



## Analysis of Digital Television User Acceptance After Analog Switch-Off (ASO) Implementation in Jabodetabek

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### Abstract

The government officially stopped broadcasting analog television or what is known as Analog Switch Off (ASO) on November 2, 2022, in Jabodetabek. It impacts analog TV users in Jabodetabek, who can no longer receive television broadcasts on their analog televisions. This research aimed to determine user acceptance of digital television broadcasts after implementing ASO in the Jabodetabek area. In the present study, the experience of digital TV users is evaluated using the UTAUT (Unified Theory of Acceptance and Use of Technology) 2 model and the Structural Equation Model (SEM). The data was obtained from a questionnaire distributed through digital media for the Jabodetabek area. According to data processing, the two factors that significantly influence the user experience of digital television broadcasts are the Analog Switch Off (ASO) policy factor and the habit factor. The hypothesized model suitability test fits the resulting data and can affect the Behavioral Intention 41.4.

**Keywords:** *Analog Switch Off, Digital Television, Jabodetabek, SEM, UTAUT, User Acceptance*

### Abstrak

Secara resmi Pemerintah telah menghentikan siaran televisi analog atau yang dikenal dengan nama Analog Switch Off (ASO) di Jabodetabek pada tanggal 2 November 2022. Hal ini tentu saja memberikan dampak terhadap pengguna di Jabodetabek, dimana televisi analog mereka sudah tidak dapat menerima siaran televisi. Penelitian ini dilakukan untuk mengetahui penerimaan pengguna terhadap siaran televisi digital di wilayah Jabodetabek setelah diberlakukannya ASO. Penelitian ini menggunakan model UTAUT 2 (Unified Theory of Acceptance and Use of Technology 2) untuk mengevaluasi penerimaan pengguna serta menggunakan Structural Equation Model (SEM) sebagai teknik pengolahan datanya. Data diperoleh dari hasil kuesioner yang disebarakan melalui media digital untuk lokasi Jabodetabek. Dari hasil pengolahan data diketahui bahwa dua hal yang paling mempengaruhi penerimaan pengguna siaran televisi digital, yaitu karena faktor kebijakan Analog Switch Off dan faktor kebiasaan. Uji kesesuaian model yang dihipotesiskan secara keseluruhan sesuai atau fit dengan data yang dihasilkan dan dapat berpengaruh terhadap Behavioral Intention sebesar 41,4.

**Kata-kata kunci:** *Analog Switch Off, Jabodetabek, SEM, Televisi Digital; UTAUT, Penerimaan Pengguna*



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## 1. Introduction

Digital terrestrial television in Indonesia began in 2009, operating alongside the analog TV system in most regions of the country. Initially, digital terrestrial television in Indonesia used the DVB-T system but later switched to DVB-T2 with Ministerial Regulation No. 5 issuance in 2012 [1]. Analog television broadcasts that have been airing for nearly 60 years in Indonesia will be replaced by digital television broadcasts no later than November 2, 2022. The government's policy regarding the discontinuation of analog TV broadcasts is known as Analog Switch Off (ASO), as stated in Ministerial Regulation No. 11/2021 amending Ministerial Regulation No. 6/2021 regarding Broadcasting Implementation [2].

With the advancement of technology, the demand for frequency spectrum has increased. It prompted the government to migrate from analog to digital TV broadcasting. In addition to optimizing frequency spectrum utilization, the government's considerations for migrating from analog to digital TV broadcasting include improving the quality of TV broadcasts and boosting the economy in the broadcasting industry sector.

ASO has been implemented in several countries, including the United States, the United Kingdom, China, Japan, Canada, and Australia [3]. Indonesia announced the migration from analog to digital TV in 2018 but was only fully realized in Jabodetabek on November 2, 2022. The ASO policy has certainly impacted analog TV users in Jabodetabek, as analog TVs can no longer receive TV broadcasts. To resume watching TV broadcasts, users need to add a Set-Top Box (STB) device or replace their analog TV with a digital one.

Research on the conversion from analog to digital TV has been conducted, including implementing digital TV broadcasting systems and testing [4] [5]. This research explains how the implementation was carried out, the results of digital broadcasting trials, and the challenges faced. There is also research on the readiness and challenges in the broadcasting industry [6] [7] [8] exploring the preparedness of both local and national TV broadcasters in preparing for analog-to-digital migration and the challenges they must face. Previous studies have also examined the public's readiness to accept the conversion from analog to digital TV [9] [10].

This study investigates user acceptance after implementing ASO in the Jabodetabek area. It seeks to identify the factors that influence user acceptance, whether the performance offered meets user expectations or is acceptance merely due to the compulsion of ASO. The study utilizes the UTAUT 2 (Unified Theory of Acceptance and Use of Technology 2) method to evaluate user

acceptance of digital TV usage during ASO, employing Structural Equation Model (SEM) as the data processing technique.

## 2. Method

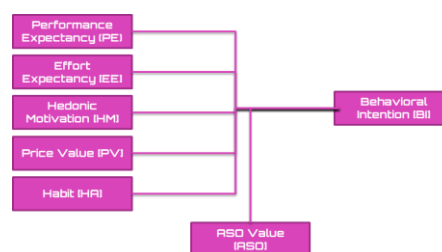
The research method used in this study is quantitative, where the model utilized is the UTAUT 2 model with the addition of 1 development variable. The data were obtained from questionnaires distributed through digital media in a Google Form of 25 questions. The selected location is the Jabodetabek area, the first area in Indonesia to implement ASO. The data processing technique employed is Structural Equation Model (SEM) using IBM SPSS AMOS 26 software, while the measurement scale utilized in the research is a 5-point Likert scale. The minimum number of respondents was calculated using the Slovin formula (1), based on a population size of 7,200,000, according to Nielsen data [11].

$$n = \frac{N}{1 + N(e)^2} \quad (1)$$

Where  $n$  represents the target sample size,  $N$  the population size of users, and  $e$  represents the error level. Based on this research, the chosen error level is 10%. From the calculation results, it is determined that the required target sample size is 100 respondents.

### 2.1 UTAUT 2 (*Unified Theory of Acceptance and Use of Technology 2*) Model

The UTAUT 2 model is an extension of the UTAUT model developed by Venkatesh. This model is an acceptable model for technology. UTAUT consists of four main factors: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions.[12] On the other hand, UTAUT 2 adds three additional factors: Hedonic Motivation, Price Value, and Habit. These seven factors will influence Behavioral Intention and Use of Behavior. The model used in this research is based on UTAUT 2, excluding the variables of Social Influence and Facilitating Conditions and adding a new variable called Analog Switch Off Value (ASO Value). Therefore, this UTAUT model will have six independent variables and one dependent variable, as shown in **Figure 1**.



**Figure 1.** The Proposed Research Model

**Figure 1** illustrates the relationship between variables. PE (Performance Expectancy) represents users' expectations of the benefits they will gain by using digital television. EE (Effort Expectancy) refers to users' expectations regarding the effort required to enjoy digital television. HM (Hedonic Motivation) measures the extent to which the use of digital television motivates users to derive pleasure. PV (Price Value) represents the value users place on the cost of using digital television. HA (Habit) reflects users' habitual use of digital television. ASO Value represents the influence of the implementation of ASO in Indonesia. These six variables impact BI (Behavioral Intention), representing users' intention or desire to continue using digital television. Each variable has a different number of questions, as shown in **Table 1**.

**Table 1.** The Question for Each Variable

Variable	Number of Questions
PE (Performance Expectancy)	6
EE (Effort Expectancy)	3
HM (Hedonic Motivation)	3
PV (Price Value)	2
HA (Habit)	3
ASO Value	6
BI (Behavioral Intention)	2

## 2.2 Hypothesis model:

Based on the research model in Figure 1, the following hypothesis model is obtained:

- a. H1: PE positively influences BI in the use of digital television.
- b. H2: EE positively influences BI in the use of digital television.
- c. H3: HM positively influences BI in the use of digital television.
- d. H4: PV positively influences BI in the use of digital television.
- e. H5: HA positively influences BI in the use of digital television.
- f. H6: ASO positively influences BI in the use of digital television.

## 2.3 Data processing

Data processing was conducted using SEM (Structural Equation Model). Validity and reliability tests were performed before entering the data into the software. The validity test is used to assess the accuracy or precision of the instrument used, in this case, the questionnaire. The test is conducted by examining the correlation between the values of each question on the questionnaire and the total value of all the samples. The values are considered valid if the

calculated value (r-value) exceeds the table value (t-value). The r-value is obtained by calculating the correlation between the average values of the specific question and the average value of all the questions from the total sample size. The reliability test is used to determine the reliability and consistency of the measured questionnaire. The reliability test is calculated using Cronbach's Alpha formula, as shown in equation (2).

$$r_{11} = \left[ \frac{n}{n-1} \right] \left[ 1 - \frac{\sum \sigma_b^2}{\sigma_t^2} \right] \quad (2)$$

where  $r_{11}$  is the Cronbach's Alpha coefficient,  $n$  is the number of items in the measure  $\sum \sigma_b^2$  is the sum of item variances, and  $\sigma_t^2$  is the total variance. The test is considered reliable if the value is greater than 0.5 [13].

After conducting the validity and reliability tests, the next step is to perform a goodness-of-fit (GOF) test using IBM SPSS AMOS software. The GOF test is conducted to assess the adequacy of a model. There are several methods available to test the GOF in a model, such as determining the chi-square value, RMSEA (Root Mean Square Error of Approximation), GFI (Goodness-of-Fit Index), AGFI (Adjusted Goodness-of-Fit Index), SRMR (Standardized Root Mean Square Residual), and others [14]. However, the  $RMSEA < 0.06$  and  $SRMR < 0.09$  combination indicates a well-fitting model [15].

To test the initial hypotheses for each variable in the model, a t-test is used. There are two types of t-tests: the first is based on the significance value (sig), and the second uses the calculated t-value and the critical t-value from the t table [16]. In the t-test conducted in this study, the computed t-value is compared to the critical t-value. The calculated t-value is obtained from the SPSS output, while the critical t-value is determined by calculating the degrees of freedom (df) and referring to the t-table. The critical t-value obtained in this test is 1.289. Therefore, the computed t-value must be greater than the critical t-value, or the absolute value of the calculated t-value must be smaller than the negative of the critical t-value [17].

### 3. Results and Discussion

#### 3.1 Respondent Profile

The total number of respondents in this study was 130 samples, with 14 samples considered unsuitable as they reside outside Jabodetabek or do not use a Set Top Box or digital television. The respondent profile can be seen in Table 2. The respondent profile shows that 63.8% of the respondents fall in the age range of 26-35 years, and 77% have a monthly income above

IDR 5,000,000. It is noted that this age range represents the millennial generation who are updated with technology, and having an income above IDR 5,000,000 makes 51.8% of them prefer to purchase a digital television instead of using an additional Set Top Box for their analog tv. Respondent profile can be shown in [Table 2](#).

**Table 2.** Respondent Profile

Characteristic		Frequency	Percentage
Gender	Male	79	61,1%
	Female	51	38,9%
Age Range	17 – 25	8	6,1%
	26 – 35	83	63,8%
	36 – 45	27	20,8%
	46 – 55	9	6,9%
	55 and above	3	2,3%
Device	Digital Television	75	60,8%
	Set Top Box	41	32,8%
	Other	14	6,4%
Monthly income	< 2.500.000	15	11,5%
	2.500.000 – 5.000.000	19	14,5%
	5.000.000 – 8.000.000	32	24,4%
	8.000.000 – 10.000.000	19	14,5%
	10.000.000 – 15.000.000	23	18,3%
	> 15.000.000	22	16,8%

### 3.2 Validity and Reliability test

Based on the R table with a significance level of 0.1 and degree of freedom (df) equal to N-2, where N is the obtained sample size of 116, the value of the rtabel is found to be 0.1535. The results of the validity test can be seen in Table 3. From Table 3, it can be concluded that the calculated value (r-count) is greater than the table r value (table-r), indicating that each question in the questionnaire is valid. Next, the reliability value is calculated using Cronbach Alpha. The computed value is found to be 0.89. Since the obtained value is more significant than 0.6, the reliability test is considered reliable. Result of validity tesh presented on [Table 3](#).

**Table 3.** Validity Test

Question		r-count	Table-r	Status
PE (Performance Expectancy)	PE1	0,467926	0,1528	Valid
	PE2	0,461295	0,1528	Valid
	PE3	0,482574	0,1528	Valid
	PE4	0,609635	0,1528	Valid
	PE5	0,521838	0,1528	Valid
	PE6	0,660039	0,1528	Valid
EE (Effort Expectancy)	EE1	0,491952	0,1528	Valid
	EE2	0,343829	0,1528	Valid
	EE3	0,582289	0,1528	Valid
HM (Hedonic Motivation)	HM1	0,711212	0,1528	Valid
	HM2	0,653555	0,1528	Valid
	HM3	0,716837	0,1528	Valid
PV (Price Value)	PV1	0,595427	0,1528	Valid
	PV2	0,549527	0,1528	Valid
HA (Habit)	HA1	0,587238	0,1528	Valid
	HA2	0,597759	0,1528	Valid
	HA3	0,577311	0,1528	Valid
BI (Behavioral Intention)	BI1	0,585246	0,1528	Valid
	BI2	0,480134	0,1528	Valid
Analog Switch Off Value (ASO Value)	ASO1	0,407119	0,1528	Valid
	ASO2	0,585477	0,1528	Valid
	ASO3	0,620988	0,1528	Valid
	ASO4	0,577237	0,1528	Valid
	ASO5	0,331674	0,1528	Valid
	ASO6	0,600161	0,1528	Valid

### 3.3 Goodness Of Fit (GOF) test

The results of the model fit test were obtained using IBM SPSS AMOS software by connecting each variable according to the proposed SEM model, as seen in Figure 2. The output of the model

fit can be observed in Table 4. Several values represent the results of the GOF fit test, such as the chi-square/df value, which is less than 3. The NNFI (Non-Normed Fit Index) and CFI (Comparative Fit Index) values are more significant than 0.95, while the RMSEA value is less than 0.06, and the SRMR value is less than 0.09. These values confirm that the GOF fit test for this research model is considered appropriate. SEM model is presented in Figure 2.

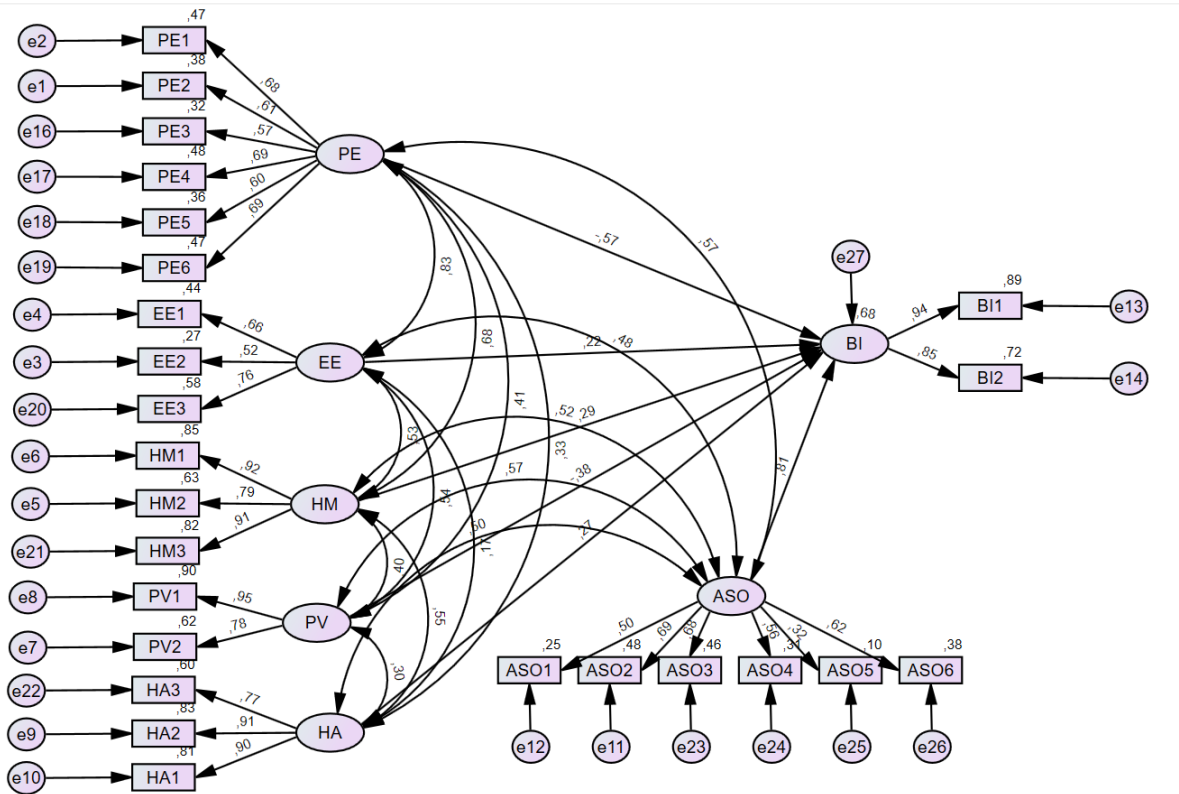


Figure 2. SEM Model

Goodness of fit test results is presented on Table 4.

Table 4. Goodness of Fit Test Results

Model Fit	Value
<i>Chi – Square</i> ( $\chi^2$ )	141,974
df	131
$\chi^2/df$	1,084
SRMR	0,044
NNFI ( <i>Non-Normed Fit Index</i> )	0,984
CFI ( <i>Comparative Fit Index</i> )	0,988
RMSEA	0,027



### 3.4 Hypothesis Test Result

Hypothesis testing is conducted by examining the t-test results and comparing them with the values in the t-table. The results of the t-test can be seen in Table 5. From the t-table, it is known that the lower and upper limits of the t-table value are  $\pm 1.289$ . Therefore, the results are as follows:

- a. H1: PE positively influences BI's use of digital television.  
Result → Significant
- b. H2: EE positively influences BI in the use of digital television.  
Result → Not Significant
- c. H3: HM positively influences BI in the use of digital television.  
Result → Significant
- d. H4: PV positively influences BI's use of digital television.  
Result → Negative Influence
- e. H5: HA positively influences BI in using digital television.  
Result → Significant
- f. H6: ASO positively influences BI's use of digital television.  
Result → Significant

T-test result can be seen on [Table 5](#).

**Table 5.** T-test Result

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t
	B	Std. Error		
\1 (Constant)	1.289	.876		1.471
PE	.084	.045	.192	1.879
EE	-.039	.074	.049	-.526
HM	.174	.068	.256	2.565
PV	-.169	.074	-.200	-2.292
HA	.180	.052	.299	3.462
ASO	.184	.037	.449	5.018
Dependent Variable BI				

PE, HM, HA, and ASO have a positive influence on BI in the use of digital television, while PV has a negative influence. It means that if the price of digital television decreases, more users will intend to continue using it. On the other hand, EE does not affect users. In other words, users do not care about the effort they put into using digital television. Overall, PE, EE, HM, PV, HA, and ASO collectively account for 41.4% of the influence on BI.

### 3.5 Finding

Based on the T-test results, it is found that the variable with the most significant influence on BI (Behavioral Intention) in the use of digital television is ASO (Analog Switch-Off). Users switch to digital television due to the government's ASO regulations. To access television broadcasts, users must switch to digital television because analog television broadcasts in the Jabodetabek area have been officially terminated. Switching to digital television allows the frequency used by analog television to be allocated to 5G technology or other technologies that require frequency allocation. Additionally, with the multiplexing system in digital television broadcasts, the number of television channels can be increased, allowing local television stations to compete. ASO regulations imply that regulations related to digital television broadcasting are still insufficient, as the current regulations still refer to the Job Creation Law. Therefore, the government is expected to promptly establish specific regulations to support the development of digital television broadcasting.

The second factor influencing BI (Behavioral Intention) in digital television is HA (Habit). The transition from analog to digital television does not significantly impact the public's viewing habits. It is likely because television is a technology that has been commonly used since childhood, with analog television broadcasts aired for 60 years. As a result, most households typically have at least one television, establishing television viewing as a habitual behavior for users. It is hoped that television stations will provide educational, high-quality, and beneficial programs to cater to viewers' habits.

Another factor influencing BI (Behavioral Intention) in the use of digital television is HM (Hedonic Motivation). When viewers are satisfied with the television programs, it directly increases their desire to watch television again. As users become more satisfied with the available television programs, it opens up opportunities for television stations to diversify their programs, increase ratings, and generate revenue through advertisements.

The last factor influencing BI (Behavioral Intention) in digital television is PE (Performance Expectancy). The research results indicate that the performance of digital television is not the primary reason for the switch. According to the survey, 89.6% of respondents agreed that digital television broadcasts' image and sound quality are superior to analog television broadcasts. Digital television also offers a greater variety of programs and channels than analog television. It opens up opportunities for the creative industry to flourish. With the increasing number of digital television channels, there is a demand for engaging and diverse programs,

providing opportunities for content creators to be more productive in creating content that appeals to digital television users.

On the other hand, the PV (Price Value) variable still has an influence, but negatively or inversely. If the price decreases, more users can afford to use digital television. However, according to the journal "Understanding the Adoption of digital terrestrial, cable-based, and satellite-based television to speed up the analog switch-off in Indonesia," it is more beneficial for low-income communities to enjoy digital television broadcasts rather than subscribing to cable/satellite. By purchasing a Set Top Box (STB), individuals can enjoy digital television broadcasts without paying subscription fees. This also creates opportunities for selling STBs and digital and opening service opportunities for STBs and digital televisions.

The T-test results also found that EE (Effort Expectancy) does not influence BI (Behavioral Intention) in the use of digital television. Users are not concerned about the effort required to watch digital television broadcasts. This is because watching television has been a habitual behavior for people for a long time. Despite the additional cost associated with watching digital television broadcasts, users try an effort to purchase digital television devices. It presents an opportunity for individuals to sell Set Top Boxes (STB) and digital and open service opportunities for STB and digital televisions.

Some interesting findings from the survey of digital television users' experiences during the implementation of ASO in the Jabodetabek area include the discovery that 53% of users purchased Set Top Box equipment or digital televisions after analog televisions became unusable. It proves that ASO is one of the main reasons respondents use Set Top Box equipment or digital televisions. Additionally, it is also known that the use of digital television does not replace the use of social media. It is supported by 68.7% of respondents who disagreed with the question, as they believe that watching television cannot replace the use of social media. It is because the experiences users gain from these two technologies are different. Digital television broadcasts only allow one-way communication, while social media enables two-way and interactive communication.

#### **4. Conclusion**

The study aims to understand the user acceptance of digital television during the implementation of ASO in the Jabodetabek area. The survey results found that the factor that most influence digital television broadcasts' user experience is the Analog Switch Off (ASO)

policy. The government policy related to ASO has the most significant impact on the user experience of digital television in Jabodetabek. On the other hand, EE (Effort Expectancy) does not influence the user experience. Customers will continue to try to enjoy digital television broadcasts, and they need help finding the installation and setup of the set-top box problematic. It is because television is the most affordable form of entertainment compared to other similar options, such as cable/satellite television or streaming services like YouTube, Netflix, and Vidio, which require subscription fees or internet costs. Overall, the model in this study is good, and all six proposed variables have a total impact of 41.4% on BI (Behavioral Intention).

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