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The Influence of Digital Audio Broadcasting (DAB+), Innovation, Expectations, and Perception on the Trust of Radio Listeners in Bangkok and the Metropolitan Area

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ABSTRACT

The radio broadcasting industry in Thailand is currently facing severe spectrum congestion due to the previous practice of allowing operators to establish radio stations freely based on demand. This has resulted in excessive radio stations, leading to air traffic issues and interference with primary radio station signals. Given this situation, Thailand's regulatory agencies must restructure the frequency spectrum to manage it more efficiently. This study aims to 1) examine the levels of digital radio DAB+, innovation, expectations, perception, and trust among radio listeners in Bangkok and the surrounding metropolitan area. 2) Investigate the influence of DAB+ digital radio, innovation, expectations, and perception on the trust of radio listeners in this region. 3) Develop a radio listener trust model in the Bangkok metropolitan area. This research employed a mixed-methods approach, integrating both quantitative and qualitative research. For the quantitative part, the sample consisted of 340 radio listeners residing in Bangkok and the surrounding areas, selected based on a criterion of 20 times the number of observed variables using multistage sampling. Data were collected via questionnaires and analyzed using structural equation modeling (SEM). The qualitative component involved in-depth interviews with 20 key stakeholders, including regulators, radio station operators, and radio hosts in the Bangkok metropolitan area. The research findings revealed that 1) levels of DAB+ digital radio, innovation, expectations, perception, and trust among listeners were high. 2) DAB+ digital radio, innovation, expectations, and perception statistically significantly influenced listener trust at the 0.05 level. 3) The developed trust model, named the "DAB+ PIEPT Model" (P = Product, I = Innovation, E = Expectation, P = Perception, T = Trust), effectively represents the factors influencing listener trust. Furthermore, the qualitative results indicate that in order to build trust among radio listeners in the Bangkok metropolitan area, radio operators must adopt advanced broadcasting technologies, develop digital audio services in accordance with international standards, utilize innovative communication strategies, and educate listeners on new systems to enhance their engagement and capabilities. The results of this study can serve as a guideline for policy development aimed at fostering sustainable trust in radio broadcasting among urban listeners in the future.

Keywords: Digital Radio / Audio Broadcasting (DAB+) / Expectations / Perception / Radio

INTRODUCTION

In an era increasingly defined by digital transformation, the radio broadcasting industry faces both unprecedented challenges and remarkable opportunities (Albarran, 2019). Traditional analog radio, once a dominant medium of mass communication, is being rapidly redefined by technological advancements and shifting consumer expectations (Napoli, 2011). At the forefront of this evolution is Digital Audio Broadcasting (DAB+), a technology that promises enhanced audio quality, broader station availability, and interactive capabilities far beyond what analog systems can offer (Ofcom, 2021). In urban centers like Bangkok and its metropolitan area, the introduction of DAB+ is not just a technological upgrade—it represents a seismic shift in how radio is consumed, perceived, and trusted by listeners (Dabass & Arora, 2021). Trust is a fundamental element in the relationship between media providers and their audiences (McQuail, 2010). For decades, radio has maintained a unique position of credibility and personal connection, often surpassing television and digital news platforms in terms of listener loyalty and perceived reliability (Tsfati & Cappella, 2003). However, the transition to DAB+ introduces new dimensions that could influence

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this trust—such as innovation, changing user expectations, and evolving perceptions of media (Chan-Olmsted & Wang, 2020). This research explores how DAB+, alongside innovation, expectations, and perception, influences radio listener trust in the context of Bangkok and its surrounding areas—a region that is technologically progressive yet culturally rooted.

The Evolution of Radio in the Digital Age-Radio broadcasting has come a long way since its inception in the early 20th century. What started as a mono-channel analog service has evolved into a multimedia platform, embracing web streaming, podcasts, mobile apps, and now digital radio technologies like DAB+ (Bardoel & Lowe, 2007). Traditional AM/FM radio continues to exist, particularly in regions where digital infrastructure is underdeveloped, but its limitations—such as poor signal quality, limited frequency space, and lack of interactivity—are increasingly evident (Ofcom, 2021).

DAB+ (an enhanced version of the original DAB standard) offers several advantages: higher audio quality, increased bandwidth efficiency, and the ability to transmit additional data such as song titles, news headlines, weather updates, and even images (Digital Radio Mondiale [DRM], 2020). These features significantly enhance the listener experience and are designed to cater to modern expectations of media interactivity and personalization (Gasser & Palfrey, 2012). Thailand, and Bangkok in particular, stands at a crossroads between analog persistence and digital adoption. As the capital city and economic hub, Bangkok exhibits a high level of technological literacy, smartphone penetration, and internet accessibility, making it an ideal ground for studying the influence of DAB+ on radio consumption and trust (Dabass & Arora, 2021).

Innovation in the Thai Radio Landscape-The Thai government and various private broadcasters have recognized the need to modernize the country's radio broadcasting system. Trial DAB+ transmissions have been initiated, aiming to assess feasibility, public reception, and operational frameworks (DRM, 2020). These trials indicate the readiness of the infrastructure and the enthusiasm of early adopters; however, full implementation requires a deeper understanding of audience behavior, expectations, and trust (Chan-Olmsted & Wang, 2020). Innovation in broadcasting is not only about technology but also about content delivery, user engagement, and value proposition. In Bangkok, radio stations are competing not only with each other but also with streaming platforms like Spotify, YouTube, and podcast networks (Napoli, 2011). To stay relevant, they must offer something uniquely compelling—something that DAB+ could facilitate through enriched content, better sound quality, and real-time interactivity (Ofcom, 2021). Innovation also carries risks. Technological complexity can alienate older or less tech-savvy audiences (Gasser & Palfrey, 2012). Moreover, the novelty of DAB+ may lead to heightened expectations that, if unmet, could damage trust. Therefore, understanding how innovation interacts with user perceptions and trust is vital (Chan-Olmsted & Wang, 2020).

The Role of Expectations and Perception- Consumer expectations have shifted dramatically in recent years. Listeners no longer passively consume content; they seek personalization, convenience, and immediacy (Napoli, 2011). Expectations regarding radio are shaped by experiences with other digital media—such as on-demand streaming, voice assistants, and algorithmic content recommendations. Consequently, DAB+ is not evaluated in isolation but compared against the broader digital media landscape (Albarran, 2019). In this context, perception plays a crucial role. A listener's perception of the credibility, usability, and relevance of DAB+ significantly affects their willingness to adopt the platform and continue engaging with it (Tsfati & Cappella, 2003). Perception is influenced by various factors, including marketing messages, peer recommendations, user interface design, and personal experiences with the technology (McQuail, 2010). Moreover, perception and expectation are dynamic; they evolve as users interact more deeply with the medium. Early adopters may perceive DAB+ as cutting-edge and trustworthy, but any technical glitches, lack of content variety, or user confusion can quickly erode that trust. Therefore, managing expectations and aligning them with actual service delivery is essential for maintaining long-term trust (Bardoel & Lowe, 2007).

Trust in Media and Radio Broadcasting - Trust in media is a multifaceted construct, encompassing beliefs about honesty, reliability, competence, and alignment with audience values (McQuail, 2010). In the case of radio, trust often stems from consistent delivery, perceived impartiality, and emotional resonance. Bangkok's radio landscape, rich with diversity in language, culture, and content, has historically enjoyed

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high levels of trust—especially in times of political turmoil or emergency, when people rely on radio for timely and accurate information (Tsfati & Cappella, 2003).

The shift to digital, however, introduces uncertainties. Concerns about data privacy, commercialization, and digital manipulation could undermine trust if not properly addressed (Gasser & Palfrey, 2012). Listeners may question the motives behind digital transformation—wondering whether it serves public interest or corporate profit. Furthermore, the disappearance of familiar analog interfaces and formats might disorient loyal listeners, especially older demographics who are less comfortable with digital change (Albarran, 2019). This research posits that trust in radio is no longer solely a function of content quality or broadcaster reputation. Instead, it is shaped by a complex interplay between technology (DAB+), innovation (new features and services), expectations (user demands), and perception (individual interpretations of value and credibility) (Chan-Olmsted & Wang, 2020). Understanding this interplay is critical to fostering a sustainable and trusted radio ecosystem in the digital age.

Bangkok and its metropolitan area offer a unique and revealing context for studying these dynamics. The region is demographically diverse, technologically progressive, and culturally rich. It includes a mix of urban professionals, students, migrants, and traditional communities—each with different media habits, levels of technological access, and trust frameworks (Dabass & Arora, 2021).

The area also reflects the broader national trends in media consumption while leading in digital innovation. Mobile phone penetration is nearly universal, and internet usage is among the highest in Southeast Asia. This digital readiness creates fertile ground for DAB+ to succeed—provided it aligns with listener needs and preserves the trust that radio has historically enjoyed (DRM, 2020).

OBJECTIVES OF RESEARCH

1) examine the levels of digital radio DAB+, innovation, expectations, perception, and trust among radio listeners in Bangkok and the surrounding metropolitan area.

2) Investigate the influence of DAB+ digital radio, innovation, expectations, and perception on the trust of radio listeners in this region.

3) Develop a radio listener trust model in the Bangkok metropolitan area.

RESEARCH METHODOLOGY

Scope of the Study

1. Content Scope

This study investigates the relationships between various factors influencing trust in the adoption of **Digital Audio Broadcasting (DAB+)** in order to develop a new conceptual model and provide policy and strategic recommendations for stakeholders in the radio industry. The ultimate goal is to promote the effective and sustainable implementation of DAB+ digital radio technology in Thailand.

The study focuses on four main factors:

1. **Product factors** – consisting of product quality, brand equity, design, and perceived benefits.
2. **Innovation factors** – including relative advantage, compatibility, complexity, and trialability.
3. **Expectation factors** – comprising performance expectancy, effort expectancy, and social influence.
4. **Perception factors** – covering perceived usefulness, perceived ease of use, and risk perception.

These four factors are hypothesized to influence the dependent variable, trust, which consists of three observed dimensions: confidence, belief, and user retention.

2. Population and Sample Scope

This research adopts a mixed methods approach using an explanatory sequential design, in which quantitative research is the primary method followed by qualitative research to enrich and explain the quantitative findings in more depth (Creswell & Creswell, 2018; Teddlie & Tashakkori, 2020).

Quantitative Phase

The population in this phase consists of radio listeners residing in Bangkok and the surrounding metropolitan area, totaling approximately 7.3 million people, based on data from a radio audience survey conducted by Nielsen and the NBTC (Thailand's National Broadcasting and Telecommunications Commission). The sample size was determined according to the requirements of Structural Equation Modeling (SEM), which recommends a minimum of 20 times the number of observed variables (Hair et al.,

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2022). Given that this study includes 17 observed variables, the minimum required sample size is 340 respondents (17 × 20 = 340). To prevent potential data loss and ensure statistical validity, 400 samples were collected (Kline, 2016). Purposive sampling was employed, with inclusion criteria as follows (Anderson & Gerbing, 2018):

1. Aged 18 years or older.
2. Resident of Bangkok or the metropolitan area for at least one year.
3. Has prior experience listening to the radio or an interest in radio content.
4. Willing to voluntarily provide data for the study.

Qualitative Phase

The qualitative study also used purposive sampling to select key informants based on their qualifications and relevant experience, ensuring the quality and depth of the data collected (Creswell & Poth, 2018). According to Guest et al. (2020), a suitable number of qualitative informants should range between 15–20 to achieve data saturation.

The key informants were selected as follows:

1. 12 stakeholders from regulatory bodies and radio operators, including high-level executives or officials involved in policy-making and operational planning in radio broadcasting, each with no less than five years of experience. Private sector participants were selected based on their roles in daily business operations and decision-making to ensure a comprehensive view.
2. 8 radio hosts from Bangkok and the metropolitan area, each with at least three years of broadcasting experience, including prior experience with digital media platforms. Their insights provide a practical understanding of listener behavior and audience demands.

This purposive selection yielded a total of 20 key informants, which is sufficient for qualitative analysis (Hennink & Kaiser, 2022).

3. Scope of Variables

This research includes the following variables:

1. Exogenous Latent Variables:
   - Product Factors, measured by four observed variables:
     - Product Quality, Brand Equity, Design, Perceived Benefits
   - DAB+ Innovation Factors, measured by four observed variables:
     - Relative Advantage, Compatibility, Complexity, Trialability
2. Endogenous Latent Variables:
   - Expectation, measured by three observed variables:
     - Performance Expectancy, Effort Expectancy, Social Influence
   - Perception, measured by three observed variables:
     - Perceived Usefulness, Perceived Ease of Use, Risk Perception
3. Dependent Variable:
   - Trust, measured by three observed variables:
     - Confidence, Belief, Retention

4. Time Scope

This research was conducted over a seven-month period, from November 2024 to May 2025.

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RESEARCH RESULT

Symbols representing the variables studied

The researcher has defined symbols to represent the variables studied as shown in Table 1

Table 1. Symbols representing the studied variables

Latent variables (laten variable)	Empirical variables (observation variable)
Product Factors (PRDCT)	Product quality (QULTY) Brand Value (EQUT) Design (DESIG) Perceived Benefits (BENFT)
DAB+ (INDAB) Innovation Factors	Comparative advantage (RELTV) Compatibility (CMPTB) Complexity (COPTY) Trial Ability (TRLBY)
Expectation (EPTN)	Performance Expectations (PFMC) Effort outcome expectation (EFFO) Social Influence (SCIFC)
Perception (PCTN)	Benefit Perception (USEF) Perceived Ease of Use (EASE) Risk Awareness (RISK)
TRUST	Confidence (CNFD) Belief (BELF) User Retention (RETIN)

Symbol / Term	Definition
$\bar{x}$	Average (mean)
SD	Standard deviation
r	Pearson product-moment correlation coefficient
R^2	Squared multiple correlation
χ^2	Chi-square statistic
df	Degrees of freedom
χ^2/df	Ratio of chi-square to degrees of freedom; should be ≤ 5.00 to indicate good model fit
P-value	Statistical significance level
λ (lambda)	Component weight represented as standardized score
Beta	Standardized regression coefficient
SE	Standard error of the component weight
e	Standard error of the indicator
t	t-value for testing significance of regression coefficient
F	F-ratio used to test statistical significance of the relationship
SS	Sum of squares
MSE	Mean square error
CFI	Comparative Fit Index; should be ≥ .90 for good model fit
GFI	Goodness of Fit Index; should be ≥ .90
AGFI	Adjusted Goodness of Fit Index; should be ≥ .90
RMSEA	Root Mean Square Error of Approximation; should be ≤ .08
SRMR	Standardized Root Mean Square Residual; should be ≤ .05
RMR	Root Mean Square Residual; should be ≤ .05

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Symbol / Term	Definition
CN	Critical N (sample size); should be ≥ 200
ρv	Average Variance Extracted (AVE)
ρc	Construct Reliability

Results of the study of general information of the sample group

The researcher collected data from a sample group of 340 radio listeners residing in Bangkok and its surrounding areas. The details are as follows:

Table 2. Number and percentage of data of the sample group in the research .

General information	quantity (person)	Percentage
sex		
female	190	56.00
man	150	44.00
together	340	100.00
age		
18-24 years old	49	14.50
25-34 years old	77	22.50
35 - 44 years old	104	30.50
45-54 years old	71	21.00
55 years and over	39	11.50
together	340	100.00
Education level		
Below bachelor's degree	99	29.00
Bachelor's degree	145	42.50
Higher than bachelor's degree	97	28.50
together	340	100.00
occupation		
Students	71	21.00
Civil servants/state enterprises	85	25.00
Private company employees	105	31.00
Self-employed/freelance	48	14.00
other	31	9.00
together	340	100.00
income		
Less than 15,000 baht	65	19.00
15,001-30,000 baht	78	23.00
30,001-45,000 baht	105	31.00
45,001-60,000 baht	58	17.00
More than 60,000 baht	34	10.00
Total	340	100.00
Radio listening frequency		
every day	141	41.50
4-6 days per week	71	21.00
1-3 days per week	54	16.00
Once in a while	73	21.50
Total	340	100.00
What time period do you listen to the radio most often (You can select more than 1)		
06.00-09.00 hrs.	206	60.50

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General information	quantity (person)	Percentage
09.01-12.00 hrs.	202	59.50
12.01-15.00 hrs.	146	43.00
15.01-18.00 hrs.	223	65.50
18.01-21.00 hrs.	138	40.50
21.01-24.00 hrs.	121	35.50
24.01-05.59 hrs.	54	16.00
Equipment used for listening to the radio (can select more than 1)		
Portable radio	119	35.00
Car radio	235	69.00
Smartphone/Tablet	88	26.00
Computer/Notebook	99	29.00
Type of program you like to listen to (you can select more than 1)		
News/News Analysis	207	61.00
Knowledge	143	42.00
Entertainment/Music	238	70.00
sport	133	39.00
Business/Finance	95	28.00
Awareness of DAB+ digital radio		
Never knew before	175	51.50
I've heard the name but don't know the details.	85	25.00
Know and understand the basic system	34	10.00
Know and have tried it	31	9.00
Regular use	15	4.50
Total	340	100.00

Table 2, the data revealed the following characteristics of the sample group: The majority of respondents were female, totaling 190 individuals (56.00%). The most common age group was 35–44 years, with 104 respondents (30.50%). In terms of education, 145 individuals (42.50%) held a bachelor's degree. The most common occupation was private company employee, accounting for 105 respondents (31.00%). Regarding income, the largest group earned between 30,001–45,000 baht, with 105 individuals (31.00%). The most frequent listening pattern was daily radio listening, reported by 141 participants (41.50%). The most popular listening time (participants could select more than one) was 3:01 p.m. to 6:00 p.m., with 223 individuals (65.50%) selecting this option. As for the device used for listening (multiple selections allowed), the most common was the car radio, used by 235 participants (69.00%). Regarding preferred radio content (multiple selections allowed), the most favored type was entertainment/music programs, chosen by 238 respondents (70.00%). In terms of awareness of DAB+ digital radio, 175 individuals (51.50%) indicated that they had never heard of it before.

The results of the study on the level of DAB+ digital radio innovation, expectations, awareness and trust of radio listeners in Bangkok and its vicinity.

Data were collected using a 5-level rating scale questionnaire with a sample group of 340 radio listeners living in Bangkok and its vicinity. Data were analyzed using descriptive statistics, including mean, standard deviation, and interpretation of score ranges, as follows:

Average 4.51-5.00 means the highest level.
Average 3.51-4.50 means high level.
Average 2.51-3.50 means moderate level.
Average 1.51-2.50 means low level.
Average 1.00-1.50 means the lowest level.

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Table 3 Average, Standard deviation and the interpretation of the meaning of DAB+ digital radio, innovation, expectations, awareness and trust of radio listeners in Bangkok and its vicinity

Variable	$\bar{x}$	Sd	Meaning
Product Factors (PRDCT)			
Product quality (QULTY)	3.80	.80	a lot
Brand Value (EQUT)	3.72	.76	a lot
Design (DESIG)	3.75	.78	a lot
Perceived Benefits (BENFT)	3.62	.79	a lot
Total average	3.72	.78	a lot
DAB+ (INDAB) Innovation Factors			a lot
Comparative advantage (RELTV)	3.91	.73	a lot
Compatibility (CMPTB)	3.73	.71	a lot
Complexity (COPTY)	3.87	.73	a lot
Trial Ability (TRLBY)	3.96	.74	a lot
Total average	3.87	.73	a lot
Expectation (EPTN)			a lot
Performance Expectations (PFMC)	3.60	.77	a lot
Effort outcome expectation (EFFO)	3.64	.76	a lot
Social Influence (SCIFC)	3.58	.75	a lot
Total average	3.61	.76	a lot
Perception (PCTN)			a lot
Benefit Perception (USEF)	3.74	.76	a lot
Perceived Ease of Use (EASE)	3.77	.76	a lot
Risk Awareness (RISK)	3.65	.80	a lot
Total average	3.72	.77	a lot
TRUST			a lot
Confidence (CNFD)	3.68	.76	a lot
Belief (BELF)	3.78	.75	a lot
User Retention (RETIN)	3.71	.73	a lot
Total average	3.72	.75	a lot

Table 3, a survey of 340 radio listeners residing in Bangkok and its surrounding areas revealed the following findings: Product factors (PRDCT) were rated at a high level, with an average score of 3.72. When examining each component individually, it was found that product quality (QULTY), brand value (EQUT), design (DESIG), and perceived benefits.

The innovation factor for DAB+ (INDAB) was rated at a high level, with an average value of 3.87. Upon examining each aspect individually, it was found that comparative advantage (RELTV), compatibility (CMPTB), complexity (COPTY), and trialability (TRLBY) were all rated at a high level, with average values ranging from 3.73 to 3.96. Expectancy (EPTN) was also rated at a high level, with an average value of 3.61. When considering each aspect, it was found that performance expectancy (PFMC), effort expectancy (EFFO), and social influence (SCIFC) were all rated at a high level, with average values ranging from 3.58 to 3.64. Perception (PCTN) was rated at a high level, with an average of 3.72. When examining each component, it was found that perception of benefit (USEF), perception of ease of use (EASE), and perception of risk (RISK) were all rated at a high level, with average values ranging from 3.65 to 3.77. Trust (TRUST) was also rated at a high level, with an average of 3.72. Upon examining each factor, it was found that confidence (CNFD), belief (BELF), and retention of users (RETIN) were all rated at a high level, with average values ranging from 3.68 to 3.78.

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Study Results on the Influence of DAB+ Digital Radio, Innovation, Expectation, and Perception on the Trust of Radio Listeners in Bangkok and Its Vicinity Data were analyzed using Structural Equation Modeling (SEM) with the LISREL version 8.72 program to examine the influence of DAB+ digital radio, innovation, expectation, and perception on the trust of radio listeners in Bangkok and its surrounding areas. The researchers checked the basic statistical assumptions, and the results of the data analysis according to the research objectives are as follows: Normal distribution of empirical variables (n = 340) Correlation coefficient between pairs of empirical variables used in the study model (Observation correlation test) (n = 340) Overall relationship of the empirical variables studied in the structural equation model (n = 340) Quality control of the measurement model (n = 340) Following these steps, data analysis was conducted to verify the results.

Table 4 Mean, standard deviation, percentage of distribution coefficient, minimum value, maximum value, skewness value, kurtosis value and p - value of Chi-square test statistics of the studied empirical variables.

Variable	$\bar{X}$	Sd	%Cv	Sk	Ku	χ^2	P-Value
QULTY	3.80	. 80	21.05	-. 889	- 1. 643	3.490	. 175
EQUT	3.72	. 76	20.43	-. 621	-. 582	. 725	. 696
DESIG	3.75	. 78	20.80	-. 599	- 1.021	1.402	. 496
BENFT	3.62	. 79	21.82	-. 226	-. 753	. 618	. 734
RELTV	3.91	. 73	18.67	-. 334	-. 329	. 220	. 896
CMPTB	3.73	. 71	19.03	. 105	-. 773	. 608	. 738
COPTY	3.87	. 73	18.86	-. 297	-. 225	. 139	. 933
TRLBY	3.96	. 74	18.69	-. 379	-. 158	. 169	. 919
PFMC	3.60	. 77	21.39	-. 125	-. 362	. 147	. 929
EFFO	3.64	. 76	20.88	. 299	-. 806	. 740	. 691
SCIFC	3.58	. 75	20.95	. 260	-. 908	. 892	. 640
USEF	3.74	. 76	20.32	. 039	- 1.472	2.168	. 338
EASE	3.77	. 76	20.16	-. 006	- 1.971	3. 885	. 143
RISK	3.65	. 80	21.92	. 316	- 1.370	1. 978	. 372
CNFD	3.68	. 76	20.65	-. 181	-. 854	. 763	. 683
BELF	3.78	. 75	19.84	- .165	-. 672	. 478	. 787
RETIN	3.71	. 73	19.68	-. 019	-. 733	. 537	. 765

Note: A statistically significant Chi - square (χ^2) value (p-value <. 05) indicates a non-normal distribution.

Examination of the distribution of empirical data in the structural equation model using the Chi-square (χ^2) statistic found that all empirical variables were statistically insignificant ($p > .05$), indicating that all empirical variables were significantly distributed according to the normal distribution pattern. This is consistent with the concept of the Central Limit Theorem (CLT), which states that if a sufficient sample size is collected ($n \geq 30$ analysis units), the distribution of the sample values will tend to approach the normal distribution, regardless of the distribution of the underlying population (Dice & Getting, 2020). Therefore, based on this concept, it can be accepted that the data used in this study are distributed according to the normal distribution in theory.

However, considering the Chi-square (χ^2) statistic alone may not be sufficient because it is sensitive to sample size. That is, when the sample size increases, the Chi-square statistic tends to be significant even though the deviation between the model and the actual data is small. To increase the accuracy of evaluating the goodness of fit of the model, the researcher also evaluated the ratio of Chi-square (χ^2) to degrees of freedom (df). The criterion for consideration is that if the ratio of Chi-square (χ^2) to degrees of freedom

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(χ^2/df) is less than 2.00, the model is considered to have a good fit with the empirical data, even though the Chi-square (χ^2) statistic is statistically significant ($p < .05$) (Kalaya Wanichbancha, 2013; Hair et al., 2006).

Results of structural equation model analysis according to hypothesis model. The fit of the hypothetical model to the empirical data was checked using the LISREL program. By considering the fit index, it was found that the hypothetical model is not consistent with the empirical data, which is considered from the fit index as follows: $\chi^2 = 346.53$ df = 110 p - value =.00000, χ^2 / df = 3.15, RMSEA = .080, RMR =.023, SRMR =.039, CFI =.98, GFI =.89, AGFI =.85, CN = 140.66

When considered, it was found that $\chi^2 = 346.53$, df = 110, and p-value = .00000, which does not meet the criteria because it is still statistically significant. The χ^2 / df = 3.15 does not meet the criteria because it is greater than 2.00. RMSEA = .080 does not meet the criteria because it is greater than .05. RMR = .023 passes the criteria because it is less than .05. SRMR = .039 passes the criteria because it is less than .05. CFI = .98 passes the criteria because it is greater than .90. GFI = .89 does not meet the criteria because it is less than .90. AGFI = .85 does not meet the criteria because it is less than .90, and CN = 140.66 does not meet the criteria because it is less than 200.00.

The results of the analysis show that the hypothesized model is not a good fit with the empirical data because the values for the goodness of fit—χ^2, χ^2 / df, RMSEA, GFI, AGFI, and CN—have not passed the specified criteria (Jöreskog & Sörbom, 1996). Therefore, the researchers are not yet confident in the parameter estimations that occur in the hypothesized model.

Consequently, the researchers need to modify the model to better fit the empirical data by allowing the variance of the standard deviation (θ) of some pairs of empirical variables to be related. This will be done with consideration of the appropriateness and feasibility in terms of concepts and theories, as well as relevant research. The feasibility of discussing the research results from the model modification will also be considered. Once the model is modified to be consistent with the empirical data, the paths and relationships in the detailed model will be further examined. The results of the analysis of the modified model are as follows:

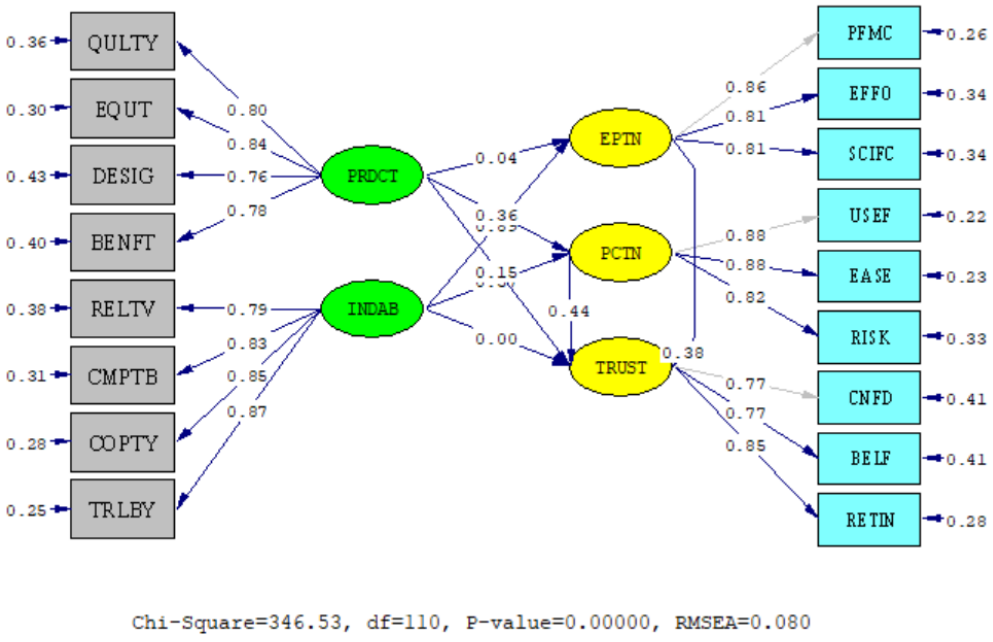

Figure 1. Model according to research hypothesis

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Results of the analysis of the adjusted structural equation model (adjust model). The researcher adjusted the model according to the hypothesis to be consistent with the empirical data

The study aimed to investigate the relationships between various factors influencing the trust of radio listeners in Bangkok and its vicinity, focusing on DAB+ digital radio, innovation, expectation, and perception. Data were analyzed using Structural Equation Modeling (SEM) to assess the fit of the hypothesized model. Initially, the model did not meet the required fit indices, including χ^2 = 346.53, df = 110, p-value = .00000, and χ^2/df = 3.15. In addition, other indices such as RMSEA = .080, GFI = .89, and AGFI = .85 did not pass the acceptable thresholds.

To improve the model fit, the researcher allowed the standard error variance of 14 pairs of empirical variables to be correlated. This adjustment resulted in a better model fit, with the new fit indices as follows: χ^2 = 175.74, df = 96, p-value = .00000, RMSEA = .049, RMR = .017, SRMR = .029, CFI = .99, GFI = .94, AGFI = .91, and CN = 242.71. These adjustments successfully brought the model in line with the empirical data and resulted in acceptable parameter estimates.

The study concluded that the adjusted structural equation model demonstrated good fit with the empirical data, and the parameter estimates were deemed reliable and valid (Jöreskog & Sörbom, 1996; MacCallum et al., 1996; Diamantopoulos & Siguaw, 2000; Tabachnick & Fidell, 2007).

Table 5 Comparison results of calculated statistical values with criteria to check the consistency with empirical data of the modified structural equation model.

List of criteria	Specified criteria (Joreskog & Sorbom, 1996)	Model statistics	Consideration
likelihood ratio chi - square statistic ($\chi^{2)}$	P - value greater than or equal to.05 (Joreskog & Sorbom, 1996)	χ^2 = 175.74 df = 96 p - value =.00000	Failed
relative χ^2 (χ^2 / df)	Less than or equal to 2.00 (Tabachnick & Fidell, 2007)	1.83	pass
Root Mean Squared Error of Approximation (RMSEA)	Less than or equal to.05 (MacCallum et al., 1996)	. 049	pass
Root Mean Squared Residuals (RMR)	Less than or equal to.05 (Diamantopoulos & Siguaw, 2000)	. 017	pass
Standardized Root Mean Squared Residual (SRMR)	Less than or equal to.05 (Diamantopoulos & Siguaw, 2000)	. 029	pass
Comparative Fit Index (CFI)	Greater than or equal to.90 (Fan et al., 1999)	. 99	pass
Goodness of Fit Index (GFI)	Greater than or equal to.90 (Tabachnick & Fidell, 2007)	. 94	pass
Adjusted Goodness of Fit Index (AGFI)	Greater than or equal to.90 (Tabachnick & Fidell, 2007)	. 91	pass
Critical N (CN)	More than or equal to 200 (Joreskog & Sorbom, 1996)	242.71	pass

The table shows that the fit index of the structural equation model after adjustment is consistent with the empirical data, which is considered from the fit index as follows: 2 χ = 175.74, df = 96 p - value = .00 000, χ^2 / df = 1.83, RMSEA = .049, RMR = .017, SRMR = .029, CFI = .99, GFI = .94, AGFI = .91, CN = 242.71 From the above fit index values, it can be concluded that the adjusted structural equation model (adjust model) is fit with the empirical data and the parameter estimation in the model is acceptable.

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Table 6. Results of research hypothesis testing

Hypothesis	Test Results Hypothesis
H1 Product factors have a positive influence on radio listeners' expectations.	Consistent with The assumptions made
H2 DAB+ innovation factors have a positive influence on radio listeners' perception	Consistent with The assumptions made
H3 Expectations have a positive influence on radio listeners' trust	Consistent with The assumptions made
H4 Awareness has a positive influence on radio listeners' trust	Consistent with The assumptions made
H5 DAB+ innovation factor has a positive influence on trust Of radio listeners	Consistent with The assumptions made
H6 Product factors have a positive influence on radio listeners' trust	Consistent with The assumptions made
H7 Product factors have a positive influence on radio listeners' perception.	Consistent with The assumptions made
H8 DAB+ innovation factor has a positive influence on expectations Of radio listeners	Consistent with The assumptions made

The results of the research hypothesis testing, as presented in Table 4, can be summarized as follows: Hypothesis 1: Product factors have a positive influence on radio listeners' expectations. The analysis revealed that product factors had a statistically significant positive influence on radio listeners' expectations at the 0.05 level, with an influence weight of 0.83. Hypothesis 2: DAB+ innovation factor has a positive influence on radio listeners' perception. The findings showed that the DAB+ innovation factor had a statistically significant positive influence on radio listeners' perception at the 0.05 level, with an influence weight of 0.47.

CONCLUSION

The results of this study support all eight hypotheses, indicating that various factors related to product characteristics and DAB+ innovation have a significant influence on radio listeners' expectations, perceptions, and trust in digital radio. Specifically:

Product factors (such as quality, design, and perceived benefits) positively influence listeners' expectations and trust, confirming their importance in shaping consumer behavior in the digital radio landscape.

DAB+ innovation factors (such as comparative advantage, compatibility, complexity, and trialability) positively affect listeners' perceptions and trust in the technology, highlighting the importance of these factors in promoting the adoption of new digital radio systems.

Expectations and awareness were found to have a positive influence on trust, showing that listeners' beliefs about the performance and ease of use of the technology, as well as their familiarity with it, significantly affect their level of trust in DAB+ radio.

DAB+ innovation also plays a crucial role in shaping radio listeners' expectations, demonstrating that technological advancements can alter consumer expectations and influence their behavior.

Overall, these findings suggest that the successful adoption of DAB+ digital radio in Thailand relies on enhancing both product-related factors and technological innovations to meet the expectations and trust of the audience.

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