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Historical evolution of Chinese and Portuguese place names in Macao through language contact and historical geography

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Article

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Abstract

Place names are sedimentary layers of language contact and shifts in power. Macao's current Chinese-Portuguese bilingual toponymic system appears on the surface to consist of corresponding translation pairs, but it contains multiple strands of historical information concerning changes in port functions, dialect contact, colonial administration and Macanese Portuguese. Drawing on a self-compiled corpus of Chinese-Portuguese place-name pairs, this study combines preliminary string-based classification with cross-checking against historical sources to examine the structural characteristics and formation mechanisms of Macao place names. Three findings emerge. First, Chinese and Portuguese generic elements show stable functional correspondences, including Rua-□, Travessa-□ and Avenida-□□, while the specific elements frequently display one-to-many pairings, coexisting aliases and semantic asymmetry. Second, the corpus contains cases in which one Portuguese name corresponds to several Chinese names, one Chinese name corresponds to several Portuguese names, and spelling or directional information is inconsistent. Third, changes in Macao place names are related to port functions, administrative inscription and cognitive reanalysis. On this basis, the article proposes the concepts of parallel institutional naming and a stratified toponymic system, together with an E0-E3 evidence framework that distinguishes string evidence, official verification, dated historical attestation and diachronic chains supported by multiple sources. The central question in the history of Macao place names is therefore not simply whether a translation is accurate, but how different naming agents formed a layered system through institutional coexistence.

1 Introduction

Place names are linguistic labels for geographical entities and material deposits of power relations, community memory and language contact (Azaryahu 2012). Since Macao developed as a port in the mid-sixteenth century, Chinese- and Portuguese-speaking communities have lived together in the same space and produced a distinctive bilingual toponymic landscape. Unlike bilingual names in officially bilingual states such as Canada and Belgium, where the two forms are often translations, Chinese and Portuguese names in Macao frequently point to different historical memories and naming logics. The best-known street provides a clear example. Its Chinese popular name, □□□, describes the road as "new", whereas its Portuguese name, Avenida de Almeida Ribeiro, commemorates a Portuguese governor. The two forms do not translate each other, but both have long remained in public use.

Macao place names have attracted sustained scholarly attention. Yan and Yan (2017) divide the history of Macao street naming into the colonial period, the transition before the transfer of sovereignty and the post-handover period, and they note cases in which the Chinese and Portuguese forms are entirely different. Xu (2013) distinguishes purely Chinese names, Chinese names translated from Portuguese, abbreviated or segmented translations, and combinations of transliteration and translation. Song (2019) further classifies Chinese-Portuguese semantic relations as complete correspondence, functional correspondence, partial asymmetry and complete asymmetry. Xie, Ursini and Samo (2023) provide the most systematic linguistic analysis of Macao urbanonyms to date. They characterise the Chinese and

Portuguese sets as parallel, commensurable toponym systems and examine their grammatical, lexical, etymological and geographical properties. The present study does not claim that parallelism itself has been overlooked. It extends their structural account by asking how co-referential Chinese and Portuguese forms were historically institutionalised and layered. Ursini and Samo (2025) compare the representational accuracy of OpenStreetMap and other gazetteers in multilingual contexts and provide a methodological point of reference for evaluating multilingual place-name data.

Three gaps remain. First, much existing work relies on selected examples or normative discussion and does not provide a fully reviewable corpus with explicit coding rules. Second, Chinese and Portuguese forms are often collectively described as "translations", although some may have arisen independently in different communities and only later have been aligned by official institutions. Third, historical language layers, first attestations and present official status have not been consistently distinguished within one evidence framework.

This article uses a self-compiled Chinese-Portuguese place-name corpus together with Ming and Qing maps, archival materials, dictionaries and previous toponymic research. It asks three questions. What generic structures and pairing relations appear in the current bilingual corpus? Which historical language layers and naming mechanisms explain the current forms and their asymmetries? How can corpus observations be connected to historical sources without overstating the evidence when item-level dates, authoritative sources or precise coordinates are incomplete?

2 Literature review

2.1 Evolution of port names and administrative inscription

The historical evolution of Macao place names first reflects the combined effects of port functions and administrative writing. Tang (2000) shows through Ming and Qing materials that □□□ and □□□ were used concurrently in official documents for a long period. □□ appeared in the late Ming, became more frequent in the early Qing, and emerged as a more stable administrative name during the Kangxi and Yongzheng reigns. Place-name change therefore cannot be described as simple lexical replacement. Port function, documentary practice and geographical scope must also be considered.

Liu (2015) offers a cognitive account of the sequence from □□ to □□□, □□□ and □□, linking change to landscape association, port function, graphic refinement and shifts in naming authority. This account helps explain why names were reanalysed, although some stages remain theoretical inferences that must be distinguished from dated documentary forms.

2.2 Critical toponymy and postcolonial theories of naming

During the past two decades, critical toponymy has shifted international place-name research from etymological reconstruction alone towards the spatial politics of naming. Rose-Redwood, Alderman and Azaryahu (2010) propose the "geographies of toponymic inscription" and define naming as a spatial

practice through which political power is materialised in the landscape. Their account identifies political semiotics, governmentality and normative theory as three major approaches. This framework is relevant to the coexistence of Portuguese colonial administrative names and Chinese popular names in Macao: naming is not a neutral act of reference, but a practice through which institutions inscribe particular narratives into urban space.

Critical toponymy often gives priority to replacement, especially the systematic removal of a former regime's naming legacy after a political transition. This model does not fully explain the long-term coexistence of Chinese and Portuguese names in Macao. Casagranda's (2018) analysis of Ireland shows that postcolonial treatment did not simply replace most English names; many English and Irish forms were instead placed in a bilingual relationship, while names with overt imperial associations were more likely to be changed. The study calls for diachronic and multilayered analysis of the interaction between colonialism, postcolonialism and national identity. Research on Maputo similarly shows that colonial names can remain in unofficial use after their formal replacement (Mahumane and Tembe 2023). These comparisons help explain why Chinese popular names in Macao may remain current alongside official forms and support the concept of parallel institutional naming developed below.

2.3 Multilingual place-name politics and asymmetric bilingualism

Macao has long maintained a distinctive ecology commonly described as "three written languages and four spoken languages". Mácha and Obrusník (2021) review theoretical and methodological approaches to place-name politics in multilingual regions, including the use and perception of bilingual signs and the role of names in constructing spatial identity. Jordan et al. (2021) compare southern Carinthia in Austria with the Těšín/Cieszyn region in Czechia and examine how place names contribute to the formation and maintenance of individual and group identities. These studies show how legal status, language hierarchy and local identity shape naming in multilingual areas.

Macao nevertheless differs from settings in which official bilingual names are normally presumed to be translations. Portuguese and Chinese are both official languages, but the two name sets are not uniformly derived from one another. They can share the same spatial referent while carrying markedly different semantic content. This article uses asymmetric bilingualism to describe that relationship while recognising that Xie et al. (2023) have already theorised the structural coexistence and commensurability of the two urbanonym systems.

2.4 Translation typologies and semantic asymmetry in bilingual place names

Bauko (2026) examines the translation of urbanonyms in a Slovak-Hungarian bilingual environment and identifies five procedures: transference, transcription, substitution, calque or partial semantic translation, and full or partial modification. This typology provides a useful comparative framework for Macao. However, the many cases of independent parallel naming in Macao, in which two names gain public

currency for the same place without an identifiable one-way translation relationship, require attention to institutional co-reference as well as translation procedure.

From the perspective of multiculturalism and translation norms, Xu (2013) distinguishes purely Chinese forms, Chinese forms translated from Portuguese, abbreviated or segmented translations, and combinations of transliteration and translation. The study identifies multiple names for one place and the absence of word-for-word correspondence as common features of Macao toponymy. Niu (2000, 2020) uses cultural history and commemorated individuals to show how Portuguese administrative names such as Avenida de Ferreira do Amaral, Avenida do Conselheiro Borja, Avenida de Horta e Costa and Avenida de Artur Tamagnini Barbosa entered the urban landscape. Song (2019) further classifies semantic relations as complete correspondence, functional correspondence, partial asymmetry and complete asymmetry, and observes that marked differences are concentrated in historical names in the old city.

2.5 Dialect layers and historical language contact

The linguistic substrate of Macao place names is more complex than a Chinese-Portuguese binary. Using the Dicionário Português-Chinês, the Aomen jilüe and contemporary phonological materials, Xu (2026) argues that historical Chinese in Macao contains at least layers of early Zhangzhou Southern Min, Xiangshan Cantonese, Southern Mandarin and later Guangzhou Cantonese, while a possible Hakka layer remains to be tested. The study stresses that a single modern pronunciation cannot establish a dialect source several centuries earlier; systematic rhyme, initial-final correspondence and contemporary evidence must be compared. In relation to place names, Xu connects Macau with □□/□□ and Taipa with □□, and treats Ká Hó, Apomee and Ke-king as early transliterated or phonologically adapted forms. The present article follows this caution and does not treat similarity to a modern spelling as sufficient etymological proof.

2.6 Multilingual communities and the background of Macanese Portuguese

Macao place-name research must be situated within its multilingual society. Cheng (2021) summarises the local ecology as "three written languages and four spoken languages", noting the parallel use of Chinese, English and Portuguese in writing and of Cantonese, Standard Chinese, English and Portuguese in speech. Macanese Portuguese arose through contact between Portuguese and Chinese and illustrates how communities can maintain distinct naming systems while borrowing through everyday interaction. Sheng (1994) describes the linguistic situation from the perspectives of cultural contact, population structure, official status and social use, emphasising the daily position of Cantonese, the administrative history of Portuguese and the later expansion of English and Standard Chinese.

Hu (1991) supplies micro-level evidence of Portuguese loans in Macao speech. The word tudo underwent a change in word-class function, while tomate, bacalhau, sopa, amigo, senhor, senhora, bom dia and obrigado were used by local residents in particular periods and contact settings. Chen's (2002)

master's thesis separates the historical, social, linguistic and cultural causes of Cantonese borrowing in Macanese Portuguese and classifies loans into semantic fields including food, objects, social phenomena, sounds, natural phenomena, plants and diseases. Huang (2022) applies five elements of speech-community theory - population, territory, interaction, identity and facilities - to show that multilingualism in Macao is not simply the addition of languages but a set of norms formed by communities in different settings. Tao (1996) further notes the former symbolic significance of Portuguese in upper-class and administrative communication, the role of Cantonese as the principal local variety of the Chinese community, and the links between English, Standard Chinese and other dialects and education, commerce, migration and identity. Liu (2025), through the "□□" element in Macao urban culture, also draws attention to an Arabic and Moorish strand that exceeds a simple Chinese-Portuguese account of the city's contact history.

2.7 Theoretical framework

Parallel institutional naming refers to a situation in which two language-specific names gain public use or institutional recognition for the same place, while the available evidence does not demonstrate a one-way translation relationship. The concept does not deny translation or loan translation. It prevents cross-language juxtaposition from being automatically reduced to a translation event. Macao provides a clear case: Portuguese administration inscribed officials, governors and religious saints into the urban landscape, while Chinese communities named the same spaces through topography, commercial activity and local memory. The two systems were institutionally aligned rather than simply replacing or translating one another. This concept builds on Xie et al.'s (2023) analysis of parallel, commensurable systems by focusing specifically on the historical and institutional processes that stabilise co-reference.

A stratified toponymic system is a landscape in which successive historical layers are added without erasing earlier layers and semantic asymmetry is retained between them. Macao's stratification includes at least four layers: early local landscape names for bays, villages, hills and waterways; contact among Chinese varieties, including Southern Min, Xiangshan Cantonese and Southern Mandarin; Portuguese colonial administrative naming, including the generic system of Rua, Avenida and Largo and commemorative names for officials; and the post-handover official bilingual regime. These layers coexist spatially and semantically rather than forming a sequence of complete replacement.

3 Materials and methods

3.1 Corpus scope and data processing

The study is based on a self-compiled Macao Place-Name Corpus, which records current or near-current forms. It contains 605 Chinese-Portuguese place-name pairs drawn from official street-name lists, the Macao Memory digital archive, field investigation of street signs and OpenStreetMap data. Ursini and Samo's (2025) comparison of OpenStreetMap and other gazetteers in multilingual contexts informs the cross-checking of OSM records.

Data processing followed three principles. Original strings were retained; variant characters, spaces, diacritics and aliases were not directly rewritten into a researcher-defined standard form. Analysis proceeded in three stages. First, character and string rules were used to classify Portuguese and Chinese generics. Second, records involving aliases, one-to-many pairings, spaces or spelling variation and directional terms were flagged for manual verification. Third, representative names in the corpus were compared with dated maps, archival materials, dictionaries and previous studies. String rules support frequency and structural observations, but cannot independently establish a historical origin.

3.2 Preliminary classification of generics and evidence levels

Portuguese generics were coded from the initial generic component, including Rua, Travessa, Largo, Praça, Avenida, Pátio, Beco, Estrada, Calçada, Rotunda and Miradouro. Chinese generics were coded from strings such as □, □, □□ or □□, □□, □, □, □, □□ and □□□. If a name contained more than one possible generic, it was assigned according to the first or clearest generic. This procedure describes the overall structure but does not replace expert judgement about the meaning of a generic or the nature of an individual feature.

The study develops a four-level evidence framework, informed by longitudinal approaches to place-name change (Buchstaller et al. 2024), to separate corpus observations from historical reconstruction. Table 1 defines the evidential threshold and the range of claims permitted at each level.

Table 1
Evidence levels and permissible scope of conclusions

Level	Meaning	Permitted conclusion
E0	Only the current Chinese-Portuguese string pair is available	Descriptive corpus observation
E1	The current name is verified in a traceable official map, regulation or government page	Current official status can be confirmed
E2	The name is attested in a dated archive, map, dictionary or local gazetteer	Historical existence can be confirmed
E3	At least two independent dated sources connect name form, spatial referent and mechanism of change	A diachronic chain can be reconstructed

"Earliest attestation" refers only to the earliest material identified in the present search and does not establish the actual moment when a name first arose.

4 Corpus overview and structural characteristics

4.1 Correspondences between Chinese and Portuguese generics

The preliminary classification identified 227 names beginning with Rua, 63 with Travessa, 57 in the combined Largo/Praça/Praceta group, 43 with Avenida, 32 with Pátio, 26 with Beco, 19 with Estrada, 12 with Calçada, 10 with Rotunda and 8 with Miradouro. Regional generics such as Ilha, Península and Zona account for 17 records, while 91 do not fall within these first-item rules.

On the Chinese side, □ occurs in 244 names, □ in 75, □/□/□□ in 63, □□ in 61, □□/□□ in 57, □ in 39, □ in 16 and □ □□ in 10. Forty records do not fall within these categories. Table 2 summarises these preliminary distributions.

Table 2
Preliminary string-based classification of major generic elements

Language	Generic element	Count	Research note
Portuguese	Rua	227	High-frequency road generic
Portuguese	Travessa	63	Lane or side-road generic
Portuguese	Largo/Praça/Praceta	57	Forecourt and square generics
Portuguese	Avenida	43	Avenue or major urban road generic
Portuguese	Pátio/Beco	58	Major correspondences for compounds, neighbourhood spaces and small internal spaces
Chinese	□	244	High-frequency road generic
Chinese	□	75	Lane generic
Chinese	□□/□□	57	Public-space generics
Chinese	□□	61	Major-road generic
Chinese	□/□	55	Internal-space or traditional-settlement generics

Structurally, correspondences such as Rua-□, Travessa-□, Largo/Praça-□□/□□ and Avenida-□□ are highly visible. They are better understood as institutionalised functional correspondences between generic elements than as evidence that every complete name was converted word for word. Portuguese generics retain the classifications of Portuguese administration, whereas Chinese generics retain local classifications of streets, lanes, compounds, neighbourhood spaces, forecourts and landscapes. Their parallel use in urban management forms the surface structure of toponymic contact.

4.2 Structural features of anomalous forms

The corpus contains many apparently anomalous pairings. A single Portuguese name may correspond to several Chinese names, as Rua da Felicidade does with □□□□ and □□□. A single Chinese name may correspond to several Portuguese names, as □□ does with Rua da Pedra and Calçada do Quartel. Spelling may vary, as in the pairing of □□□□ with Rua de S. Paulo and Ruade San Paulo. Directional information may also appear inconsistent, as when □□□□□ is paired with Avenida do Conselheiro Borja. These cases

should not automatically be treated as errors. They may preserve traces of parallel circulation across communities, media and institutions, although each requires source verification. Representative cases are summarised in Table 3.

Table 3
Representative anomalous pairings

Type	Chinese name	Portuguese name	Possible interpretation
One Portuguese name to several Chinese names	□□□□	Rua da Felicidade	Spatial or alias difference between two Chinese records paired with one Portuguese administrative name
One Portuguese name to several Chinese names	□□□	Rua da Felicidade	As above
One Chinese name to several Portuguese names	□□	Rua da Pedra	Different segment or older and newer name
One Chinese name to several Portuguese names	□□	Calçada do Quartel	As above
Spelling inconsistency	□□□□	Rua de S. Paulo / Ruade San Paulo	Abbreviation, spacing and source-version variation
Directional inconsistency	□□□□□	Avenida do Conselheiro Borja	Parallel Chinese popular name and Portuguese administrative name

5 Historical language layers and naming mechanisms

5.1 Early local landscape naming

Current corpus forms such as □□, □□, □□, □□□, □□□, □□□, □□, □□ and □□ cannot be traced solely by working backwards from their Portuguese counterparts. The late-Ming map discussed by Tang (2000) records □□□, □□□, □□□ and □□□, showing that a local system centred on bays, villages, hills and waterways existed before comprehensive Portuguese involvement. □□ was later written as □□, □□ or □□. These forms may reflect phonological and graphic adjustment or a writer's reinterpretation of topographic meaning. Disagreement over the location of □□□ also shows that a name, a position on a map and a modern geographical entity cannot be equated without verification.

5.2 Transliteration and phonological transcription

□□/Macau is the most representative cross-language form. Xu (2026) compares early spellings including Amagua, Amachao, Amacao, Amaguao, Amaguam, Maquao, Amaguau, Amangao and Amacon. In combination with □□□ in the Guangdong Coastal Map in Yuedaji, the study argues that the □□/□□ explanation is persuasive, while acknowledging that early Romanised transcription was unstable and the

etymology remains a historically competing explanation. Yang's archival research shows that □□ gradually replaced □□□ and □□□ as an administrative name during the Qing. Together, these sources suggest that Macau is both a cross-language transcription and a form stabilised through administrative writing.

□□/Taipa presents another path. The 1751 map in the Aomen jilüe writes □□, and a 1772 map records Taypa. A Southern Min diminutive form and the later Cantonese □□ may form a phonological and graphic chain. The same research records early transcriptions such as □□/Ká Hó, □□□/Apomee and □□/Ke-king. The safest formulation is to report that the literature proposes an etymology and to identify the contemporary evidence, rather than treating resemblance to a modern spelling as conclusive proof.

5.3 Semantic translation and mixed forms

The generic correspondences in the present corpus show functional translation, including Rua-□, Travessa-□, Largo/Praça-□□/□□ and Avenida-□□. Specific elements, however, frequently retain different cultural referents. □□□□□□□□□ corresponds to Avenida de Almeida Ribeiro and also has the socially widespread Chinese name □□□; □□□□□□ corresponds to Avenida de Artur Tamagnini Barbosa; □□□□□□ to Avenida de Horta e Costa; and □□□□□ to Avenida do Conselheiro Borja. Portuguese specific elements derive from commemorative and administrative figures, whereas a Chinese form may transliterate the Portuguese name, retain an older local name, or coexist with both (Niu 2000, 2020).

Bauko's (2026) procedures of transference, transcription, substitution, calque and full or partial modification help describe the surface relations of Chinese and Portuguese names. Historical explanation also requires a category of independent parallel naming. □□□-Rua da Barra and □□□□-Rua do Campo can be understood as the juxtaposition of a Chinese local name and a Portuguese functional name. Without dated naming documents, it is not possible to claim that one was translated from the other.

5.4 Parallel naming and Chinese-Portuguese semantic asymmetry

Several well-known bilingual forms point to different historical memories. In □□□□□-Ruínas de São Paulo, the Chinese name foregrounds the local description of the building's surviving form, while the Portuguese name foregrounds the religious and architectural history of the Church of São Paulo. In □□□-Jardim de Luís Camões, the Chinese form is associated with a local landscape image, while the Portuguese form links the space to the commemoration of the poet Camões. In □□□□□-Largo do Lilau, the Chinese form retains a local legend or memory of a well, while the Portuguese form institutionalises Lilau. In □□□□-Calçada da Igreja de São Lázaro, the Chinese □□ is associated with the history of a leprosarium, whereas the Portuguese form refers to the Church of Saint Lazarus. Song (2019) and Xu (2013) both show why such names should not be judged through word-by-word measures of translation quality. They must be interpreted through the naming agents, historical events and institutional settings of each community.

Parallel institutional naming therefore describes two language-specific names that gain public use or institutional recognition for one place when no available evidence establishes a one-way translation relation. The concept does not deny translation or loan translation; it avoids reducing every cross-language alignment to a translation event.

5.5 Colonial administrative naming

Niu's (2000) examples - including □□□□□□, □□□□, □□□□□, □□□□□, □□□□□, □□□□□□, □□□□□□ and □□□□□ - show how Portuguese colonial administration inscribed officials, governors and administrative figures into urban space through roads, squares and transport works. Research on Macao place-name culture also records religious, medical, settlement and colonial memories in names such as □□□, □□, □□□, □□□, □□□ and □□□□ (Niu 2020). These names connect to the authority to name, the institutions that made maps and the capacity to place names into public administration.

On the Chinese side, official documents, local residents, religious communities and commercial activity continued to produce names. Forms such as □□□, □□, □□□, □□ and □□□ could remain after institutional naming changed. The history of toponymy is not a history in which each new name completely destroys its predecessor. Naming authority is redistributed across settings: administrative maps favour standardisation, local interaction preserves popular names, and tourism or heritage narratives may reactivate older forms.

5.6 Multilingual communities and name circulation

Research on multilingual communities helps explain why the same place takes different forms among different groups. Cheng's (2021) examples of Macao-□□, Taipa-□□, Coloane-□□ and Avenida de Almeida Ribeiro-□□□ show how Portuguese-speaking, Chinese and Macanese communities may use their own forms before public facilities and bilingual signs align them. Huang (2022) argues that multilingual forms in Macao place names and public signs emerge through the interaction of population, territory, interaction, identity and facilities. The growing role of English in tourism, gaming, education and commerce can also produce a third or further outward-facing form for the same place.

Research on Portuguese loanwords shows that name circulation is grounded in everyday situations. Hu's (1991) examples bacalhau-□□□, sopa-□□, amigo-□□ and senhor-□□ demonstrate phonological adaptation, semantic narrowing, changes in word-class function and the reconstruction of social address in Macao speech. Chen's (2002) classification of Cantonese loans in Macanese Portuguese links borrowing to food, objects, social phenomena, natural phenomena and disease. Similar mechanisms can inform the study of transliteration and mixed forms in place names, provided that their spatial referents and historical evidence remain central.

5.7 Official replacement, alias retention and urban expansion

The shift in administrative prominence from □□□ and □□□ to □□ in Ming and Qing records is a macro-level relocation of naming focus. At the micro level, corpus records such as "□□□□□□□□□□□□□□□" and "□□□□□□□□□□(□□□)" show that a formal name and a social alias can coexist in one record or across different sources. Names for new reclamation zones, transport facilities and border-control spaces may follow different naming logics on the Portuguese and Chinese sides, reflecting the simultaneous construction of urban space, functional change and administrative naming.

This coexistence reveals at least three temporal mechanisms. Administrative replacement occurs when a new name displaces an old one in regulations and maps. Alias retention occurs when an older form remains in local interaction or cultural narratives. Functional expansion occurs when new features and roads receive Chinese and Portuguese names while earlier landscape names are embedded within a new urban system. Only a continuous chain of dated records can establish which mechanism applies in a particular case. The Maputo study by Mahumane and Tembe (2023) provides comparative evidence for the unofficial retention of earlier names.

6 Discussion

6.1 From translation relations to parallel institutional naming

The most important finding from the 605 paired records is not whether Chinese and Portuguese forms correspond completely, but that their relationships have multiple origins. Generics often show functional correspondence, while specific elements may involve transliteration, semantic translation, mixed forms, traditional popular names, colonial commemorative names and independent parallel naming. Treating all pairs as translations obscures the fact that local residents, religious organisations and colonial administration could name separately. Analysing their institutional alignment better explains semantically asymmetric cases such as □□□, □□□, □□□ and □□.

Casagranda's (2018) account of bilingual place names in Ireland shows that the coexistence of English and Irish forms can be a stable institutional arrangement rather than a temporary stage. Macao's Chinese-Portuguese parallel naming is comparable in this respect and should be treated as a toponymic system rather than a failure of translation. This interpretation extends, rather than duplicates, Xie et al.'s (2023) concept of parallel, commensurable toponym systems. Their study establishes structural coexistence and compares linguistic patterns; parallel institutional naming focuses on the naming authorities, administrative procedures and community practices through which two historically distinct forms become a publicly recognised pair.

6.2 Stratification of dialect contact and Portuguese contact

Language contact in Macao is not a single encounter between "Chinese" and Portuguese. Before Portuguese contact, interaction among Southern Min, Xiangshan Cantonese and Southern Mandarin had already created internal Chinese layers. Portuguese then came into contact with local names, religious terminology, port-function labels and administrative specific names. Macau and Taipa record phonological transcription; Rua, Avenida and Largo record an administrative generic system; and □□, □□, □□ and □□ preserve historical memories within local society. The current bilingual display is therefore a cross-section of multilayered linguistic history rather than a mirror between two languages.

Sociolinguistic research clarifies this stratification. Portuguese historically held administrative and elite symbolic value, Cantonese functioned as a daily and identity language within the Chinese community, English was linked to international commerce and education, and Standard Chinese became more prominent after the handover as mobility and national connections increased (Sheng 1994; Tao 1996; Huang 2022). The public visibility of a place name is determined not only by linguistic structure but also by community size, institutional power, education and media infrastructure.

6.3 Naming authority, institutionalisation and historical memory

The shift from □□□ and □□□ to □□, and from local landscape labels to commemorative names for Portuguese officials, shows the relationship between institutionalisation and naming authority. Archives, maps and regulations can enlarge the administrative visibility of a name, while local use can maintain earlier names and aliases. The post-handover bilingual regime did not eliminate historical layers; it incorporated names of different origins into the same public space. Research on Macao place names should therefore ask who named, who inscribed, who used and who confirmed a form in which medium, alongside traditional etymological questions.

Yankson's (2023) social-sustainability framework for street naming in postcolonial Windhoek examines street naming as a tool of political construction and the effect of retained colonial names on urban identity. These concerns relate directly to the stratified system proposed here. Erőss et al. (2022) show that ethnic competition can remain central to place-name politics in Romanian multiethnic cities where demographic proportions remain balanced. Comparative cases indicate that Macao is not unique in combining multilingual naming, colonial legacies and identity politics, even though its particular institutional alignment is distinctive.

7 Conclusion

This article has used 605 current Chinese-Portuguese place-name pairs and relevant historical sources to examine the historical evolution of Macao toponymy through language contact. Three conclusions follow.

First, the current corpus displays stable correspondences between Chinese and Portuguese generics, but correspondence between generic elements does not entail translation of the specific elements. One-

to-many pairings, coexisting aliases and semantic asymmetry are structural features of the bilingual toponymic system.

Second, Macao place names preserve multiple layers of linguistic history and social memory. Early landscape naming interacted with Southern Min, Xiangshan Cantonese and Southern Mandarin, while Portuguese entered urban space through transcription, an administrative generic system and colonial commemorative naming.

Third, place-name change is jointly related to port function, administrative inscription, urban expansion and changes in naming authority. Earlier forms do not necessarily disappear; they can remain as popular names, heritage names or aliases.

Parallel institutional naming and the E0-E3 evidence scale connect observable corpus structures with verifiable historical evidence. For the history of Macao place names, the most productive approach is not to compress all Chinese and Portuguese forms into one model of translation, but to trace how each name was formed, contested, replaced and reused across languages, communities, media and institutions. Future research should add item-level dates, authoritative sources, geographical coordinates and naming agents, progressively raising E0 records to verifiable historical evidence. Comparisons with Hong Kong, Goa, Malacca and other former Portuguese or British colonial cities can then be developed. The comparative framework proposed by Jordan et al. (2021) offers a useful methodological basis for that work.

Declarations

Competing interests

The authors declare no competing interests.

Artificial intelligence usage

A large language model was used to assist with English translation, language editing, structural revision and reference-format checking. The authors reviewed the resulting text and remain responsible for the analysis, interpretation, source verification and final manuscript.

Author Contribution

Y.X. led the overall drafting of the manuscript, developed the analytical approach for the corpus statistics and structural analysis, and drafted the Introduction, the initial version of the Literature Review, and the main text of Section 4. Y.X. and H.Y. jointly collected and curated the place-name corpus, organised the data, and revised the Literature Review. H.Y. led the preparation of the Materials and Methods section,

revised Section 4, and drafted the Conclusion, to which Y.X. contributed substantive revisions. Y.X. and H.Y. jointly wrote Sections 5 and 6, critically reviewed and revised each other's contributions, and approved the final version of the manuscript.

Data Availability

The Chinese–Portuguese place-name corpus used as the primary dataset for this study is provided as Supplementary Data 1. The corpus contains 605 paired records and was compiled from historical maps, archival materials, published studies and contemporary place-name sources cited in the article. The coding procedures and aggregate results derived from the corpus are described in the article. No personal or sensitive data are included.

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