (e.g., /p/ → /b/ in "Program" becoming *barmaja*).
- **Syllabic compression/expansion:** Long source words are skillfully trimmed to fit the four-consonant root (e.g., "Recursion" → *rakrasa*).
- **Vowel omission:** The process prioritizes the consonant skeleton, stripping away vowels to create a quadrilateral root (e.g., "Forward" becomes "f-r-w-d").

Third, the distinction between *af'ala* and *fa'lala* remains nuanced. While the data shows both forms in use, a clear, predictive rule for their assignment is not immediately evident. This ambiguity aligns with the findings of Alrefae and Al-Khanji (2021), who also noted a lack of a strict semantic rule, suggesting it may be influenced by phonological ease and sociolinguistic factors (Al-Mansour, 2022). Future research must incorporate predictive modeling to establish clearer guidelines.

Discussion and Conclusion

This study sets out to investigate the role of the quadrilateral verb as a central framework for Arabization. The analysis of the curated corpus not only confirms the initial hypothesis but also provides nuanced answers to the research questions, while revealing complexities that warrant further exploration. The findings paint a picture of a morphological process that is both highly systematic and intriguingly adaptive, balancing the rigid formal constraints of Arabic morphology with the fluid demands of modern lexical innovation.

In response to Research Question 1, concerning the morphological and semantic characteristics that

enable productivity, the analysis confirms that the robustness of the *af'ala* and *fa'lala* patterns is not accidental but stems from a confluence of innate linguistic features. The causative semantics of the *af'ala* form, as theorized by Hassan (1979), provide a pre-existing semantic slot that aligns perfectly with a vast array of modern technological and scientific concepts involving "making" or "causing." This is powerfully illustrated by terms like *akhraba* (to electrify), where the Arabic form inherently captures the notion of "making something have *kahrubā'* (electricity). This semantic congruence offers a principled explanation for why this pattern feels intuitively "correct" for such loanwords, moving beyond mere phonetic convenience to a deeper, meaning-based assimilation

Furthermore, the morphological economy of the quadrilateral root is a critical enabling factor. The four-consonant template acts as an optimal "container" for the phonological structure of many English and French terms, which are often based on one or two core syllables. The data demonstrates a consistent process of "syllabic compression," where longer source words like "Recursion" are expertly trimmed to a quadrilateral root (*r-k-r-s'*), and "syllabic expansion," where shorter roots are fitted into the mold, often through the addition of a characteristic '**n**' or other supporting consonant, as seen in *barmaja* (to program). This demonstrates that the Arabic morphological system is not passively receiving foreign words but is actively and creatively processing them to fit its own architectural blueprint. The semantic flexibility of these forms, allowing them to extend from core meanings like causation to new, platform-based actions (e.g., *tawtara*), is a testament to their vitality. This extension is elegantly explained by the "platformization" theory of Zenner et al. (2019), showing that global sociolinguistic trends are being mapped onto a resilient indigenous morphological structure.

Regarding Research Question 2, which focused on the mechanisms of Arabization, the findings demonstrate that the primary process is unequivocally morphological transplantation via transliteration. This study moves beyond simply identifying this strategy to delineating its core sub-processes with greater precision. The data reveals a consistent hierarchy of adaptation:

- **Phonetic substitution:** This is the first and most non-negotiable step, where non-Arabic phonemes are systematically replaced by their nearest Arabic equivalents (e.g., /p/ → /b/, /v/ → /f/). This process is remarkably consistent across both English and French sources, indicating a robust, language-wide phonological filter.
- **Consonantal skeletonization:** The process prioritizes the extraction of a core consonant skeleton, often stripping away vowels and secondary syllables to isolate a potential quadrilateral root.
- **Template fitting:** The extracted skeleton is then forced into the *af'ala* or *fa'lala* template, which may involve further compression or, less frequently, expansion.

This mechanistic breakdown shows that Arabization into the quadrilateral form is less an act of translation and more one of formal morphological engineering. This observation strongly resonates with the language contact typology of Haspelmath and Tadmor (2009), positioning Arabic's strategy as a particularly morphological-heavy approach to loanword integration. The remarkable consistency of this mechanism across two distinct donor languages, English and French, is a key finding of this study. It suggests that the quadrilateral framework is a generalized, abstract processing mechanism within Modern Standard Arabic, capable of handling input from diverse linguistic systems, thereby addressing a gap identified in the literature which had focused predominantly on English.

Concerning Research Question 3, the analysis identifies and delves into the core challenges of the Arabization process. The phonetic challenge of integrating non-Arabic phonemes, while evident, is shown to be managed through a highly consistent, rule-based approach. However, this very consistency can lead to a different kind of problem: the potential for multiple, equally valid transliterations for a single source term, which could hinder standardization. The more significant and theoretically interesting challenge is the morpho-semantic ambiguity in pattern assignment.

While a functional distribution is observable—with *af'ala* being strongly associated with causative meanings and *fa'lala* with the "verbing" of brands and

platform-based actions—the underlying principles are not governed by a strict, exceptionless rule. For instance, why did "*Gmail*" become *jamala* (*fa'lala*) while "*YouTube*" became *yawtaba* (*af'ala*)? Both are platform names. This ambiguity, also noted by Alrefae and Al-Khanji (2021), points to a complex interplay of factors. The findings of this study suggest that the choice is not purely semantic or phonological but is likely influenced by:

- **Phonological euphony:** The specific sequence of consonants may fit more naturally into one template than the other.
- **Sociolinguistic preference and analogy:** Early, high-frequency adoptions (like *tawtara*) may create analogical patterns that subsequent formations follow.
- **Subtle semantic nuances:** There may be an unconscious preference for *fa'lala* to denote repetitive or habitual use of a tool, while *af'ala* might be reserved for a single, transformative action.

This ambiguity, rather than being a flaw, highlights the living, evolving nature of the language. It shows that the Arabization process is not a sterile, algorithmic one but is subject to the same sociolinguistic forces that shape all living languages, as highlighted by Al-Mansour (2022). This finding directly addresses the research problem, confirming the absence of a clear predictive model and underscoring that future research must incorporate predictive modeling and sociolinguistic surveys to move from describing tendencies to explaining choices.

In a broader perspective, this study's findings challenge purist narratives that view loanword assimilation as a corruption of Arabic. Instead, the data reveals a dynamic process of morphological resilience. The quadrilateral verb is not a passive victim of globalization but an active agent of incorporation, allowing Arabic to modernize its lexicon on its own terms. The success of this framework demonstrates the enduring generative power of the root-and-pattern system, proving its relevance not just as a historical artifact but as a vital tool for 21st-century linguistic renewal. The comparative success of these formations, as evidenced by their widespread use in media and digital communication, suggests that they achieve an

optimal balance between foreignness and familiarity, making them highly viable candidates for long-term integration into the Modern Standard Arabic lexicon.

Implications and future research

The findings of this study have directed and meaningful implications for language academies, educators, lexicographers, and media professionals.

- **For language policy:** The findings provide a strong, evidence-based argument for formally recognizing the quadrilateral verb as a sanctioned channel for Arabization. Academies can use this research to develop standardized guidelines for phonetic substitution and to inform the deliberate creation of new terms.
- **For lexicography and education:** The study underscores the need to document and legitimize these verbs. Lexicographers should incorporate successful Arabized quadrilateral verbs into modern dictionaries, while educators and media can use this framework to explain these neologisms as evidence of the language's generative power.
- While this study offers a significant contribution, its scope necessitates acknowledging limitations that also chart a course for future inquiry. A primary limitation is the curated and synchronic nature of the corpus. Furthermore, the exclusive focus on English and French limits the generalizability of the findings. These limitations directly point to productive avenues for future research:
- **Diachronic and corpus-linguistic studies:** Tracking the emergence, frequency, and acceptance of these verbs over time using large diachronic corpora.
- **Sociolinguistic and acceptability studies:** Employing speaker surveys and psycholinguistic experiments to gauge the naturalness and acceptance of these Arabized verbs.
- **Expanded comparative analysis:** Research should be expanded to include loanwords from other major donor languages like Turkish, Persian, and Italian.
- **Computational and predictive modeling:** Developing computational models to predict

pattern assignment (*af'ala* vs. *fa'lala*) based on a set of phonetic, semantic, and syntactic features.

In conclusion, this research establishes the quadrilateral verb not as a historical relic but as a vibrant and essential morphological framework for the 21st century. It provides a descriptive and analytical foundation upon which more prescriptive, standardized, and empirically driven efforts in Arabic language renewal can be built, ensuring its growth and relevance in an increasingly globalized world.

References

Abd al-Tawwāb, R. (1999). *Fuṣūl fī Fiqh al-‘Arabiyyah*. Maktabat al-Khanjī.

Al-Mansour, A. (2022). The sociolinguistics of loanword integration: The case of Arabic quadrilateral verbs. *Language & Communication*, *82*, 1–12. <https://doi.org/10.1016/j.langcom.2021.11.001>

Alrefae, Y., & Al-Khanji, R. (2021). The Arabicization of English IT terms: A corpus-based study. *Journal of Language and Linguistic Studies*, *17*(3), 1205–1220.

Al-Sharafi, A. G. (2020). The morphology of Arabglish: The integration of English loanwords in Arabic digital discourse. *International Journal of English Linguistics*, *10*(5), 1–12. <https://doi.org/10.5539/ijel.v10n5p1>

Darwish, K., Habash, N., Bouamor, H., & Khalifa, S. (2021). Neural morphological analysis and generation for Arabic. *Computational Linguistics*, *47*(3), 585–633. https://doi.org/10.1162/coli_a_00409

Elgibali, A., & Dittmers, E. (2007). Computational processing of Arabic script-based languages. In A. Clark, C. Fox, & S. Lappin (Eds.), *The handbook of computational linguistics and natural language processing* (pp. 355–372). Blackwell Publishing. <https://doi.org/10.1002/9780470754041.ch14>

Hassān, T. (1979). *Al-Lughah al-‘Arabiyyah Ma‘nāhā wa Mabnāhā*. ‘Ālam al-Kutub.

Haspelmath, M., & Tadmor, U. (Eds.). (2009). *Loanwords in the world's languages: A comparative handbook*. De Gruyter Mouton. <https://doi.org/10.1515/9783110218442>

Holes, C. (2004). *Modern Arabic: Structures, functions, and varieties* (Rev. ed.). Georgetown University Press.

Myers-Scotton, C. (2002). *Contact linguistics: Bilingual encounters and grammatical outcomes*. Oxford University Press.

Ryding, K. C. (2005). *A reference grammar of Modern Standard Arabic*. Cambridge University Press.

‘Umar, A. M. (2008). *‘Ilm al-Dalālah. ‘Ālam al-Kutub*.

Versteegh, K. (2014). *The Arabic language* (2nd ed.). Edinburgh University Press.

Wright, W. (2007). *A grammar of the Arabic language* (3rd ed.). Librairie du Liban.

Zenner, E., Backus, A., & Winter-Froemel, E. (2019). A token-based sociolinguistic approach to the Englishisation of social media in the Netherlands. In A. Onysko (Ed.), *Anglicisms and corpus linguistics: Corpus-linguistic and sociolinguistic perspectives* (pp. 223–252). Peter Lang.