CULTURAL TRANSMISSION AND REGIONAL ADAPTATION OF A MUSICAL INSTRUMENT IN ASIA: DOCUMENTING THE CHING IN THAILAND

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Abstract

This study explores the historical and cultural journey of the ching, a traditional Thai musical instrument, within the broader context of Asian musical cultures. Using archaeological findings, historical documentation, and field interviews, the researchers trace the diffusion and adaptation of the ching from its origins along the Silk Road to its contemporary significance in Thailand. The analysis reveals how the *ching* has become a symbol of national Thai identity, undergoing local transformations that reflect the dynamic interactions between indigenous practices and foreign influences. By examining the *ching*'s role in various regional ensembles and its physical and acoustical variance, this paper highlights the instrument's impact on the preservation of cultural heritage and the ongoing dialogue between tradition and global influences in Thai music. This study contributes to a deeper understanding of the sociocultural dynamics that shape musical identities in a globalized context.

Keywords

Ching, cultural transmission, musical instruments, silk road, Thai music culture

INTRODUCTION

Music as an intangible cultural heritage is transmitted over time, but is shaped by the tangible heritage of the instruments used to play it. One such instrument is the *ching*, a Thai musical instrument that plays a primary role in dictating rhythm within an ensemble. It is present in folk bands across various regions of Thailand. However, this type of instrument can be seen in many countries along the path of the former Silk Road, from Western Asia to Southeast Asia, with similar names, sizes, shapes, and playing styles:

- In Arab cultures, it is referred to as *sagat* (Egypt) and *zills* (Turkey) (Danielson, Marcus, and Reynolds, 2002).
- South Asian cultures, including India, Sri Lanka, and Bangladesh, call it *manjira*, while it is *tingsha* in Nepal and Tibet (Nettl et al., 1998).
- In East Asian cultures, it is the *pengling* (China) and *denshig* (Mongolia) (Lau, 2015).
- Southeast Asian cultures, especially Thailand, Laos, and Cambodia, refer to it as the *ching*, and it is known as the *si* in Myanmar (Miller & Shahriari, 2017).

The appearance of the same instrument in such a variety of cultures raises intriguing questions about how these instruments gained so much prominence in such a wide geographical scope, especially concerning cultural transmission through generations. In all these cultures, the sound of the *ching* acts as a connector, drawing the listener in with its clear and steady rhythm within the composition. The *ching* in Thai musical culture is of particular interest due to its appearance in many significant and sophisticated forms, from the selection of materials for instrument making to its appropriate use in performances by experienced musicians. Besides its significant

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role as a musical instrument, the *ching* also symbolizes and identifies national identity in Thailand. Thus, the researcher was interested in studying the origins and role of the *ching* in Thai musical ensembles, as well as its regional differences and relationship to Asian musical culture. The primary objective was to document how *ching* sounds, styles, and production vary across Thailand and place this within the wider history of *ching* development across Asia.

Literature Review

Historical Appearance of the Ching in Asian Musical Culture

Archaeological findings show that small cymbals have been used in musical cultures throughout history and in multiple geographic locations. In Mesopotamia, ancient musical instruments known as finger cymbals were shaped like small cups, measuring 3.5 cm in height and 6.3 cm in width, made from a copper alloy, dating back to 900–800 BC (Duchesne-Guillemin, 1981; Yalcin Dittgen, 2023). Similar evidence has been found from the Roman Empire in Palestrina, Italy, which is now preserved in the National Museum in London, UK (Habetzeder, 2012; Wardle, 1981). Mosaic murals from ancient Pompeii also show musicians, some possibly from the Cybele cult, moving toward a ceremonial platform, accompanied by a variety of instruments and dancers (Mungari and Wyslucha, 2021). Excavations in Baqa al-Gharbiya, Israel, uncovered medieval copper finger cymbals from the late Byzantine period, measuring 5 cm in width, showcasing the continuity and spread of cymbal use across cultures and periods (Radwan, 2016).

Figure 1: *Ching*-like instruments from (A) Mesopotamian civilization, discovered in Nineveh, Iraq; (B) Roman civilization, discovered in Palestrina, Italy; (C) Greco-Roman civilization, discovered in Provence-Alpes-Côte d'Azur; (D) Ancient India, discovered in Mohenjo-Daro and Harappa. All photographs in the public domain and re-printed with permission.

In China, during the era of the Three Kingdoms, followed by the Sui (AD 589–618) and Tang (AD 618–907) dynasties, there was significant cultural and religious development. Tang murals and terracotta figurines within the Tomb of Tang Li Daojian in Shaanxi, China, depict the Ruan Wu Dance, and the figurines are holding musical instruments (Lawergren, 2017; Whitener and Shu, 2018). In the Indian subcontinent, the Gupta Dynasty (approx. 4th to 6th centuries CE) was marked by significant advancements in art, education, and religion (Uddhav, 2021). Artifacts from this era include sculptures and cave paintings at Ajanta and Aurangabad, showcasing musicians in ancient Indian settings (Pacciolla, 2022). Music in the Southern Indian dynasties, including the Pandya, Chola, and Chera (Kerala), flourished independently, often from as early as the Ashokan period (Hamid, 2019). These dynasties contributed significantly to India's cultural and religious landscape. Architecture such as the Gangaikonda Cholapuram temple shows intricate sculptures of dancers and musicians in devotion to Lord Shiva (Tallotte 2022). These disparate examples of musical culture reached Thailand along the Silk Road, and especially through the Indian-influenced Dvaravati culture, spanning from Myanmar to Thailand (Baumann, 2018; Jamnongsarn, 2022; Johnston, 2010). Artifacts and architectural remnants, particularly in Nakhon Pathom, Ratchaburi, and Suphanburi provinces in Thailand, highlight the influence of these diverse cultures on the region. Thailand has a unique position as a Southeast Asian nation that was never formally colonized. Unlike its neighbors, Thailand

navigated the pressures of Western imperialism through a combination of diplomacy and strategic modernization efforts. This unique historical trajectory has profound implications for understanding the *ching*'s cultural resilience and adaptation. Thailand's sovereignty allowed for a continuous, unbroken transmission of its musical traditions, including the *ching*. Post-colonial theory suggests that non-colonized nations like Thailand maintained and adapted their cultural practices amid external influences (Peleggi, 2007; Winichakul, 1994). This framework helps explain how the *ching* reached Thailand through cross-cultural exchanges facilitated by trade routes such as the Silk Road, influenced local musical culture, and was preserved and transformed through stable domestic support.

THE TRANSCULTURAL JOURNEY OF THE CHING

The *ching*'s presence in various Asian cultures exemplifies the dynamic process of its cultural exchange and adaptation. These interactions involved complex negotiations of identity and cultural autonomy and reflect a broader trend of selective integration of foreign elements into local traditions, serving as an early example of globalization (Reynolds, 1998; Connors, 2007). Nonetheless, Marie Thorsten (2005) argues that the Silk Road has become a nostalgia for globalists expressing a longing for a cosmopolitan home. This longing is for a perceived time when a vast global flow of ideas and things permitted adventure, romance, and knowledge (Boym, 2008). The Silk Road, though often referred to in the singular, denotes multiple networks flourishing from around 100 BCE to the 15th century, facilitating extensive cultural and commercial exchanges between what are now considered Eastern and Western cultures. This exchange is often romanticized in popular narratives, depicting tales of long-buried treasures, transcontinental expeditions, and trade alliances, thereby naturalizing the globalization of the present (Thorsten, 2005). These narratives construct a shared memory that emphasizes common humanity and universalism, suggesting that differences can be celebrated without being exoticized or forgotten (Huyssen, 2003). In this context, studying music within its historical framework offers a lens through which these cultural exchanges can be understood, not just as trade or migration, but as deeply interwoven threads of sociocultural continuity (Millward, 2018). This romanticized view of the Silk Road resonates with the *ching*'s history and presence in other Asian cultures, highlighting its role in fostering a sense of global community and cultural belonging (Boym, 2008). In turn, this reflects the prismatic nature of global memory, which, though heterogeneous, fosters an inclusive sense of identity and cultural continuity.

The transmission of musical instruments along the Silk Road signifies the diffusion and transformation of musical ideas and practices across different cultures. Aside from being tools for entertainment, instruments were symbols of cultural identity, reflecting the interplay of music, politics, and religion in their historical context. For example, Millward (2018) found that lutes disappeared from Indian iconography in c.700 CE, but re-emerged in the courts of Central Asian conquerors, who introduced the instruments as part of a broader cultural influence. The reintroduction sparked the development of hybrid instruments such as the sitar. Similar themes of external introduction of musical instruments have been identified in Chinese and Thai musical cultures (Chang, 1993; Wang, 2023). This process of cultural transmission necessitated their adaptation to fit local musical sensibilities and practices, and to take ownership of the cultural narrative. This illustrates how cultural exchanges were active engagements that reshaped the musical landscapes of the regions they touched. The role of musicians and instrument makers as agents of innovation was pivotal, blending different musical influences to create instruments that met the evolving aesthetic and cultural demands of their societies (Millward, 2018). Naming conventions also indicate attempts to naturalize imported instruments, as Johnson (1996) documented with his analysis of the Japanese Koto. Johnson demonstrated that the naming of musical instruments enables local people to retain a sense of identity and reveals much about the transmission of cultural heritage.

Regional folk identity lies at the core of Thai musical culture. A singular Thai culture was cultivated largely by government initiatives in the twentieth century, which brought together a disparate, albeit related, range of local indigenous practices through a variety of methods (Connors, 2005; Laochockchaikul and Ratnatilaka Na Bhuket, 2024). The narrative has (rightly or wrongly) forged a shared mainstream identity with regional peculiarities. Traditional Thai music is thus an amalgamation of indigenous music from Tai, Khmer, Malay, and countless other ethnic groups, with historic influences from Indo-Chinese merchants and traders (Miller, 2010; Miller and Chonpairot, 1994; Morton and Duriyanga, 1976). Curiously, there is a modern backlash against the global interference of Western, Japanese, and Korean popular music in the development of traditional Thai music, despite the clear impact of global music cultures in creating the modern understanding of traditional Thai music (Chuppunnarat et al, 2020; Zaimi, 2020). Despite these tensions between tradition and global influence, the ongoing dialogue within Thai musical culture illustrates a broader pattern evident in musical traditions worldwide. This reflects a dynamic interplay between maintaining cultural heritage and embracing global influences, a theme central to this study. This paper will explore how similar dynamics are mirrored in the evolution of the *ching* in Thailand, demonstrating its significance as a symbol of broader cultural interconnections and transformations.

RESEARCH METHODOLOGY

For this qualitative investigation, the researcher examined documentary and historical evidence within Thailand and internationally. Field data was collected from interviews with two groups of respondents. The first group was composed of 22 individuals, including national artists, scholars, and musicians, including national artists in the field of Thai music and performing arts, scholars in musicology from higher educational institutions, and artists from the Department of Cultural Promotion, Ministry of Culture. This group comprised experts in traditional Thai music, Southern folk performing arts, ethnomusicology, Thai musical scholarship from various universities, and practitioners from the Department of Fine Arts. The second group was composed of individuals from three traditional Thai musical instrument shops, which included factories that produce and distribute Thai musical instruments. These shops are in Bangkok and external provinces, representing a significant portion of *ching* distributors in the country. All research participants provided informed consent to participate in the study and for their data to be used for the research and related publications. All informants named in this study gave their permission.

At the start of the research process, the researchers prepared a detailed outline on the topic, followed by the collection of relevant documents and data according to the set objectives. The study phase focused on exploring the history and cultural context of Thai music culture, specifically the *ching*, its musical characteristics, and the methodologies of playing the *ching* in Thai orchestras. During the data study phase, data were collected from domestic and international literature, as well as fieldwork through formal and informal interviews, and non-participatory observations. Research equipment used in data collection included a still camera, a motion camera (SJCAM SJ6 Legend), an MP3 audio recorder (SONY Digital Music Player NWZ-B152F), a sound level meter (ZOOM Handy Recorder H4n), a noise level meter (AMMOON AMT-01GB), an electronic scale, and interview forms related to the research objectives. In the data processing phase, the researchers synthesized documentary data, historical evidence, audiovisual materials, interview data, and print media in alignment with the research objectives. This was achieved by analytic induction and typological analysis. All data was validated by source and methodological triangulation. The analysis phase was conducted based on the established research questions and objectives.

The research aimed to achieve two primary objectives. The first objective was to study the *ching* in the context of Asian musical culture. To achieve this objective, the researchers used the documentary data, including historical literature, articles, books, art images, mural paintings, and archaeological artifacts. These materials were analyzed to sequence the periods and create

a timeline of the *ching*'s appearance across different eras both in Thailand and abroad. Additionally, musical data was gathered to understand the cultural context of music in various regions, focusing on the structure, forms, and methodologies of playing the *ching*. The second objective was to examine the *ching* within Thai musical culture pathways. This required an in-depth study of documentary data to explore the cultural context of Thai music, focusing on the elements of the *ching* in traditional and folk music. Field data and interviews were also collected to complement the documentary data. This included studying the history and cultural context of Thai music through photographs and interviews, and analyzing the musical characteristics of the *ching* by examining its playing styles, physical characteristics, and sound qualities.

Results

Ching Styles in the Music Culture of Thailand

Ching occupy a significant role in Thai musical culture. One of the earliest pieces of evidence showcasing ching in Thai music culture is found in the Dvaravati period, represented by a sculpture group of female musicians at a temple base in Khu Bua, Ratchaburi, Thailand. This ensemble, called a mahori band, consists of various traditional instruments, including ching, indicating their historical significance in Thai culture. The Khmer Empire, with its capital at Angkor, also left behind evidence of *ching*'s presence in the region, particularly through architectural and sculptural works. These include the celebrated bas-relief of Shiva Nataraja at Sikhoraphum Temple, Surin, Thailand, where Brahma is shown playing *ching*, highlighting the instrument's ceremonial importance.

During the Sukhothai period, literature and art flourished, and with them, the documentation and portrayal of *ching* in Thai culture. The Tri Phum Phra Ruang, a significant literary work from King Li Thai's reign, mentions *ching* among the instruments in a grand musical ensemble, showcasing its pivotal role in the royal and religious ceremonies. *Ching*'s presence in these periods underscores its versatility and enduring presence in Thai musical traditions. Whether in grand royal ceremonies, religious rituals, or folk performances, the *ching* has played a fundamental role, reflecting the social, religious, and cultural values of the Thai people over centuries.

During the Ayutthaya Kingdom, the *ching* held a vibrant role within the musical tapestry of Thailand. Literary evidence from Nicolas Gervaise, a French Jesuit, in his description of Siamese lifestyle, highlights the lively boat races accompanied by music and rhythm from various instruments including the *ching*, creating a festive atmosphere along the rivers. This account underlines the integration of ching into the social and ceremonial life of Ayutthaya, showcasing its importance in entertainment and cultural expressions. Another literary piece from the late Ayutthaya period, the *Praise of the Mahori Teachers*, delineates an ensemble including *ching* among instruments in a ceremonial context, suggesting its significance in formal and ritualistic settings. Latterly, in the Rattanakosin era, wall paintings from Wat Phra Si Rattana Satsadaram (Wat Phra Kaew), dating back to the late 19th century, depict various scenes of mythical narratives and daily life activities, incorporating *ching* in the portrayal of musical ensembles. These artworks reflect the continuity and evolution of the *ching*'s role in Thai culture.

The spread of *ching* across various regions of Thailand illustrates its adaptability and integration into local musical traditions. In Northern Thailand, the instrument has been incorporated into ensembles like the *klong song na* and *mahori*, serving to maintain rhythm and enhance the musical texture with its distinctive sound. In Lanna (Northern Thailand), the instrument similar to *ching*, known as *sing*, has been traditionally used in ensembles such as *klong sing mong* (drums, *sing*, and gongs ensemble). Over time, *sing* found its place in modern ensembles, blending with other regional instruments to create a unique northern Thai musical identity. From historical accounts and artistic representations, it is evident that the *ching* has been an integral part of Thailand's musical heritage across various eras and regions. The sizes of

northern Thai *ching* range from 5.5 to 7 cm in diameter, with weights ranging from 156 to 512 g (Figure 2a). There are three types of dome shapes: (1) half-circle dome: D1.1, D1.5; (2) high bowl-shaped dome: D1.2, D1.3; (3) wide-brimmed hat dome: D1.4, D1.6.

Code	Weight (g)	Diameter (cm)
D1.1	512	7
D1.2	255	5.5
D1.3	291	5.5
D1.4	261	6.3
D1.5	339	6
D1.6	156	5.5

Figure 2a: Table showing the size and form of northern Thai Ching.

From the data on northern cymbals' physical characteristics: Northeastern Thai music can be divided into two areas: northern and southern Isan. In Nong Phok District, Roi Et Province, Mr. Songsak Prathumsin stated that in northern Isan, cymbals are not used with traditional Isan music, but are instead used in Luk Thung Isan bands and central Thai Luk Thung music more often. This interview led the researcher to Phlap Phla Chai District, Buriram Province, where Mr. Phiphat Sudsiang, who preserves southern Isan music culture, manages the Pah Ploy Mor Isan ensemble. Mr. Phiphat Sudsiang mentioned that cymbals are used in two ensembles: the Mor Isan ensemble and the Kantrem ensemble. The Mor Isan ensemble, used for listening and processions, includes the Krapue (fretted floor zither), Japuey (small cymbals), Tru (fiddle), Sakaur (drum), Pi Sai, *ching*, clash cymbals, and Krap. The Kantrem ensemble, popular in auspicious ceremonies and processions, consists of the Pa Yor O (a type of oboe), Tru (fiddle), Sokol (a double-headed drum), singers, *ching*, clash cymbals, and Krap. The researcher collected examples of cymbals used in the Mor Isan ensemble, totaling two pairs (Figure 2b). There are two types of dome shapes: (1) high-domed bowl: E1.1; (2) wide-brimmed hat dome: E1.2.

Code	Weight (g)	Diameter (cm)
E1.1	326	6.4
E1.2	287	6.3

Figure 2b: Table showing the size and form of Northeastern Thai Ching.

In Southern Thai music, during field research, it was found that Mr. Khwan Tuan Yoke, a national artist in the field of performing arts (Southern folk music), uses cymbals in various musical ensembles, including Song Baok, Nora, Shadow Play, and Jungle Likay. Song Baok uses cymbals primarily for rhythm, accompanying spoken poetry and different poetic structures. Nora and Shadow Play ensembles include a pair of cymbals, a Tuk drum, Mohng (a pair of small cymbals), *ching*, and Pi Ton (a type of flute). However, modern Shadow Play has incorporated Western musical instruments, creating differences between Nora and Shadow Play music. Jungle Likay consists of Mohng (a pair of small cymbals), *ching*, Pi Yot (a type of flute), and Rammana dance. The researcher collected samples of *ching* used in Song Baok and Nora performance music, totaling five pairs (Figure 3a). From the physical characteristics of cymbals in the Southern region, there are two types of dome shapes: (1) wide-brimmed hat dome: F1.2; (2) thick-brimmed hat dome: F1.1, F1.3, F1.4.

Code	Weight (g)	Diameter (cm)
F1.1	427	7.3
F1.2	212	5.4
F1.3	328	6.5
F1.4	358	6.7

Figure 3a: Table showing the size and form of Southern Thai Ching.

The use of *ching* in the local music of the Central region is widespread, used in performances, songs, and ceremonies. *Ching* plays a crucial role in rhythm and timing for performers, including in the piphat ensemble, string instrument ensemble, and Mor lam music group. The *ching* in central Thai music ensembles has a clear role: to guide the main rhythm in a song. According to an interview with Ms. Tasanee Khunthong, a national artist in the field of performing arts, there are two types of *ching*: large *ching* used with the piphat ensemble for a louder sound and regular-sized *ching* used with the string instrument ensemble and Mor lam music group. The researcher collected samples of *ching* used in performances from Wichian Kerdphol and the Luang Pradit Phairoh Foundation, totaling 13 pairs (Figure 3c). There were five types of dome shapes: (1) half-circle curve dome: G2.3; (2) wide-brimmed hat dome: G2.5; (3) thick-brimmed hat dome: G1.1, G1.2, G1.3, G2.1, G2.2, G2.4, G2.8, G2.9; (4) small cymbal-like dome: G2.7; (5) low mound dome: G2.6.

Code	Weight (g)	Diameter (cm)
G1.1	328	6.5
G1.2	313	6.5
G1.3	299	6.5
G2.1	404	6.5
G2.2	250	5.5
G2.3	225	5.0
G2.4	445	7.5
G2.5	173	5.5
G2.6	227	6.5
G2.7	69	5.4
G2.8	278	6.5
G2.9	165	5.5

Figure 3b: Table showing the size and form of Central Thai Ching.

The following figures offer a summary of the different physical characteristics, weights, and sizes of *ching* across Thailand. Examples of the dome shapes are also provided in Figure 4b.

Dome Type	*Ching* Codes
Half-circle curve dome	D1.1, D1.5, G2.3
High bowl-shaped dome	D1.2, D1.3, E1.1
Wide-brimmed hat dome	D1.4, D1.6, E1.2, F1.2, G2.5
Thick-brimmed hat dome	F1.1, F1.3, F1.4, F2.1, G1.1, G1.2, G1.3, G2.1, G2.2, G2.4, G2.8, G2.9
Small cymbal-like dome	G2.7
Low mound dome	G2.6

Figure 3c: Table showing physical characteristics of cymbal domes.

Region	**Lightest weight (g)**	**Heaviest weight (g)**	**Smallest diameter (cm)**	**Largest diameter (cm)**
Northern	156	512	5.5	7
Northeastern	287	326	6.3	6.4
Southern	212	358	5.4	7.3
Central	69	445	5	7.5

Figure 4a: Table showing weights and sizes of ching across Thailand.

Figure 4b. Dome shapes of ching. (A) Half-circle curve dome (Code D1.1); (B) high bowl-shaped dome (Code D1.2); (C) wide-brimmed hat dome (Code D1.4); (D) thick-brimmed hat dome (Code F1.1); (E) small cymbal-like dome (Code G2.7); (F) low mound dome (Code G2.6).

PLAYING TECHNIQUES

The method of playing the *ching* involves specific starting and sitting positions. The player sits in a cross-legged position or with legs folded back, maintaining a straight posture. The right hand grips the string in a pinching manner with the thumb and index finger, holding the cymbal facing down to control its movement. The left hand also grips the string with the thumb and index finger, but in a grasping manner, holding the cymbal facing up for stability. The cymbals

are held at chest level or at the level of the Thai flute's mouthpiece, with the right hand slightly above the left by about a hand's width. Players can switch hand positions based on comfort.

Striking the *ching* involves three distinct techniques. For the *ching* sound, the right hand controls the top cymbal, striking the edge of the lower cymbal at about halfway to produce a resonant sound, allowing for a slight rebound. The *chap* sound is created by pressing the top cymbal onto the lower one fully or halfway without a forceful impact, closing the middle, ring, and little fingers of the right hand to dampen the sound. For rolling the *ching*, the cymbals are kept an inch apart, with the right hand striking them rapidly and consistently to create a rolling sound effect.

Physical Characteristics and Production of Ching

The researcher conducted fieldwork to collect the processes involved in making ching, which can be divided into two types: hand-hammered and cast. The production of hand-hammered *ching* at Ban Noen Kong Wong, Pran Nok, Bangkok, involves several steps. Preparation begins with arranging the equipment and materials necessary for melting and casting brass, including the preparation of coal and the furnace. The casting process involves pouring molten brass into molds lubricated with motor oil to prevent sticking. Once cast, the brass is hammered into sheets to form the *ching*. Subsequent steps include lathing, tuning, and polishing, where rough polishing and lathing of both exterior and interior surfaces take place, followed by tuning and preparing the *ching* for final polishing with a wet stone. The physical characteristics of the hand-hammered *ching* produced at Ban Noen Kong Wong include weights and diameters as follows: C1.1 weighs 394 g with a diameter of 6.7 cm, C1.2 weighs 438 g with a diameter of 6.8 cm, and C1.3 weighs 564 g with a diameter of 7 cm.

The production of cast *ching* at Boonruen Thai Musical Instrument Shop is a detailed and traditional process. It begins with molding, where special clay is prepared along with molding frames and a water tank. The melting process, which takes about 4–6 h, involves melting copper scraps and tin in specified proportions. Once melted, the brass liquid is poured into molds. The lathing and tuning phases rely heavily on the artisan's expertise, using a standard model for tuning comparison and alternating lathing to achieve the desired sound and size. The final step is polishing and finishing, where the *ching* is polished to a glossy finish before packaging for sale. The physical characteristics of brass cast *ching* from Boonruen Thai Musical Instruments are as follows: B1.1 weighs 135 g with a diameter of 5 cm, B1.2 weighs 138 g with a diameter of 5.5 cm, and B1.3 weighs 183 g with a diameter of 6.2 cm. Additionally, the shop produces another type of *ching*, known as *ching long hin*, with two distinct formulae. The first formula includes three sizes: B2.1 weighs 282 g with a diameter of 5.5 cm, B2.2 weighs 424 g with a diameter of 6.5 cm, and B2.3 weighs 690 g with a diameter of 7.5 cm. The second formula comprises two sizes: B3.1 weighs 290 g with a diameter of 5.1 cm and B3.2 weighs 358 g with a diameter of 6.5 cm. Cast *ching* from a third shop, Malai Thai Musical Instruments, includes Type 1 with A1.2 weighing 303 g and a diameter of 6.3 cm, and Type 2 A1.3 with the same specifications as B3.2.

Sound Characteristics of Produced Ching

The researchers analyzed the sound wave frequencies and musical characteristics of the *ching* using the Audacity program: Fast Fourier Transform (FFT). The frequencies were compared with those of traditional Thai musical instruments and Western musical instruments, detailed in Figure 5.

Code	Sound frequency (Hz)	Sound frequency of Ranad Thum Lek (Thai Musical Instrument Set, Office of Music, Department of Fine Arts) (Hz)		Sound frequency of international musical instrument: Piano (Hz)	
D1.1	10365	Mi 10	9919.2	D#9	9956.20
D1.2	5340	Mi 9	4959.6	E8	5274.07
D1.3	10646	Mi 10	9919.2	E9	10548.47

D1.4	3343	La 8	3337.6	G#7	3322.44
D1.5	4501	Re 9	4492.0	C#8	4434.93
D1.6	3769	Ti 8	3685.0	A#7	3729.31
E1.1	3875	Ti 8	3685.0	B7	3951.07
E1.2	5249	Mi 9	4959.6	E8	5274.07
F1.1	3949	Ti 8	3685.0	B7	3951.07
F1.2	5184	Mi 9	4959.6	E8	5274.07
F1.3	10207	Mi 10	9919.2	D#9	9956.20
F1.4	3989	Ti 8	3685.0	B7	3951.07
G1.1	3492	La 8	3337.6	G#7	3322.44
G1.2	3665	Ti 8	3685.0	A7	3520.00
G1.3	3490	La 8	3337.6	G#7	3322.44
G2.1	4197	Do 9	4068.5	C8	4186.06
G2.2	4866	Re 9	4492.0	D#8	4978.05
G2.3	8277	Do 10	8089.6	C9	8372.12
G2.4	3866	Ti 8	3685.0	B7	3951.07
G2.5	4886	Re 9	4492.0	D#8	4978.05
G2.6	3720	Ti 8	3685.0	A#7	3729.31
G2.7	3739	Ti 8	3685.0	A#7	3729.31
G2.8	8773	Do 10	8089.6	C9	8372.12
G2.9	11159	Fa 10	10959.8	E9	10548.23

Figure 5: Frequency values of *ching* in comparison to some traditional Thai and Western musical instruments.

The analysis showed *ching* as a high-frequency instrument, placing its sound levels (keys) mainly in the octaves 7, 8, 9, and 10, both in Thai and Western music standards. For Thai music, the most frequent sound ranges are Ti (eight times) and La (three times) in octave 8; Re (three times), Do (once), and Mi (three times) in octave 9; and Mi (three times), Fa (once), and Do (twice) in octave 10. The most common frequency range found is Ti 8: 3685.0 to Do 9: 4068.5. For Western music, the frequencies include G# (three times) and A (once) in octave 7, A# (three times), and B (four times); octave 8 includes C (once), C# (once), D# (twice), and E (three times); octave 9 comprises C (twice), D# (twice), and E (twice). The most common range is G#7: 3322.44 to B7: 3951.07. This frequency data reflects the diverse keys used in Thai music ensembles, highlighting the *ching*'s sound characteristics. Figure 6 demonstrates the spectrum plot in Audacity for frequency analysis of *ching*.

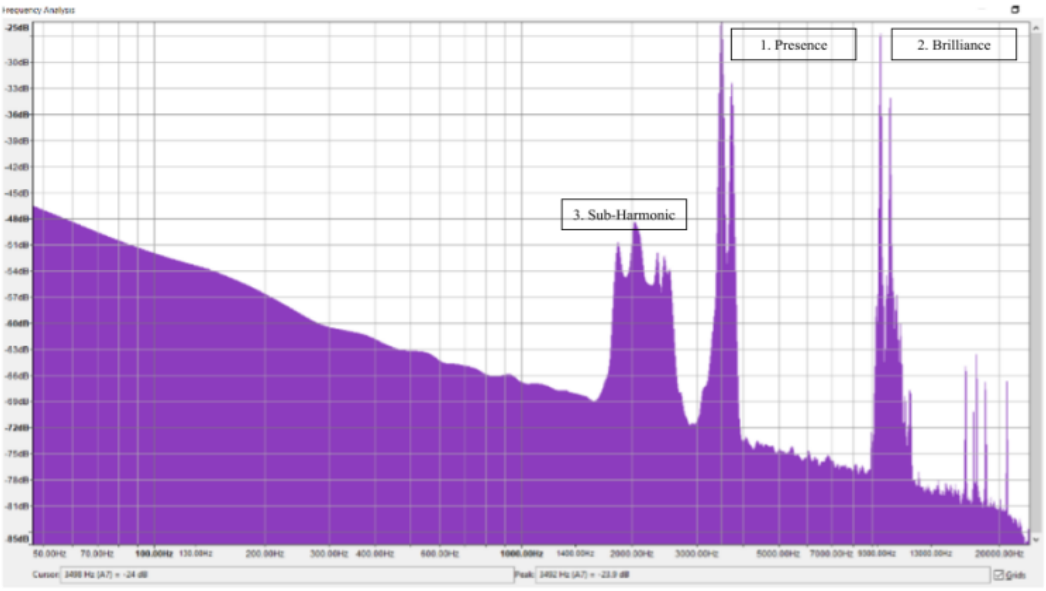

Figure 6: The frequency graph for the *ching*. (Produced by the authors).

The highest frequency zone in the graph, called presence, indicates the intensity and key. The second highest frequency zone, called brilliance, signifies the brightness of the sound (the level of brightness varies with the gap between the two frequency peaks). The third zone, at half the size of the highest frequency zone, called sub-harmonic, strengthens the primary sound, indicating the sound's density and strength. Thus, the sound of *ching* possesses resonance and brightness, yet is also robust and dense.

CONCLUSIONS

The researchers identified musical elements of *ching* in Asia through archaeological and historical evidence, finding that there are four shapes and sizes of domes: high triangular domes, low mounded domes, high cupped domes, and semi-circular curved domes. Three playing grip styles were identified: the first style involves holding the *ching* sideways; the second has one face down and one up, alternating between left and right hands; the third involves holding both faces up. Ensemble types and music genres can be divided into ceremonial music, theatrical music, and entertainment music. Analysis of murals, sculptures, and architectural works shows that *ching* is a type of musical instrument whose origins cannot be definitively traced. However, evidence suggests the *ching* has a long history and widespread presence around the world.

Research into the presence of *ching* in Thai culture suggests that it first emerged in the Dvaravati period, evident in sculptures and base decorations of stupas in Khu Bua, Ratchaburi Province, reflecting ancient ensembles, and in bas-relief sculptures in Sikhoraphum, Surin Province, showcasing assemblies of deities from the Khmer Empire period. These art pieces, found in religious sites, undoubtedly connect to religion. Physical characteristics of *ching* in Thailand show six types of dome shapes and sizes: (1) semi-circular dome, (2) high cupped dome, (3) flared brim dome, (4) thick brim dome, (5) small cymbal-like dome, (6) low mounded dome, with weights ranging from 69 to 512 g and diameters from 5 to 7.5 cm. Analysis of notes identifies two types of rhythms: regular and special. Regular rhythms allow the *ching* to clearly dictate the song's rhythm, aiding instruments in smooth melody progression. Special rhythms are divided into instrumental and vocal accompaniments. Two production methods were identified: hand-forging and casting. Analyzing frequency and musical properties using Audacity: FFT, it was found that the most common frequencies in Thai pitches range from Ti 8: 3685.0 to Do9: 4068.5 and international pitches from G#7: 3322.44 to B7: 3951.07. The analysis shows characteristics of *ching* sound through (1) high frequency, indicating resonance; (2) brightness, reflecting vibrancy and clarity; and (3) depth, giving the sound strength and fullness.

Given its portability, the *ching*'s presence across various regions is not surprising; it is often found in murals, sculptures, and religious and archaeological sites, indicating its connection with beliefs and religious ceremonies. This aligns with iconographic concepts, enabling the interpretation of art content that corresponds with global history and the origins of the *ching* and to the research of Thorsten (2005). Musical instruments like the *ching* function as artifacts of cultural memory, embodying the diversity and interconnectedness of Silk Road societies. The widespread distribution of the *ching* and its variants highlights a complex web of cultural interactions, resonating with the idea of a cosmopolitan nostalgia within global history, where shared cultural elements like the *ching* underscore a collective human experience across geographical and temporal divides (Boym, 2008).

Interviews and fieldwork revealed that the *ching*, traditionally central Thai, was adopted in the north through *piphat* ensembles, valued for its beautiful and bright sound. This pattern is not unique to northern music but is also found in Isan and southern music, where the *ching* does not play a primary rhythmic role but enhances the ensemble's sound quality. Yet, the *ching* remains indispensable for achieving the desired musical effect. This observation led to applying the theory of cultural anthropology to explain the adaptation process that becomes part of one's culture. This adaptive process is reflective of the dynamic nature of cultural preservation and

innovation described by Connors (2007), who emphasized how local traditions are continually redefined through the selective assimilation of foreign elements. The *ching*'s integration into varied regional musical practices in Thailand exemplifies how traditional instruments are actively recontextualized within new cultural settings.

In central Thai music, the *ching* has a defined role, systematically dictating the rhythm, highlighting its significance in the ensemble. This functional specificity contrasts with its use in other regions, showing how the ching has been adapted to different musical contexts. This variation in usage also parallels findings by Reynolds (1998), who argues that the movement of musical instruments across cultures often results in their functional and symbolic transformation. Such adaptability is key to their sustained relevance (Millward, 2018).

Interestingly, Miller (2010) demonstrated that consistent use of the *ching* in local ensembles ensures the retention of Thai identity amid the appropriation of Chinese musical elements. As instruments such as small two-headed wooden Chinese drums or Chinese-style gongs became incorporated into *mahori* or *khruangsai* ensembles (local Thai musical genres), "Thai" percussion instruments such as the *ching* and *chap lek* (larger and flatter cymbals) helped to maintain a Thai sound. This example demonstrates how the *ching*, despite being a foreign import into Thai culture, has been adopted, adapted, and elevated as a symbol of national musical culture. This supports Millward's (2018) conclusions that cultural exchange reshaped regional musical landscapes as instruments evolved to become local representations of the original imports and grew to become recognized as a distinct feature of local music identity. This is clearly true of the ching, with its many local variances, affirming Huyssen's (2003) notion of modernity's quest to reconcile the local with the global through the threads of cultural memory that bind disparate communities.

SUGGESTIONS

From this investigation, the researchers wish to make a few suggestions. First, *ching* production should be promoted and developed to achieve high-quality sound while being environmentally conscious, using new technologies or innovations to save energy and time due to the high material cost and lengthy production process. Furthermore, transmission and revival of playing techniques should be encouraged to accompany singing in theaters, which requires experienced musicians, who are dwindling in number. Regarding future research, the authors feel there is a gap regarding teaching methodologies and song forms where the *ching* plays a crucial role in rhythm control, reflecting the transmission theories and methodologies of teachers. Research into the initial mixing steps for *ching* production in industrial settings could also lead to process improvements and the development of tools for producing higher-quality sound.

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