

Re-Actualization Balinese Gamelan Harmony¹ for Renewal Knowledge of the Balinese Music

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Abstract

Balinese music has a variety of gamelan that develops in the community. Balinese gamelan is a central object in the development of Balinese musical knowledge. One of the most problematic is the harmony system. In the context of Balinese music knowledge, the harmony system is an element that is often discussed its existence. The 'harmony system' has been recognized through the dualistic concept. This concept is the source of the technique for playing the Balinese Gamelan. Knowledge of the harmony system with this dualistic concept is based on the object of research by Gamelan Gong Kebyar. Gamelan Gong Kebyar is indeed very closely related to the dualistic system. However, this system is not relevant to several other Balinese Gamelan, one of which is the Gamelan Gambang. Therefore, knowledge of the harmony system in Balinese music needs to be updated. This update is an actualization of knowledge about gamelan harmony. The problems discussed in this article are what is Balinese Gamelan harmony, what is the roles of Balinese Gamelan harmony and the concept of Balinese musical harmony. This research uses a mix method, namely qualitative and quantitative methods. Musicology approach as a qualitative method while sound physics as a quantitative method.

Keywords: *actualization, harmony, gamelan, karawitan*

Re-aktualisasi Harmoni Gamelan Bali untuk Pembaruan Pengetahuan Musik Bali

Abstrak

Karawitan Bali memiliki ragam gamelan yang berkembang di masyarakat. Gamelan Bali merupakan objek sentral dalam pengembangan pengetahuan karawitan Bali. Salah satu yang paling bermasalah adalah sistem harmoni. Dalam konteks pengetahuan karawitan Bali, sistem harmoni merupakan unsur yang sering dibicarakan keberadaannya. Sistem harmoni terepresentasi melalui konsep dualistik. Konsep inilah yang menjadi sumber teknik memainkan Gamelan Bali pada umumnya. Pengetahuan sistem harmoni dengan konsep dualistik ini berdasarkan objek penelitian Gamelan Gong Kebyar. Gamelan Gong Kebyar memang sangat erat kaitannya dengan sistem dualistik. Namun sistem ini tidak relevan dengan beberapa Gamelan Bali lainnya, salah satunya Gamelan Gambang. Oleh karena itu, pengetahuan tentang sistem harmoni dalam karawitan Bali perlu dimutakhirkan. Pembaruan ini merupakan aktualisasi pengetahuan tentang harmoni gamelan. Permasalahan yang dibahas dalam artikel ini adalah apa yang dimaksud dengan harmoni Gamelan Bali, batasan harmoni Gamelan Bali dan model harmoni secara musikal gamelan Bali. Penelitian ini menggunakan mixmethode, yaitu metode kualitatif dan kuantitatif. Pendekatan musikologi sebagai metode kualitatif sedangkan fisika bunyi sebagai metode kuantitatif.

Kata kunci: *aktualisasi, harmoni, gamelan, karawitan*

¹ The term harmony in this study does not refer to the notion of harmony in western music. This term is indeed sometimes used by ethnomusicology researchers to refer to several game models that produce harmony, so that one of the implementation of harmony in good musical instruments is closely related to playing techniques.

INTRODUCTION

The tuning system dramatically influences the playing system, which eventually becomes the essential harmony in the concept of the Balinese Gamelan tradition. The tunes are deliberately tuned to create different frequencies for the same tone in the Gamelan - this is known as the *ngumbang ngisep* concept in the Balinese Gamelan "tone" system. *Ngumbang ngisep* is a concept that creates variations in playing techniques, which ultimately represent the harmony in the Balinese Gamelan. Sugiarta stated that harmony - which has the same position as melody, rhythm, and frequency - is the result of sound modification done by artists (Sugiarta, 2015). Therefore, the modification of sound through frequency in the tuning system has an important aspect in the context of Balinese Gamelan harmony.

The Balinese Gamelan tradition gives freedom to each Gamelan maker (Pande Gamelan) to interpret his taste in tuning the Gamelan. Other Pande has their methods to making tone (Tenzer, 2011). This tradition causes the harmonization system between one and another Gamelan to diverse, both between the same type of Gamelan (gong kebyar with the other gong kebyar) and the different types (gong kebyar with other Gamelan: *Samara Pagulingan, Leluangan, Bebarongan, Gambang*). So, this is causing the theory of harmony to be difficult to explain in musical practice. However, this is the special features of karawitan, including Balinese Gamelan. The practice of harmony is usually closely related to playing techniques, so that the diversity of Gamelan results in a variety of techniques, that also at the same time, its results in a diversity of the concept of harmony.

At present, the harmony in the context of Balinese Gamelan is explained through studies of the Gamelan Gong Kebyar, so that other ancient Gamelans such as Gambang which has self-harmonized characteristics are not formulated in detail, ultimately people only know about the Balinese Gamelan harmony system represented by the Gamelan Gong Kebyar. Therefore, it is very important to update knowledge of Balinese Gamelan harmony by observing and researching the Gamelan Gambang. There is a gap between the knowledge of harmony contained in some literature and the practices of several types of Balinese Gamelan, one of which is the Gamelan Gambang. So that, it is necessary to formulate the concept and theory of harmony, which is applied by the musicians in the daily Gamelan Gambang practice.

Gamelan Gambang is one type of Balinese Gamelan that has not been widely discussed and described regarding the study of text² in detail. This Gamelan is said to be one of the sacred Gamelan, usually used to accompany religious ceremonies in Bali (Tenzer, 2011). Based on its position as a sacred art, it is very natural that ethnomusicological discussions have colored many writings on

² The study of the text in question is research that discusses explicitly tone, musical organization, tunings, *patets*, and even the *Gamelan Gambang* harmony system.

Gamelan Gambang. Referring to the researcher's experience of listening and watching, the Gamelan Gambang is a typical Gamelan with complex systems and techniques in Balinese Gamelan vocabulary. Because of its complexity, Gamelan Gambang should have had systematic musical systems. Even so, there are not many reviews about techniques and systems - including the harmony system in the Gamelan Gambang - which can be read, understood as a basis for playing practice and the development of sciences. Therefore, it is important to conduct research that focuses on the harmony system.

Based on the above background, the formulation of the questions is as follows: What is called harmony in Balinese musical instruments? What are the limitations of the science of harmony in Balinese Gamelan? How is the concept of the Balinese musical harmony system found in the Gamelan Gambang? The purposes of this study are such as: to formulate an appropriate definition of harmony within the framework of Balinese musical knowledge; Formulating the boundaries of harmony in Balinese musicals; Finding a concept about the Harmony system in Balinese musicals.

MATERIALS AND METHOD

The research in the form of Re-Actualization of Balinese Gamelan Harmony for the Renewal of Balinese Music Knowledge is classified as a combination of qualitative and quantitative research. Qualitatively, this research uses the descriptive-analytical method which aims to obtain data about the basic concepts of harmony. The approach used in studying these objects is musicology. In Balinese music, the musicological approach is closely related to musical elements: melody, rhythm, dynamics, harmony, tempo, and playing techniques. These elements are analyzed descriptively based on empirical data in the field. Therefore, the main data in this study, which is about harmony, is not seen based on the theory of western music harmony. However, it is analyzed based on musical instruments because the harmony of western music in practice is different from that of karawitan.

Musicologically, the harmony system is closely related to the tones' high and low sound frequencies parallel between one tone to another. This frequency is analyzed quantitatively based on the sound physics approach. According to the researcher, the musicology approach aims to solve the problems of playing techniques, which are an important part of the term in defining harmony. This term includes a playing system that is the basis for various playing techniques contained in the Gamelan Gambang, the scale system, and the tuning system. A physics approach that aims to obtain measurements of the frequency of tones available in the Gamelan Gambang. This frequency becomes the basic foundation in determining the ideal combination of tones to be categorized as a Balinese Gamelan

harmony system. Valid data will support the two approaches above to get the correct conclusions.

Research Flowchart

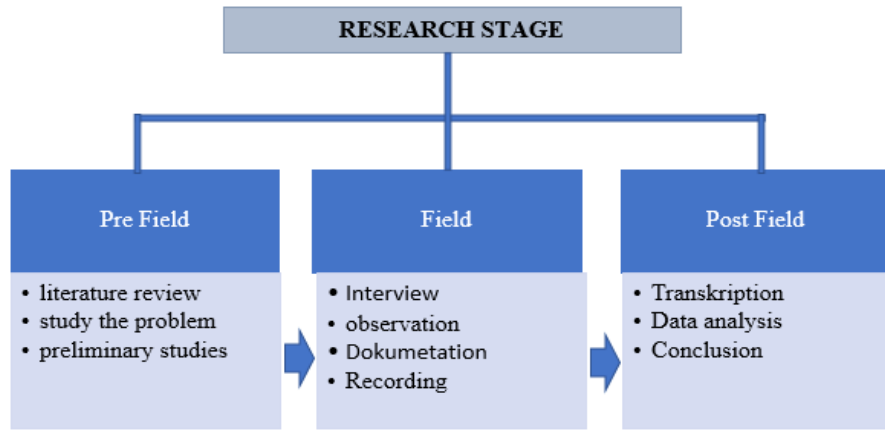


Chart 1. Research Stages

FINDINGS AND RESULTS

RESULTS



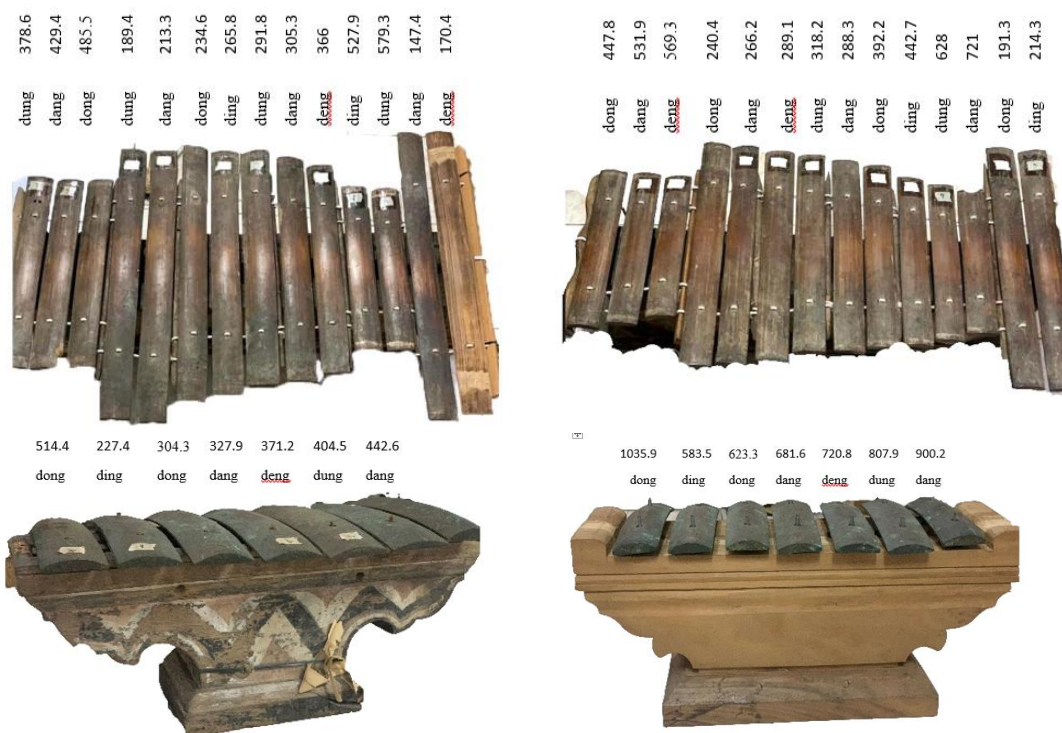


Figure 1. Gamelan Gambang instrumens
Source: Author, 10 Agustus 2020

Table 1. The Information of Figure 1

No	Name	Description
1.	Gambang <i>pengenter</i>	Gambang <i>Pengenter</i> is an instrument that functions to play the ornamentation patterns of each song and has a pitch and low pitch based on the frequency of each note.
2.	Gambang <i>Pemero</i>	The <i>Gambang pemo</i> is one of the four gambang that functions as an instrument that plays the ornamentation patterns of each song and has a different tone frequency from other Gambang.
3.	Gambang <i>Penyelat</i>	The Gambang <i>penyelet</i> is one of the four xylophones, which also functions as an instrument that plays the ornamentation patterns of each song. The xylophone diver also has a different pitch than the other four xylophones.
4.	Gambang <i>Pemetit</i>	The Gambang <i>pemetit</i> is one of the four xylophones that plays the ornamentation melody patterns on each song and also has a different pitch tone from the other four xylophones.
5.	Gangsa Gede	Gangsa gede is an instrument that functions to play a song frame in each song and has a different pitch than the xylophone instrument (Schaareman, 1980).
6.	Gangsa Cenic	Gangsa cenik is an instrument that also functions to play the melodic framework of each song (Schaareman, 1980).

DISCUSSION

A. Harmony sistem in the Gamelan Gambang

Harmony is not only a matter of music but also philosophy. Especially in western music, harmony has been established as a science, although previously, there was a dynamic understanding of harmony, especially before the seventeenth century. Gouk clearly states that harmony is about music, body and soul, and the universe (Gouk, 2008). Finally, after the seventeenth century, the harmony of music's harmony regulates the combination of tones, or a collection of tones played together (Prier SJ, 1989). In the discussion on the harmony of Balinese Gamelan, it is analyzed from the understanding that harmony is a combination of notes that are played simultaneously.

The gambang harmony system is different from the other Balinese Gamelan systems (Ardana, 2020). In particular, the gambang has its self harmony system. See Figure 1, the pattern of laying out the tone arrangements on the Gambang above, considering the concept of harmonization with good sound quality, produced when two notes are struck together. Each Gambang instrument has a tone position that refers to the concept of tonal harmonization by considering the aesthetic aspects of the sound. The pitch distance of each instrument is adjusted by considering the aspect of harmony so that when it is played it will immediately provide chords, kwints, and notes. The harmony playing pattern on the Gambang is supported by the Gambang bat (*panggul*) which has been set in such a way, all the Gambang *panggul* has a different distance between the right and the left *panggul* (Mariyana, 2019). The following is a picture of the pelvis for playing the Gambang instrument:



Figure 2. The *panggul* Gamelan *Gambang* instrumens
Source: Mariana, 2020

The *panggul* (instrument) above is played with two hands that are played equally between the right and left hands. Referring to the shape of the *panggul*, every stroke of the right or left hand will always sound two tones. Therefore, the two notes are simply applied as harmony. The purpose of the two notes being played simultaneously is also strongly influenced by the Gamelan Gambang tuning system which is different from Balinese Gamelan in general. The following is a recapitulation of the Gamelan Gambang tuning system which is recapitulated from Figure 1:

Table 2. Recapitulation of the frequency of each Gambang instrument with a pair system

Instrumen/Tungguhan							
Pengenter		Pemero		Penyelat		Pemetit	
Hertz	Nada	Hertz	Nada	Hertz	Nada	Hertz	Nada
108.7	deng						
117.8	ding	117	dong				
125.9	dong	125.5	ding				
132.9	dang	138.5	dong				
142.2	dung	150.8	dang	147.4	dang		
149.2	dang	166.5	deng	170.4	deng		
165.5	dong	192.3	dung	189.4	dung		
189.5	deng	222.8	dang	213.3	dang	191.3	Dong
217.8	ding	231.7	dong	234.6	dong	214.3	Ding
237.3	dong	255.5	ding	265.8	ding	240.4	Dong
255.6	dang	266.7	dong	291.8	dong	266.2	Dang
304.7	dung	305.2	dang	305.3	dang	288.3	Dang
355.7	dang	354.5	deng	366.0	deng	289.1	Deng
392.4	dong	389.0	dung	378.6	dung	318.2	Dung
		426.3	dang	429.4	dang	392.2	Dong
				485.3	dong	442.7	Ding
				527.3	ding	447.8	Dong
				579.3	dong	531.9	Dang
						569.3	Deng
						628.0	Dung
						721.0	Dang

Information

The colors symbolize the notes and the game system. The same color in one instrument category means notes of different frequencies are being struck simultaneously. The blue color is struck together with the blue and so on for the column on the other instruments.

The data above is a recapitulation of the frequency of each tone on each xylophone instrument. Each instrument plays two notes simultaneously (marked with the same color on each instrument). This playing technique has simply shown

that every stroke always plays two notes with different frequencies. In the table, although playing the same tone, theoretically, it does not mean that the same note is an octave. For example, for example, the *ding* tone column (117.8 hertz) is always hit simultaneously with the *ding* tone (217.8). Between the first *ding* note (117.8 hertz) and the second *ding* (217.8) is not an octave tone, such as do with high do. Therefore, this simultaneous play will significantly produce sound characteristics which in the Balinese musical concept is called harmony. This playing model is different from Balinese Gamelan in general so that the Gamelan Gambang has its own uniqueness. The following shows the differences in frequencies based on the same tone (*ding* tone with *ding*, *dong* with *dong*, and so on) but has different frequencies.

Table 3. Recapitulation of the same high and low notes on each Gambang instrument

Nada	<i>Pengenter</i>	<i>Pemero</i>	<i>Penyelat</i>	<i>Pemetit</i>
Ding	117.8	125.5	265.8	214.3
Dong	125.9	138.5	234.6	191.3
Deng	108.7	166.5	170.4	289.1
Dung	142.2	192.3	189.4	318.2
Dang	132.9	150.8	213.4	266.2
Ding	217.8	255.5	527.3	442.7
Dong	165.4	138.5	291.0	240.0
Deng	189.5	354.5	366.0	569.3
Dung	304.7	389.0	378.6	628.0
Dang	255.6	222.8	305.3	288.3
Ding				
Dong	237.3	231.7	485.3	372.2
Deng	-			
Dung			378.6	
Dang	255.6	305.2	429.4	531.9
ding				
dong	392.4	266.7	579.3	447.8
deng				
dung				
dang	355.7	426.3		721.0

The data in the table shows that none of the notes contained in the xylophone instrument are the same. This difference is part of the very dynamic Gambang concept, meaning that each Gamelan Gambang has its own frequency size without having to follow other Gambang. This difference in frequency, when played, will harmonize each playing. This is also a distinct difference from other Balinese Gamelan.

As in the explanation in the previous section, the representation of Balinese Gamelan harmony can be seen from a playing system that combines two different tonal elements so that a characteristic sound color appears which is considered

harmonic. The existence of this system is actually related to two things, namely the Balinese Gamelan tuning system and playing techniques. Therefore, the explanation regarding the actualization of Balinese Gamelan harmony in this section is discussed through a simple tuning system (the result of a bid) and playing techniques. First, the discussion of the tuning system will be fluent in recognizing the shape and model of the instrument so that this model affects the way and technique of playing. The shape of the instrument and how to play it as shown above implicitly shows that the Gamelan Gambang is a manifestation of harmony caused by its tuning system. Therefore, the tuning system: adjusting the high and low notes that do not have the same frequency in one type of tone is a concept of harmony, which can affect the playing technique so that it creates a variety of sound characteristics if all the xylophone instruments are played simultaneously.

1. *Ngembat* as a Representation of Gamelan Gambang Harmony

The gamelan Gambang technique uses two hands to play each melody of the *gending*. In principle, the melody pattern consists of three models, each model uses a *ngembat* system to embody harmony. The following below is each model of the melody playing pattern with the *ngembat* system:



Figure 3. Notation 1: Harmony *gangsa gede* and *cenik*

The melody model above is a playing pattern performed by *gangsa gede* and *cenik* instruments. Both are played by one player using two hands. The right hand plays *gangsa gede* and the left hand plays *gangsa cenik*. *Gangsa gede* and *cenik* have the same sequence of notes. *Gangsa cenik* is the *ngembat* tone (octave) of *gangsa gede*. Both instruments are played simultaneously with the same pattern and the same notes so that there is a harmony which is manifested from the *ngembat* system.

Apart from the *ngembat* patterns, the notation above to point out that there is a rhythmic pattern that is the same at every 2 bars or *gatra*. This is a peculiarity of the gamelan Gambang rhythm model. The rhythm is accurate from the first 2 elements to the last. The rhythm of this model is one of the characteristics of the gamelan Gambang. The Gambang rhythm pattern played through *gangsa gede* and

cenik is different from the rhythm pattern played by other Gambang instruments (*pengenter-pemero* and *penyelat-pemetit*). The rhythm pattern played by a *gangsa* instrument can be referred to as a "*gangsa* rhythm". The *gangsa* rhythm is also combined with the rhythm of other instruments, the following are the rhythm and melody playing patterns of the *penyelat* and *pemetit* instruments:



Figure 4. Notation 2: Harmony *ngembat pemetit* and *penyelat* instruments

The melody pattern above is played by *penyelat* and *pemetit* instruments. In the upper notation it is played by a *pemetit* instrument while below it is played by a *penyelat*. The principle of the game of both has the same pattern, but the second pattern is placed on a different beat, giving the impression that the two are different patterns. The *pemetit* pattern is played on a beat or half beat, while the *penyelat* is played on a quarter beat.

Two people play the *pemetit* and *penyelat* game patterns. *Pemetit* played by one person and one person *penyelat*. The technique of playing this instrument uses two hands, namely the right and left hands. The right and left hands alternated, which aims to make melody patterns. The above notation clearly point out that the melodic play pattern is carried out with two hands and harmony is manifested from the *ngembat* system.

The melody pattern played by the *penyelat* and *pemetit* instruments is a development of the main melodies of *gangsa gede* and *cenik*. Musical development aims to fill the empty spaces between beats. The principle of this filling in the context of Balinese gamelan is termed a gending ornamentation (*pepayasan*). The main and ornamentation melody of the music are played simultaneously. The integration of the two gave birth to a typical musical pattern characteristic in the gamelan Gambang. Just like the *gangsa* instruments, the *pemetit* and the *penyelat* also implicitly have a distinctive rhythm pattern and the rhythm is different from the *gangsa*. The rhythm length of the two instruments is only two styles (bars). This rhythm can be referred to as the "*pemetit* rhythm" because it is played by both *pemetit* and *penyelat*. Thus, the Gamelan Gambang is harmoniously represented as a rhythm pattern.



Figure 5. Notation 3: Harmony *ngembat pengenter* and *pemero* instruments

The above pattern is played by the *pengenter* and *pemero* instruments. Top is the *pengenter* and bottom *pemero*. The *pengenter* and *pemero* melody is a unified pattern in the Gamelan Gambang, and it are model be called the triple melody. The principle of playing the melody of the two instruments also uses the *ngembat* system as a representation of harmony. The *ngembat* system is clearly visible on every note that is struck, which is always playing the low and high notes simultaneously.

The melody pattern above also implicitly has different rhythm patterns from other instruments. The rhythm above is also known as the "*pengenter* rhythm", because it is played by the *pengenter* and *pemero* instruments. The rhythm contained in the instruments of *gangsa gede*, *cenik*, *pemetit*, *penyelat*, *pengenter*, and *pemero* can be concluded that this musical consists of three rhythm models.

Gangsa instruments (*gede* and *cenik*), *pengenter*, *pemero*, *penyelat* and *pemetit* all uses the *ngembat* system as a representation of harmony. In addition, the rhythm of each instrument has a different pattern so that the impression is more complex in harmony. The rhythm in the gamelan Gambang plays an important role in enriching musical patterns to make them seem more complicated. Harmonies manifested from rhythmic patterns are more complex than melodic ones. Harmony is manifested in three different rhythm models, namely: the *gangsa* rhythm, the *pemetit* rhythm, and the *pengenter* rhythm.

2. *Polos-Sangsih* as a Representation of Gamelan Gambang Harmony

See notations 10 and 11, the pattern to point out that the melody is played using the *polos-sangsih* technique. *Polos-sangsih* is used in playing the *pemetit-penyelat* and *pengenter-pemero* instrument. The principle of the game of innocence is paired. *Polos* is a game that fits the beat (onbeat), while *sangsih*, a game that 'does not fit the beat'. The principle of the melody pattern that is integrated between the *polos-*

sangsih is a model that is also developed in the gamelan Gambang game. *Polos-sangsih* is a way to realize gamelan harmony through playing techniques.

B. The Principle of Harmony in Balinese Gamelan

Harmony is one of the manifestations of musical patterns in Balinese musicals which are determined from the combination of tones in each musical composition. In general, in several books, what has considered a representation of harmony is a playing pattern combining two different tones, namely the first note with the fourth tone, so that in the playing, auditive characters that are considered harmonious will emerge. However, this concept is only played by instruments that function as ornamentation and are not played by instruments that play the main melody. This is one of the reasons that the concept of harmony in Balinese Gamelan and *karawitan* is not the same as western music; however, for the phenomena that have been mentioned, it can be categorized as the concept of harmony based on the philosophical concept of harmony (Bandem, 1986).

Ngembat, Ngempat, Nelu as Representation of Harmoni

Ngembat, ngempat, nelu is a playing model in several Balinese Gamelan compositions which can be called harmony. In a musical organization, this harmony is a melodic playing pattern called a foundation, which is ornamentation (melody of development) of the main melody. This pattern is played improvisational by players of *pemade, kanti, and riyong* instruments. This choice is based on the interpretation of the player. However, the player cannot freely interpret the play of the melody of the foundation. The concept of musical organization in Balinese musicals is a way of interpreting the ornamentation pattern with three models: *ngembat, ngempat, and nelu*.

Ngembat

Ngembat (octave) is a system of mixing lows and highs that are struck simultaneously to show that there are several different and harmonious sound colors as a musical organisation. More details can be seen in the notation below:



Figure 6. Notation 4: Harmony *ngembat*

Ngempat

Theoretically, *ngempat* is an effort to harmonize the high sound and the lower sound in one stroke played simultaneously through two different instruments to produce a variety of sound characteristics.

The playing of *ngempat* is played by *kantil* and *pemade* instruments. This playing is applied through a plain *polos* and *sangsih* system, meaning that in its application the playing of *ngempat* is played by two instruments of the same type (two instruments of *pemade/pemade* contributor). The concept of this playing is contained in the Gamelan *pelog* five and seven notes. The *ngempat* system is a harmony model generated from a dynamic game of *kantil* and *pemade*. An example of a melody playing is as follows:

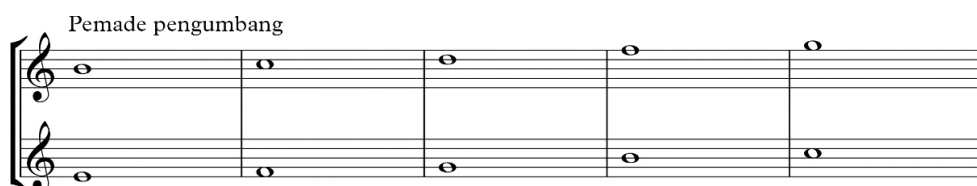


Figure 7. Notation 5: Harmony *ngempat*

The concept of *ngempat* from *pemade pengumbang* instrument is the same as *pemade pengisep*. This game is a harmony generated from the cooperative play between *ding* tones with *dung* tones, *dong* tones with *dang*, *deng* with *ding*, *dung* with *dong*, *dang* with *deng*.

Nelu

Third, the *nelu* playing system is a harmony pattern generated from two different tones played by the same type of instrument. Here is the notation:



Figure 8. Notation 6: Harmony

C. Practice Harmony in the Gamelan Gong Kebyar.

The practice of harmony in this sub-section is reviewed based on practical experience found in the Gamelan *Gong Kebyar* and so on. Of course, this review shows the difference in the application of the harmony system both in practice and in the playing (technique) with the Gamelan Gambang. This comparison is important to explain so that the results of observations and analyzes of the harmony system in the Gamelan Gambang are different from Balinese Gamelan in general.

This difference will indicate a renewal of the harmony system that has not been disclosed scientifically and in detail so far.

This review of the practice of harmony in Balinese Gamelan will use several case studies. The case study is the practice of playing Balinese music, which has been developing and often presented by musicians. This piece is a traditional piece. The principles and practices are a fundamental concept in the playing patterns of Balinese Gamelan. Therefore, the concept of the practice of playing harmony presented in it is something that is common and natural for every musician in Bali.

The practice of harmony in every Balinese Gamelan repertoire is played through several playing techniques. The technique is a way to create a melody. The practice of making melodies containing harmony in Balinese Gamelan can be played through several techniques: the twist technique, the *norot* technique. These two techniques have different concepts in a melody game. These two techniques are a way of weaving the ornamentation melody played by the *pemade*, *kantil*, and *reyong* instruments.

Implementation of Harmony through the *Ubit-ubitan* Technique

Ubit-ubitan is one technique commonly used by musicians in presenting Balinese musical repertoire (Bandem, 1991). The application of this technique aims to obtain a composition that seems dynamic, complex, and aesthetically pleasing. This technique is used in case studies of certain repertoires only. An example of the application of this technique is in the accompaniment of *Pendet* dance.

In the accompaniment of *Pendet* Dance, the pattern of the *ubit*-circle game is played by instruments, *kantil*, *pemade*. These two instruments play with the concept of *polos* and *sangsih*. From this playing there are several horizontal harmony patterns. The following below is an example of the twirling game pattern and its concept of harmony.

The image displays a musical score for five instruments: Jegogan, Jublag, Ugal, Kantil, and Pemade. The score is written in a single system with five staves. The top staff, labeled 'Jegogan', features a long, sustained note with a slur over it. The second staff, 'Jublag', has a few scattered notes. The third staff, 'Ugal', shows a melodic line with several notes. The fourth staff, 'Kantil', consists of a dense, repetitive rhythmic pattern of eighth notes. The fifth staff, 'Pemade', also features a dense, repetitive rhythmic pattern of eighth notes, mirroring the Kantil part. The overall structure suggests a complex, layered texture characteristic of Balinese Gamelan.



Figure 9. Notation 7: Harmony of the *ubit-ubitan* technique

In the *Pendet* repertoire practice system above, the harmony application is played with the *ngembat* system. This harmony system is present in every beat because the application is played by all instruments, namely *jegogan*, *jublaga*, *ugal*, *pemade*, and *kantil*. Each instrument plays its own pattern (see the previous page).

The musical above is a short example consisting of 4 bars and played repeatedly. Each instrument has a different pitch value. *Jegogan* as an instrument that plays a melodic framework, plays once in eight beats, namely on the first and eighth beat. The sound produced from the playing still has a vibration or vibration on the second, third, to the eighth beat. This means that on the second to seventh beats there is a sound resulting from the vibration of the *jegogan* instrument whose voice is *dung* in tone, while on the ninth beat to the fifteen beats it has a *ding* tone. These sounds or vibrations - especially on beats two through seven and nine to fifteen - are integrated with the other notes played by the *jublaga* instrument and others (see notation above).

The *jublaga* instrument plays notes: *dung*, *ding*, *dung*, *dang*, *ding*, *deng*, *dong*, *dang*. The *dung* note is played on the first beat, even though the vibration is still vibrating on the second beat as well as the next note, meaning that the vibration plays every note on level 2 beats. Based on the concept of play patterns and the resulting vibration effect, a harmony system occurs which can be seen in the table below:

Table 4. Harmony practical concept

Ket	np	nv	nv	nv	nv	nv	nv	nv	np	nv	nv	nv	nv	nv	nv	Nv
Jg	u	u	u	U	u	u	u	u	i	i	i	i	i	i	i	I
Jb	u	u	i	I	u	u	a	a	i	i	e	e	o	o	a	A
Ket	np	nv	np	nv	np	nv	np	nv	np	nv	np	nv	np	nv	np	Np

See the table above which consists of 4 columns down. The top column is the description (Ket for the Jegogan instrument) which consists of 16 columns³ of **np** (struck tone⁴), **nv** (vibrational tone⁵). The striking tone is on the first and eighth beats, while the vibrational tone is on the second to seventh and ninth to fifteenth beats. Next look at the second column from the top. In the column there is a symbol **Jg** which means the *jegogan* instrument. In the next column there are 8 symbols u and 8 i symbols. Symbol u means *dung* tone and symbol i means *ding* tone. The *jegogan* instrument plays *dung* notes as hit notes on the first beat and *dung* notes as vibrational notes on the second to seventh beats. On the eighth beat, the *ding* (i) tone is played as the striking tone and the *ding* (i) tone is played as a vibrational tone on the ninth beat to the fifteenth beat.

In the third column there is a symbol of **Jb**, which means the *Jublag* instrument. In this column there are several notes that are played with the following symbols: u (*dung* tone), i (*ding* tone), a (*dang* tone), e (*deng* tone), o (*dong* tone). In the fourth column (vertical) there is a ket which means to explain the type of tone played by the *jublag* instrument. In this information, there is a hit tones for every odd and even beat.

Analysis of the harmony system contained in the pattern above is that at the first beat between the *jegogan* and *jublag* instruments there is a symmetrical harmony which is manifested by a combination of the tone u (*dung*) is lower and u (*dung*) is higher (*ngempat*) - see beat one, two, five, six, eight, and nine. On the third beat, there is a combination of the tone u (*dung*) and i (*ding*), this means the concept of a combination that uses the *nelu* system. In the sixth and seventh beats, a combination of the tone u (*dung*) and a (*dang*) means using the *siliran* system. On beats ten and eleven there is a combination of tone i (*ding*) with tone e (*deng*), this means using the *nelu* system; On the twelfth and thirteenth beats there is a clause between the tone i (*ding*) and o (*dong*), this means using the *siliran* system. Finally,

³This means that it consists of 4 bars. 4 columns are 1 bar. Therefore, the 16 columns have 2 punch tones and 14 vibrational tones).

⁴This term is to describe the resulting tone being struck at the time of the 1st and eighth beats in accordance with the concept of playing the Jegogan instrument.

⁵This term is to describe a vibration that is still present and heard at every beat even though the instrument strikes no tone according to the description above.

on the fourteenth and fifteenth beats, a combination of the tone *i* (*ding*) with the tone *a* (*dang*) means using the *siliran* system.

The harmony playing system in the example of the above can be concluded: a vertical and horizontal system. Vertically it is applied through a system of *ngembat*, *ngempat*, *nelu*, *siliran*, while the horizontal harmony system is the movement of the change in the harmony model at each beat. Therefore, the horizontal harmony of the above pieces is from *ngembat* to *nelu*, *ngembat*, *siliran*, *ngembat*, *nelu*, *siliran*, and *siliran*. Of the 16 beats contained in the music above, several characteristics of the impression can be generated from the harmony playing above. According to the author, the character of *ngembat* tends to be happy, *nelu* tends to be restless, and *siliran* tends to be restless.

Implementation of Harmony through the *Norot* Technique

Norot is a Balinese Gamelan technique that is often used to interpret a single frame of the melody and main melody (Dibia, 2017). This technique is used to weave a development melody that is played by the *pemade*, and *reyong* instruments. The playing is manifested in a *polos* and *sangsih* system. This system is played by *kantil* and *pemade* instruments. Apart from *kantil* and *pemade*, *reyong* also plays its role as a melodic development instrument by playing the *norot* technique in certain *gending* cases. *Reyong* instruments are more complex than *kantil* and *pemade*. The *norot* technique found in *reyong* is played with four players by applying different melodies so that the harmony system contained in it is more complex. Therefore, in the case of the implementation of the harmony system in the *norot* technique, it will be analyzed through the *reyong* game pattern in the case study of the first part of the musical instrument, *tabuh telu sekar gadung*.

The image displays two systems of musical notation for the *norot* technique. Each system consists of three staves. The top staff in each system contains a melodic line with a few notes and rests. The middle staff contains a rhythmic line with a series of notes and rests. The bottom staff contains a complex rhythmic pattern with many notes and rests, representing the intricate texture of the *norot* technique. The notation is written in a standard musical staff format with a treble clef and a key signature of one flat.

Figure 10. Notation 8: Harmony of the *norot* technique

The pattern of the *reyong* playing above is played by four players in one instrument. The playing concept is divided into four patterns. All four are played simultaneously. At the same time with a different melody direction, produces harmony. A concrete explanation of each measure for each rickshaw player and the system can be shown in the table below:

Table 5. Interpret *reyong* instrument musical on the first beat and the first bar

Jb	<i>Dang</i> (a)			
<i>Reyong</i> 1	a (<i>dang</i>)	e (<i>deng</i>)	a (<i>dang</i>)	e (<i>deng</i>)
<i>Reyong</i> 2	e (<i>deng</i>)	i (<i>ding</i>)	e (<i>deng</i>)	i (<i>ding</i>)
<i>Reyong</i> 3	a (<i>dang</i>)		a (<i>dang</i>)	
<i>Reyong</i> 4	e (<i>deng</i>)	i (<i>ding</i>)	e (<i>deng</i>)	i (<i>ding</i>)

The table above consists of several columns which among them are intended to show the instruments and notes being played. The first column (at the top) consists of two columns: the left column shows the name of the instrument, namely the *jublaga* instrument, while the right column is the basic tone played by the instrument. The tone played is the tone a (*dang*) which in the above notation is equated with the tone do. Tone a (*dang*) is interpreted into four patterns of *reyong* play (can be seen in the second, third, fourth, fifth tables). Each *reyong* plays different notes but is played simultaneously. The combination contained in the *reyong* playing is: the tone a (*dang*) is played simultaneously with the notes e (*deng*), a (*dang* high); tone e (*deng*) is played simultaneously with note i (*ding*). The playing of these notes simultaneously uses the *nelu* and *ngempat* and *ngembat* systems.

The playing pattern above contains an example of just one tap. One beat can represent the play of the next beat. In essence, each beat with the basic tone played by the *jublaga* instrument is interpreted using the *nelu*, *ngempat*, and *ngembat* system by the *reyong* instrument. This means that every root note will always be interpreted simultaneously with the *nelu*, *ngempat* and *ngembat* systems. Therefore, the pattern of movement of the harmony system will always be the same horizontally. This is somewhat different from the harmony system that is played through the twist technique.

CONCLUSION

Referring to the research questions and the results of the discussion above, the re-actualization of the Balinese Gamelan harmony system produces three conclusions, namely: musical harmony is an activity of sounds that are interconnected between the harmonization system, musical patterns such as melody

(gending) and rhythm, and game technique. The three of them are tied to each other so as to produce harmony in the cohesiveness of the sound

The restrictions that are elements in determining the harmony of Balinese Gamelan are the system of tuning, playing techniques and melody pattern models with the principles of *ngembat*, *ngempat*, and *nelu*. The principles of the game *ngembat*, *ngempat*, and *nelu* are very much influenced by game techniques and game techniques are also influenced by the tuning system. Therefore, the harmonization system, playing techniques and melody models are integrally a unit that creates harmony in a Balinese Gamelan phenomenon.

Gamelan Gambang has different forms of harmony with Balinese Gamelan in general, but the differences are not significant. The difference between the Gamelan Gambang in the representation of harmony is the tuning system and the melody model which only uses the *ngembat* system. In addition, the harmony in the Gamelan Gambang is also strengthened by a distinctive rhythm pattern.

REFERENCES

- Ardana, I. K. K. (2020). Representasi Konsep Patet dalam Tradisi Garap Gamelan Bali. *Resital: Jurnal Seni Pertunjukan (Journal of Performing Arts)*, 21(1), 11–27. <https://doi.org/10.24821/resital.v21i1.4213>
- Bandem, I. M. (1986). *Prakempa: Sebuah Lontar Gamelan Bali*.
- Bandem, I. M. (1991). *Ubit-ubitan Sebuah Teknik Permainan Gaelan Bali*. STSI Denpasar.
- Dibia, I. W. (2017). *Kotekan dalam Musik dan Kehidupan Bali (Pertama)*. Bali Mangsi Foundation dan ISI Denpasar.
- Gouk, P. (2008). The role of harmonics in the scientific revolution. In T. Christensen (Ed.), *The Cambridge History of Western Music Theory* (pp. 223–244). Cambridge University Press.
- Mariyana, I. N. & at al. (2019). Gamelan Gambang Kwanji Sempidi Kajian Sejarah, Musikalitas dan Fungsi. *Kalangwan*, 5(2), 119132. [http://download.garuda.ristekdikti.go.id/article.php?article=1209586&val=10275&title=Gamelan Gambang Kwanji Sempidi Kajian Sejarah Musikalitas dan Fungsi](http://download.garuda.ristekdikti.go.id/article.php?article=1209586&val=10275&title=Gamelan%20Gambang%20Kwanji%20Sempidi%20Kajian%20Sejarah%20Musikalitas%20dan%20Fungsi)
- Prier SJ, K. E. (1989). *Ilmu Harmoni*. Pusat Musik Liturgi Yogyakarta.
- Schaareman, D. H. (1980). The Gamelan Gambang of Tatulangga, Bali. *Journal of the Society For Ethnomusikology*, XXIV(3), 465–482. https://www.academia.edu/34430078/The_Gamelan_Gambang_of_Tatulin_gga_Bali
- Sugiarta, I. G. A. (2015). Bentuk dan Konsep Estetik Musik Tradisional Bali. *Panggung*, 23(1), 46–60. <https://jurnal.isbi.ac.id/index.php/panggung/article/view/14/18>
- Tenzer, M. (2011). *Balinese Gamelan Music* (Third). Tuttle Publishing.