The impact of digital transformation adoption towards broadcasting industry in Sri Lanka

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Abstract

Sri Lanka's media landscape follows the global broadcasting industry's popularity. Digitalization has had the greatest impact on the sector and all its usage scenarios. Therefore, the primary goal of this study is to ascertain how Sri Lanka's broadcast business would be impacted by the digital revolution. This study seeks to uncover the factors that influence the media industry's transition to a digital model and determine how much viewers, broadcasters, content providers, and infrastructure in Sri Lanka depend on public digital media use. A standardized questionnaire has been administered to reach the goal. From a sample of 1174 respondents in the Western Province, information about the nine research constructs was gathered using previously validated instruments SmartPLS 3 and the SPSS 26 that were used to systematically assure the empirical validation of the theoretical model. The conceptual framework did not match the research's real-world reality. Digital broadcasts and digital literacy affect broadcasters' digital uptake. User device availability, price, and perceived ease of use mediate the intention to use a digital device. Perceived usefulness partially mediates broadcast user digital adoption. Age and gender moderating variables, produced from solid empirical findings and fully excluded from the study, established a new field of study for the literature. The findings also omit the independent policy on digitalization variable. Hence, the study showed that its survey results had a considerable impact on the conceptual model compared to past empirical investigations, and most importantly, it opened up a new field of knowledge for future research. Lastly, the study's findings were discussed and recommendations are provided. Sri Lanka's media industry's digital transformation will benefit from applying the research's findings. The proper application of the research's conclusions will improve the sector by bringing about several advantages for Sri Lanka's media industry's digital transformation.

Keywords: broadcast, digital adoption, digitalization, digital literacy, digital transformation

1. Introduction and background

The landscape of the audio-visual market has been drastically changing over the last thirty years (Medina, Herrero and Etayo, 2015). Digitalization has far reached impact to broadcasting industry and it has been tending to cease the common experience and shared the activity as an individual experience (Chalaby and Segell, 1999).

Dominick (2009) says "*Hoping to capitalize and utilize the public's increasing awareness of high-definition television (HDTV) the radio industry is introducing high-definition (HD) radio, a digital service that generally improves the signal quality of terrestrial radio stations broadcast.*"

It is observed that digital media consumption has exponentially increased in the world and digital video viewer count has doubled during the last five years to 1.3 million and 66 % use the smartphone as connecting device (Tiwary and Shloma, 2019). Even though digital has gained a share of consumer time spent, it hasn't substituted traditional media but total media exposure time has increased substantially over the period (Ganesh, 2018). Oliver Botti, as summarized by Davies (2019), pointed out two areas where linear TV is currently and will continue to thrive, that is live sports and reality TV programming. Some of the traditional broadcaster experiences cannot replicate in an on-demand environment and thus will continue to be relevant for traditional broadcasters and liner programming (Davies, 2019).

The Deloitte Report (Boehm, et al., 2018) about the future of the TV and video landscape by 2030 has mentioned a few key parameters that are impacting digital transformation, as an influence of ageing viewership, the number of content producers, the digital capability of the general public, diversification of players in TV / video market, and transmission / frequency. Further, Clara (2022) predicted the coexistence of traditional TV with non-linear content offerings in the year 2030 as well.

1.1 The current situation of the study

Odun and Utulu (2016) claim that despite the widespread use of digital media, there are still several barriers preventing its usage by all segments of society. These barriers include poor internet connectivity, power outages, the inability to maintain digital equipment, and low money.

In 1923, radio service was launched in Sri Lanka, while television service followed in 1979 (Ransirilal, 2016). Sri Lanka was the first country in south Asia to begin broadcasting. In Sri Lanka, 80 % of people who watch television and 75.4 % of people who listen to the radio do so (Ransirilal, 2016). People began utilizing the internet when it was introduced to Sri Lanka in 1992 (Induruwa, 2017), and by January 2020, 10.10 million people were using it (Kemp, 2020) on both mobile and fixed devices. In addition to being heavily used, the internet has emerged as one of the primary media used for information sharing among other things.

As the internet expands, a technology known as "Media Convergence" is developed to enable the joining of many communication platforms from disparate groups into a single entity. This technology serves as a "tool" to support the operation of technological progress (Chalaby, 2016; Chinmi and Marta, 2020).

Nearly all Sri Lankan broadcast stations have at least one social media platform to engage with their viewers, according to Statcounter (2023). Nonetheless, radio and television still account for the majority of analog transmission reception in Sri Lanka, with 100 % and 76 %, respectively (Statista, 2014). There are 53 analog FM radio channels and 21 analog television broadcast channels included. However, just 50 % of television broadcasters and 65 % of radio broadcasters use at least one digital medium to connect with their audience. As a result, it shows that, in contrast to the rest of the world, Sri Lanka still does not place a high priority on using digital platforms to connect with its audience.

The goal of this research is to examine how audiences perceive the digital revolution of the broadcasting business and to pinpoint the factors that influence how people utilize digital media.

This type of study has not been done in Sri Lanka when refereeing the public archive of the government document repository and internet enabled journals. Hence, this study will carry a considerable amount of heavy weightage to the academia to start a similar kind of study for future researchers. This study will be used in academia to assess the elements that have an impact on the broadcast business and to provide broadcast government authorities with supporting data and facts to set up a plan for digital transformation.

1.2 Problem statement

According to Datareportal (2023), 5.18 billion people were active internet users encompassing 64.6 % of the global population. Hence, more than half of the population has the connectivity to use digital media.

Even though Asia is listed as having the highest number of online users with 2.3 billion on count population it has the lowest percentage of online media use at 29 % (Kameke, 2023). This derives the requirement of existence of the traditional media to cater the gap of 71 % who do not have access to digital media. Gunawardene (2015) states that about 30 % of Sri Lankan television households now subscribed to foreign pay television content on digital platforms but there are 70 % of the population still using traditional media as their main source of information. Hence, almost two third of the population still use traditional media, which prevents them to have the features of digital media including on-demand features, high-quality video and audio, interactivity, and the ability to use multiple devices (Serrano-Puche, 2017).

Despite having many advantages of the use of digital media, and a high level of internet penetration in Sri Lanka of 52.6 % (Kemp, 2022), the adaptation of digital media is not as per expectation.

In Sri Lankan radio bouquet, all the radio channels and 84 % of television channels are analog, which depicts the problem of not having sufficient broadcast to receive by public. Sri Lanka does not have free view digital television service and digital pay TV is having 30 USD initial connection fee and a 5 USD minimum monthly fee (Dialog TV, 2020). Thus, it is difficult to afford the digital service by the majority of the audience, which is derived from high switching costs and the monthly recurrent fee.

According to Kemp (2022), Sri Lanka has a 35.9 % flat TV penetration in the market, which depicts that 64.1 % do not have digital reception enable device.

Hence, unavailability of the sufficient device for reception of digital TV also makes barriers to digital transformation.

According to LIRNEasia (2020), Sri Lanka has poor digital awareness and 61 % of non-internet users do not know what the internet is. Hence, lack of awareness of digital broadcasting and its service could impact to slow down the digital transformation in Sri Lanka's broadcasting industry.

According to ITU (2012), Sri Lanka had started to define the policy to migrate analog TV using DVB-T technology. But in 2014, local authorities signed an agreement with Japan International Cooperation Agency (JICA) to start digital transmission using ISDB-T technology by aiming to complete the digital transition and analog switch-off by 2018 (JICA, 2014).

Even though Sri Lanka has launched the national digital policy for 2020–2025 by the media and information ministry (MDIIT, 2019) it does not mention a plan for broadcast digital transformation. Hence, there are neither roadmap nor guidelines in Sri Lanka, which have been imposed by local authorities to be followed by the broadcasting industry. This has led to arising uncertainty in the broadcasting industry in digital transformation.

Thus, there is a requirement to study the people's perception of traditional vs digital media, factors affecting the use of digital media and identify the drivers and barriers to consuming digital media in the Sri Lankan context.

1.3 Research objective

The main objective of this research is to determine the impact of digital transformation on the broadcast industry in Sri Lanka.

Specific objectives are:

1. To examine whether Sri Lanka has adequate digital broadcast services to cater to audience demand.

2. To analyze the switching cost and operational cost for the audience and whether they can be accommodated by the public.

3. To analyze the audience's awareness of digital usage.

4. To analyze the market readiness for user terminals to consume digital services.

5. To study the available digitalization policies in Sri Lanka and impact on the industry.

2. Methods

The study is focused on analyzing the audience's behavior and intention using the quantitative analysis of the public. Since Sri Lanka had 5.1 million households in 2020 (von Kameke, 2017), it is required to have 384 samples (Krejcie and Morgan, 1970) using a simple random method to conduct the survey. The general response rate of the field questionnaire is 84.4 % (Campisi, et al., 2020), from which is derived that the total questionnaire shall be 455. Since the research was going to be carried out in three districts including Colombo, Gampaha, and Kandy the corresponding total sample was 1365.

It was hypothesized that digital broadcast availability (DBA), digital literacy (DL), and policy on digitalization (PoD) have a direct relationship with user digital adoption (UDigAd). Further, user device availability (UDA), affordability (AFO), perceived usefulness (USE), and perceived ease of use (EOU) mediate the intention to use the digital device (ItU). Age and gender moderate the independent and mediating variables.

This study has been limited to the television broadcast reception audience in Sri Lanka. Those who do not have a television reception unit were exempted.

The target population was the people who live in Sri Lanka and research has been carried out within the Western Province, which is the 28.2 % total population of the country (Brinkhoff, 2022). This makes possible to extrapolate the result to the whole country as the Western Province is the most populated province, equally urbanized and ethnicity-diversified area.

Since the research has been conducted to gather information mainly using a self-administered questionnaire depicted in Annex 2, it is expected to have basic knowledge of the reading and writing skills of the selected population.

2.1 Theoretical framework

According to Cubukcuoglu (2013), use of technology depends on the wide availability of the technological system. Hence, it is important to have digital broadcast, video, or audio services in Sri Lanka for users to adopt digital service usage.

Affordability is the one of key elements when considering user adaptation to the technology. Usually, there is a rule of thumb explaining that if a particular product price exceeds 5 % of disposable income it will substantially reduce the demand (Galperin, 2012). Digital reception device availability in the market is also one of the key factors that impact the growing digital con-

sumer audience (Stafford Global, 2022). If the customer is equipped with the digital reception enabling device, his switching cost would be minimal when transforming as a digital user.

One of the key barriers to digital transformation is the lack of a clear and coherent digital transformation strategy for the industry (van Dyk and Van Belle, 2019).

Technology acceptance explains the causal relationship between USE and EOU impact to use the technology by the public (Davis, 1989). The perceived usefulness depicts to which extent particular technology is helping to enhance the performance of the job. The EOU indicates to which extent the system is helping to use the technology free from effort. According to Davis (1989), USE and EOU have a direct relationship with the tendency of using the technology and continue to use it.

Unified theory of acceptance and use of technology 2 (UTAUT2) model has indicated social influence has the impact on users of new technologies by consumers (Venkatesh, et al., 2003). This reflects the importance of others' beliefs in society and perceived social status and pressure to use the technological system.

The theoretical model explained in Figure 1 has been derived based on the compilation of facts of the findings in previous studies.

According to UTAUT 2 model age, gender, and experience are impacting the behavioral intention of technology use, which can be considered to act as moderating variables for USE, EOU, social influence, and hedonic motivation.

It requires having at least some level of awareness and/or technology literacy to use the technical system (Obot and Inwang, 2012); without having any literacy customers will not tend to use it.

2.2 Hypotheses

According to Wolverton (2009), the hypothesis is a testable prediction that is expected to occur in different circumstances and having relationship with two or more variables in the study. As per the theoretical framework in Figure 1, there are seven independent variables, one mediating variable, and two moderating variables with dependent variables considered in the study.

There are eight key hypotheses that were developed to achieve the objectives of the research by testing the variables.

H1 There is a relationship between digital broadcast availability in Sri Lanka and broadcast user digital adoption.

H2 There is a relationship between digital literacy and broadcast user digital adoption.

H3 There is a relationship between govern policy on digitalization and broadcast user digital adoption.

H4 There is a relationship between end-user terminal availability in the market and the intention to use the digital device.

H5 There is a relationship between the affordability of the device and the intention to use the digital devices.

H6 There is a relationship between perceived usefulness and intention to use the digital devices.

H7 There is a relationship between perceived ease of use and intention to use of the digital devices.

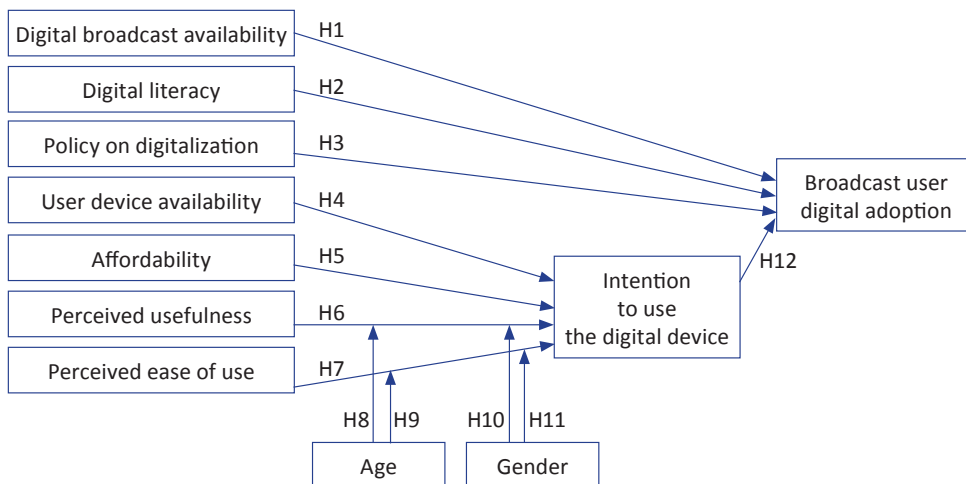H8 Age moderates the relationship between perceived usefulness and intention to use the digital devices.

Figure 1: Theoretical model for analyzing impact of digital transformation in broadcast industry

H9 Age moderates the relationship between perceived ease of use and intention to use the digital devices.

H10 Gender moderates the relationship between perceived usefulness and intention to use the digital device.

H11 Gender moderates the relationship between perceived ease of use and intention to use the digital devices.

H12 There is a relationship between intention to use the digital device and broadcast user digital adoption.

2.3 Sampling and sampling procedures

Table 1: Registered voters of the Western Province in Sri Lanka in 2021 (Election Commission of Sri Lanka, 2023)

District	Population
Colombo	1 709 209
Gampaha	1 785 964
Kaluthara	972 319

As per Table 1 there were 4 467 492 people considered as the population of the research. According to Krejcie and Morgan (1970), and Anon (1960), the sample size of 384 was selected to carry out the research with a confidence level of 95 % and a margin of error of 5 %.

The field study included questionnaire method to obtain data from a selected sample of the population and use a numerical questionnaire with nominal, ordinal, and ratio scales including the Likert scale as well to obtain the answers. The questionnaire has been designed such a way that expected analysis could be gathered using responded data fields. The questionnaire for the study has been divided into three parts described below.

Section 1: Participant's demography factors.

Section 2: TV, radio and social media usage behavior of the participant.

Section 3: Participant's expectation related to broadcast digitalization and its use cases.

2.4 Data analysis

Primary and secondary data have been used for the analysis. Primary data were collected from the main survey using sample selection from the districts of Colombo, Gampaha, and Kaluthara. The researcher distributed hard copies of questionnaires in English, Sinhala, and Tamil language from simple random sampling selection according to the proportionate ethnicity. Secondary data was collected from telecommunication

regulation commission (TRC) research data and publications, broadcaster publications, magazines, journals, books, and previous research.

All collected data from primary research have been coded before proceeding with the analysis. Non-scaling variables such as gender and education were coded using numerical values. The remaining Likert scale variables have been mapped from 1 to 5 levels for analysis. All the data taht have been coded were fed to the statistical package for social science – SPSS version 26 for analysis. Once data have been filtered for multivariate outliers, it has been tested for normality. The normality check can be done on the 1174 responses on the questionnaire (degree of freedom) using Kolmogorov-Smirnov test (Kirkman, 1996).

Table 2: Test of normality for degree of freedom of 1174

Variable	Kolmogorov-Smirnov Statistic	Shapiro-Wilk Statistic
DBA	0.137	0.923
DL	0.146	0.909
PoD	0.175	0.931
UDA	0.135	0.930
AFO	0.123	0.949
USE	0.155	0.932
EOU	0.177	0.906
ItU	0.097	0.956
UDigAd	0.122	0.926

The significance value of Kolmogorov-Simirnov was 0.000, less than 0.05, which means the null hypothesis is rejected and the data are not normally distributed. Further Shapiro-Wilk test also accrued out to test the normality of response. According to Dahiru (2008), since the *p*-value of the test is less than 0.05, then the null hypothesis is rejected at 5 % significance and the conclusion is non-normality of the data.

According to Hair Jr, et al. (2014), since the data are non-normal based on the analysis, it is decided to use the PLS-SEM analysis technique. Thus SmartPLS 3 statistical software was used to do the measurement model and structural model assessments.

2.5 Data screening

The research was conducted purely using physical interaction with a hardcopy questionnaire. Hence, all the answered questions were observed to check whether all the questions have been accessed by the responder. Those questions have been manually entered by the researcher and double-checked by a third party to maintain the highest level of accuracy. All the entries were verified item by item and descriptive statistics have been run to check the normality.

3. Results

3.1 Sample characteristics

The questionnaire has been distributed to 1365 samples among the population in the Western Province. Out of the circulated hard copies of the questionnaire sheets, 1225 have been responded to. After the data cleansing process, 1174 responses have been considered for the data analysis (Table 3).

Table 3: Demographic characteristics of the respondents

Characteristic	Variable	Number	%
Gender	Male	704	59.97
	Female	470	40.03
Age	18–30	347	29.56
	31–40	451	38.42
	41–60	318	27.09
	Above 60	58	4.94
Language	Sinhala	850	72.40
	Tamil	267	22.74
	English	57	4.86
Education	GCE O/L	258	21.98
	GCE A/L	592	50.43
	Diploma	144	12.27
	Graduate	154	13.12
	Postgraduate	26	2.21
Employment	Business	121	10.31
	Professionals	73	6.22
	Government employee	295	25.13
	Private employee	407	34.67
	Student	160	13.63
	Other	118	10.05
Family income	less than 50 000	305	25.98
(Sri Lankan	50 001 to 100 000	552	47.02
Rupees)	100 001 to 300 000	202	17.21
	300 001 above	115	9.80
District	Colombo	391	33.30
	Kaluthara	395	33.65
	Gampaha	388	33.05

The sample responses were received mainly from the males, which are about 59 % of the responses, hence, answers could be considered slightly to bias to the male response. The highest age category mentioned as over 60 and received a 5 % response from that group. However, the majority of responses came from the age group between years 31 to 40 stated as 38.4 %.

With regards to the language, 72.2 % responded in Sinhala, 22.7 % in Tamil, and 5 % in English. Sri Lanka consists of 74.9 % Sinhalese, 24.6 % Tamil, Muslims, and 0.5 % others, which reflects the sample shows approximately the same results (Nortwestern University, 2018).

Regarding the education level, most of the responses are from advanced-level qualified persons comprising 50.4 %, and the lowest response is from post-graduate qualifications at 2.2 %. Regarding the employment level of the sample, the majority is 34.7 % from the private sector, 25.1 % from the government and 13 % from students. However, all the respondents have good language literacy since the entire sample could fill out the questionnaire without external guidance.

The questionnaire has included the geographic area the respondent lives in and it has been observed approximately 33 % of responses from each area, which will help to have an unbiased response.

3.2 Dimensions of the variables

The quality of the latent variables in the study was assessed based on the evaluation of results of the measurement model. The assessment of the quality of the criteria starts from the factor loading test and thereafter constructs reliability and validity. According to Hair Jr, et al. (2017), measurement models need to be tested for item reliability, composite reliability, discriminant, and convergence validity. Further, reflective and formative constructs require different procedures; they were analyzed separately.

3.3 Exploratory factor analysis

Indicator reliability of reflective factors construct can be tested using factor loading in SmartPLS (Hair Jr, et al., 2017). The convergence validity of the model construct was assessed using three criteria. According to the Fornell and Larcker (1981), construct and items factor value should be greater than 0.7. Second, the composite reliability of each latent variable should be equal or above 0.70. Thirdly, according to Fornell and Larcker (1981), the average variance extracted (AVE) for each construct should be greater than 0.50.

According to Hair Jr, et al. (2017), items scoring between 0.4 and 0.7 should be removed from the list if they negatively affect the AVE of their construct. In the initial stage with all the factor loadings, three items had factor loading less than 0.7, which are from constructs of UDA, ItU, and UDigAd. Those constructs negatively impacted their AVE and after removing single items that were less than 0.7 in each construct, AVE values have been improved to greater than 0.5.

The convergent validity of the scale items was assessed using three criteria. Cronbach's alpha of each construct should be more than 0.7 (Nunnally and Bernstein, 1994; Hair, 2010). All the constructs must exceed the composite reliability (CR) value of 0.7. Furthermore, Dijkstra and Henseler (2015) have introduced the Rho_A coef-

Table 4: Fornell-Larcker Criterion

	AFO	DBA	DL	ItU	EOU	USE	PoD	UDA	UDigAd
AFO	0.713								
DBA	0.528	0.708							
DL	0.470	0.685	0.763						
ItU	0.628	0.596	0.561	0.724					
EOU	0.518	0.546	0.572	0.724	0.811				
USE	0.602	0.570	0.576	0.748	0.737	0.807			
PoD	0.349	0.344	0.483	0.416	0.431	0.424	0.751		
UDA	0.475	0.467	0.523	0.519	0.533	0.498	0.482	0.719	
UDigAd	0.587	0.668	0.656	0.750	0.694	0.722	0.433	0.552	0.714

ficient, which is related to the quality of the construct. It is necessary to maintain a Rho_A value greater than 0.7. The Cronbach's alpha value of all the constructs are greater than 0.7 and also composite reliability values exceed 0.7. Further, Rho_A value of all the constructs has exceeded 0.7. Therefore, it has been exhibited that the internal consistency of the analytical data set is at an acceptable level.

According to Fornell and Larcker (1981), it has been stated that AVE and CR require to check on convergent validity. The AVE represents the extent to which a construct can explain the variance of its items and how much of the variance can be attributed to the measurement error (Esposito Vinzi, et al., 2010). To have high convergent validity, the average variance extracted value shall be greater than 0.5 and composite reliability shall be greater than 0.7. According to Table 4, it has been implied that AVE and CR value is in expected range, which was the case for all the constructs, and overall results will portray the high convergent validity of the constructs.

The discriminant validity specifies to which extent a given construct is different from the other constructs in the model. Discriminant validity assessment has been performed by comparing the correlations among the construct with the square root of AVE (Fornell and Larcker, 1981), cross loading and heterotrait–monotrait (HTMT) ratio of correlations. According to Hair, et al. (2019), indicator cross loading shall be greater than 0.7 or should be the highest value among all other non-related constructs. As per Annex 1, all the related constructs have the highest cross-loading factors in each indicator. To satisfy the Fornell-Larcker criterion, the correlation of the square root of each construct, AVE needs to be lower than the related constructs. According to Table 4, this was the case for all constructs except ItU, thus their discriminant validity according to the Fornell-Larcker criterion can be claimed (Hair Jr, et al., 2017).

However, Henseler, Ringle and Sarstedt (2015), have claimed that neither the Fornell-Larcker criterion nor the evaluation of the cross-loadings completely

explained the discriminant validity problems. Hence, HTMT was used as an alternative measurement for discriminant validity (Henseler, Ringle and Sarstedt, 2015).

Since the ItU had some issue in Fornell-Larker creations, heterotrait-monotrait ratio has been considered to the analysis.

3.4 Structural equation modelling

The structural model evaluates the relationship among all the variables. Multicollinearity is the main factor, which uses checking the correlation between constructs (Hair, 2010). The structural model can be checked for multicollinearity problems by examining the variance inflation factor (VIF) values of all predictor variables. According to Hair, Ringle and Sarstedt (2011), a maximum threshold 5 or lower is required to avoid the issue of collinearity.

Table 5: The variance inflation factor values

Variable	USE	UDigAd
AFO	1.734	
EOU	2.422	
USE	2.738	
UDA	1.525	
PoD	0.546	1.363
DBA	0.570	2.154
DL	0.344	2.239
ItU	0.668	1.738

As depicted in Table 5 all values of the VIF are below the restrictive cut-off value of 3.3 (Petter, Straub and Rai, 2007). Hence, above statement concludes that each exogenous variable is independent of each other and every exogenous variable have a unique piece of information about an endogenous variable.

To test hypothesis for significance, bootstrapping procedure is performed using two-tailed t-distribution (Hair, 2010). The bootstrapping was run using 5 000 subsample iterations. According to 95 % confidence interval testing, value shall not pass the zero (Richter,

et al., 2015). According to the analysis results, neither of 95 % confidence intervals includes zero as zero does not fall in any of the path confidence interval. A two-tailed test was computed for t- and p-values to test the significance of the path coefficient at a significance level of 1 %. The t-value shall be above 1.96 and the p-value shall be less than 0.05. Results yield t-value above 2.22 and p-value below 0.026, which indicates that there exists a significant relationship between all paths of the connected constructs.

The structural model was tested for the significance of the direct relationships between independent and dependent variables (Dürrbaum and Sattler, 2019; Wamba, et al., 2017). This has been done by examining the path coefficients between the constructs and the values for the path coefficients are usually between −1 and +1, indicating a strongly negative and strongly positive relationship between the variables. Values close to 0 present a weak relationship. In the analysis, all the relationship between construct displays the positive significant relationship. Further, ItU (0.478) was indicated as the most influencing factor followed by USE (0.344) and EOU (0.316).

As per Cohen (1988), effect size f-square (f^2) indicates how much exogenous latent variable contributes to the endogenous latent variable R^2 value. The effective size will assess the overall magnitude and strength of the relationship between the latent variables, which helps to gauge on overall contribution to research study (Table 6).

Table 6: The f-square values

Variable	ItU	UDigAd
AFO	0.074	
DBA		0.067
DL		0.060
ItU		0.395
EOU	0.116	
USE	0.146	
PoD		0.007
UDA	0.010	

The rule of thumb of f^2 value is that between 0.02 to 0.15 it is small, 0.15 to 0.35 is medium and 0.35 and above shows a large effect (Cohen, 1988; Hair Jr, et al., 2017). According to Table 6, independent constructs such as AFO, EOU, USE have weak relationship with ItU and DBA and DL with UDigAd. However, ItU has strong relationship with UDigAd. Furthermore, PoD and UDA almost do not have relationship with exogenous latent variables as both values are less than 0.05.

The assessment of the goodness of fit R-square (R^2) indicates the strength of the structural model is fitted

based on derived factors. This R^2 coefficient represents the collective effect of all exogenous latent variables on the endogenous latent variable. Hair, Ringle and Sarstedt (2011) explained the values of 0.75, 0.50, and 0.25 for endogenous latent variables, which are referred to as substantial, moderate, and weak prediction power, respectively.

Table 7: The R-square values

Variable	R^2	R^2 adjusted
UDigAd	0.668	0.667
ItU	0.666	0.665

The results in Table 7 show R^2 value of 0.668 for UDigAd and 0.666 for ItU.

Predictive relevance of a model can be measured by the Q-square (Q^2) value (Stone, 1974; Geisser, 1974). The effect size Q^2 allows assessing an exogenous construct's contribution to the endogenous latent variable's Q^2. As a relative measure of predictive relevance, Q^2 value of 0.02 to 0.15 indicates small, 0.15 to 0.35 medium and above 0.35 large predictive relevance for endogenous construct (Hair, et al., 2018).

Table 8: The Q-square values

Variable	SSO	SSE	$Q^2 = 1 − SSE/SSO$
Broadcast user digital adoption	16 436	10 925	0.335
ItU	8 218	5 413	0.341

According to Table 8, the values depict that the research model has medium prediction power for the endogenous constructs. Hence, the path model can be considered as goodness of prediction value has medium strength.

3.4.1 Mediating relationships

The mediation effect was analysed by following the guidelines provided by Hair Jr, et al. (2017), and few of the research studies conducted using SmartPLS (Berghman, et al., 2013; Wamba, et al., 2017). The mediation analysis is done based on the path coefficients and standard errors of the direct path relationships between the independent and the mediating variable, and the mediating and the dependent variable (Wamba, et al., 2017).

Table 9 depict the figures derived from SmartPLS for mediating analysis. These show that AFO, EOU and UDA do not have direct relationship with dependent variable UDigAd as p-value is greater than 0.05 (Hair, 2010). However, USE has a direct relationship with dependent variable UDigAd.

According to Table 10, all four indirect construct variables are significant since neither 95 % confidence interval includes zero. Further, *t*-values and *p*-values are consecutively above 1.96 and below 0.05, which emphasizes the significance further. When considering direct effect, it has been observed that AFO → UDigAd, EOU → UDigAd and UDA → UDigAd relationships *p*-value greater than 0.05, which deprives the significance of the paths. However, AFO → ItU, EOU → UDigAd and UDA → ItU path *p*-values, *t*-values and 95 % confidence intervals did not cross the zero, which indicates their significance in mediating. Hence, AFO, EOU and UDA constructs relationships are fully mediated by ItU.

Further, USE → UDigAd path maintains *p*-value less than 0.05, *t*-value greater than 1.96 and standard coefficient of 95 % confidence interval without crossing the zero. Therefor, USE → UDigAd relationship is partially mediated by the ItU construct. Since both direct and indirect effects are in the same direction, respective relationships can be considered complementary for mediation situation (Hair, et al., 2018).

3.4.2 Moderating effects

According to Hair Jr, et al. (2017), moderation analysis can be done using SmartPls. Since the proposed moderating variables are categorical variables, initially had to be created dummy variables for gender and age categories. In order to test for the significance of the moderation, the bootstrapping procedure with 5 000 iterations and no sign changes was applied (Hair Jr, et al., 2017).

Table 9: Mediation analysis

| Relationship | Without direct path to IV to DV avoiding MV | | | | | | With direct path to IV to DV | | | | | |
	Orig.	2.50 %	97.50 %	*t*-value	*p*-value	Sig.	Orig.	2.50 %	97.50 %	*t*-value	*p*-value	Sig.
AFO → UDigAd							0.049	−0.011	0.107	1.604	0.1090	Yes
AFO → ItU	0.222	0.167	0.275	7.986	0.000	Yes	0.222	0.169	0.277	7.959	0.0000	Yes
DBA → UDigAd	0.219	0.155	0.285	6.658	0.000	Yes	0.175	0.109	0.240	5.248	0.0000	Yes
DL → UDA	0.211	0.148	0.273	6.535	0.000	Yes	0.148	0.083	0.213	4.440	0.0000	Yes
ItU → UDA	0.478	0.406	0.544	13.578	0.000	Yes	0.272	0.196	0.347	6.966	0.0000	Yes
EOU → UDigAd							0.119	0.039	0.207	2.793	0.0500	No
EOU → ItU	0.316	0.247	0.390	8.691	0.000	Yes	0.315	0.242	0.385	8.568	0.0000	Yes
USE → UDA							0.177	0.092	0.255	4.188	0.0000	Yes
USE → ItU	0.344	0.276	0.417	9.560	0.000	Yes	0.344	0.273	0.418	9.178	0.0000	Yes
PoD → UDigAd	0.057	0.006	0.105	2.222	0.026	Yes	0.011	0.037	0.061	0.423	0.6730	No
UDA → UDigAd							0.072	0.003	0.147	1.942	0.0520	No
UDA → ItU	0.074	0.017	0.129	2.640	0.008	Yes	0.074	0.022	0.130	2.649	0.0080	Yes

Table 10: Direct and indirect effect analysis of the mediating construct

| Relationship | Direct effect | | | | | Indirect effect | | | | | Type of mediation |
	Orig.	2.50 %	97.50 %	*t*-value	*p*-value	Orig.	2.50 %	97.50 %	*t*-value	*p*-value	
AFO → UDigAd	0.049	−0.011	0.107	1.604	0.1090	0.222	0.169	0.277	7.959	0.0000	Fully
EOU → UDigAd	0.119	0.039	0.207	2.793	0.0500	0.315	0.242	0.385	8.568	0.0000	Fully
USE → UDigAd	0.177	0.092	0.255	4.188	0.0000	0.344	0.273	0.418	9.178	0.0000	Partially
UDA → UDigAd	0.072	0.003	0.147	1.942	0.0520	0.074	0.022	0.130	2.649	0.0080	Fully

Table 11: Moderating effect of gender construct

	Original	Sample mean	Standard deviation	2.50 %	97.50 %	*T*-stat.	*p*-value
Gender (M) → ItU	0.009	0.008	0.017	−0.025	0.040	0.508	0.611
Moderating effect of gender to EOU → ItU	−0.011	−0.001	0.035	−0.069	0.066	0.020	0.984
Moderating effect of gender to USE → ItU	−0.010	−0.009	0.034	−0.076	0.058	0.289	0.773

Table 12: Moderating effect of age construct

	Original	Sample mean	Standard deviation	2.50 %	97.50 %	*T*-stat.	*p*-value
Age → ItU	0.023	0.025	0.019	−0.012	0.063	1.184	0.236
Moderating effect of age to EOU → ItU	0.034	0.032	0.045	−0.056	0.119	0.759	0.448
Moderating effect of age to USE → ItU	−0.037	−0.034	0.042	−0.114	0.049	0.889	0.374

Table 13: Summary of the hypotheses testing

#	Hypothesis	Significance	Relationship	Coclusion
H1	There is a relationship between digital broadcast availability in Sri Lanka and broadcast user digital adaption.	Significant	Weak positive	Supported
H2	There is a relationship between digital literacy and broadcast user digital adaption.	Significant	Weak positive	Supported
H3	There is a relationship between govern policy on digitalization and broadcast user digital adaption.	Not significant	Extremely weak positive	Not Supported
H4	There is a relationship between end user terminal availability in the market and intention to use of digital device.	Significant	Extremely weak positive	Supported
H5	There is a relationship between affordability of the user and intention to use of digital device.	Significant	Weak – fully mediating positive	Supported
H6	There is a relationship between perceived usefulness and intention to use of digital device.	Significant	Weak – partially mediating positive	Supported
H7	There is a relationship between perceived ease of use and intention to use of digital device.	Significant	Weak – fully mediating positive	Supported
H8	Age moderate the relationship between perceived usefulness and intention to use of digital device.	Not significant	Moderating	Not Supported
H9	Age moderates the relationship between perceived ease of use and intention to use of digital device.	Not significant	Moderating	Not Supported
H10	Gender moderates the relationship between perceived usefulness and intention to use of digital device.	Not significant	Moderating	Not Supported
H11	Gender moderates the relationship between perceived ease of use and intention to use of digital device.	Not significant	Moderating	Not Supported
H12	There is a relationship between intention to use of digital device and broadcast user digital adoption.	Significant	Strong positive	Supported

The SmartPLS algorithm was used to test the moderating effect of age between EOU → ItU and USE → ItU relationship.

According to Table 11, confidence intervals of all the moderating structural variable paths cross the zero value. Thus, gender to ItU, EOU to ItU and USE to ItU do not satisfy the significance requirement. Further, *p*-values are also greater than 0.05, which confirms the non-significance of the gender variable in the proposed structural model.

The second moderating variable of age has been considered in the SmartPLS 3 algorithm to check the moderating effect including path coefficient.

As per Table 12, all the moderating structural variable paths confidence intervals cross the zero value. Thus, age to ItU, EOU to ItU and USE to ItU does not satisfy the significance requirement. Furthermore, *p*-values of each path also greater than 0.05, which depict the non-significance of the age variable in the structural model.

According to the analysis carried out in the chapter, the initial structural model has been changed based on the results derived from SPSS and SmartPLS software.

The UDigAd and DL against BCA relationship in Sri Lanka has been tested and verified using the results from Table 9. Further, UDA, AFO, EOU and USE have mediating relationship with the ItU as per Table 10. The above variables have significant relationship according to assigned hypothesis. However, according to Table 9, the relationship between PoD and UDigAd was insignificant, which tends to remove the exogenous variable from the model. The moderating variables of gender and age have been tested in the structural model and the summarized results in Table 13 depict that none of the relationships are moderated by the latent variables. Hence, seven of the relationships have been accepted according to the derived results and discussions.

3.5 Comparison of the revised model with the initial model

According to De Souzabido and Da Silva (2019), initial structural model can be redrawn considering the facts used based on the accepted and rejected hypotheses. Hence, revised structural model has been included in Figure 2. According to Figure 2, the revised model does not contain the moderating variables and it includes partially mediating variable of ItU, which mediates the relationship of USE and UDigAd. Further, the independent variable of PoD has been removed from the model based on the significance analysis. Moreover, UDA, EOU and AFO fully mediate the relationship to dependent variable of UDigAd via ItU. Final derived model has been depicted in Figure 3.
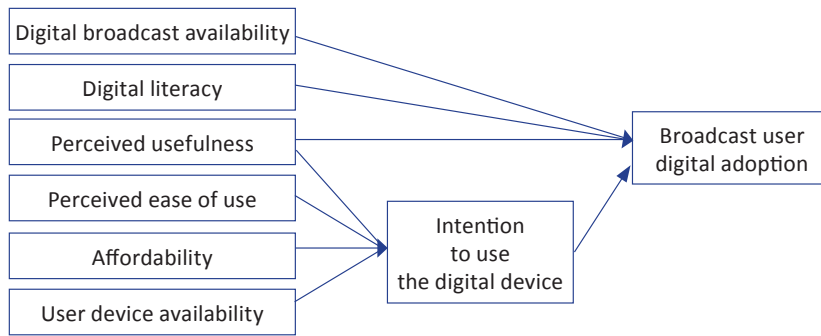
S.M.D.D. Samarakoon, M.G.M. Johar and A. Khatibi – J. Print Media Technol. Res. – Vol. 12 No. 2 (2023), 73–96

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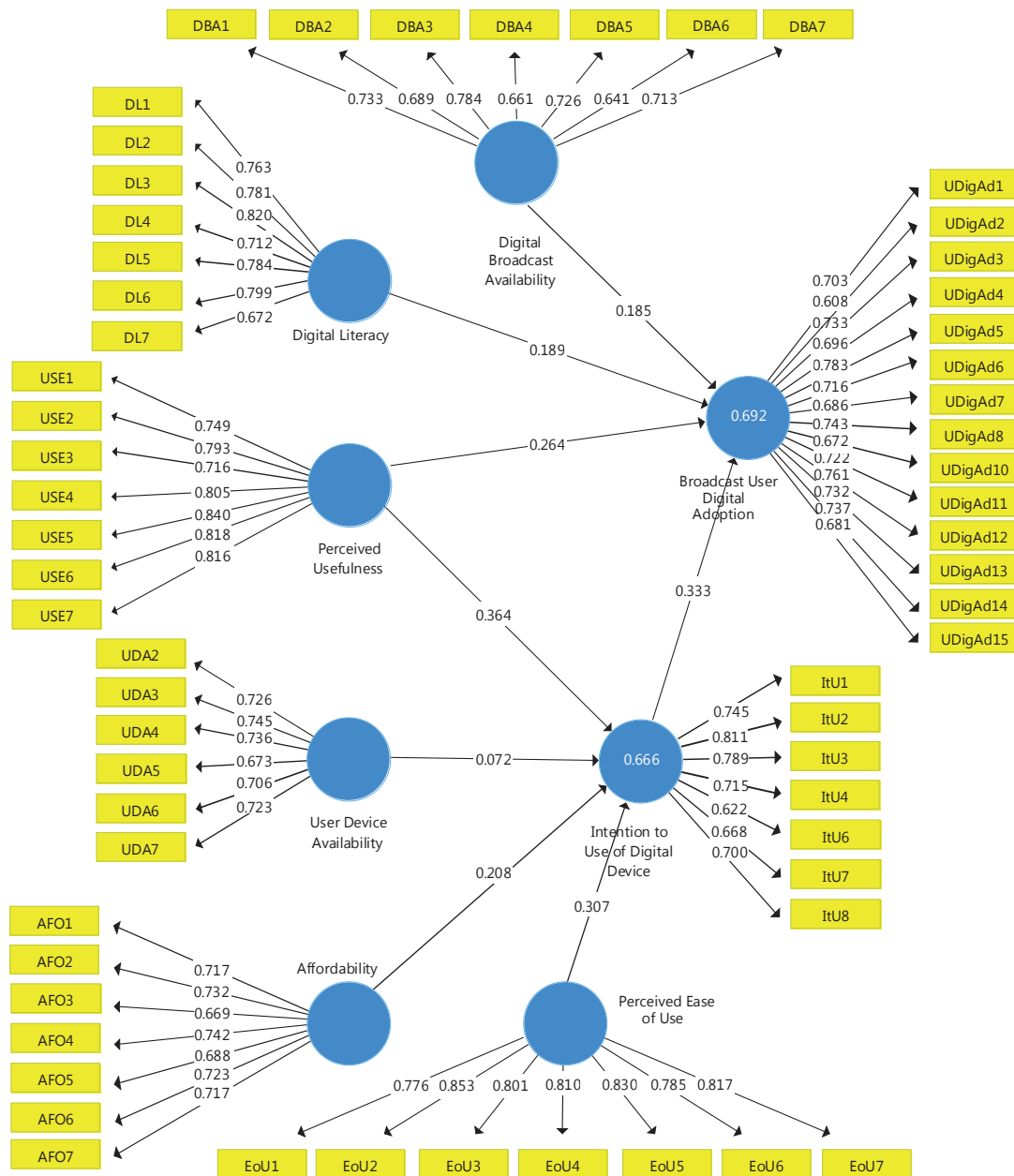*Figure 2: Revised structural model based on the results*

Figure 3: Final model derived from SmartPLS 3

4. Discussion

This research has been carried out with the main objective of determining the impact of digital transformation towards broadcast industry in Sri Lanka. Therefore, research has been conceptualized based on theoretical framework with the facts extracted from literature survey and have derived four specific objectives.

4.1 Objective 1: To examine whether Sri Lanka has adequate digital broadcast services to cater audience demand

The results indicate DBA positively related to UDigAd. Specifically, this study hypothesized that there exists a positive relationship between DBA and UDigAd (H1). The empirical findings support this hypothesis. The relationship between DBA and UdigAd is statistically significant ($B = 0.219$, $p = 0.000$). However, f^2 value of the relationship has been considered as weak relationship (0.067). Further, in the importance performance matrix DBA is in below the mean performance level (30.679) and importance (0.219) in above the mean, thus it can be considered an important factor that can increase UdigAd and need attention with highest priority.

4.2 Objective 2: To analyze the switching cost and operational cost for audience and whether they can be accommodated by public

The analysis has been done under the hypothesis of AFO and UdigAd mediated by the ItU (H5). The relationship has been identified as significant ($B = 0.222$, p-value = 0.000) and positive relationship. Since f^2 value is 0.074, the relationship is weak. Moreover, importance performance matrix has indicated the AFO importance level (0.099) is below the mean and performance level (37.538) is above the mean value. Hence, it is in the category requiring less attention, which indicates that even improvement can be done, the impact to UDigAd will be very low.

4.3 Objective 3: To analyze the audience awareness about digital usage

The audience awareness about digital usage have been evaluated by hypotheses H2, H6, H8, H10, and H12. DL and UDigAd has significant and positive weak relationship. This indicates that DL has impact on UDigAd. Hypothesis 6 results indicate that USE and ItU have significant and partially mediating effect for UDigAd. However, the hypotheses H8 and H10 have been rejected with the indication of age and gender do not have any moderating effect to the relationship between USE and UDigAd. Further, ItU and UdigAd have significant and strong positive relationship.

4.4 Objective 4: To analyze the market readiness for user terminals to consume digital services

The market readiness for digital user terminals to consume digital device have been analyzed by the hypotheses H4, H7, H9 and H11. Hypothesis 4 evaluates the relationship between UDigAd and UDA. Since the results indicate $B = 0.074$ and p-value = 0.008 it can be concluded that user terminal availability has weak but positive significant relationship. Further, user device availability is below the mean level of importance (0.034) and below the performance (27.17) mean average, which indicates that even though UDA get improved its impact to UdigAd will be very low. The results of H7 evaluation indicate that perceived EOU and ItU have weak but significant positive relationship. However, according to the H9 and H11 results, it has been depicted that age and gender do not moderate the relationship between EOU and UDigAd. According to the results discussed above it has been implied that market readiness of user devices has impact on UDigAd.

4.5 Objective 5: To study the available digitalization policies in Sri Lanka and impact to the industry

According to hypothesis H3, the UDigAd shall be related to PoD. However, it has been tested for significance and it indicates that a higher p-value (0.673) in the relationship depicts the non-significance of the relationship. Hence, it can be concluded that even though the literature showed the relationship between PoD and UDigAd (Dialog TV, 2020), it has not been confirmed in the case of this study, which shows a non-significant relationship. Hence, any policy-making decision will not have high impact to broadcast user digital adoption.

5. Conclusion

Digital broadcast adoption in Sri Lanka is being a topic for the last decade and a process yet to be implemented officially. However, when considering the technological advancement that happened during the last period it has been observed that people have adapted to use of digital broadcast to some extent. But as discussed in chapter 1, the research gap showed that compared to the connectivity device penetration in Sri Lanka taht is about 47 %, still very low margin of about 30 % has been adopted to receive the digital broadcast. Ten factors have been identified as impacting variables to digital broadcast adoption via analysis of the literature review using theoretical models. Among those factors digital broadcast availability, digital literacy, user device availability, affordability, perceived usefulness, perceived ease of use and intention to use of the digital

device have been identified as the influencing attributes. However, policy on digitalization, age, and gender have been identified as non-significant factors according to the analysis results. Thus, it can be concluded that user digital adaptation will not much be impacted policy on digitalization. Hence, users will tend to adopt the digital broadcast regardless of the policy makers

decision but based on the incremental advancement of remaining factors. Based on the results, it is of utmost importance to have a clear roadmap in digitalization policy as otherwise user will adopt to get used to different digital broadcast technologies regardless of the intended technology, which is planed by the policy makers.

References

Anon, 1960. Small-sample techniques. *The NEA Research Bulletin*, 38(4), pp. 99–104.

Berghman, L., Matthyssens, P., Streukens, S. and Vandenbempt, K., 2013. Deliberate learning mechanisms for stimulating strategic innovation capacity. *Long Range Planning*, 46(1–2), pp. 39–71. https://doi.org/10.1016/j.lrp.2012.11.003.

Boehm, K., Esser, R., Klein, F., Mogg, A., Lee, P., Raab, J., Casey, M., Steemers, P. and Ferreri, J.-P., 2018. *The future of the TV and video landscape by 2030*. [pdf] Deloitte. Available at: <https://www2.deloitte.com/content/dam/Deloitte/be/Documents/technology-media-telecommunications/201809%20Future%20of%20Video_DIGITAL_FINAL.pdf> [Accessed June 2023].

Brinkhoff, T., 2022. *Western Province in Sri Lanka*. [online] Available at: <https://www.citypopulation.de/en/srilanka/prov/admin/1_western/> [Accessed 5 May 2023].

Campisi, S.C., Carducci, B., Akseer, N., Zasowski, C., Szatmari, P. and Bhutta , Z.A., 2020. Suicidal behaviours among adolescents from 90 countries: a pooled analysis of the global school-based student health survey. *BMC Public Health,* 20: 1102. https://doi.org/10.1186/s12889-020-09209-z.

Chalaby, J.K. and Segell, G., 1999. The broadcasting media in the age of risk: the advent of digital television. *New Media & Society,* 1(3), pp. 351–368. https://doi.org/10.1177/14614449922225627.

Chalaby, J.K., 2016. Television and globalization: the TV content global value chain. *Journal of Communication*, 66(1), pp. 35–59. https://doi.org/10.1111/jcom.12203.

Chinmi, M. and Marta, R.F., 2020. RuangGuru as an ideation of interaction and education revolution during COVID-19 pandemic in Indonesia. *Revista Romaneasca pentru Educatie Multidimensionala – Journal for Multidimensional Education*, 12(2), pp. 118–129. https://doi.org/10.18662/rrem/12.2Sup1/297.

Clara, 2022. 2030: the end of linear television? *Le blog son-vidéo.com*, [blog] 4 August. Available at: <https://blog.son-video.com/en/2022/08/2030-the-end-of-linear-television/> [Accessed 20 March 2023].

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* 2nd ed. New York: Routledge.

Cubukcuoglu, B., 2013. Factors enabling the use of technology in subject teaching. *International Journal of Education and Development using Information and Communication Technology*, 9(3), pp. 50–60.

Dahiru, T., 2008. P-Value, a true test of statistical significance? a cautionary note. *Annals of Ibadan Postgraduate Medicine*, 6(1), pp. 21–26. https://doi.org/10.4314/aipm.v6i1.64038.

Datareportal, 2023. Digital around the world. *Datareportal,* [online] Available at: <https://datareportal.com/global-digital-overview> [Accessed 15 May 2023].

Davies, J., 2019. IBC 2019: Linear TV isn't dead just yet. *telecoms.com* [blog] 16 September. Available at: <https://telecoms.com/499701/ibc-2019-linear-tv-isnt-dead-just-yet/> [Accessed June 2023].

Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), pp. 319–340. https://doi.org/10.2307/249008.

De Souzabido, D. and Da Silva, D., 2019. SmartPLS 3: specification, estimation, evaluation and reporting. *Administração Ensino e Pesquisa*, 20(2), pp. 465–513.

Dialog, 2020. *Dialog TV all packages.* [online] Available at: <https://www.dialog.lk/television-packages-postpaid> [Accessed December 2020].

Dijkstra, T.K. and Henseler, J., 2015. Consistent partial least squares path modeling. *MIS Quarterly,* 39(2), pp. 297–316. https://doi.org/10.25300/MISQ/2015/39.2.02.

Dominick, J.R., 2009. *The dynamics of mass communication: media in the digital age*. 10th ed. New York: McGraw-Hill Higher Education.

Dürrbaum, T. and Sattler, F.A., 2019. Minority stress and mental health in lesbian, gay male, and bisexual youths: a meta-analysis. *Journal of LGBT Youth,* 17(3), pp. 298–314. https://doi.org/10.1080/19361653.2019.1586615.

Election Commission of Sri Lanka, 2023. *Comparative note on the number of registered voters registered according to the electoral district 2013–2022*. [online] Available at: <https://elections.gov.lk/en/voters/voters_statistics_E.html> [Accessed June 2023].

Esposito Vinzi, V., Chin, W.W., Henseler, J. and Wang, H. eds., 2010. *Handbook of partial least squares: concepts, methods and applications*. Berlin: Springer.

Fornell, C., and Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), pp. 39–50. https://doi.org/10.2307/3151312.

Galperin, H., 2012. *Precios y calidad de la banda ancha en América Latina: benchmarking y tendencias – documento de trabajo No. 12*. Buenos Aires, Argentina: Universidad de San Andrés, Centro de Tecnología y Sociedad.

Ganesh, R., 2018. Interview on Havas Media, India. Interviewed by R. Admin, 17 May 2018.

Geisser, S., 1974. A predictive approach to the random effect model. *Biometrika*, 61(1), pp. 101–107. https://doi.org/10.1093/biomet/61.1.101.

Gunawardene, N., 2015. Media sector reforms in Sri Lanka: some 'big picture' level thoughts. *Open Minds!* [blog] 21 March. Available at: <https://nalakagunawardene.com/2015/03/21/media-sector-reforms-in-sri-lanka-some-big-picture-level-thoughts/> [Accessed June 2023].

Hair, J.F., 2010. *Multivariate data analysis: a global perspective*. 7th ed. Upper Saddle River, NJ, USA: Pearson Education.

Hair, J.F., Ringle, C.M. and Sarstedt, M., 2011. PLS-SEM: indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), pp. 139–152. https://doi.org/10.2753/MTP1069-6679190202.

Hair Jr, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G., 2014. Partial least squares structural equation modeling (PLS-SEM): an emerging tool in business research. *European Business Review*, 26(2), pp. 106–121. https://doi.org/10.1108/EBR-10-2013-0128.

Hair Jr, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M., 2017. *A primer on partial least squares structural equation modeling (PLS-SEM)*. 2nd ed. Los Angeles: SAGE.

Hair, J.F., Sarstedt, M., Ringle, C.M. and Gudergan, S.P., 2018. *Advanced issues in partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA, USA: SAGE.

Hair, J.F., Risher, J.J., Serstedt, M. and Ringle, C.M., 2019. When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), pp. 2–24. https://doi.org/10.1108/EBR-11-2018-0203.

Henseler, J., Ringle, C.M. and Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), pp. 115–135. https://doi.org/10.1007/s11747-014-0403-8.

Induruwa, A., 2017. *History of ICT in Sri Lanka*. [online] Available at: <https://www.ict-history.lk/en/prof-abhaya-induruwa/> [Accesed April 2023].

ITU, 2012. *Roadmap for the transition from analogue to digital terrestrial television broadcasting in Sri Lanka*. [pdf] International Telecommunication Union. Available at: < https://www.itu.int/ITU-D/tech/digital_broadcasting/project-dbasiapacific/Roadmaps/db_asp_roadmap_SriLanka.pdf> [Accessed June 2023].

JICA, 2014. *Feasibility study on digital terrestrial television broadcasting network project in Democratic Socialist Republic of Sri Lanka.* [pdf] Colombo: Ministry of Mass Media and Information. Available at: <https://openjicareport.jica.go.jp/pdf/12154530.pdf> [Accessed June 2023].

Kemp, S., 2020. Digital 2020: Sri Lanka. *Datareportal,* [online] Available at: <https://datareportal.com/reports/digital-2020-sri-lanka> [Accessed June 2023].

Kemp, S., 2022. Digital 2022: Sri Lanka. *Datareportal,* [online] Available at: <https://datareportal.com/reports/digital-2022-sri-lanka> [Accessed June 2023].

Kirkman, T.W., 1996. *Statistics to use*. [online] Available at: <http://www.physics.csbsju.edu/stats/KS-test.html> [Accessed 6 May 2023].

Krejcie, R.V. and Morgan, D.W., 1970. Determining sample size for research activities. *Educational and Psychological Measurement,* 30(3), pp. 607–610. https://doi.org/10.1177/001316447003000308.

LIRNEasia, 2020. Poor digital awareness and skills are a barrier to internet use in Sri Lanka (Policy Brief). *LIRNEasia,* [blog] 12 March. Available at: <https://lirneasia.net/2020/03/poor-digital-awareness-and-skills-are-a-barrier-to-internet-use-in-sri-lanka-policy-brief/ [Accessed June 2023].

MDIIT, 2019. *National Digital Policy for Sri Lanka 2020–2025.* [pdf] Colombo: Information and Communication Technology Agency of Sri Lanka. Available at: <https://np.gov.lk/pdf/tender/2020/Draft_National_Digital_PolicyFINAL07102019.pdf> [Accessed November 2022].

Medina, M., Herrero, M. and Etayo, C., 2015. The impact of digitalization on the strategies of pay TV in Spain. *Revista Latina de Comunicación Social,* 70, pp. 252–269.

Northwestern University, 2018. *Population, ethnic groups, and languages (Sri Lanka)*. [online] Available at: <https://library.law.northwestern.edu/c.php?g=1182176&p=8644721> [Accessed May 2023].

Nunnally, J.C. and Bernstein, I.H., 1994. *Psychometric theory*. 3rd ed. New York: McGraw-Hill.

Obot, C. and Inwang, I.I., 2012. Awareness of and preparedness for digital broadcasting among communication practitioners and educators in Uyo. *Athens Journal of Mass Media and Communications,* 3(2), pp. 107–130. https://doi.org/10.30958/ajmmc.3.2.2.

Odun, O. and Utulu, A.U., 2016. Is the new media superior to the traditional media for advertising. *Asian Journal of Economic Modelling*, 4(1), pp. 57–69. https://doi.org/10.18488/journal.8/2016.4.1/8.1.57.69.

Petter, S., Straub, D. and Rai, A., 2007. Specifying formative constructs in information systems research. *MIS Quarterly*, 31(4), pp. 623–656. https://doi.org/10.2307/25148814.

Ransirilal, B.A.D.A., 2016. The current situation of Sri Lanka TV media and the challenges ahead. In: *24th JAMCO Online International Symposium*. Online, January 2016 – August 2016. Colombo: Sri Lankah Rupavahini Corporation.

Richter, N.F., Cepeda, G., Roldán, J.L. and Ringle, C.M., 2015. European management research using partial least squares structural equation modeling (PLS-SEM). *European Management Journal,* 33(1), pp. 1–3. https://doi.org/10.1016/j.emj.2014.12.001.

Serrano-Puche, J., 2017. Key features of digital media consumption: implications of users' emotional dimension. In: F.C. Freire, X. Rúas Araújo, V.A. Martínez Fernández and X. Lopez García, eds. *Media and Metamedia Management: Conference proceedings of XESCOM International Symposium on Communication Management*. Santiago de Compostela, Spain, 27–28 November 2015. Cham: Springer, pp. 471–478. https://doi.org/10.1007/978-3-319-46068-0_62.

Stafford Global, 2022. The influence of digital marketing on consumer behavior. *Stafford University,* [blog] 17 June. Available at: <https://www.staffordglobal.org/articles-and-blogs/marketing-articles-blogs/digital-marketing-behavior/> [Accessed 15 May 2023].

Statcounter, 2023. Social media stats in Sri Lanka: Jan – Dec 2020. *Statcounter*, [online] Available at: <https://gs.statcounter.com/social-media-stats/all/sri-lanka/2020> [Accessed 12 May 2023].

Statista, 2014. Pay TV penetration rate in Sri Lanka in 2012 and 2020. *Statista*, [online] Available at: <https://www.statista.com/statistics/287379/sri-lanka-pay-tv-penetration-rate/> [Accessed 07 November 2020].

Stone, M., 1974. Cross-validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society: Series B,* 36(2): pp 111–147. https://doi.org/10.1111/j.2517-6161.1974.tb00994.x.

Tiwary, R. and Shloma, E., 2019. Insights for publishers: How broadcast and video companies can adapt to APAC's changing digital landscape. *Marketing Strategies*, [online] Available at: <https://www.thinkwithgoogle.com/intl/en-apac/marketing-strategies/video/apacs-changing-digital-landscape-how-broadcast-and-video-companies-can-keep-up/> [Accessed June2023].

van Dyk, R. and Van Belle, J.-P., 2019. Factors influencing the intended adoption of digital transformation: a South African case study. In: M. Ganzha, L. Maciaszek and M. Paprzycki, eds. *Proceedings of the 2019 Federated Conference on Computer Science and Information Systems (FedCSIS)*. Leipzig, Germany, 1–4 Septemebr 2019. Polish Information Processing Society, IEEE, pp. 519–528.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D., 2003. User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27(3), pp. 425–478. https://doi.org/10.2307/30036540.

von Kameke, L., 2017. Number of households in Sri Lanka 2013–2021. *Statista,* [online] Available at: <https://www.statista.com/statistics/728353/number-of-households-sri-lanka/> [Accessed 05 May 2023].

Wamba, S.F., Gunesekaran, A., Akter, S., Ren, S.J.-f., Dubey, R. and Childe, S.J., 2017. Big data analytics and firm performance: effects of dynamic capabilities. *Journal of Business Research*, 70, pp. 356–365. https://doi.org/10.1016/j.jbusres.2016.08.009.

Wolverton, A., 2009. Effects of socio-economic and input-related factors on polluting plants' location decisions. *The B.E. Journal of Economic Analysis & Policy*, 9(1): 14. https://doi.org/10.2202/1935-1682.2083.

Annex 1: Cross loading analysis – Part 1

	AFO	DBA	DL	ItU	EoU	USE	PoD	UDA	UDigAd
AFO1	**0.717**	0.385	0.285	0.447	0.391	0.427	0.156	0.291	0.399
AFO2	**0.732**	0.334	0.264	0.372	0.332	0.342	0.184	0.287	0.358
AFO3	**0.669**	0.281	0.240	0.309	0.251	0.315	0.152	0.239	0.297
AFO4	**0.742**	0.312	0.255	0.400	0.305	0.361	0.212	0.270	0.360
AFO5	**0.688**	0.385	0.369	0.458	0.353	0.438	0.318	0.353	0.456
AFO6	**0.723**	0.435	0.445	0.549	0.485	0.569	0.350	0.440	0.527
AFO7	**0.717**	0.439	0.406	0.508	0.392	0.462	0.293	0.413	0.452
DBA1	0.428	**0.733**	0.462	0.466	0.413	0.427	0.196	0.332	0.462
DBA2	0.402	**0.689**	0.449	0.466	0.358	0.410	0.206	0.331	0.488
DBA3	0.415	**0.784**	0.505	0.470	0.399	0.440	0.225	0.336	0.513
DBA4	0.398	**0.661**	0.415	0.418	0.338	0.342	0.250	0.324	0.435
DBA5	0.361	**0.726**	0.501	0.421	0.392	0.434	0.283	0.323	0.493
DBA6	0.267	**0.641**	0.503	0.300	0.370	0.334	0.249	0.306	0.416
DBA7	0.337	**0.712**	0.557	0.398	0.433	0.424	0.297	0.364	0.492
DL1	0.374	0.600	**0.763**	0.426	0.449	0.462	0.329	0.394	0.531
DL2	0.370	0.587	**0.781**	0.443	0.442	0.437	0.344	0.372	0.540
DL3	0.379	0.553	**0.820**	0.440	0.504	0.473	0.395	0.396	0.546
DL4	0.359	0.456	**0.712**	0.426	0.350	0.430	0.372	0.350	0.445
DL5	0.350	0.488	**0.784**	0.463	0.437	0.452	0.392	0.439	0.469
DL6	0.354	0.492	**0.798**	0.446	0.454	0.466	0.422	0.448	0.498
DL7	0.320	0.458	**0.672**	0.348	0.404	0.350	0.331	0.397	0.461
ItU1	0.493	0.456	0.460	**0.745**	0.606	0.601	0.345	0.392	0.572
ItU2	0.460	0.490	0.425	**0.811**	0.570	0.608	0.300	0.384	0.587
ItU3	0.525	0.504	0.457	**0.789**	0.663	0.646	0.334	0.444	0.615
ItU4	0.418	0.451	0.442	**0.715**	0.596	0.560	0.374	0.456	0.573
ItU6	0.459	0.306	0.247	**0.621**	0.310	0.372	0.180	0.224	0.391
ItU7	0.407	0.367	0.363	**0.668**	0.410	0.454	0.237	0.345	0.503
ItU8	0.422	0.402	0.403	**0.700**	0.419	0.483	0.298	0.338	0.521
EoU1	0.475	0.443	0.449	0.623	**0.776**	0.621	0.339	0.435	0.549
EoU2	0.454	0.439	0.463	0.592	**0.853**	0.640	0.361	0.424	0.586
EoU3	0.370	0.436	0.484	0.538	**0.801**	0.559	0.364	0.430	0.531
EoU4	0.429	0.455	0.438	0.606	**0.810**	0.616	0.353	0.401	0.571
EoU5	0.386	0.415	0.473	0.580	**0.830**	0.612	0.364	0.434	0.538
EoU6	0.401	0.443	0.452	0.561	**0.785**	0.539	0.345	0.452	0.565
EoU7	0.411	0.465	0.489	0.599	**0.817**	0.587	0.320	0.450	0.593
USE2	0.495	0.490	0.483	0.626	0.629	**0.773**	0.348	0.416	0.622
USE3	0.438	0.418	0.460	0.572	0.493	**0.726**	0.366	0.355	0.498
USE4	0.502	0.492	0.458	0.606	0.588	**0.814**	0.272	0.397	0.590
USE5	0.529	0.469	0.438	0.635	0.600	**0.852**	0.332	0.408	0.607
USE6	0.464	0.461	0.484	0.583	0.615	**0.834**	0.364	0.435	0.581
USE7	0.477	0.421	0.466	0.588	0.637	**0.834**	0.372	0.396	0.586

Cross loading analysis – Part 2

	AFO	DBA	DL	ItU	EoU	USE	PoD	UDA	UDigAd
PoD1	0.234	0.215	0.353	0.324	0.359	0.343	**0.633**	0.330	0.317
PoD2	0.241	0.265	0.390	0.271	0.276	0.280	**0.783**	0.375	0.305
PoD3	0.280	0.245	0.330	0.340	0.276	0.305	**0.741**	0.376	0.316
PoD4	0.269	0.265	0.359	0.346	0.355	0.364	**0.802**	0.370	0.338
PoD5	0.248	0.254	0.347	0.286	0.317	0.294	**0.790**	0.327	0.323
PoD6	0.242	0.252	0.317	0.260	0.299	0.271	**0.757**	0.368	0.293
PoD7	0.303	0.300	0.427	0.342	0.365	0.354	**0.738**	0.377	0.368
UDA2	0.302	0.300	0.321	0.357	0.404	0.368	0.367	**0.726**	0.381
UDA3	0.314	0.305	0.352	0.341	0.420	0.353	0.372	**0.745**	0.380
UDA4	0.361	0.319	0.355	0.347	0.352	0.328	0.343	**0.736**	0.362
UDA5	0.293	0.331	0.379	0.338	0.323	0.315	0.309	**0.673**	0.357
UDA6	0.318	0.355	0.378	0.380	0.360	0.320	0.272	**0.706**	0.401
UDA7	0.433	0.388	0.448	0.450	0.426	0.440	0.403	**0.723**	0.476
UDigAd1	0.498	0.481	0.453	0.635	0.558	0.597	0.290	0.403	**0.701**
UDigAd2	0.388	0.450	0.419	0.486	0.410	0.412	0.216	0.417	**0.610**
UDigAd3	0.479	0.483	0.495	0.546	0.508	0.527	0.372	0.441	**0.733**
UDigAd4	0.395	0.444	0.486	0.495	0.483	0.507	0.372	0.409	**0.696**
UDigAd5	0.457	0.525	0.524	0.610	0.577	0.572	0.327	0.425	**0.783**
UDigAd6	0.393	0.465	0.462	0.534	0.437	0.471	0.273	0.394	**0.717**
UDigAd7	0.417	0.468	0.436	0.545	0.403	0.472	0.265	0.355	**0.687**
UDigAd8	0.414	0.461	0.453	0.526	0.488	0.553	0.291	0.379	**0.741**
UDigAd10	0.410	0.454	0.471	0.505	0.472	0.460	0.323	0.367	**0.673**
UDigAd11	0.419	0.529	0.467	0.537	0.490	0.516	0.298	0.366	**0.723**
UDigAd12	0.382	0.482	0.489	0.522	0.584	0.554	0.328	0.405	**0.760**
UDigAd13	0.396	0.485	0.467	0.522	0.552	0.551	0.306	0.370	**0.730**
UDigAd14	0.397	0.503	0.467	0.523	0.468	0.497	0.314	0.395	**0.738**
UDigAd15	0.403	0.429	0.460	0.483	0.475	0.495	0.348	0.389	**0.681**

Annex 2: Survey form

Survey on digital broadcast establishment in Sri Lanka
Questionnaire for potential users

Date ………………

Dear Sir/Madam,

It would be highly appreciating that you have decided to take part on the research survey. Following questionnaire is defined as to study on Digital conversion of Sri Lanka Broadcasting services with special reference to Televisions. The questionnaire will not consist of personal identifiable information and it will make sure not to disclose any information you are sharing here to any third-party personals and this will use for academic purpose only.

Further I will make sure to secure your confidentiality and all the response forms will discard after completion of the research.

If you have any facts to clarify regarding this questionnaire, please don't hesitate to contact principal investigator on email: darshitha@hotmail.com; phone: 0777337050; WhatsApp: +94777337050.

Section 1

This section consists of the participant information which will corelated on evaluation of the TV and radio usage.

1   Gender

    Male ☐   Female ☐

2   Age (Years)

    18-30 ☐   30-40 ☐   40-60 ☐   over 60 ☐

3   Highest level of education

    O/L or less ☐   A/L ☐   Diploma ☐   Bachelor ☐   Master ☐

    PhD ☐

4   Civil Status

    Married ☐   Unmarried ☐   Separated ☐

5   Members in the house

    2 or less ☐   3-5 ☐   6-9 ☐   Above 10 ☐

6   Type of occupation

    Business ☐   Professional ☐   Government ☐   Student ☐

    Others (Specify)………..

7   Monthly individual income of your' s

    Less than 50,000 ☐   50,000 – 100,000 ☐   100,000 – 300,000 ☐

    More than 300,000 ☐

8   Monthly household income   (All family members living in house)

Lass than 50,000 ☐   50,000 − 100,000 ☐   100,000 − 300,000 ☐

More than 300,000 ☐

9   District   (your house is located at)

Colombo ☐   Katluthara ☐   Gampaha ☐

10   Your preferred language

English ☐   Sinhala ☐   Tamil ☐

Section 2

This section consists of yours TV and Social media usage behavior which will help to determine the TV and radio usage confined on the research.

1   Do you have a TV/ TVs in your home?

Yes ☐   No ☐

2   If "No" for Q1, what is the reason for not having a TV?

………………………………………………………….

3   If "No" for Q1, are you intended to have a TV in near future (within 2 years' time)?

Yes ☐   No ☐

4   If "Yes" for Q1, how many TVs do you have at home?

1 ☐   2 ☐   3 ☐   4 or more ☐

5   If "Yes" for Q1, what are the types of TVs you have at home?

CRT ☐   LCD/LED/Flat Screen ☐   Smart TV/WEB TV ☐

6   How many hours do you spend to watch TV in a week?

Less than 5 Hrs ☐   5-10 Hrs ☐   11-20 Hrs ☐   More than 20 hours ☐

7   Are you using a smart phone/ phones?

Yes ☐   No ☐

8   Are you using paid video service in mobile? (Like Netflix, Iflix, ALTBalagi etc)?

Yes ☐   No ☐

9   Are you using any pay TV connection in house?

Yes ☐   No ☐

10   Who are the services providers?

Dialog TV ☐   Peo TV ☐   Dish TV ☐   Cable TV ☐

11   What is the reason that you tend to have a Pay TV connection. (There could be more than one selection)?

Better Video Quality ☐   Better Audio Quality ☐   Easy for reception ☐

Easy to use ☐   Maintain Social Status ☐   Rewind TV ☐

12   What is the monthly rental you pay for the TV?

………………………………

13   Do you see the value for money of paying monthly amount for a TV connection?

Yes [ ]   No [ ]

14   If "No" for Q15, what is the monthly fee that you are willing to pay for "Pay TV" connection?

………………………………………….

15   Do you have internet connection at home?

Yes [ ]   No [ ]

16   Are you usually watching video from internet?

Yes [ ]   No [ ]

17   Are you using social media?

Yes [ ]   No [ ]

18   How many hours do you spend in social media per week?

Don't Use [ ]   Less than 5 Hrs [ ]   5-10 Hrs [ ]   11-20 Hrs [ ]

More than 20 Hrs [ ]

Section 3

This section consists of your believe and expectation related to TV, Radio and internet connectivity benefits,
expectations and behavior which will help on developing the roadmap for digital broadcasting adaptation in Sri Lanka.

Questions from 19−32 related to digital broadcast availability and literacy in Sri Lanka and please place X mark
in the suitable box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
19	I expect to use Digital TV					
20	I expect to access my TV program in any location from my mobile or any screen device					
21	I expect to use digital TV when I need it					
22	I expect more TV channels in Sri Lanka					
23	I expect higher quality video in TV channels					
24	I expect to watch my favorite programs continually without interrupting advertisements					
25	I expect to watch my favorite TV program in later day as recorded content whenever I required					
26	I know how to use Digital TV					
27	I know about digital Receiver Box connected to TV					
28	I know about Video On Demand					
29	I know about time shift TV					
30	I know about Cathup TV					
31	I know about electronic program guide (EPG)					
32	In terms of your Internet skills, do you consider yourself to be a knowledgeable person is to use internet.					

Questions from 33−39 related to policy on digitalization in Sri Lanka and please place "X" mark
in the appropriate box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
33	Have you heard about " Telecommunication Regulation Commission" ?					
34	Do you believe that Government policy making institutes want to intervene to digitalize the television					
35	Do you think that government policy making institutes is currently sufficiently involving for make policy for media					
36	Do you think that government institutes want to encourage TV stations to upgrade to digital					
37	Do you think that government want to standardize the media digitalization in Sri Lanka					
38	Do you think that government want to educate consumers about broadcast digitalization in Sri Lanka					
39	Do you think that government want to act as network operator and rent out space/tower for all private and public TV channels.					

Questions from 40−46 related to user device availability and please place "X" mark in the appropriate box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
40	I have access to digital TV devices in my home or workplace					
41	I have seen digital TV available to sell in the market					
42	I have seen there are advertisement related to digital TV in the media					
43	I have seen digital service providers (Dialog TV, PeoTV) advertisement/promotions					
44	I believe there are sufficient collection of devices available in Sri Lanka to receive digital TV					
45	I have access to watch video from my mobile phone					
46	Probably I will consider digital TV reception availability if I purchase a new TV					

Questions from 47−53 related to affordability of using the digital TV and please place "X" mark in the appropriate box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
47	I am willing to pay some money to have digital TV connection to my home					
48	I am willing to pay 2000 LKR for initial connection fee for Digital TV reception					
49	I am willing to pay 800 LKR in monthly basis to receive 30+ local channels in digital reception					
50	I am willing to pay 1500 LKR to receive international news, sports, film, drama, education channels in monthly connection					
51	I believe my friends and families also willing to pay some monthly rental to receive good quality TV content					
52	I might consider having digital TV connection, If I purchase a new TV in coming months.					
53	I might consider to purchase more digital connections to have personalize viewing (private)					

Questions from 54−60 related to usefulness of using the digital TV and please place "X" mark in the appropriate box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
54	Digital TV services will make my life easier					
55	Digital TV services will help me to watch my favorite program whenever I required					
56	Digital TV services will help me to arrange reminder for the favorite program					
57	Digital TV services will be beneficial in my life					
58	Digital TV services will increase my efficiency and effectiveness of TV usage					
59	Digital TV connection will enable opportunities to learn new things than analog TV					
60	Overall, I find the Digital TV service to be useful in my life					

Questions from 61−67 related to ease of use the digital TV and please place "X" mark in the appropriate box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
61	Learning to operate the Digital TV services will be easy for me					
62	Digital TV service usage will be clear and understandable					
63	It will be easy to me to watch what I need from Digital TV services more than traditional TV					
64	I will be easily become skillful for using the Digital TV services					
65	I found it is easy to use "Digital TV" to view the program what I want					
66	I think that I can use Digital TV without obtaining the help from others					
67	Overall, the Digital TV services are easy to use					

Questions from 68−75 related to intention of use the digital TV and please place "X" mark in the appropriate box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
68	I intend to use Digital TV service					
69	I convince and promote others to use Digital TV service					
70	I Plan to use Digital TV service					
71	I think most of my family members would like to use the Digital TV					
72	I am expecting to increase my TV size within next two years' time					
73	I am expecting to view TV channels continuously using my TV and mobile in same time					
74	I want to use my mobile screen as a TV whenever required					
75	I want to use my single TV subscription in multiple devices whenever required					

Questions from 76–90 related to broadcast users digital adoption and please place "X" mark in the appropriate box.

		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
76	Digital TV usage will be pleasant experience					
77	I am currently using internet to view video					
78	I am/will use digital TV service whenever required					
79	I believe my family members like to use Digital TV service					
80	I believe I can use digital TV effectively					
81	I require to use TV in mobile environment (using mobile phone or portable screen)					
82	I want to continue the viewing program while I move					
83	I want to watch my favorite program whenever I want it (when I'm ready)					
84	I want to purchase TV which is recommended by TRC (Telecommunication Regulation Commission)					
85	I want to use the Digital TV by learning all the features by myself (without ohers help)					
86	I want to use digital TV using my existing TV setup.					
87	I want to use digital TV as its easy to use					
88	I want to use Digital TV because it seems useful for me.					
89	I expect channels dedicated to different services (like Sports, education, drama, film, cartoon)					
90	I believe the analog TV will shut down and Digital TV will replace within next 5-10 years' time in Sri Lanka.					