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SIMULCAST SYSTEM: IMPLEMENTATION OF ANALOGUE AND DIGITAL RADIO BROADCASTING MEDIA IN INDONESIA

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Abstract

Until now radio broadcasting operators continue to look for breakthrough innovations both in terms of broadcasting technology development (broadcasting) and broadcast material. The Indonesian government, specifically for radio, plans to anticipate the presence of the digital era by transforming digital radio technology with the DAB (Digital Audio Broadcasting) and DRM (Digital Radio Mondiale) systems in an effort to foster public interest in listening to digital radio with the simulcast system. This system is a combination of services to the audience with two or more channels, namely analog and digital. Radio broadcasting operators need to continue to seek innovation in order to be competitive with other digital media in this convergence era, including utilizing the internet (Broadband).

Literature reveals that based on data from Kominfo (Ministry of Communication and Informatics) in 2021, the number of radio broadcasting institutions throughout Indonesia that have Broadcasting Operations Permits (IPP) is 1,902 stations. Apart from Public Broadcasting Institutions (LPP) Radio of the Republic of Indonesia (RRI) and Local Public Broadcasting Institutions (LPPL), radio groups in Indonesia are divided into two, namely Private Broadcasting Institutions (LPS) and Community Broadcasting Institutions (LPK). LPS operates for commercial purposes. Meanwhile, LPK is usually established by a community based on area, issue, or interest. From the perspective of media economics, the radio industry is seen as a media industry that has distinctive characteristics in terms of audiences.

This research used a qualitative approach that has not been widely used to examine digital radio technology with the DAB (Digital Audio Broadcasting) and DRM (Digital Radio Mondiale) systems in an effort to foster public interest in listening to digital radio with the simulcast system. Data collection techniques were carried out through field observations, interviews, and documentation studies.

This research confirms that it is time for Indonesia to transform analog radio to digital as time changes. In addition, this research finds out that current radio broadcasting, apart from transmitting over the air or (broadcast) in the form of sound or sound with an analog system, also needs to transmit through sound or voice with a digital system and if both channels are played then it is called a simulcast system.

Keywords: Analog radio, digital radio, DAB, DRM, Media, Simulcast.

INTRODUCTION

The Indonesian government needs to take steps and policies that truly protect broadcast media, particularly radio broadcasting. The radio broadcasting industry must immediately enter the digital broadcasting era. The Indonesian government needs to ensure licensing guidelines/regulations/policies. The radio broadcasting industry needs to adapt in line with the initiation of the 2021-2024 digital Indonesia roadmap sectoral in the media and entertainment sectors. It is hoped that at least the radio broadcasting industry will create an ecosystem for digital radio broadcasting to become media and entertainment as mandated by law. All policies need to be followed by real steps from the commitment of radio broadcasting stakeholders in an effort to improve the broadcasting industry which is planned to use the simulcast system.

Information technology transformation in the form of radio digitization in Indonesia is in accordance with the public's right to obtain information as stated in Article 28F of the Constitution of the State of the Republic of Indonesia of the Year 1945 and is an important matter to implement considering that frequency is a limited resource. In its implementation, this radio digitization policy needs to be regulated by government agencies that have the authority that has been attributed to laws and regulations.

From several research conclusions about the urgency of regulating radio digitization in Indonesia, one of them stated that the enthusiasm to legitimize the implementation of digital radio and its regulations as a legal basis has been believed by stakeholders as a demand for the development of information technology in an increasingly modern era. It should be noted that the digitalization of radio will have new consequences in the form of a restructuring of the radio broadcasting industry towards digital. Simultaneous changes in radio digitization will certainly be a challenge for the government as a regulator, consumers (radio listeners), providers of public broadcasting radio, private broadcasting radio, and community broadcasting radio, however, the government must determine its stance for radio broadcasting whether the process will be regulated and determined, or it will be left working naturally depending on the needs of radio broadcasting operators and the public. (KEMENKOMINFO, 2015)

The government has been conducting a study on the strategy for implementing digital broadcast radio in Indonesia since 2015. In the study, it is stated that there are several reasons why a digital system would later become a necessary system, especially with regard to broadcast radio. The reasons underlying the need to migrate to a digital system are frequency spectrum efficiency and quality and reliability (KEMENKOMINFO, 2021)

Based on data from Kominfo in 2021, the number of radio broadcasting institutions throughout Indonesia that have Broadcasting Operations Permits (IPP) is 1,902 stations. Apart from Public Broadcasting Institutions (LPP), RRI (Radio of the Republic of Indonesia), and Local Public Broadcasting Institutions (LPPL), radio groups in Indonesia are divided into two, namely Private Broadcasting Institutions (LPS) and Community Broadcasting Institutions (LPK). LPS operates for commercial purposes. Meanwhile, LPK is usually established by a community based on area, issue, or interest. In the perspective of media economics, the radio industry is seen as a media industry that has distinctive characteristics in terms of audiences. (KEMENKOMINFO, 2021)

It is about time, Indonesia needs to carry out an analog radio transformation to digital radio in line with the changing of time. The researcher appreciates the radio digitization initiative from the Indonesian National Private Broadcasting Radio Association (PRSSNI) which supports the government to conduct trials of DRM digital terrestrial broadcasting systems on the MF Band (526.5-1.600.5KHz) and DAB+ terrestrial digital broadcasting systems on VHF Band III (174-240 MHz). This is based on the DAB+ business model and technical model that is similar to DVBT Digital TV so that the implementation process is easier. After carrying out this trial, it seems that the Government needs to continue the strategic steps which are realized in the form of a radio digitization policy as a policy that is fundamental to technical in nature related to the implementation of radio digitization policies. The government needs to regulate technical matters concretely, by establishing regulations to become the operational basis for digital radio broadcasting via terrestrial.

The current condition in analog broadcasting is that each broadcasting institution has its own broadcasting infrastructure such as transmitter towers, antennas, and so on. The application of digital broadcasting technology provides better efficiency in the use of frequency spectrum so that it can meet the needs of providing broadcast programs that are many times more than analog broadcasting. Radio broadcasting digital technology provides a great opportunity for the availability of space for broadcasting operations. (KEMENKOMINFO, 2021)

The Geneva Agreement held by the International Telecommunication Union (ITU) in 2006 marked the beginning of the end of analog broadcasting. It is hoped that digital transition will leap over existing technologies to connect the unconnected to underserved and remote communities and close the digital gap. As many as 85% of areas in the world have implemented this digital system. Even ASEAN countries such as Malaysia and Singapore have implemented broadcasting digitalization since 2015. The implementation of Digital Radio operation needs to be carried out immediately in line with the implementation of digital TV. Digitalization implementation in the field of radio broadcasting is made to create efficiency and effectiveness. (KEMENKOMINFO, 2019)

In order for the digital radio implementation plan to be more focused, it is necessary to prepare a roadmap so that implementation in Indonesia can meet the expectations of stakeholders. In the explanatory section of the 2002 Indonesian Broadcasting Law No.32, it is stated: "Anticipate the development of information and communication technology, especially in the field of broadcasting, such as digital technology, compression, computerization, cable television, satellite, internet, and other special forms others in organizing broadcasts; About 15 years ago, the law anticipated the development of digital technology. However, this is not enough considering that there are quite a lot of changes that occur when the implementation of digital radio broadcasting is carried out. Of course, a strong regulatory basis is needed so that the

problems that occur in the migration of Digital Broadcasting Television do not occur in Digital Broadcasting Radio. (KEMENKOMINFO, 2021)

Change is an empirical perspective that can be a real example in the dynamic of radio management in the digital era. When digital values have entered the mind and thought of radio broadcasting operators, research is needed to be able to uncover the phenomena that occur. This research intends to provide an in-depth description of radio broadcasting with the simulcast system (analog and digital).

This research aims to obtain factual knowledge in exposing radio broadcasting using the simulcast system (analog and digital) related to the implementation of terrestrial broadcasting. Through this research it is hoped that a clear and objective picture of how and why radio broadcasting with a simulcast system (analog and digital) will be carried out in radio broadcasting.

The research objective is formulated and stated in the main question: How is the simulcast system for analog and digital radio broadcasting media implemented in Indonesia?

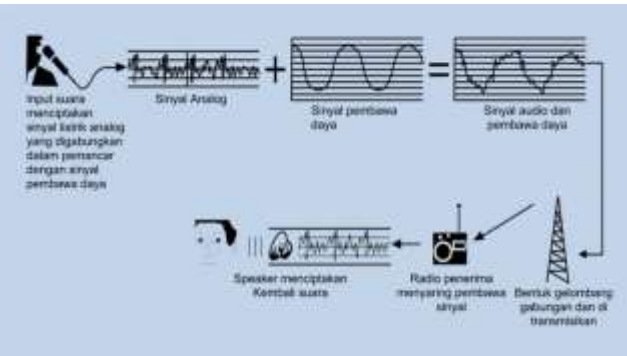
Development of Radio Broadcasting in Indonesia

The development of radio broadcasting is a 'dramatic' part of the history of communication. Meanwhile, the rise of broadcasting is the story of a struggle whose value is enormous. The development of radio in Indonesia undergoes a very long process, namely from the Dutch colonial era, the Japanese occupation era, and then the independent Indonesian period. Advances in technology have greatly accelerated the dissemination of information. At this time, radio has also entered Indonesia and its broadcasts could be received in villages, both government radios such as RRI and non-government radios. During the reign of the Dutch East Indies, radio began to develop in Indonesia. The first radio to appear in Indonesia was Bataviasche Radio Vereeniging (BRV) in Jakarta (Batavia). On 16 January 1925, Bataviasche Radio Vereeniging (BRV) conducted the first amateur radio broadcast in the Dutch East Indies. Since BRV was established, other radio broadcasts had appeared in Jakarta, Bandung, Medan, and Surakarta. During the Japanese era, the development of radio experienced a setback. The Japanese occupation government strictly regulated radio broadcasting. Radio broadcasting was managed by a special agency named Hoso Kanri Kyoku, and was a radio broadcast based in Jakarta. Its branches are called Hoso Kyoku, located in Bandung, Purwakarta, Yogyakarta, Semarang, Surabaya, and Malang.

At that time all radio broadcasts were directed to the interests of the Japanese military. However, during the Japanese occupation, culture and art progressed very rapidly. People got a lot of opportunities to develop culture and arts. This opportunity also led to the emergence of artists who composes new Indonesian songs. At the time of Indonesia's independence, the development of radio progressed very rapidly. People who worked in the radio field consider it important to organize radio broadcasts. On 10 September 1945 radio leaders from all over Java gathered in Jakarta to discuss the problem. On September 11, 1945, radio leaders agreed to establish a broadcast radio called Radio 12 Republik Indonesia (RRI). When it was founded, RRI had 8 broadcasting radio stations in eight cities in Java (formerly Hoso Kyoku). Since the late 1960s, radio broadcasting in Indonesia has experienced a very significant "development" and strengthening of its socio-political role. Like newspapers, magazines, and television, radio is a mass communication medium that can be used by everyone for a specific purpose. (KEMENKOMINFO, 2020)

However, radio broadcasting in Indonesia today is the same as when AM (Amplitude Modulation) frequency broadcasting technology existed and suddenly the trend of Frequency Modulation (FM) emerged as a new technology in the mid-1980s. At that time, many radio broadcasting institutions broadcast using two frequencies, namely AM and FM. In the end, the AM frequency was less desirable because audiences were getting used to listening to FM, and radio broadcasting technology developed via FM waves in the mid-1980s.

Figure 1. Radio Broadcasting



source: Straubhaar and LaRose, "Media Now – Communications Media in the Information Age "

The figure above shows how analog radio broadcasting uses sound waves. The announcer's voice is changed by electricity using a microphone, this electrical signal is combined with a high-frequency carrier signal and broadcast to a radio receiver. The receiving radio filters the carrier signal and creates an original electrical analog signal, which the speaker converts into sound energy.

Radio Media

Media is nothing but a tool to strengthen, harden and expand human functions and feelings. In other words, each new media discovery is really considered to expand some human abilities and skills. Following this theory, there have been several major changes following technological developments in communication, where each period has equally broadened human feelings and thoughts. When people think of the media, what comes to their mind is that most of the leisure activities in the world are media use. But there are many forms of media or mediums, which must be studied in mass communication. Until now, defining mass media is easy. (Littlejohn and Foss, 2009) Mass communication theory has also evolved with the changing nature of media. Although the definition of communication may vary from source to source, the definitions share elements in common. Mass communication is often described or explained by comparing interpersonal communication when the source encodes the message and sends it to the receiver through verbal and non-verbal means which then translates the message and provides feedback. In interpersonal communication, the source and receiver are usually individuals, the channel is usually face-to-face, and the communication is usually private. Feedback is generally direct and immediate. However, mass communication is a process in which a group of people, or a large organization creates messages and transmits some type of media to heterogeneous audiences. With internet channels designed to showcase unique content, audiences are relatively small.

In radio broadcasting, these relatively large audiences are the percentage of the population living in the geographical area where the radio broadcasting agency's station is located. The mass audiences are in many ways made up of people who are distinct from one another. These differences are for example social, educational, economic, psychological, cultural, ethical, religious, political, physical, or intellectual. This background diversity will result in different skills and attitudes from the audience so it will produce problems for communicators, in this case, radio broadcasters.

In addition, radio programs are received by audiences from locations with different levels of interference when receiving radio program symbols. This disturbance is related to the activities of the audience when listening, such as working, reading, driving, sitting, and concentrating on the radio program or other activities. It should be noted that the broadcasting process forms the basis of radio media which can be used for personal communication and mass communication. As you know that the success of any communication is determined by the behavioral responses of the audience. The response in question is usually the reaction from the audience because they pay attention to the symbols on the radio, namely listening to the radio. Even before the audience listens, a program must be heard through a radio receiver.

Audiences listening to radio broadcasts can be called responses. Another type of response is receiving symbols through radio programs which can result in affective communication behavior in audiences such as laughing, crying, shaking or the like.

The important role of mass communication forms the basis of radio broadcasting as mass media, when compared to other communications, it is the transmission of messages. In interpersonal, small group, and public communication, the sender is responsible for transmitting the message. In mass communication, however, the transmission is very complicated to be completed by an individual or even several people. It is because transmission involves distributing materials and presenting materials. One of the distinctive characteristics of radio broadcasting as a medium is the personal medium. (Turow, 2009)

Radio broadcasting is a medium that is most personal and a medium that is much larger than life because the screen is our own brain. Albert Einstein once stated that fantasy is a gift that means a lot to him of all the talents, he has to be able to quickly and straightforwardly absorb positive knowledge. Radio is an arena of fantasy, a theater in our minds, with an unlimited number of performances made of words, and images that we always imagine. (Schulberg in Prayudha and Munaf, 2013)

Like other conventional media, radio broadcasting is a medium that has a selective reach for certain market segments. The term radio in this description is not an object, not only its physical form but the physical form and radio activities are mutually intertwined, and cannot be separated from one another, just as between the human soul and body, externally and spiritually humans are also inseparable. Therefore, if the definition of radio is separated one by one or physically specified, then what is called radio is the whole of the transmitter, studio, and receiver. Radio is very famous for its use in developing countries. Radio can also be called imaginary theater because radio programs are not only limited to what can be seen. A radio is not a television set without pictures. Because there is no such literal image, when the radio is run with creativity by the initiators of its programs and also by advertisers, radio can immediately attract the interest of many people. And this is

a far cry from the wild images in even the wildest adventure programs on television. (Schulberg, 1996) Radio broadcasting is a unique, growing, and pervasive medium. What is meant by unique here is having the ability to send electronic advertising messages according to geography and demographics. (Weinberger, et al., 1994)

Analog Radio Broadcasting

Radio broadcasting as one of the broadcasting media occupies an important position in educating human life. Radio, both in the AM and FM bands, is increasingly being felt as an effective means of information media in everyday life. Currently, AM and FM radio can only broadcast voice (audio) services, but in the era of information and technology development, they will be able to broadcast using other technologies, namely digital radio broadcasting. These services can be in the form of audio, text, images, and even visuals as broadcast content. Currently, AM and FM radio broadcasting operators in Indonesia are starting to prepare for the development of digital-based radio. This of course will provide added value to the development of the radio industry in the present era. For radio broadcasters, migrating to digital is not a necessity like television, but is a choice, because radio broadcasting technology is very mature and relatively perfect when viewed from the point of view of the audio signal that is emitted, and the price of the receiving device is cheaper compared to television.

Digital Radio Broadcasting

Digital radio broadcasting is radio technology that transmits information using digital signals. Digital radio broadcasting is the next generation of analog radio broadcasting. Digital radio broadcasting has many advantages such as clearer sound compared to analog radio broadcasting, better signal quality, and various facilities such as being able to pause, rewind, or save temporarily if you want to listen to it later.

The purpose of digital radio broadcasting is to perform spectrum frequency efficiency, network transmission, transmission power and power consumption, as well as to obtain improved signal quality and stability so that it is free of interference, noise, fading, sharper audio resolution, more stable sound, possible recovery of transmission interference (error correction) as well as increased compatibility in the form of signal interoperability and development of ubiquitous devices as receivers in addition to obtaining increased scalability from mono, stereo to AES-EBU and even to HD (high definition) radio broadcasting.

RESEARCH METHOD

In order to find the implementation of the analog and digital radio broadcast media simulcast system in Indonesia with the main components that must be found, this research is in accordance with the intention to provide an in-depth picture of the implementation of the analog and digital radio broadcast media simulcast system in Indonesia. In addition, it aims to obtain factual knowledge regarding the implementation of the simulcast system for analog and digital radio broadcasting media in Indonesia. Another thing is to develop concepts, theoretical models, and radio broadcasting approaches by implementing a simulcast system for analog and digital radio broadcasting media in Indonesia.

This research uses a qualitative approach with case studies, namely a qualitative data analysis method that emphasizes the case of the implementation of the simulcast system for analog and digital radio broadcasting media in Indonesia. It is directed by collecting and analyzing data to gain an understanding of research cases in a flexible manner. The research findings explain from the point of view of the implementation of the simulcast system for analog and digital radio broadcasting media in Indonesia.

The object of this study is the simulcast system for analog and digital radio broadcasting media while the subject is the simulcast system study team of the Ministry of Communication and Informatics of the Republic of Indonesia. Researchers chose resource persons who understand radio broadcasting. Determination of the sources to be interviewed was carried out purposively, namely selected with certain considerations and objectives. The resource persons referred to were resource persons who had special characteristics, namely the study team for the preparation of guidelines/regulations/policies/permits for digital radio broadcasting. Researchers conducted research at the Ministry of Communication and Information of the Republic of Indonesia. While the time and period of the research was from July 2022 to December 2022.

The researcher in this research has collected data through interviews and looked for documentation data. In conducting the interviews, the researcher used a qualitative interviewing type, namely field research with a more active investigation by holding discussions with radio practitioners. Conduct interviews by asking prepared questions to resource persons relating to the preparation of guidelines/regulations/policies/permits for digital radio broadcasting.

In the interview activity, their answers were recorded based on a series of question topics that were discussed in depth. The researcher also made observations in the field related to research problems and assume values with confidence. In addition, the researcher collected and examined written data related to research problems from the research document sources, books, journals, magazines, the internet, and others

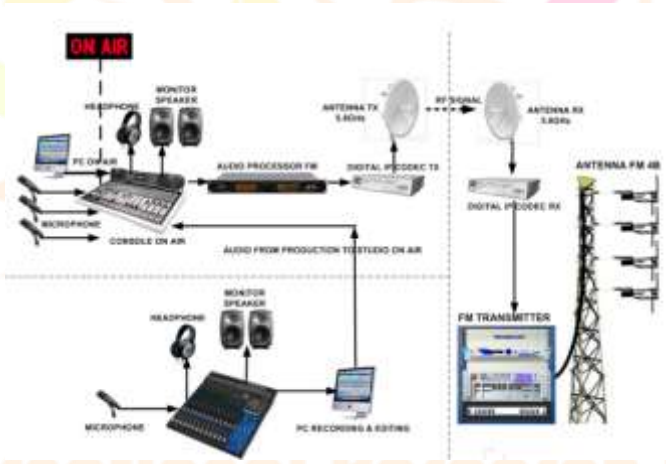
The data analysis technique used was qualitative data analysis, data obtained from various sources, using triangulation data collection techniques. In addition, processing data was conducted by organizing, analyzing, and explaining patterns of description between the dimensions of the implementation of the simulcast system for analog and digital radio broadcast media. The researcher conducted research with a framework related to research cases using data reduction analysis techniques, data display, and drawing conclusions. Researchers test the validity of the data so that quality is guaranteed. Therefore, the validity of the research findings was carried out through triangulation, the researchers conducted data analysis using data collection techniques, and existing data sources were reviewed.

DISCUSSION

Radio broadcasting is the oldest electronic media, having existed for more than a century and trying to continue to exist to overcome stiff competition with the presence of other media. The motivation to continue to exist is generally influenced by the survival factor of the broadcasting institution itself. Analogously as humans, the motive for radio broadcasting institutions is to give direction and energy to the behavior of human resources in radio broadcasting organizations. Radio technology has developed quite rapidly. Until now, its development has led to the digitization of radio. Several technologies have been tested in Indonesia, both by RRI and PRSSNI member radio.

With the development of digital broadcasting technology, the use of digital technology in the broadcasting industry is a necessity that will be adopted by broadcasting operators. Moreover, the development of digital technology provides more benefits than analog technology, especially in terms of service quality. (KEMENKOMINFO, 2021)

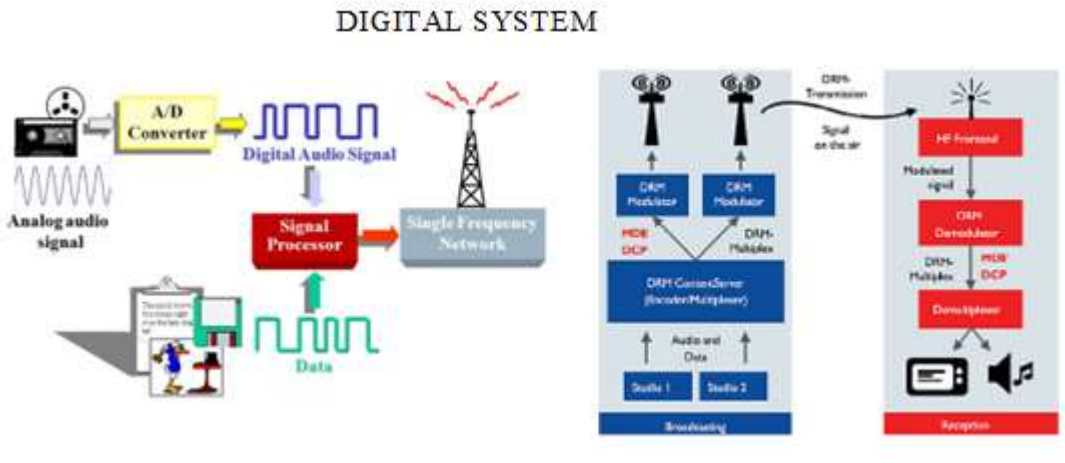
Figure 2. Analogue Radio Broadcasting System (FM)



Source: Broadcast Solution (www.jualpemancar.com)

The selection of technology standards is important because it will affect the provision of radio receiver ecosystems. From the results of a digital radio feasibility study conducted by Indonesia, the most suitable digital radio technology standards in Indonesia are: System A - Digital Audio Broadcasting (DAB) or System G - Digital Radio Mondiale (DRM)

Figure 3. Digital Radio Broadcasting System (DAB and DRM)



Source: *https://automotivetesting.car.blog/2020/07/01/digital-audio-broadcasting-dab/*
https://www.edn.com/understanding-drm-digital-radio-mondiale/

The reasons for choosing a digital radio broadcasting standard are: an open system where the standard is open to the international community, widely used by various countries, no annual license fee, the frequency is suitable for the Indonesian location, cost efficiency, easier migration process, and the availability of more receiving devices.

In the report of the need identification study for digital radio broadcasting in 2021, it is stated that the implementation of digital radio broadcasting is very different from digital television, therefore the grand design of digital radio is a complement, not a substitute for analog broadcasts, and simulcast and migration decisions are the decisions of the respective radio broadcasting institutions both in big cities and sub-urban/rural areas. In particular, private radio broadcasting operators hope that there will be no ASO obligation for analog radio broadcasts. Thus, there are several choices of radio broadcasting services that can occur in the implementation of the simulcast system (audio transmissions that are simultaneously played on two or more service channels).

Analog	Digital
AM (Existing)	+ DRM/DAB
AM (Existing)	+ DAB/DRM
FM (Existing)	+ DRM/DAB
FM (Existing)	+ DAB/DRM
New Applicant	DRM / DAB

In relation to the above matters, the Government needs to regulate the subjects of digital radio operation, including the tariff for channel leasing for multiplexing services as an additional service. In this regard, it is necessary to carefully calculate the additional rent because it is related to the technological infrastructure used which requires location, electricity, shared tower, and antenna costs, as well as human resources that manage the multiplexing service as an additional service.

AM Radio	FM Radio	DAB Radio	DRM Radio
Analog radio uses Amplitude Modulation (AM) It is still used worldwide primarily for medium-wave (MW), long-wave (LW), and short-wave (SW) transmissions.	FM broadcasting is a method of radio broadcasting using frequency modulation (FM) technology FM broadcast is capable of producing better sound quality than AM broadcast	DBA is the standard for digital radio audio broadcasting service Used in many countries around the world	DRM is a digital radio standard designed to work in the bands currently used for AM and FM analog radio broadcasting. DRM is more efficient spectrally than AM and FM.
AM transmission is much less susceptible to signal interference than FM or digital, and often has lower audio	Worldwide, the FM broadcast band is included in the VHF part of the radio spectrum. Typically, it is 87.5 to 108.0 MHz	DAB is more efficient in the use of frequency spectrum than FM radio	Allowing more stations with higher quality, for a given amount of bandwidth
AM tends to be in a spoken word format, like talking radio, all news, and sports The frequencies of LF 153 to 279 kHz, MF 531 to 1602 kHz, and HF 2.3 to 26.1 MHz		Offering more services with the same bandwidth Sound quality can be noticeably lower if the bit rate allocated to each audio program is inadequate DAB is not forward compatible with DAB+, meaning that the DAB broadcast receiver cannot receive DAB+ broadcast	Using various MPEG-4 audio encoding formats DRM30 uses frequencies below 30 MHz DRM+ uses VHF frequencies between 30 - 300 MHz
		DAB uses frequencies with wide bandwidth allocated in band III (174 - 240 MHz) and L band (1.452 - 1.492 GHz) The original version of DAB used the MP2 audio codec. The upgraded version is called DAB+ using the HE-AAC v2 audio codec.	Generally, in band I (47 - 68 MHz), band II (87.5 - 108 MHz), and band III (174 - 230 MHz)

To boost the development of digital radio broadcasting in Indonesia, the Government's role is very much needed with regard to regulations related to the funding scheme and financing of national digital transformation with this simulcast system. To support the implementation of digital radio broadcasting using a simulcast system, it is necessary to create a comprehensive "Roadmap" so that the transition to radio broadcasting technology provides maximum benefits for radio broadcasting industry stakeholders. Indonesia needs to take strategic steps to build the radio broadcasting industry to be more empowered in this digital era.

The government must continue to encourage Indonesia to start with concrete actions after conducting a study on digital radio broadcasting discourse since 2015. Therefore, the Government needs to prepare a wider infrastructure to carry out further trials.

The researcher held a Radio Discussion Forum (FDR) with stakeholders, especially private broadcasting institutions represented by the organization's Central Management of Indonesian National Private Broadcasting Radio Association (PRSSNI) and DKI Regional Management of Indonesian National Private Broadcasting Radio Association (PRSSNI) on December 2, 2022, with a special discussion on organizing terrestrial digital radio using the simulcast system. In principle, in particular, private radio broadcasting institutions do not object to the implementation of the simulcast system and are waiting for the regulations set by the Government by integrating the current analog system that is used and not turned off. Private radio broadcasting institutions that are licensed members of PRSSNI (Existing) hope that they will be prioritized to fill terrestrial digital broadcast channels prepared by the Government.

From the Radio Discussion Forum (FDR) it was stated that Indonesia should implement 1 platform (DAB or DRM). It is predicted that when using 2 different platforms, radio listeners will be reluctant to use terrestrial digital radio, because every time they move to a city, they will change the platform from DAB to DRM, or vice versa, listeners will still use analog FM, because listeners will not want to be troubled by switching the channels.

Analog		Digital
AM (Existing)	+	DAB
AM (Existing)	+	DAB
FM (Existing)	+	DAB
FM (Eksisting)	+	DAB
New Applicant		DAB

Analog		Digital
AM (Existing)	+	DRM
AM (Existing)	+	DRM
FM (Existing)	+	DRM
FM (Eksisting)	+	DRM
New Applicant		DRM

In relation to the above matters, the Government needs to regulate the subjects of digital radio operation, including the tariff for channel leasing for multiplexing services as an additional service. In this regard, it is necessary to carefully calculate the additional rent because it is related to the technological infrastructure used which requires costs of location, electricity, shared tower, and joint antenna, as well as human resources that manage the multiplexing service as an additional service.

To boost the development of digital radio broadcasting in Indonesia, the Government's role is very much needed with regard to regulations related to the funding scheme and financing of national digital transformation with this simulcast system. To support the implementation of digital radio broadcasting using a simulcast system, it is necessary to create a comprehensive "Roadmap" so that the transition to radio broadcasting technology provides maximum benefits for radio broadcasting industry stakeholders.

Indonesia needs to take strategic steps to build the radio broadcasting industry to be more empowered in this digital era. The government must continue to encourage Indonesia to start with concrete actions after conducting a study on digital radio broadcasting discourse since 2015. Therefore, the Government needs to prepare a broader infrastructure to carry out further trials, starting from digital radio broadcasting planning, setting digital radio broadcasting standards, digital radio broadcasting trials, analog, and digital radio simulcast broadcasting to fully digital radio broadcasting.

From the team's study and discussion on 17 November 2022, there were several issues that became the subject of discussion regarding the implementation of radio broadcasts using the simulcast system.

Regulation Aspect	Radio broadcasting licence The need for simulcast radio broadcasting regulation
Business Aspect	Simulcast radio broadcasting business model Establishment of a radio multiplex Cost-benefit of establishing radio multiplex broadcasting
Technical Aspect	Infrastructure readiness both transmitter and receiver Technical standards for the operation of digital radio Broadcast reception service quality
Supporting Aspect	Development of digital radio ecosystem Education and socialization to the community Human resources

In addition, it is also necessary to prepare matters relating to regulatory and policy requirements.

Digital Radio Broadcast Licence	Multiplexing-radio operation licence Radio broadcasting program operation licence
Evaluation and Broadcasting Commissioning	Multiplexing-radio commissioning Radio broadcasting program commissioning
Broadcast Licence Fee	Broadcast licence fee for national multiplexing-radio operation licence Broadcast licence fee for local multiplexing-radio operation licence Broadcast licence fee for radio broadcasting program operation
Service Coverage Area	Service coverage area for multiplexing-radio operation Service coverage area for radio broadcasting program operation
Slot Mux Tariff	Slot mux tariff in national multiplexing-radio operation
	Slot mux tariff in local multiplexing-radio operation

The policy for permits for the operation of digital radio broadcasting with a simulcast system should be limited. Because it is limited, the licensing process is carried out by means of selection or evaluation with certain requirements. It is better if the existing licensed radio broadcasting operators are prioritized. Furthermore, if it is done by selection, it must follow the applicable provisions according to the provisions of the law.

CONCLUSION

In principle, particularly, private radio broadcasting institutions do not object to the implementation of the simulcast system and are waiting for regulations to be stipulated by the Government by integrating the current analog system that is being used is not turned off and private radio broadcasting institutions that are licensed members of PRSSNI (Existing) hope that they will be prioritized to fill terrestrial digital broadcasting channels prepared by the Government. Simultaneous changes in radio digitization will certainly be a challenge for the government as a regulator, consumers (radio listeners), and providers of public broadcasting radio, private broadcast radio, and community broadcasting radio. allowed to naturally depend on the needs of radio broadcasting operators and the community.

From the results of a digital radio feasibility study that has been carried out that the most suitable digital radio technology standards in Indonesia are: System A - Digital Audio Broadcasting (DAB) or System G - Digital Radio Mondiale (DRM). Indonesia should implement 1 platform (DAB or DRM). The reasons for choosing a digital radio broadcasting standard are: an open system where the standard is open to the international community, widely used by various countries, no annual license fee, an appropriate frequency for Indonesia, cost efficiency, easier migration process, and availability of more receiving devices.

It is predicted that when using 2 (two) different platforms, radio listeners will be reluctant to use terrestrial digital radio, because every time they move to a city, they will change the platform from DAB to DRM, or vice versa, listeners will still use analog FM because listeners will not want to be bothered by switch channels. We need to meet with DAB or DRM vendors, what we need is they can provide data on the number of digital radio broadcast listeners, which can be used as a reference for radio sales (competing with digital broadband). What the industry needs most right now is listener data in real time. If radio broadcasting can provide that data, radio broadcast can compete with digital broadband. It may be that not all receivers can provide data, only receivers that are integrated with broadband (car radios, cellphones, etc.) that can send broadcast listener data to servers and radio broadcasters can download these data.

The government needs to regulate the subjects of digital radio operations, including the tariffs for leasing channels for multiplexing services and additional services. In this regard, it is necessary to carefully calculate the lease for this service because it is related to the technological infrastructure used which requires costs of location, electricity, shared towers and antennas, as well as human resources who manage the multiplexing service as an additional service. To encourage the development of digital radio broadcasting in Indonesia, the Government's role is very much needed with regard to regulations related to the funding scheme and financing of the national digital transformation with this simulcast system. Implementation of digital radio broadcasting using a simulcast system needs to create a comprehensive "Roadmap" so that the transition to radio broadcasting technology provides maximum benefits for radio broadcasting industry stakeholders in Indonesia.

Indonesia needs to take strategic steps to build the radio broadcasting industry to be more empowered in this digital era. The government must continue to encourage Indonesia to start with concrete actions after conducting a study on digital radio broadcasting discourse since 2015. Therefore, the Government needs to prepare a wider infrastructure to carry out further trials

RECOMMENDATION

It is necessary to increase the readiness of radio broadcasting operators towards digitalization by increasing the understanding of the scheme that will be applied to analog radio broadcasting (Existing) in the implementation of simulcast digital radio broadcasting. The cooperation of all parties (regulators, vendors, and radio broadcasting institutions) is required to support the implementation of simulcast digital radio broadcasting (Analog & Digital).

In order for the analog radio broadcasting industry to live a healthy life, it is necessary to encourage manufacturers to re-produce analog radio receivers (AM & FM). This is necessary because analog radio broadcasts in Indonesia are not turned off, but in reality analog radio receivers are very rare on the market. In addition, there is a need for efforts to reproduce the need for the "evolution of analog radio broadcast receivers" by producing using new creativity and product designs that are attractive to the present or add value to products that are used routinely by today's society, such as power banks or refrigerators in House. In addition, the government needs to encourage mobile phone/gadget vendors so that all products of any brand and any price that are marketed in Indonesia must be able to receive terrestrial analog and digital radio broadcasts, including broadcast radio receivers in four-wheeled vehicles (cars), starting to add DAB and DRM in addition to SW/AM/FM channels.

The most important thing is also that it is necessary to further enhance the socialization of broadcast radio digitalization regarding the benefits that can be obtained by implementing a digital radio broadcasting system with a simulcast system for both radio broadcasting operators and the public as listeners. It is necessary to conduct a review regarding whether it is possible for Indonesia to use only 1 (one) DAB digital radio broadcasting platform or only DRM? The government facilitates the empowerment of radio human resources as professional managers to encourage the successful implementation of simulcast (Analog & Digital) radio broadcasting.

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