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Phonological Variation Technology Integration for Indonesia Cultural Preservation and Edupreneurship

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ABSTRACT

This study explores phonological variations in the Komering dialects of South Sumatra, Indonesia, examining differences in vowel and consonant phonemes influenced by geographical and socio-cultural factors. Using a descriptive qualitative approach and synchronic dialectology, data were collected through field observations, in-depth interviews, and technological tools like Praat software and Natural Language Processing (NLP). **The findings** reveal significant phoneme shifts, **such as [i] to [ɛ] and [h]** to omission. Despite these variations, the linguistic kinship among Komering dialects remains strong, reflecting community interactions and adaptations. **This research** emphasizes the importance of preserving endangered regional languages by integrating phonological research with educational technology and gamification, aligning with Sustainable Development Goals (**SDG 4**: Quality Education and **SDG 10**: Reduced Inequalities). **Proposed solutions** include interactive language learning tools and edupreneurship initiatives to engage younger generations while fostering cultural preservation and creative innovation. **The study** contributes to linguistic understanding, cultural heritage preservation, and inclusive education by offering sustainable approaches to address language endangerment in the digital age.

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1. INTRODUCTION

One of the seven regional languages in South Sumatra Province, Indonesia, is Komering. This language is spoken in various regions, such as Ogan Komering Ulu, Ogan Komering Ilir, and Ogan Komering Ulu Timur. According to data from the Indonesian Language Agency, Komering is spoken by approximately 400,000 people across different districts. Local geographical and cultural factors influence the dialectal variations of this language, causing differences in the phoneme structure, both vowels and consonants, in each region. Previous studies have shown that Komering is very different from other Malay languages and, in some cases, is even considered a distinct language [1].

Dialectology is a branch of linguistics that studies how languages vary according to social and geographical environments. Synchronic dialectology of Komering provides an understanding of phonological differences across regions, particularly regarding intonation, accent, and phoneme distribution. These variations are related to geographical factors and the history of interactions between community groups [2, 3]. This

research uses a geolinguistic approach to explain language differences resulting from language contact and social interactions in South Sumatran communities, particularly in transmigration areas where migrants from Java and Bali maintain their original languages [4–8].

With advances in technology, dialectological analysis can be enhanced through the use of Natural Language Processing (NLP) and machine learning. These technologies enable the automatic processing of language data to analyze phonological variations across Komering dialects more efficiently and accurately. The application of NLP for dialect analysis has been widely studied, as highlighted in the research "Natural Language Processing for Dialects of a Language: A Survey", which shows how these technologies can assist in mapping and distinguishing dialectal variations more quickly and precisely [8, 9]. This integration of technology in dialectology facilitates deeper and more systematic analysis, making it possible to handle vast amounts of linguistic data more effectively. Additionally, the use of technology in dialectological research can support the preservation of regional languages, such as Komering, which are increasingly threatened by globalization and urbanization.

2. LITERATURE REVIEW

Research on the phonological variation of Komering can help preserve regional languages that are at risk of extinction due to globalization and urbanization, especially among younger generations who use Indonesian as their primary language in daily life [10]. To track the impact of urbanization, which influences language and cultural shifts, further research is needed before these languages become extinct [11].

The affixation system (N-) in Komering, the kinship system, and the reduplication system are some aspects of the Komering language that have been the subject of previous research. However, the phonological relationships between Komering dialects have not been extensively studied. The aim of this research is to gain a better understanding of the kinship between dialects and to enrich Indonesia's linguistic repertoire by introducing the richness of regional languages that have been little studied. Additionally, this study aims to trace the variation of vowel and consonant phonemes [12]. This research uses cognitive and sociocultural approaches to demonstrate that language is a complex system that not only serves as a means of communication but also reflects the social and cultural values of the communities that use it [13].

By uncovering the phonological relationships between dialects, this study is expected to improve our understanding of phonological variation in Komering and enrich our understanding of dialectology. This research is also expected to help preserve the Komering language by identifying the diversity of Indonesian languages. This method provides useful empirical data for phonology and dialectology and contributes to the preservation of regional linguistic heritage in the face of increasing globalization [14].

Furthermore, this research has strong correlations with the Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education) and SDG 10 (Reduced Inequalities). This study can contribute to the development of high-quality educational materials for learning regional languages, improve access to education in local languages, and support the preservation of endangered languages. As emphasized in SDG 4, this research supports the achievement of inclusive and quality education by providing technological platforms for more effective and accessible local language learning [15, 16]. Therefore, this research is not only scientifically significant but also serves as an effort to preserve cultural heritage and reduce social and cultural inequalities in increasingly diverse societies, in line with SDG 10, which focuses on reducing inequalities and promoting inclusivity within communities.

3. RESEARCH METHODS

This research employs a descriptive qualitative approach to investigate the phenomenon of phonological variation in Komering dialects. This approach is well-suited to exploring linguistic phenomena within their natural socio-cultural contexts, enabling a comprehensive understanding of how language reflects and interacts with the daily lives of the Komering people. The integration of technology further enhances this approach by facilitating efficient data processing and analysis [17–19].

The study adopts the synchronic dialectology method, which focuses on analyzing language variation at a single point in time, disregarding historical developments. This method allows for an in-depth examination of phonological elements, such as vowel and consonant variation, and their relationship with geographical and socio-cultural influences. It emphasizes how language variation reflects the unique characteristics of local communities [20]. By focusing on present-day linguistic elements, this method captures the dynamic interplay

between language and the environment of the Komering people.

3.1. Informant/Participant

In this study, informants were purposively selected based on linguistic research standards. Some important factors, such as:

- Male or Female
- Aged 25-65 years (not senile)
- The informant parents, wife or husband were born and raised in the village and rarely or never leave the village
- Have a maximum education of completing basic education (primary school or junior high school)
- Medium social status (not low or high) with the hope of not having too high mobility
- Farming or labor work
- Have pride in your isolect and its isolect community
- Can speak Indonesian; and Physically and spiritually healthy (no language impairment, sharp hearing, and not crazy or senile

The selection of criteria, such as education level and social status, aims to capture linguistic patterns from individuals whose language use is minimally influenced by external factors, thereby ensuring data reliability. For instance, restricting education to basic schooling reduces exposure to standardized Indonesian, which could obscure native phonological characteristics. Likewise, focusing on medium social status minimizes the impact of economic mobility on language variation.

3.2. Research Location

Observation points were selected in various villages within Ogan Komering Ulu, East Ogan Komering Ulu, and Ogan Komering Ilir districts, as these areas are known to feature numerous Komering dialects. According to [21, 22], the selection of these locations was based on prior linguistic mapping and the Indonesian Language Agency's consensus regarding the distribution of Komering dialects. These regions enable researchers to identify phonological differences across the areas and understand the patterns of Komering language variation.

The observation points in this research, as shown in Figure 1, provide a clear representation of the surveyed areas on the map.

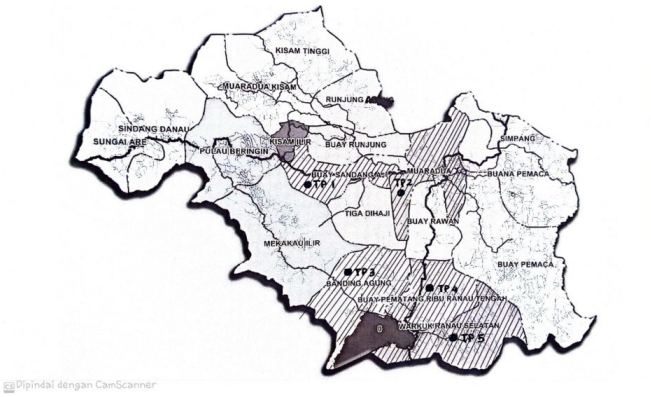

Figure 1. Point of Observation

The map illustrates the research areas, encompassing several observation points within the Ogan Komering Ulu, Ogan Komering Ilir, and East Ogan Komering Ulu districts. These locations were selected due to the linguistic diversity of the Komering dialects present in each region. Areas such as Kisam Tinggi,

Muara Dua, Buay Rawan, and Pematang Ribu Ranau are among the focus points of the study, aimed at exploring phonological variations, including shifts in vowel and consonant phonemes.

Each observation point highlights the geographical distribution and local cultural characteristics that influence language variation. The research in these regions seeks to identify linguistic differences shaped by social, cultural, and inter-community interactions, such as those occurring in transmigration areas. The map provides a visual representation of how language variations are mapped, offering insights into the linguistic relationships and dynamics of the Komering dialect across different areas [23, 24].

3.3. Technique Collecting Data

Data collection in this research is conducted through a combination of traditional linguistic methods and advanced technological tools. Field observations are carried out directly at the research sites to identify language usage within the sociocultural context of the Komering community. This method allows researchers to observe linguistic practices as they naturally occur in daily life, providing valuable qualitative insights [25].

Additionally, in depth interviews are conducted with selected informants using structured guides to explore phonological variations, focusing on vowel and consonant pronunciation. This approach helps to capture the nuanced differences in the dialects that might not be apparent in casual observation [26, 27].

To ensure accuracy and comprehensiveness, voice recordings are made during data collection, encompassing 1,218 root words, including 200 Swadesh words that represent cultural terms such as body parts, tools, and kinship systems. These recordings serve as primary linguistic data for phonological analysis. The integration of technological tools, such as Praat software, enhances the precision of phonetic analysis by enabling detailed acoustic examination of vowel and consonant articulations. Furthermore, NLP techniques are employed to automate the detection and mapping of phonological patterns, significantly improving efficiency in processing large datasets and ensuring accuracy in identifying linguistic variations. Specifically, the NLP techniques employed include tokenization for segmenting text data, acoustic feature extraction using Praat software, and clustering algorithms like K-means to group similar phonological patterns. These methods are integrated with phoneme recognition tools leveraging Hidden Markov Models (HMMs) to enhance accuracy. This combination of techniques ensures a robust analysis of phonological variations across observation points This combination of traditional and technological methods ensures that the data collected is both rich in cultural context and rigorously analyzed using state-of-the-art tools[28, 29].

3.4. Data Analysis

Data analysis was conducted using the articulatory pairing method, which uses the speech organ as the determining tool. Furthermore, the researcher used the dialectometric method to measure the degree of difference between dialects and the isogloss method to find phonological differences by region. In this case, the commensurate method helps map the different phonological elements among the observed dialects by using articulatory differences as the main benchmark [26, 30]. The results of this analysis are presented in tabular form showing the differences in vowel and consonant phoneme variation between the observation points. This research aims to provide a better understanding of the dialectal variation present in Komering and facilitate the interpretation of the degree of phonological differences between regions by presenting the data in a structured format [12, 31].

4. RESULTS AND DISCUSSION

4.1. Phonological Variation in Komering Dialects

The results of this study show that there are significant phonological variations between Komering dialects at several observation points in the South Sumatra region, each of which has unique vowel and consonant phoneme characteristics. Based on data analysis, several consistent patterns of phoneme change were found at various points, which can be presented as follows:

Vocal Phoneme Significant vowel variations, such as the change of the phoneme [i] to [ε], can be observed at the observation points in the villages. For example, within the same word, the vowel [i] at observation point A may change to the vowel [ε] at observation point B.

One additional variation is the shift of the word [u] to [o] in certain phonological contexts. This phenomenon shows that vowel sounds tend to be lower. This could be due to geographical influences or local adaptations to the speech styles of people in the area [20].

Table 1. Similar Relative Words (Vocal Phoneme Correspondence) at Five Observation Points (PO)

	Correspondence	Glos	Form of Realization at the Point of Observation (PO)				
			PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
1	i ∼ ε	And	[hi?]	[hi?]	[$Y\varepsilon P$]	Yi?	Yi?
		With	[hi?]	[hi?]	[$Y\varepsilon P$]	[$Y\varepsilon$?]	[Yi?]
		Life	[huYi?]	[huYi?]	[huYi?] / [huYε?]	[huYε?]	[uYi?]
		Because	[ulih ni]	[ulih ni]	[$ul\varepsilon h$ ni]	[mani]	[sebab]
		Pull	[taYi?]	[taYi?]	[taYi?] / [$taY\varepsilon$]	[$taY\varepsilon$]	[taYi?]
		small plates	[timit]	[timit]	[cip$\varepsilon YYeni$?]	[$cip\varepsilon YYen\varepsilon$?]	[$cip\varepsilon YYeni$?]
		cerme	[ceYmin]	[ceYmin]	[$ceYm\varepsilon n$]	[$ceYm\varepsilon n$]	[ceYmin]
		Dencis fish	[dincis]	[dincis]	[$d\varepsilon ncis$]	[$d\varepsilon ncis$]	[$sard\varepsilon n$]
		Mouse	[tikus $Yen\varepsilon$?]	[tikus $Yen\varepsilon$?]	[tikus $Yeni$?]	[tikus $Yeni$?]	[tikus $Yeni$?]
		Flood	[banjiY]	[banjiY]	[$banj\varepsilon Y$]	[$banj\varepsilon Y$]	[$banj\varepsilon Y$]
		Bitter	[pahi?]	[pahi?]	[$pah\varepsilon$?]	[$pah\varepsilon$?]	[$pah\varepsilon$?]
		Edge	[$pingg\varepsilon Y$]	[$pingg\varepsilon Y$]	[$pingg\varepsilon Y$]	[$pingg\varepsilon Y$]	[$p\varepsilon ngg\varepsilon Y$]
2	i ∼ e	Evening	[dibingi]	[dibingi]	[debingi]	[debingi]	[bingi]
		Frecarious	[$gint\varepsilon ng$]	[$gint\varepsilon ng$]	[$gint\varepsilon ng$]	[$gint\varepsilon ng$]	[$gent\varepsilon ng$]
		Peanut brittle	[$pey\varepsilon$?]	[$pey\varepsilon$?]	[$piy\varepsilon$?]	[$piy\varepsilon$?]	[$piy\varepsilon$?]
		Seeds	[benih]	[benih]	[beneh]	[bibit]	[bibit]
3	$u \sim o$	Drink	[nginum]	[nginum]	[nginom]	[nginom]	[nginom]
4	ø ∼ e	Person	[jelma]	[jelma]	[jelma]	[jelema]	[jelma]
5	$\varepsilon \sim a$	Years	[$t\varepsilon hun$]	[$t\varepsilon hun$]	[tahun]	[tahun]	[tahun]
6	$a \sim u$	Old	[taha]	[taha]	[tuha]	[tuha]	[tuha]
7	$u \sim o/\varepsilon \sim o$	Sideburns	[$gud\varepsilon k$]	[$gud\varepsilon k$]	[$god\varepsilon k$]	[$god\varepsilon k$] / [bawo?]	[pangkeh]
8	u ∼ o	Brain	[uto?]	[uto?]	[uto?]	[uto?]	[oto?]
		Outhouse	[kakos]	[kakos]	[kakus]	[kakos]	[kakus]
		Dipper	[timbo?]	[timbo?]	[timbu?]	[timbo?]	[timbu?]
		Mattress	[kasuY]	[kasuY]	[kasoY]	[kasoY]	[kasoY]
		Torch	[obor]	[obor]	[ubor]	[obor]	[ubor]
		Ricek cake	[luntong]	[luntong]	[lontong]	[lontong]	[lontong]
		Drink	[inuman]	[inuman]	[inoman]	[inoman]	[inoman]
		Kedondong	[kedungdung]	[kedungdung]	[kedongdong]	[kedongdong]	[kedongdong]
9	e ∼ u	Mature	[teha]	[teha]	[tuha]	[mutuha]	[tuha]
			-	-	-	-	[$w\varepsilon c\varepsilon$]
		Boil	[solu?]	[solu?]	[mesunu?]	[musunu?]	[sunu?]
10	e ∼ a	Mosques	[mesejid]	[mesejid]	[masjid]	[mesjed]	[mesjed]
		Pecal	[pecal]	[pecal]	[pecel]	[pecal]	[pecel]
		Potato	[kentang]	[kentang]	[kentang]	[kantang]	[kantang]
		Pariah	[peYia]/ [paYia]	[peYia]	[paYia]	[peYia]	[peYia]
11	o ∼ o	Door	[Yango?]	[Yango?]	[Yango?]	[Yango?]	[Yango?]
12	o ∼ a	Heirloom	[pusako]	[pusako]	[pusaka]	[senimbang]	[pusaka]
13	i ∼ ø	Ladder	[ijan]	[ijan]	[jan]	[jan]	[jan] / [obor]
14	o ∼ a	Mango	[manggo]	[manggo]	[mangga]	[mangga]	[mangga]
		Weak	[lemoh]	[lemoh]	[lemah]	[lemoh]	[lemah]
15	o ∼ u	Vegetable	[sayoY]	[sayoY]	[sayur]	[gulaj]	[sayur]
16	o ∼ u ∼ a	Durian	[doYian]	[doYian]	[daYian]	[duYian]	[duYian]
17	u ∼ i	Deaf	[tulo]	[tulo]	[tilu]	[tilu]	[tilu]

Table 1 lists 18 different vowel phoneme correspondences for comparable words in the Komering dialect: Vowel correspondences: i ∼ ε, i ∼ ϵ, u ∼ o, ø ∼ ϵ, ε ∼ a, a ∼ u, u ∼ o, ε ∼ o, u ∼ o, ϵ ∼ u, ϵ ∼ a, o ∼ u, i ∼ ø, o ∼ a, o ∼ u, o ∼ u ∼ a, u ∼ i. Furthermore, PO 5 contained one special term for the word mature, which is [$w\epsilon c\epsilon$].

Table 2 displays the differences in the correspondence of the consonant phonemes in the Komering language.

4.2. Consonant Phoneme

Consonant phonemes undergo many significant changes. These include the phoneme [h] changing to [ø] or missing in some words. Consonant sounds in words are lost or omitted in some types of dialects. This phenomenon is known as consonant elision.

In words with the same phonological context in different regions, the consonant [m] changes to [b]. This is an additional consonantal variation. For example, in village C, a word pronounced with the sound [m] changes to [b]. This variation shows a pattern of homorganic assimilation, where adjustments to the local

phonological environment cause sound changes.

Table 2 concludes that there are 40 variations in consonant phoneme correspondence for word kinship similarities in the Komering language dialect, namely $m \sim \eta/\mathsf{K}$, $s \sim \emptyset$, $h \sim \emptyset$, $m \sim b$, $g \sim k \sim \emptyset$, $\eta \sim \emptyset$, $\gamma \sim \emptyset$, $h \sim \gamma$, $d \sim \emptyset$, $p \sim m/w \sim k$, $n \sim s$, $h \sim s$, $\emptyset \sim b - V$, $p \sim b$, $p \sim k$, $\emptyset \sim w/ - V$, $h \sim g$, $r \sim Y$, $r \sim Y/\emptyset \sim p$, $\emptyset \sim l$, $m \sim b \sim k$, $d \sim k$, $\emptyset \sim h \sim k$, $k \sim t/ - V$, $ny \sim Y$, $? \sim Y$, $\emptyset \sim m/ - V$, $\emptyset \sim t/ - V$, $\emptyset \sim ng/ - V$, $\emptyset \sim t/g \sim k$, $c \sim ny$, $ng \sim k$, $\emptyset \sim m/\emptyset \sim ng$

The research on phonological connectedness in the Komering dialect, Indonesia, revealed significant variations in the use of vowel and consonant phonemes at several observation points. Through the analysis of phonological data, it was found that vowel variations, such as differences in the pronunciation of the phonemes /a/, /i/, and /u/, identified with variations such as [a], [æ], [ɑ], and [i], [I], [e], reflect the influence of different socio-cultural environments in each area. The percentage of differences between observation points ranged from 60% to 80%, indicating that despite the marked differences, the linguistic relationships among the dialects remain strong. This aligns with the dialectometric criteria proposed by [32], which suggests that even though variations occur, relevant phonological proximity remains intact, even with local adaptation.

This finding supports previous studies by [33], which suggest that dialectal differences are often triggered by social interaction and cultural exchange between communities. This aligns with global patterns in endangered languages, such as preservation efforts for Maori in New Zealand and Welsh in the UK, where similar phonological variations signify cultural resilience. Comparative analysis reveals that, while Komering shares traits like phoneme reduction, it also displays unique regional adaptations, highlighting the importance of locally tailored preservation strategies In the case of the Komering dialect, these phonological variations not only reflect phoneme changes but also show how the communities speaking these dialects adapt to external influences such as trade and media. For example, the use of borrowed words from other languages can lead to changes in the pronunciation of phonemes, showing the influence of more dominant languages.

In the study of phonological variation mapping and kinship analysis of the Komering dialect, comparison data of vowel and consonant phonemes from several observation points showed significant differences. For example, variations in vowel phonemes such as [a], [æ], and [ɑ] or consonant phonemes like [k], [g], and [ŋ] at each observation point demonstrate that, although the percentage differences ranged from 60% to 80%, the linguistic relationship between dialects remains relatively close. This finding is consistent with previous research by [4, 33], which stated that dialectal differences in closely related languages are influenced by socio-cultural development and community interaction. Therefore, the identified phonological variations are not merely phoneme changes but also reflect the social adaptation of the communities that use these dialects in their daily lives.

Through this understanding, we can conclude that despite the striking phonological variations, the Komering dialects show a strong kinship that requires further research to better understand the social and cultural context that influenced linguistic development in the region. This research also opens opportunities for further study of the social dynamics that shape language variation, including the influence of trade and media in enriching or changing the pronunciation and usage of dialects.

4.3. Linking with Educational Technology and Edupreneurship

The results of this phonological research can be linked with the development of educational technology, especially in the context of regional language preservation through edupreneurship. Technology can be utilized to create language learning applications tailored to specific dialects. For example, an application utilizing this phonological analysis could teach accurate phoneme pronunciation while introducing users to dialect variations from different regions within a cultural context. As highlighted in the research, edupreneurship plays a vital role in fostering a generation that is not only tech-savvy but also capable of preserving cultural heritage through creative innovation.

Furthermore, in the context of The Social Dimensions of Creativepreneurship Education: Unleashing Youth's Creative Potentials through Teamwork and Collaborative Creativity, the research emphasizes the importance of creativepreneurship education in developing young people's creative potentials through collaboration and teamwork. With the findings from phonological research, language learning applications can be designed to provide collaborative and interactive experiences, increasing youth engagement in learning regional languages while also developing their creative skills.

Table 2. Similar Relative Words (Consonant Phoneme Correspondence) at Five Observation Points (PO)

	Correspondence	Glos	Form of Realization at the Point of Observation (PO)				
			PO 1	PO 2	PO 3	PO 4	PO 5
1	$m \sim ng/\text{ø} \sim K$	flow (me)	[mehili]	[mehili]	[ngehili]	[muhili]	[hilian]
2	$s \sim \text{ø}$	child	[$sana?$]	[$sana?$]	[$ana?$]	[$ana?$]	[$ana?$]
		All	[unyinni]	[unyinni]	[sunyin]	[unyin]	[unyin]
3	$\text{ø} \sim s/-V$	Pen	[kuta]	[kuta]	[kuta]	[kuta]	[sekuta]
		Hundred	[Yatus]	[Yatus]	[Yatus]	[seYatus]	-
		Thousand	[Yibu]	[Yibu]	[Yibu]	[seYibu]	[seYibu]
4	$h \sim \text{ø}$	Smoke	[$haso?$]	[$haso?$]	[$aso?$]	[$aso?$]	[$aso?$]
		Green	[hujaw]	[hujaw]	[ujaw]	[ujaw]	[ujaw]
		White	[$handa?$]	[$handa?$]	[$handa?$]	[$anda?$]	[$anda?$]
		Roof	[$ato?$]	[$ato?$]	[$hato?$]	[$hato?$]	[$hato?$]
		Pestle	[helu]	[helu]	[elu]	[helu]	[elu]
		Pot	[Yayo]	[Yayo]	[Yayoh]	[Yayoh]	[Yayo]
		Enau	[hanaw]	[hanaw]	[hanaw]	[hanaw]	[anaw]
		Fine	[halus]	[halus]	[halus]	[alus]	[alus]
		Will	[haga]	[haga]	[aga]	[aga]	[aga]
5	$m \sim ng$	Split	[mbelah]	[mbelah]	[ngebelah]	-	-
6	$m \sim b$	Blind	-	-	-	[melah]	[belah]
		Swollen	[buta]	[buta]	[muta]	[muta]	[muta]
7	$g \sim k \sim ?$	Heavy	[megug]	[megug]	[megak]	[megag]	[$mega?$]
8	$y \sim \text{ø}$	Give	[$biya?$]	[$biya?$]	[$bia?$]	[$biya?$]	[$biya?$]
9	$ng \sim \text{ø}$	Burp	[$ngju?$]	[$ngju?$]	[$ngeju?$] /[$ju?$]	[$ngeju?$]	[$ju?$]
		Rotten	[mengkeYak]	[mengkeYak]	[mukeYak]	[mukeYak]	[mukeYak]
10	?simk	Fat	[$busu?$]	[$busu?$]	[$busu?$]	[busuk]	[$busu?$]
		Fall	[gemuk]	[gemuk]	[$gemu?$]	[gabak]	[gemuk]
		And	[tiak]	[tiak]	[$tia?$]	[$tiya?$]	[$tia?$]
11	$h \sim Y$	With	[$hi?$]	[$hi?$]	[$Y\epsilon?$]	[$Yi?$]	[$Yi?$]
		Sun	[$hi?$]	[$hi?$]	[$Y\epsilon?$]	[$Y\epsilon?$]	[$Yi?$]
		Crocodile	[mataYani]	[mataYani]	[mataYani]	[mataYani]	[matahari]
		Hear	[beha]	[beha]	[buYa]	[buha]	[buaya]
12	$n \sim t$	Thin	[nengis]	[nengis]	[nengis]	[tengis] / [nengis]	[tengis]
		Throw	[nipis]	[nipis]	[tipis]	[tipis]	[tipis]
		Where	[nimbak]	[nimbak]	[tayaY]	[nayaY]	[nayaY]
		Plant	[tanom]	[tanom]	[tanom]	[nanom]	[nanom]
13	$di \sim \text{ø}$	Where	[didipa]	[didipa]	[dipa]	[dipa]	[dipa]
		Here	[didija]	[didija]	[dija]	[dija]	[dija]
		There	[didudi]	[didudi]	[dudi]	[dudi]	[dudi]
14	$p \sim m/w \sim k$	Rub	[pusaw]	[pusaw]	[gusuk]	[musaw]	[gusu?]
		Think	[pikeY]	[pikeY]	[mikeY]	[pikeY]	[pikeY]
15	$ny \sim s$	Sew	[$nyeYu?$]	[$nyeYu?$]	[$nyeYu?$]	[$nyeYu?$]	[$seYu?$]
		Blow	[sebu]	[sebu]	[nyebu]	[sebu]	[sebu]
		Dive	[nyelom]	[nyelom]	[selom]	[nyelom]	[selom]
16	$h \sim s$	We	[hikam, Yam]	[hikam, Yam]	[sekam, Yam]	[sekam, neYam]	[sekam, Yam]
17	$\text{ø} \sim b - V$	Woman	[baj]	[baj]	[bebaj]	[bebaj]	[bebaj]
18	$p \sim b$	Armpit	[pah kelupah]	[pah kelupah]	[bah kelupah]	[bah kelupah]	[bah kelupah]
19	$p \sim k$	Clothesline	[pengeYangan]	[pengeYangan]	[keneYangan]	[keneYangan]	[keneYangan]
20	$\text{ø} \sim w/-V$	Barn	[welaj]	[welaj]	[welaj]	[welaj]	[welaj]
21	$h \sim g$	Saw	[heYgaji]	[heYgaji]	[geYgaji]	[geYgaji]	[geYgaji]
22	$r \sim Y$	Screen	[layar]	[layar]	[layar]	[layaY]	[bebar]
		Rambutan	[Yambutan]	[Yambutan]	[rambutan]	[Yambutan]	[hambut]
		Friendly	[ramah]	[ramah]	[ramah]	[Yamah]	[ramah]
23	$r \sim Y/? \sim p$	Ringworm	[$kuYa?$]	[$kuYa?$]	[kurap]	[kuYap]	[kurap]
24	$\text{ø} \sim l$	Fishing rod	[kawi]	[kawi]	[kawil]	[kawil]	[kawi]
25	$m \sim b \sim k$	Coconut pistil	[mambang]	[mambang]	[bambang]	[kambang]	[bambang]
26	$d \sim k$	Hairy	[bebulu]	[bebulu]	[bebulu]	[kebulu]	[bebulu]
27	$\text{ø} \sim h \sim k$	Rattan	[uI]	[uI]	[huI]	[kuI]	[kuwi]
28	$k \sim t/-V$	Hawk	[knuj]	[knuj]	[knuj]	[knuj]	[tenuj]
29	$ny \sim Y$	Bee	[nyiwan]	[nyiwan]	[$mengingo?$]	[Yiwan]	[nyiwan]
30	$\text{ø} \sim h$	Horn	[$tungka?$]	[$tungka?$]	[tungkah]	[tungkah]	[tungkah]
31	$b \sim Y$	Crescent moon	[bulan sabit]	[bulan sabit]	[bulan sabit]	[bulan saYit]	[bulan sabit]
32	$s \sim h$	Rainbow	[Yunis]	[Yunis]	[uneh]	[Yuneh]	[Yuneh]
33	$Y \sim ng$	Cool	[Yison]	[Yison]	[ngison]	[ngison]	[segar]
34	$\text{ø} \sim m$/-V	Sweet	[mis]	[mis]	[memis]	[memis]	[memis]
		Low	[Yebah]	[Yebah]	[Yebah]	[Yebah]	[meYebah]
		Fear (physical impact)	[Yabai]	[Yabai]	[Yabai]	[Yabai]	[meYabai]
		Afraid (of the atmosphere)	[Yabai]	[Yabai]	[Yabai]	[Yabai]	[meYabai]
		Kebaya	[$kebaya?$]	[$kebaya?$]	[$kembaya?$]	[$kembaya?$]	[$kebaya?$]

	Correspondence	Glos	Form of Realization at the Point of Observation (PO)				
			PO 1	PO 2	PO 3	PO 4	PO 5
		Read	[mbaca]	[mbaca]	[ngebaca]	[ngambaca]	[baca]
35	$\emptyset \sim t/-V$	Middle	[tengah]	[tengah]	[tengah]	[tengah]	[tatengah]
		Poop	[Yandan]	[Yandan]	[tiYandan]	[tiYandan]	[Yimpok]
		Step on	[$ili?$]	[$ili?$]	[$tili?$]	[$tili?$]	[$ili?$]
36	$\emptyset \sim ng/-V$	Push (men)	[njun]	[njun]	[jujun]	[ngejujun]	[ngejujun]
		Support behind	[babai]	[babai]	[babai]	[babai]	[ngebabai]
37	$\emptyset \sim t/g \sim k$	Slide	[$gis\epsilon Y$]	[$gis\epsilon Y$]	[$tigis\epsilon Y$]	[$begis\epsilon Y$]	[bekiseY]
		Hide (be)	[$sego?$]	[$sego?$]	[$tisego?$]	[$sego?$]	[$sego?$]
38	$c \sim ny$	Uphold	[cuncun]	[cuncun]	[cuncun]	[nguncun]	[cuncun]
39	$ng \sim k$	Run	[cengkelang]	[cengkelang]	[cekelang]	[cekelang]	[cekelang]
40	$\emptyset \sim m/\emptyset \sim ng$	Not yet	[kung]	[kung]	[makung]	[kung]	[mangkung]

4.4. Educational Games and Creativepreneurship

The phonological research findings can also be applied to the development of educational games or applications based on local culture that teach regional languages in an interactive way. The study, shows that digitalization and technology use in education can significantly impact the development of language and business, where technopreneurship enables the preservation of regional languages and cultures through digital innovation. For instance, a language learning app for Komering could feature phoneme-specific pronunciation guides, voice recognition for practice and feedback, and cultural content like folk tales to contextualize learning. Gamification elements, such as earning badges for mastering dialect variations, and peer collaboration through multiplayer quizzes can enhance user engagement. These tools not only develop linguistic skills but also foster cultural immersion Therefore, educational games based on the Komering dialect and local culture could be an effective tool for introducing regional languages to younger generations in a fun, gamified way.

For example, an educational game that introduces vocabulary and pronunciation in the Komering dialect while showcasing local cultural stories could attract younger audiences to learn their native language through a medium they enjoy. This supports the findings, which highlights the importance of social and creative entrepreneurship skills in education to address social and cultural challenges in the digital age, including during the pandemic.

4.5. Monetization and Educational Technology Potential

With language learning applications based on dialectology or teaching tools using technology, there is significant potential for monetization. Incorporating principles of creativepreneurship, such as leveraging storytelling and interactive visuals, can make the apps more engaging. For instance, embedding local crafts or traditional music within the app enhances its cultural value, creating a distinct market niche. This approach not only supports language learning but also promotes regional heritage as a unique brand identity Applications that teach regional languages or provide knowledge about dialect variations can be integrated into digital platforms that can be downloaded or accessed through subscriptions. Monetization could be achieved through app sales, premium features for more in-depth lessons, or through targeted ads. Additionally, the content developed from this research can be extended into online courses, tutorials, or e-books that discuss the linguistic and cultural richness of Indonesia's regional languages.

Through this approach, the results of phonological research on the Komering dialect not only serve as a linguistic knowledge source but also create opportunities for digital solutions that educate, preserve language, and foster culture-based entrepreneurship. This approach also aligns with the goal of cultural preservation in the digital age, having a positive impact on communities and future generations.

5. MANAGERIAL IMPLICATIONS

Based on the research findings, the following five managerial implications provide actionable insights for stakeholders in education, technology, and cultural preservation:

5.1. Strategic Development of Educational Technologies

Educational institutions and technology developers are encouraged to collaborate on designing specialized language-learning applications. These applications should leverage advanced tools such as Natural

Language Processing (NLP), phoneme recognition software and gamification elements to teach regional dialects like Komering. Features such as interactive pronunciation guides, cultural storytelling, and real-time feedback can ensure that these tools are engaging, accurate, and culturally immersive. Such strategies would significantly contribute to preserving endangered languages while improving digital literacy among users.

5.2. Encouragement of Edupreneurial Initiatives

Managers and policymakers should promote the growth of edupreneurship by establishing platforms that encourage the development of educational products rooted in local cultural heritage. Programs like innovation grants, competitions, and startup incubation hubs can support entrepreneurs in creating technology-driven solutions for cultural preservation. These efforts would generate economic opportunities while ensuring that younger generations value and maintain their linguistic and cultural identity.

5.3. Integration of Cultural Heritage in Education Policy

Policymakers should integrate regional language preservation into national educational frameworks by mandating the inclusion of culturally relevant digital tools in schools and community programs. Managers in the education sector could advocate for developing lesson plans and teaching materials that emphasize regional dialects. These materials should align with national goals, such as improving quality education (SDG 4) and reducing inequalities (SDG 10), ensuring inclusivity in education regardless of geographic or socio-economic barriers.

5.4. Monetization and Economic Opportunities

Organizations can explore the commercial potential of digital language-learning tools by developing scalable business models. This could include subscription-based access, premium features like advanced dialect training, or bundling applications with cultural artifacts, such as traditional music and folklore. Managers in the private sector can also target specific markets, including heritage tourism or expatriate communities, to expand the reach and impact of these tools.

5.5. Fostering Collaborative Networks for Sustainable Impact

Effective language preservation requires a collective effort from linguists, technologists, educators, and community leaders. Managers should prioritize establishing cross-sector partnerships to pool resources, expertise, and funding. For example, collaboration with local cultural organizations can ensure tools remain culturally authentic, while partnerships with universities and tech firms can bring cutting-edge innovations to language education. Such synergy would enable the creation of sustainable solutions for linguistic and cultural preservation.

6. CONCLUSION

The research on phonological variations in the Komering dialect reveals significant differences in the pronunciation of vowel and consonant phonemes across regions, reflecting the influence of local social and cultural environments. Despite the considerable phonological variation, the linguistic relationship between dialects remains strong. These findings support the idea that dialectal differences are driven by social and cultural interactions among communities. The study also emphasizes the importance of preserving regional languages, especially among younger generations who tend to prioritize Indonesian.

The implications of this research offer opportunities for the development of educational technology, such as language learning apps based on phonological variations and dialectology. Edupreneurship can play a key role in creating tech solutions that not only educate but also preserve local languages. Additionally, educational games and interactive apps based on local culture can engage younger generations in learning regional languages in an enjoyable way. The potential for monetizing these learning applications, through subscription models or sales, is significant. This research contributes to the achievement of SDGs, particularly SDG 4 (Quality Education) and SDG 10 (Reduced Inequalities), by promoting language preservation and inclusive education.

7. DECLARATIONS

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The data presented in this study are available on request from the corresponding author.

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The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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