 Challenges and opportunities for Integrated Broadcast Broadband (IBB) implementation in Indonesia

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Abstract. TV consumption patterns around the world have changed dramatically since the appearance of over the top service. Integrated Broadcast Broadband (IBB) system provide value services that attract customers to enjoy traditional TV services compared to OTT services. ITU-R define IBB system as a combination of broadcast and broadband technology, which provides high quality, flexible, interactive, and personable services. This study aims to determine the challenge and opportunities of implementing IBB in Indonesia. The research method is carried out with a qualitative data approach using PEST analysis. The results showed that IBB has potential opportunities to be applied in Indonesia since the digital terrestrial television coverage has reached more than half of the population. Moreover, the increasing number of digital satellite television subscribers, as well as IPTV subscribers, provide a potential market for IBB services. However, the lack of supporting broadband infrastructure and digital terrestrial television regulations uncertainty will be a challenge for the success of IBB implementation in Indonesia.

Keywords. Integrated Broadcast Broadband (IBB), Digital Terrestrial Television, PEST analysis

1. Introduction

Increased internet penetration rate has led to a shift in the consumption of public broadcast content. Content viewers based on OTT services, such as streaming and video on demand (VoD) offering diverse content at relatively affordable prices is increasing, while viewers from traditional linear broadcast television are declining. In the US, the penetration of pay-TV customers has dropped from 84% in 2014 to 79% in 2017. In contrast, the penetration of OTT customers has increased to 51% in the latter. Subscriptions Video on Demand (SvoD) and Advertising Video on Demand (AvoD) are the most popular on-demand content, with 83% global revenue [1].

Some broadcasters managed to provide added value from their traditional services through integrated broadband broadcast (IBB) technology to overcome the threat of OTT services. IBB technology may combine interactive multimedia services, distributed through broadband networks and traditional linear broadcasting services. HbbTV, Hybridcast, Ginga, and ATSC 3.0 are some of the IBB common standard [2]. Thus, HbbTV is the most widely adopted standard worldwide among those standards. At present, 36 countries have adopted the HbbTV platform standards; five of them are from the Asia Pacific region, namely Australia, New Zealand, Singapore, Malaysia, and Vietnam [3].
Singapore was the first country in Southeast Asia to deploy Hbbtv through Mediacorp in 2013 with the Toggle services [4]. Toggle services allow customers to access linear and on-demand content via primary or second devices such as smartphones, smart TVs, computers, specific media streaming devices, and Toggle Red Button [5].

International Telecommunication Union (ITU) in the ITU-R BT.2267-6 report mentioned that IBB technology offers a combination of broadcast technology advantages providing high-quality information with efficient delivery, as well as flexible and interactive services from broadband technology [6]. IBB services can be further developed by using companion devices and IoT devices to improve user experience [7][8]. However, in addition to the advantages offered by IBB services, the high level of interaction between IBB applications and second devices such as smartphones and tablets, increase security vulnerability to users [9]. Also, there are privacy issues where user data such as location can be utilized by broadcaster without notification to users [10].

Consideration of IBB standards adoption in a country is inseparable from the development of digital terrestrial television (DTT). In Malaysia and Vietnam, HbbTV platform became part of DVB-T2 launches [11]. Meanwhile, in Indonesia, terrestrial broadcast digitalization has been delayed due to regulatory constraints. The Minister of Communication and Informatics Regulations regulating the operation of digital terrestrial television broadcasting is contradictory to the broadcasting law [12][13]. However, despite the obstacles in DTT deployment, satellite television broadcasting, and IPTV customers have increased in the country [14]. This study will examine the challenges and opportunities of IBB deployments in Indonesia so that the government can prepare regulations to support IBB implementation in Indonesia.

2. Broadcasting Technology Evolution

Analog TV technology appeared in the 1950s. There are two standards of analog television in the world, i.e., the 625-line system with a 50 Hz frame rate and the 525-line system with a 60 Hz frame rate. The color transmission standards are PAL (Phase Alternating Line), NTSC (National Television System Committee), and SECAM (Séquentiel Couleur a Mémoire) [15]. PAL standard is widely used by European and Asian countries, including Indonesia, while American, South Korean, Japanese use NTSC[16]. Meanwhile, SECAM standard is widely used by middle-east countries and Africa [17].

Digital TV technology was released in the 1980s. Digital TV provides more advantages than analog TV, namely more services, in addition to better image quality and interactive television[18]. Digital TV system consists of digital terrestrial television (DTT) and digital terrestrial multimedia (DTM) systems. There are several standards of DTT, namely, ATSC, DVB-T, ISDB-T, DTMB, DTMB-A, and DVB-T2[19]. Digital Video Broadcasting-Terrestrial (DVB-T) is the DVB European-based consortium standard for the broadcast transmission of digital terrestrial television that was published in 1997. Many European, African, and Asian countries used that standard for their digital terrestrial television.

ISDB-T is a digital television standard that was released by Japan. Japan, Brazil, Peru, Argentina, Chile, and Venezuela are several countries using the standard. Meanwhile, the United States, Canada, Mexico, El Salvador, and the Dominican Republic are using ATSC standard for their digital terrestrial television [20]. Integrated broadcast broadband (IBB) technology is a combination of broadcast and broadband, maximizing benefit integration, providing high quality, flexibility, interactivity, and personal service [21]. IBB standard includes Hybrid broadcast-broadband television (HbbTV) system, Hybridcast, Ginga (middleware), and ATSC 3.0 [2].

3. Research Method

This study was conducted using a qualitative approach. Qualitative data was obtained through focus group discussion with regulators, private broadcasters, content providers, IPTV providers, local TV set manufacturers, and mobile network operators. The data were analyzed using PEST analysis to discover, evaluate, organize, and track macro-economic factors which may impact broadcaster existing and future businesses. Figure 1 shows PEST analysis template.
Political or politically motivated factors that could impact the organization.

Overall economic forces that could impact on your success.

Social attitudes, behaviors, and trends that impact your organization and target market.

Technology that can affect the way you make, distribute, and market your products and services.

### Figure 1. PEST Analysis Template

Political factor has a significant impact on business entities. The stability of the political environment and government policies affect business continuity. The government position on marketing ethics and economy are the issues of political factors. Meanwhile, Economic factors influence business considerations in the short and long term. The economic element comprises of interest rates and another item such as Gross Domestic Product per capita.

Social-cultural factors influence the market target. The elements comprise of consumer attitudes and opinions of media views, lifestyle trends, fashion, and role models. The other factor, technology, is vital for competitive advantage and is a significant driver of globalization. The competing technology development, linkage to the existing technology, and the maturity of technology are affecting the technology factor [22].

### 4. Analysis

#### 4.1. Political Factors

IBB is a technology that supports both broadcast and broadband in one system simultaneously. Synchronization between broadcast and broadband signals is needed so that the broadcast signals sent are in the form of digital signals through terrestrial, satellite, and cable. Digital broadcasting infrastructure readiness is essential to support IBB implementations [14]. The Indonesian government has planned to complete the analog switch over (ASO) in 2020. However, Indonesia has not been able to complete the ASO due to certain hindering regulatory factors. The existing Broadcasting Law, Broadcasting Law Number 32 of 2002, does not accommodate digital terrestrial broadcasting [13]. Since there is no strong legal basis for digital terrestrial broadcasting, digital terrestrial TV infrastructures deployed by private broadcaster have been in stagnating condition. Currently, Indonesian Public Broadcasting Institution (LPP) TVRI is the only broadcaster which develops digital terrestrial TV infrastructure progressively.

The number of digital terrestrial TV stations in Indonesia increased slightly in the first few years, but it dropped significantly from 2016 to 2017, as shown in Figure 2. From 2013 until 2015, the number of digital terrestrial TV stations slightly increase by no more than 20%. After 2016, the number of terrestrial TV stations fell by around 84%. However, to support the development of digital terrestrial TV broadcasts, LPP TVRI continues to improve broadcast quality.
By the end of 2016, TVRI digital terrestrial broadcasts have reached 43.2 percent broadcast coverage and cover 54.5 percent population across Indonesia [24]. Also, the Ministry of Communication and Informatics (MCI) Indonesia and LPP TVRI have conducted three phases trial in 12 cities by involving 42 content providers [25]. IBB services are categorized as OTT services and digital broadcasting value-added services (VAS). As regulation regarding, the provision on OTT is necessary to support the IBB services, protect customers’ personal data, and control the content. Singapore has identified IBB as OTT services and regulate them in the content code for over-the-top, video on demand, and niche service [12].

4.2. Economic Factors
Broadcasting providers’ advertising revenue is decreasing every year [26]. The reduced income is due to the shift of TV viewer interest to enjoy streaming broadcast via the internet. They consider that linear TV program is less interactive and less attractive. TV programs are not available for on-demand viewing and the contents do not fit their demand. Through the IBB, people will be able to enjoy big-screen TV at home with various and more interactive services so that people will be interested in watching it. Thus, the advertising income of broadcasting providers will increase.

Japan has already established Hybridcast as the standard of its national IBB system. Currently, broadcasting providers such as NHK, TBS Television, and TV Asahi provide a free IBB program to attract customers. The broadcasters expect to obtain more profit from interactive advertisements, interactive quizzes, and games. HbbTV in Singapore, organized by Toggle red button, provides services that enable the customers to enjoy on-demand access on aired programs aired on Mediacorp channels, video-on-demand, star over, and stay updated on upcoming programs with the on-screen TV guide for the next seven days. The various services offered are expected to attract TV viewers so that advertising revenue can increase.

Figure 3 shows the comparison of advertisement incremental revenues between a TV program and online video. The income from TV program was significantly higher than that from online video from 2013 to 2015, but became lower from 2016 to 2018. The decreasing of TV revenue is caused by the number of viewers who are more interested in watching online video via the internet than watching linear programs from TV. However, the Media Partner forecast shows that the revenue of the TV program will increase and reach a higher point from that of online video. It will be the case if the TV stations provide new technology to support new services, such as IBB.
4.3. Social Factors

It is necessary to examine the number of people who watch digital TV to find out the potential of IBB in Indonesia. Based on the data of MCI Indonesia, the number of satellite and cable pay-TV subscribers increased from 2016 to 2017. Figure 4 shows that the most significant increase of users is that of satellite pay-TV, with a more than 800% increase from 2016 to 2017. Users of cable pay-TV increased more than 600% in 2017 from 2016. However, the users of satellite and cable pay-TV (combo) decreased by 2%

The largest satellite pay-TV users are those of MNC Sky Vision. Despite the fact that it only began its operations in 1995, MNC Sky vision users have increased significantly from 2005 to 2014. The increase of users only slowed down after 2014 when other satellite subscription TV and IPTV services released by telecommunications operators in Indonesia. Currently, there is an increasing trend in the use of triple-play services, which consist of IPTV, internet, and telephone. IPTV services offer non-linear TV services so that viewers can enjoy on-demand TV shows at any time according to viewers’ need. Indihome owns one of the largest IPTV markets as shown in Figure 5.

Figure 3. The Incremental revenue of advertisement (US$ million) [26]

Figure 4. Pay-TV Subscribers

Figure 5. IPTV (Indihome) subscribers [27][28][29][30]

Figure 5 shows that Indihome started its operation in 2015, reaching one million customers in 2015 and increased more than 50% in 2016 and 2017. In today’s digital era, people are more interested in enjoying on-demand services such as Youtube, Iflix, and Netflix. IBB technology offers on-demand services, catch-up TV, online games, multi-view, start-over, etc. so that people will be interested in enjoying this technology.
4.4. Technological Factors
Initially, the standards for digital terrestrial TV technology was the Digital Video Broadcasting-Terrestrial (DVB-T) standard, as stipulated in the Regulation of MCI Number 07 of 2007. As the DVB-T standard developed, the standard was replaced with DVB-T2 under the Regulation of MCI Number 05 of 2012 [25]. Both DVB-T dan DVB-T2 standards were issued by European Telecommunications Standards Institute (ETSI) [26]. DVB-T2 can increase the data-carrying capacity by up to 30% over DVB-T and improve the flexibility of operation and robustness of reception [31]. The HbbTV standard has been implemented in many countries across Asia and Europe. In the Asia Pacific, Singapore, Malaysia, Australia, New Zealand are among countries that have been using the standard. Table 1 shows the HbbTV features implementation in Asia and Europe.

Table 1. HbbTV Implementation

| System   | Features                          | Countries                      |
|----------|-----------------------------------|--------------------------------|
| HbbTV 1.0 | CE-HTML (XHTML1.0), MPEG-DASH (1.5 only) Embedded player) HTML5 | European countries, Singapore (Toggle Red) Malaysia (by Media Prima, RTM) |
| HbbTV 1.5 | MPEG-DASH (embedded player) Second screen | UK (Freeview Play), Ilaty (Tivu) |

Hybridcast is another IBB standard from Japan, which has been applied by Japan since 2013. That standard is compatible with ISDB-T, a digital terrestrial TV standard issued by Japan. The number of TV set Hybridcast production increases each year. The highest production is predicted in 2020 due to the Olympics event, which will be held in Japan. Moreover, Japan TV industry also predicts that Hybridcast TV set will achieve by 75% of the whole TV production in its country.

Table 2 shows the features of Hybridcast systems. The difference between Hybridcast v.1.0 and v.2.0 is that Hybridcast v.2.0 has supported second screens. Japan is the only country to have implemented Hybridcast standard. Before providing IBB services, broadcasters must register to IPTV Japan to obtain Hybridcast ID. The broadcasters who have registered for ID broadcasting until 2018 in Japan were 31 terrestrial commercial broadcasters, five commercial satellite broadcasters, and 14 cable TV operators.

Table 2. Features of Hybridcast Systems and Broadcasters

| System     | Features               | Broadcasters                   |
|------------|------------------------|--------------------------------|
| Hybridcast v.1.0 | HTML5, second screen   | Japan (NHK, Nippon, Mitsubishi, TV Tokyo, TBS, etc) |
| Hybridcast v.2.0 | MPEG-DASH, Second screen |                               |

The successful implementation of IBB depends on the availability of the telecommunication and broadcasting supporting infrastructure. Based on the Ministry of Communication and Information Technology Indonesia, in 2017, the number of the 3G base station has reached 45%. However, the 4G base station number is less than 20%. Meanwhile, the fiber optic distribution from 2015 to 2017 has increased each year significantly. The FTTH is expanding more than 100% from 2016 to 2017, as shown in Figure 6. However, the deployed fiber optic has only covered 16% of all cities in Indonesia.
5. Conclusions and Recommendations

IBB technology is one of the digital television added services. It may support analog switch over and increase digital television terrestrial broadcaster’s income. IBB technology can support non-linear services that are quite popular among the public. IBB can be well implemented if sufficient digital TV networks are available.

Until 2016, digital terrestrial TV coverage has reached 54.5 percent of the population in all regions of Indonesia. Also, the number of digital satellite TV subscribers continues to increase from year to year. Thus, there are opportunities for IBB technology to develop as value-added services, both for digital terrestrial TV and satellite digital TV. However, low FTTH penetration has been an issue in IBB implementation. In addition, a legal basis in digital terrestrial TV operations has not been in place. This led to private broadcaster’s hesitance in investing digital terrestrial TV infrastructure, especially IBB infrastructure.

The government is required to accelerate the passage of laws that support the implementation of digital television to support the successful implementation of IBB. Since IBB is categorized as an OTT service for digital TV, the government also needs to stipulate OTT content regulations to anticipate negative implications for users. In addition, the government needs to increase broadband network penetration to improve the quality of IBB services.

6. References

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