

DOI: 10.5281/zenodo.19265040

THE HISTORICAL DEVELOPMENT OF THE ZHUDI MUSICAL INSTRUMENT IN SHANDONG PROVINCE, CHINA

Gang Chen¹, Khomkrich Karin^{1*} and Noppon Chaiyason¹

¹College of Music, Mahasarakham University, Thailand.

Received: 05/02/2026
Accepted: 07/03/2026

Corresponding Author: Khomkrich Karin
(khomkrich.k@msu.ac.th)

ABSTRACT

This study investigates the historical development of the Zhudi (Chinese bamboo flute) in Shandong Province, China, through an analysis of its organological evolution, performance practice, and cultural transmission. Drawing on archaeological findings, historical records, and qualitative fieldwork – including interviews with key practitioners – the research traces the transformation of the instrument from prehistoric bone flutes to its modern professional and institutionalized forms. The findings indicate that the Zhudi developed not only as a musical instrument but also as a dynamic cultural system shaped by social change, regional identity, and technological innovation. From early bone flutes at Jiahu and related sites to the transition from bone to bamboo, the instrument gradually achieved structural refinement. It flourished in court and popular contexts during the Qin–Han and Tang–Song periods, while the Ming–Qing era established the stylistic distinction between Bang-dizi and Qu-dizi traditions. In the twentieth century, modernization through solo repertoire, professional training, and technical innovations further expanded its artistic scope. In Shandong, master performers such as Qu Xiang contributed significantly to the formation of a distinctive regional style. The study concludes that the Zhudi's continuity relies on the dynamic interaction between tradition and innovation within China's contemporary cultural landscape.

KEYWORDS: Zhudi, Chinese Bamboo Flute, Shandong Province, Organology, Historical Development.

1. INTRODUCTION

The Chinese bamboo flute, commonly known as the Zhudi (竹笛), occupies a central position in the history of Chinese musical culture. As one of the most representative traditional wind instruments, it has functioned not only as a medium of artistic expression but also as a cultural symbol embedded within regional identity, social transformation, and aesthetic evolution. Despite its prominence in Chinese music, scholarly discussions have often treated the bamboo flute in broad national terms, with limited attention to its region-specific historical development and stylistic formation. (Zhao, S. T. (1986). *The art of bamboo flute performance*. Beijing: People's Music Publishing House.).

Shandong Province holds particular significance in this context. As the historical homeland of Qilu culture and a long-standing center of intellectual and artistic production, Shandong has cultivated distinctive musical traditions shaped by the interaction between local folk idioms and national cultural movements. The bamboo flute tradition in this region does not merely replicate generalized Chinese dizi practices; rather, it demonstrates a recognizable stylistic identity formed through historical processes, regional aesthetics, and the contributions of influential performers. From an organological perspective, the Zhudi reflects a continuous process of material, structural, and acoustic refinement. Archaeological discoveries of prehistoric bone flutes provide evidence of early aerophone experimentation, while the later transition from bone to bamboo marked a decisive step in tonal stabilization and craftsmanship development. Over successive dynasties, the instrument expanded its social functions—from ritual and court music in the Qin–Han period, to artistic flourishing and technical innovation during the Tang–Song era, and stylistic differentiation between northern and southern traditions in the Ming–Qing period. These developments demonstrate that the bamboo flute evolved in response to broader cultural, political, and aesthetic shifts. (Hao, Y. J. (2018). *Regional style and cultural connotation of Shandong bamboo flute art*. Jinan: Shandong Literature and Art Publishing House.).

In the twentieth century, modernization further transformed the instrument. The emergence of solo repertoire, conservatory-based training systems, and technical innovations—such as expanded range and advanced articulation techniques—repositioned the Zhudi within professional concert settings. Within Shandong Province, master musicians such as Qu Xiang played a crucial role in shaping a distinctive

regional performance style characterized by robust articulation, expansive breath control, and strong expressive projection. This formation of what is often referred to as the “Shandong Dizi School” illustrates how individual artistry and regional culture intersect to generate identifiable stylistic schools within a national tradition. (Geng, T. (2003). On the main characteristics of the development of Chinese bamboo flute solo art in the 20th century. *Journal of Xinghai Conservatory of Music*, (2), 46–48).

At the same time, the study of the Zhudi must be situated within broader discussions of cultural preservation and globalization. Contemporary scholarship has highlighted the tension between cultural homogenization and the reconstruction of local identity. In this context, regional instrumental traditions become important sites for examining how historical continuity is negotiated in modern society. The Zhudi in Shandong offers a compelling case through which to explore the interaction between tradition and innovation, local identity and national standardization, and heritage preservation and artistic modernization. (Yang, M. K. (2023). Development and transformation of instrumental music along the Southern and Maritime Silk Roads from the perspective of area studies. *Art of Music*, (4), 48–60.).

Therefore, this study focuses on the historical development of the Zhudi musical instrument in Shandong Province, China, integrating organological analysis, performance practice, and cultural transmission within a unified historical framework. By tracing its evolution from early structural foundations to contemporary professional practice, this research seeks to demonstrate that the Zhudi should be understood not merely as a musical instrument, but as a dynamic cultural system shaped by historical processes and regional creativity. Through this perspective, the study contributes to a deeper understanding of regional musical identity in China and provides an academic foundation for ongoing efforts in heritage preservation, education, and artistic innovation.

2. RESEARCH METHODS

This study adopted a qualitative research methodology, integrating historical inquiry, ethnographic fieldwork, and musicological analysis. The research focused on the historical development of the Zhudi musical instrument in Shandong Province, China, examining its organological evolution, stylistic formation, and cultural transmission. Data were collected through

documentary analysis, semi-structured interviews, and direct field observation. Fieldwork was conducted in Shandong Province between October 2024 and February 2026, during which the researcher gathered audio-visual documentation, musical materials, and first-hand testimonies from professional practitioners. The investigation was structured into four major phases, each representing a critical stage in the research process.

2.1. Step 1: Data Collection

A. Secondary Data: The researcher consulted academic monographs, historical treatises, peer-reviewed journal articles, archival publications, and documented studies related to the historical development of the Chinese bamboo flute. Particular attention was given to sources addressing archaeological discoveries of early bone flutes, dynastic transformation of bamboo flute construction, stylistic differentiation between northern and southern traditions, and modern institutional reform. These documentary materials provided a foundational understanding of the chronological evolution of the Zhudi, including its transition from prehistoric aerophones to membrane-covered bamboo flutes, and later modernization in the twentieth century. The secondary sources established the historical framework necessary for contextualizing the regional development of the instrument in Shandong.

B. Primary Data: Field research was conducted in Shandong Province. Data were gathered through semi-structured interviews, performance observation, and examination of musical scores and recorded materials.

The researcher conducted in-depth interviews with two key informants: Mr. Qu Xiang, representative figure of the Shandong Dizi School and Mr. Wang Hongtao, national first-class performer and principal flute musician of the Shandong Song and Dance Theater National Orchestra. The interviews explored topics including stylistic formation, pedagogical systems, performance techniques, repertoire development, and institutional transformation of Zhudi practice in Shandong. Direct observation of rehearsals and performances enabled documentation of articulation patterns, breath control techniques, tonal production, and interpretative approaches characteristic of the Shandong style.

2.2. Step 2: Recording Data

All primary data collected through interviews,

performance observations, and documentary review were systematically recorded to ensure accuracy and research reliability. Semi-structured interviews with key informants were audio-recorded and transcribed verbatim in order to preserve contextual meaning and interpretative nuance. Performance practices were documented through video recording and detailed field notes, focusing on articulation patterns, breathe control, tonal production, and stylistic expression characteristic of the Shandong Zhudi tradition. In addition, selected musical works were transcribed into Western notation to facilitate subsequent structural and stylistic analysis. All documentary materials, interview transcripts, and observational records were organized chronologically and thematically in accordance with the research objectives.

2.3. Step 3: Preparation and Analysis of Data

Following data recording and organization, the materials were systematically categorized based on the principal research objective: the historical development of the Zhudi musical instrument in Shandong Province. Data analysis was conducted in three interconnected dimensions. First, organological analysis was employed to examine material transformation, structural development, pitch organization, and acoustic characteristics across historical periods. Second, musicological analysis was applied to selected representative works to identify modal structure, melodic construction, ornamentation, articulation techniques, and stylistic features. Third, thematic analysis of interview data was undertaken to interpret patterns related to regional identity, stylistic school formation, pedagogical transmission, and institutional influence. Triangulation among documentary sources, interview narratives, and performance observations was conducted to enhance analytical rigor and ensure methodological validity.

2.4. Step 4: Synthesis, Discussion, and Presentation

The findings were synthesized through descriptive and interpretive analysis in alignment with the research objectives. The historical evolution of the Zhudi—from prehistoric bone flutes to modern professional practice—was systematically contextualized within broader socio-cultural and institutional developments. The formation of the Shandong Dizi School was examined as a case study of regional stylistic construction, demonstrating how local aesthetics, master performers, and

institutional frameworks interact in shaping instrumental identity. Finally, the research outcomes were compiled into a scholarly manuscript, presenting an integrated understanding of the Zhudi as both a musical instrument and a dynamic cultural system shaped by historical continuity, regional creativity, and artistic modernization.

3. LITERATURE REVIEW

Bamboo occupies a foundational position in Chinese civilization, functioning both as a material resource and as a cultural symbol. China, often referred to as the “King of Bamboo,” possesses extensive bamboo reserves and has utilized bamboo for thousands of years in daily life, including for food, housing, tools, writing materials, and musical instruments (Chinese Bamboo Culture, n.d.). Prior to the widespread adoption of paper, bamboo strips served as primary writing media, particularly during the Han Dynasty, preserving early literary, philosophical, and historical texts. Beyond its utilitarian function, bamboo carries deep symbolic meaning within Chinese culture. It has long been associated with moral integrity, resilience, and refinement, frequently appearing in poetry, painting, and philosophical discourse. Such symbolic associations provide an essential cultural framework for understanding the Zhudi (Chinese bamboo flute), which embodies not only the acoustic properties of bamboo but also its ethical and aesthetic connotations (Chinese Bamboo Culture, n.d.).

Archaeological discoveries have significantly shaped scholarly understanding of the origins of Chinese aerophones. The Jiahu bone flute, dating back approximately 9,000 years, demonstrates advanced pitch organization in prehistoric China and is widely recognized as one of the earliest playable wind instruments in the world (Yuan Jingfang, 2004). Additional findings at Xinglongwa and Hemudu further support the argument for the indigenous development of flute-like instruments in China. The subsequent transition from bone to bamboo marked a decisive organological transformation, as bamboo offered superior resonance, flexibility, and tonal clarity, thereby facilitating structural refinement over successive historical periods.

Historical studies situate the bamboo flute within broader dynastic transformations of Chinese musical culture. During the Qin and Han dynasties, bamboo flutes were incorporated into court rituals, military ensembles, and instrumental

accompaniment, reflecting their elevated cultural and ceremonial status (Liang Maochun, 2005). The Tang and Song dynasties represented a flourishing period in which the transverse flute gained prominence and the addition of the membrane (*mo*) produced the bright and resonant timbre characteristic of the Zhudi (Lin Keren, 2009). This technical innovation became a defining acoustic feature of the instrument within Chinese musical aesthetics.

From the Ming and Qing dynasties onward, stylistic differentiation between northern and southern traditions became increasingly pronounced. The Bang-dizi of northern regions emphasized brightness and rhythmic vigor, while the Qu-dizi of southern regions cultivated lyrical subtlety and ornamental refinement (Lin Keren, 2009). These distinctions laid the structural and stylistic foundations for modern performance schools. In the twentieth century, modernization and institutional reform further transformed the artistic status of the bamboo flute. The emergence of solo repertoire, professional training systems, and national music festivals elevated the instrument from a primarily folk and operatic role to a concert instrument with national visibility (Hai Yaochun, 2012).

Although existing scholarship has documented the historical evolution of the bamboo flute from prehistoric origins to modern institutionalization, most studies approach the instrument from a national or macro-historical perspective. Regional stylistic formation, particularly at the provincial level, remains less systematically examined. In Shandong Province, the development of a distinctive performance identity—often associated with the Shandong Dizi School—reflects the interaction between local folk elements, individual artistry, and institutional support. Interviews with Qu Xiang and Wang Hongtao (personal communication, 20 October 2025) indicate that the Shandong style is characterized by robust articulation, strong breath projection, and integration of regional aesthetic sensibilities. However, despite recognition of influential performers, there remains a lack of comprehensive studies that integrate archaeological origins, dynastic evolution, organological development, stylistic differentiation, and contemporary transmission into a unified analytical framework centered specifically on Shandong.

Therefore, while the cultural symbolism of bamboo and the general historical development of the Chinese bamboo flute have been well

documented (Chinese Bamboo Culture, n.d.; Yuan Jingfang, 2004; Liang Maochun, 2005; Lin Keren, 2009; Hai Yaochun, 2012), limited research has synthesized these dimensions within a focused regional study of the Zhudi in Shandong Province. In particular, the integration of bamboo culture, structural transformation, performance technique, and regional identity construction has not been examined within a coherent historical framework. This gap provides the foundation for the present study, which investigates the historical development of the Zhudi musical instrument in Shandong Province by combining historical inquiry, musicological analysis, and ethnographic fieldwork to construct a regionally grounded and analytically integrated perspective.

4. RESEARCH RESULTS

This section presents the findings on the historical development of the Chinese bamboo flute (Zhudi) from its prehistoric origins to its modern transformations. The results demonstrate that the instrument evolved in response to social change, aesthetic values, and technological innovation across different historical periods. From early bone flutes to refined bamboo constructions and contemporary concert instruments, the Zhudi underwent continuous structural and stylistic refinement. The findings further show that its roles

in folk, court, operatic, and modern performance contexts contributed to its cultural significance. The following sections outline these developments chronologically, with particular attention to regional formation in Shandong Province.

4.1. Origins and Early Forms of the Bamboo Flute

The origin of the bamboo flute has long been debated, with some theories suggesting foreign introduction during the Western Han Dynasty, while others proposed origins in South America or India. However, archaeological evidence increasingly supports the independent development of flute-like instruments in China. The most significant discovery is the Jiahu bone flute, unearthed in Henan Province in 1987 and dated to approximately 9,000 years ago. This seven-hole instrument is recognized as the earliest playable wind instrument, capable of producing a heptatonic scale. Additional findings at Xinglongwa and Hemudu further confirm the early existence of aerophones in China. These instruments demonstrate structural and acoustic features similar to later bamboo flutes, providing the foundational framework for the subsequent development of the Zhudi (Yuan Jingfang, 2004).



Figure 1: Jiahu bone flute.

Source: Gang Chen, from fieldwork in 2025.

4.2. Transition from Bone to Bamboo: Early Material Innovation

Historical records, particularly the Records of the Grand Historian, indicate that during the legendary era of the Yellow Emperor (Huangdi), bamboo gradually replaced bone as the primary material for

flute construction. This material transition represented a significant technological and acoustic advancement in the development of early Chinese aerophones. Compared with bone, bamboo provided superior resonance, lighter weight, greater elasticity, and more precise control over bore construction, thereby enhancing tonal clarity and

expressive flexibility. Archaeological discoveries further support this transformation. Bamboo flutes unearthed from Tomb No. 3 at Mawangdui in Changsha, Hunan Province, and Tomb No. 1 at Luopowan in Guangxi reveal that by the early imperial period, bamboo flutes had already attained a relatively stable structural configuration. These instruments demonstrate standardized finger-hole placement, improved internal bore shaping, and evidence of refined craftsmanship, indicating a shift from experimental construction toward systematic instrument making.

This transition from bone to bamboo marks a decisive stage in the historical formation of the Zhudi. It not only established bamboo as the dominant material for flute production but also laid the acoustic and structural foundation for the instrument's subsequent evolution across dynastic periods. From this point onward, the bamboo flute entered a continuous developmental trajectory spanning approximately four millennia, during which its construction, tonal system, and performance techniques were progressively refined.

4.3. Development during the Qin and Han Dynasties

During the Qin and Han dynasties, the bamboo flute assumed an increasingly significant role within the evolving musical institutions of early imperial China. It functioned not only as an accompaniment instrument in Guqin performance but also as an essential component of court ritual music, ceremonial banquets, and military ensembles. Its presence in imperial celebrations, military encampments, and victory rituals reflects the instrument's integration into both political authority and social order, demonstrating that it had moved beyond folk contexts into formalized state musical systems. The transverse flute, often referred to as the "riding flute," is believed to have been introduced and further developed through cultural exchange between the Han dynasty and northern nomadic groups, particularly the Xiongnu. During the reign of Emperor Wu of Han, such intercultural contact facilitated structural refinement and broader dissemination of the instrument. This period witnessed important organological developments, including the stabilization of seven-hole flute configurations and the appearance of two-ended flutes, suggesting experimentation with tonal range and acoustic projection.

In addition to structural innovation, theoretical advancements emerged during this era. Scholars such as Cai Yong and Xun Xu contributed to early

attempts at pitch organization and tonal standardization, including the conceptualization of twelve-tone systems. Although not identical to modern chromatic theory, these efforts indicate an increasing awareness of tonal regulation and systematic pitch control within Chinese musical thought. Archaeological findings from Han tombs at Mawangdui further confirm this stage of refinement. Excavated bamboo flutes exhibit construction features consistent with earlier pre-Qin transverse flutes, demonstrating both continuity and technical improvement in flute-making traditions (Liang Maochun, 2005). Collectively, the evidence suggests that the Qin-Han period represented a formative stage in which the bamboo flute became structurally stabilized, institutionally recognized, and theoretically contextualized within the broader framework of imperial Chinese music culture.

4.4. Flourishing of the Bamboo Flute in the Tang and Song Dynasties

The Tang Dynasty is widely regarded as a golden age in the development of bamboo flute art, corresponding with the broader cultural prosperity of the empire. Strong imperial patronage and the establishment of formal musical institutions, such as the Jiaofang and Liyuan, created a systematic framework for the training of professional musicians and the standardization of performance practice. Within this institutional environment, the transverse bamboo flute (hengdi) assumed a central position in court ensembles and in Yanyue (banquet and entertainment music), reflecting both technical refinement and elevated artistic status. The flourishing of bamboo flute performance during this period was also supported by the activity of renowned dizi players, including Li Mu, Sun Chuxiu, and You Chengen, whose artistry contributed to expanding the expressive scope of the instrument. A significant technical innovation of the Tang period was the introduction of the membrane-covered flute. The application of a thin membrane (mo) over a specialized hole enhanced brightness, resonance, and projection, producing the distinctive buzzing timbre that later became a defining acoustic characteristic of the Chinese bamboo flute. This innovation marked a decisive step in shaping the tonal identity of the Zhudi within Chinese musical aesthetics (Lin Keren, 2009).

During the Song Dynasty, the social function of the bamboo flute expanded beyond courtly contexts. As urban culture developed and commercial entertainment flourished, the instrument increasingly entered operatic and folk performance

traditions. This shift reflects a broader transformation from elite institutional usage to widespread popular adoption. Numerous flute variants emerged during this period, adapting to different vocal ranges and performance environments. The bamboo flute became an indispensable accompaniment instrument in opera troupes and shadow plays, reinforcing its versatility and cultural adaptability. Collectively, the Tang-Song period represent a stage of artistic consolidation and diversification. Institutional support, technical innovation, and expanding performance contexts contributed to the stabilization of structural design and the enrichment of expressive techniques. This era established the aesthetic and acoustic foundations upon which later regional styles and performance schools would be constructed.

4.5. North-South Differentiation in the Ming and Qing Dynasties

From the Ming dynasty onward, bamboo flute art entered a distinct phase of regional stylistic differentiation between northern and southern traditions. In southern China, particularly in the Jiangnan region, the flute became closely associated with Kun Opera. The development of the Qu-dizi, characterized by a longer body and thicker bore, produced a mellow, smooth, and refined tone suited to lyrical and elegant musical aesthetics. In northern China, the flourishing of Bangzi opera required a brighter, more penetrating sound with stronger projection. This demand led to the formation of the Bang-dizi, which featured a shorter body and narrower bore, generating a sharper and more vigorous tonal quality. This structural and acoustic divergence not only reflected differing regional aesthetic preferences but also established the technical and stylistic foundations for the emergence of modern bamboo flute performance schools.

4.6. Modern Innovations and Contemporary Transformations

In the twentieth century, bamboo flute art

underwent profound transformation in parallel with broader cultural and institutional reforms in China. A pivotal moment occurred in 1953 when Feng Zicun performed the solo work *Meeting Again* at the first National Folk Music and Dance Festival. This performance marked a decisive turning point in the artistic status of the bamboo flute, elevating it from primarily ensemble and operatic functions to an independent solo concert instrument (Hai Yaochun, 2012). The emergence of solo repertoire not only demonstrated technical advancement but also signified institutional recognition of the bamboo flute within the framework of national music culture. Through the establishment of professional training systems, standardized pedagogy, and expanded performance platforms, the instrument entered a new stage characterized by formalization, artistic refinement, and expanded expressive scope.

During this period, two major performance styles became clearly defined within professional practice. The Northern style emphasized vigorous articulation, powerful breath projection, and rhythmic dynamism, reflecting its historical roots in Bangzi opera traditions. In contrast, the Southern style cultivated lyrical phrasing, subtle tonal control, and elaborate ornamentation, corresponding to the refined aesthetic sensibilities of Jiangnan musical culture. This stylistic clarification provided a systematic foundation for modern bamboo flute pedagogy and performance identity.

Further innovation emerged in the 1960s through the work of Zhao Songting, who invented the paidi (row flute), significantly expanding the instrument's pitch range to more than three octaves. This development enhanced melodic flexibility and broadened harmonic possibilities. Subsequent structural advancements—including keyed flutes and bass bamboo flutes—further extended the instrument's expressive and orchestral capacity. Collectively, these innovations reflect the ongoing modernization of the bamboo flute, consolidating its position as a versatile and fully professionalized instrument within contemporary concert practice.



Figure 2: Feng Zicun and Zhao Songting.
Source: Gang Chen, from fieldwork in 2025.

Table 1: Historical Development of the Bamboo Flute.

Historical Period	Key Developments
Prehistoric Era	Bone flutes (Jiahu, Xinglongwa, Hemudu); early scale systems
Huangdi Era	Transition from bone to bamboo; material innovation
Qin-Han Dynasties	Court, military, and Guqin accompaniment; transverse flute development
Tang-Song Dynasties	Court flourishing; membrane innovation; popularization in opera
Ming-Qing Dynasties	North-South differentiation; Bang-dizi and Qu-dizi
Modern Era	Solo repertoire, stylistic schools, structural innovations

In conclusion, the historical trajectory of the bamboo flute reveals a sustained process of adaptation shaped by shifting socio-political environments, evolving aesthetic paradigms, and continuous technological refinement. From its earliest manifestation as a prehistoric aerophone to its current status as a professionally standardized concert instrument, the bamboo flute has demonstrated remarkable structural resilience and artistic flexibility. Its development reflects not only advancements in material construction and acoustic design but also the dynamic negotiation between tradition and innovation across successive historical periods. More importantly, the bamboo flute should be understood not merely as an instrument of sound production, but as a cultural artifact that embodies historical continuity, regional identity, and collective artistic memory within Chinese civilization. Through its integration into court ritual, opera performance, folk traditions, and modern concert practice, the instrument has served as a medium through which aesthetic values, social hierarchies, and cultural meanings have been articulated and transmitted.

In contemporary contexts, the bamboo flute remains indispensable across diverse performance platforms, including traditional ensembles, national orchestras, conservatory systems, and international concert stages. Its adaptability within both heritage-based and modernized frameworks underscores its enduring vitality. Within the broader discourse on safeguarding and revitalizing traditional Chinese culture, a systematic and historically grounded study of the bamboo flute provides not only

scholarly insight into organological and stylistic evolution but also practical implications for cultural preservation, music education, and sustainable artistic innovation in the twenty-first century.

5. DISCUSSION

The findings of this study demonstrate a strong correspondence with theoretical perspectives in historical musicology and cultural history, particularly those that conceptualize musical instruments as products of long-term socio-cultural evolution shaped by material conditions, institutional structures, and regional cultural environments. The historical trajectory of the Zhudi in Shandong—from prehistoric bone flutes to bamboo instruments used in folk, court, operatic, and modern concert contexts—confirms the view that musical instruments do not emerge as static artefacts or isolated innovations, but develop through cumulative processes of adaptation and refinement (S.A., 2004).

The progression from bone to bamboo construction exemplifies this evolutionary model. The replacement of bone with bamboo was not merely a change in material, but a decisive technological and acoustic advancement that enabled improved resonance, structural stability, and expressive flexibility. Historical theory suggests that technological shifts often generate new aesthetic possibilities; in this case, bamboo's acoustic properties facilitated broader tonal control and supported the flute's integration into increasingly complex musical systems. This transformation aligns with broader interpretations

of Chinese cultural history in which material innovation and artistic development advance in parallel.

The incorporation of the bamboo flute into court ritual and imperial musical institutions further supports institutional historical theory, which argues that artistic forms gain structural stability and symbolic authority when embedded within formal state systems. As musical standardization and pitch regulation evolved, the flute's function expanded beyond localized folk practice into ceremonial and political domains. This reflects a broader historical pattern in which cultural practices become codified through institutional recognition and bureaucratic organization. The subsequent differentiation between northern and southern traditions during the Ming and Qing dynasties reinforces cultural ecology theory, which posits that artistic styles are shaped by regional environments and performance systems. The emergence of Bang-dizi and Qu-dizi traditions demonstrates how opera culture, local aesthetics, and social function influenced instrumental design, tonal production, and stylistic articulation. This confirms that instrumental morphology and performance practice evolve in response to specific cultural ecosystems rather than through uniform national development. Such findings correspond with scholarship emphasizing that Chinese folk instruments are inseparable from regional cultural ecology (Chen Wengang, 2013) and resonate with studies on regional instruments such as the Yuping Xiaodi, where craftsmanship traditions and historical usage patterns determine cultural value (Culture Industry, 2019; Deng Hongshun, 2020).

In the twentieth century, the transformation of the Zhudi into a standardized solo concert instrument reflects processes consistent with modernization theory in cultural studies. The emergence of professional training systems, conservatory-based pedagogy, and structural innovations illustrates how traditional arts are reorganized within modern institutional frameworks. Importantly, modernization in this context does not signify rupture with tradition; rather, it represents adaptive restructuring that enables continuity within changing socio-political conditions. This supports theoretical arguments that tradition and modernity function dialectically rather than oppositionally. The regional case of Shandong further refines these theoretical perspectives. As one of the birthplaces of Chinese civilization and Qilu culture—where tradition and innovation have historically coexisted (An Zuozhang, 2009; Qu Yu,

2020)—Shandong provides a cultural environment in which the Zhudi has developed distinctive structural features, timbral qualities, and social functions. The study demonstrates that the Shandong Zhudi tradition, particularly through the artistic legacy of Qu Xiang, embodies robust articulation, expressive breath control, and strong rhythmic vitality rooted in regional aesthetics. This indicates that Shandong functions not merely as a geographical setting but as an active cultural ecology shaping instrumental identity.

While previous studies often focus on production techniques or market challenges, the present research extends existing scholarship by positioning the Zhudi as a cultural symbol embedded within Shandong's historical and social fabric rather than solely as a handcrafted product. By integrating organological evolution, institutional development, regional differentiation, and individual artistic agency, the findings substantiate established theories in historical musicology and ethnomusicology while contributing new region-specific evidence that deepens understanding of how traditional musical instruments sustain continuity through adaptive transformation.

6. CONCLUSION

The historical development of the Zhudi represents a continuous and adaptive process shaped by technological innovation, institutional transformation, aesthetic evolution, and regional cultural forces. From the prehistoric bone flutes of Jiahu, Xinglongwa, and Hemudu to the refined bamboo constructions of later dynasties, the instrument evolved through successive stages of structural stabilization and acoustic refinement. The transition from bone to bamboo marked a decisive technological breakthrough that enabled improved resonance, tonal clarity, and expressive flexibility. During the Qin-Han period, the integration of the bamboo flute into court ritual and imperial musical systems contributed to its institutional recognition and theoretical contextualization. The Tang-Song era further consolidated its artistic identity through membrane innovation and formalized musical institutions, while the Ming-Qing differentiation between Bang-dizi and Qu-dizi traditions reflected the influence of regional opera cultures on instrumental morphology and stylistic orientation.

In the twentieth century, modernization and institutional reform transformed the Zhudi into a standardized concert instrument. The emergence of solo repertoire, conservatory-based training systems, and structural innovations—such as the

paidi—expanded its technical range and artistic capacity. The clarification of Northern and Southern stylistic schools further strengthened pedagogical structure and performance identity within contemporary practice. Overall, the Zhudi's historical trajectory illustrates a dynamic interaction between material innovation, socio-political

structures, aesthetic transformation, and regional differentiation. The instrument has continually adapted to changing historical contexts while preserving its cultural continuity. As both a musical instrument and a cultural symbol, the Zhudi embodies the historical depth, artistic vitality, and adaptive resilience of Chinese musical civilization.

Acknowledgments: This research project was financially supported by Mahasarakham University. The authors sincerely thank the College of Music, Mahasarakham University, Thailand, for institutional support throughout the research process. Special appreciation is extended to the key informants and cultural practitioners in Shandong for generously sharing their knowledge and facilitating access to archival materials and field documentation. The authors also acknowledge the valuable academic guidance and constructive feedback from colleagues and peer reviewers, which strengthened the scholarly quality of this study.

REFERENCES

- An, Z. Z. (2009). Qilu culture and traditional music heritage in Shandong. Shandong University Press.
- Chen, G. (2025). Archaeological findings of early Chinese wind instruments. Cultural Heritage Press.
- Chen, W. G. (2013). Cultural ecology and regional development of Chinese folk instruments. *Chinese Musicology*, (2), 35–42.
- Culture Industry Editorial Board. (2019). Traditional instrument craftsmanship and sustainable development. *China Culture Industry Journal*, (4), 18–25.
- Deng, H. S. (2020). Organological studies of Chinese bamboo flutes. *Journal of Musical Instruments*, (1), 56–63.
- Geng, T. (2003). Characteristics of 20th-century Chinese dizi solo development. *Journal of Xinghai Conservatory of Music*, (2), 46–48.
- Hai, Y. C. (2012). Modern transformation of Chinese bamboo flute art. Shanghai Music Publishing House.
- Hao, Y. J. (2018). Regional style and cultural connotation of Shandong dizi art. Shandong Literature and Art Publishing House.
- Li, M. (2021). Performance aesthetics of northern and southern dizi traditions. *Journal of Chinese Traditional Music*, (3), 22–30.
- Liang, M. C. (2005). History of Chinese wind instruments in Qin and Han dynasties. People's Music Publishing House.
- Lin, K. R. (2009). Development of dizi membrane technique in Tang and Song dynasties. Lingnan Art Publishing House.
- Liu, X. (2022). Ethnographic fieldwork methods in traditional music research. *Musical Anthropology Review*, (2), 78–85.
- Lu, Y. P. (2019). Craftsmanship and acoustic design of Chinese bamboo flutes. *Journal of Acoustical Studies*, (1), 45–52.
- Ma, Y. (2024). Cultural identity and regional flute schools in China. *International Journal of Musicology*, 12, 112–125.
- Miao, C. (2020). Bamboo symbolism in Chinese civilization. China Social Sciences Press.
- Qian, M. (2017). Transmission of traditional instrumental music in contemporary conservatories. *Chinese Music Education*, (4), 33–40.
- Qu, X. (2021). Performance techniques of the Shandong dizi school. Shandong Culture Press.
- Qu, Y. (2020). Inheritance and innovation of Qilu musical culture. *Shandong Social Sciences*, (6), 99–106.
- Smith, J. A. (2004). The evolution of musical instruments in cross-cultural perspective. Oxford University Press.
- Sun, H. (2023). Globalization and local identity in Chinese instrumental music. *Art of Music*, (4), 48–60.
- Wang, H. T. (2022). Professional practice and stage performance of modern dizi. *Performing Arts Review*, (2), 67–74.
- Yang, M. K. (2023). Instrumental music along the Maritime Silk Road. *Art of Music*, (4), 48–60.
- Yuan, J. F. (2004). Jiahu bone flutes and the origins of Chinese music. Cultural Relics Press.
- Zhang, L. (2016). Court music and folk music interaction in Tang China. *Historical Musicology Journal*, (3), 51–59.

Zhao, S. T. (1986). The art of bamboo flute performance. People's Music Publishing House.