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EMERGING TECHNOLOGIES AND AUDIENCE ENGAGEMENT IN SELECTED LAGOS RADIO STATIONS

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ABSTRACT
Radio broadcasting in Nigeria operated at a contested crossroads between analogue tradition and digital possibility. This study examined how selected commercial radio stations in Lagos, Nigeria, adopted emerging technologies, including online streaming, social media integration, mobile applications, podcasting, and artificial intelligence tools, and how such adoption related to measurable changes in audience growth and engagement. The study was situated within the Uses and Gratifications Theory and the Diffusion of Innovations Theory as its analytical framework. A mixed-methods research design was employed, combining a structured questionnaire administered to 380 radio listeners in Lagos with in-depth interviews conducted with programme directors and digital content managers at five purposively selected radio stations: Beat 99.9 FM, Cool FM Lagos, Lagos Talks 91.3 FM, Wazobia FM, and Nigeria Info 99.3 FM. Quantitative data were analysed using descriptive statistics and multiple regression, while interview data underwent thematic analysis. Findings indicated that online streaming and social media integration produced the strongest effects on audience reach, while podcast archiving and artificial intelligence content tools, though promising, remained unevenly adopted across stations. The data tentatively indicated a positive association between interactive digital features (notably WhatsApp community engagement) and sustained audience loyalty. The study argued that technology adoption in Lagos radio proceeded asymmetrically, shaped by financing constraints, personnel capacity, and regulatory ambiguity. Recommendations were offered for station managers, media regulators, and communication policymakers.

Keywords: radio broadcasting, digital technology, audience engagement, Lagos radio, media innovation

Introduction

Few media institutions have demonstrated the durability of radio in Nigeria. From the inaugural broadcast of the Nigerian Broadcasting Service in 1932 through the deregulation of 1992 and the rapid proliferation of private FM stations in the early 2000s, radio has remained a primary channel of information, entertainment, and political mobilisation across the country (Oso et al., 2020). Lagos, as Nigeria's commercial capital and most densely populated city, hosts one of the most competitive radio markets on the continent, with more than thirty licensed FM stations competing for the attention of an estimated twenty-two million residents (National Broadcasting Commission [NBC], 2022).

Digital transformation has reshaped broadcasting globally over the past decade. The convergence of internet infrastructure, smartphone penetration, and social media platforms has dissolved traditional distinctions between broadcast and narrowcast, between producer and audience, and between scheduled listening and on-demand consumption (Jenkins, 2006; Dwyer, 2020). Nigeria added approximately forty-two million new internet subscribers between 2018 and 2022, with mobile broadband accounting for over ninety-five percent of connections (Nigerian Communications Commission [NCC], 2023). This structural shift creates both an opportunity and a threat for terrestrial radio broadcasters.

Emerging technologies now available to radio stations extend well beyond early digitisation. Online audio streaming platforms allow stations to reach listeners beyond FM signal boundaries. Social media platforms enable real-time audience interaction that the broadcast model never permitted. Podcasting transforms single-broadcast content into asynchronous media assets. Artificial intelligence tools are beginning to enter editorial and scheduling workflows, with applications ranging from automated content discovery to audience analytics dashboards (Goodman, 2022; Srivastava, 2023). Each of these technologies carries specific implications for how stations build, retain, and measure their audiences.

Statement of the Problem

Despite the volume of global scholarship on digital radio and media innovation, the specific dynamics of technology adoption in Nigerian commercial radio remain understudied. Research that does exist tends to address either the regulatory framework (Obiechina & Okonkwo, 2021) or general audience behaviour trends (Adeyemi & Lawan, 2022), rather than the relationship between specific technological deployments and measurable audience outcomes at the station level. This gap is consequential: without empirical data on which technologies produce engagement returns in the Lagos market, station managers lack actionable evidence, and policymakers lack a basis for targeted intervention. This study was designed to address that gap by investigating the relationship between emerging technology adoption and audience growth and engagement at selected commercial radio stations in Lagos.

Research Objectives and Research Questions

The primary objective of this study was to examine the relationship between emerging technology adoption and audience growth and engagement at selected commercial radio stations in Lagos, Nigeria. Specifically, the study sought to: (1) identify which emerging technologies selected Lagos radio stations had adopted and at what depth of integration; (2) determine how audiences perceived and responded to these technological innovations in their listening and engagement behaviour; and (3) establish the statistical relationship between specific technology types and self-reported audience engagement outcomes.

Three research questions guided the inquiry. First, what emerging technologies have selected Lagos radio stations adopted, and at what depth of integration? Second, how do audiences perceive and respond to these technological innovations in their listening and engagement

behaviour? Third, what is the statistical relationship between specific technology types and self-reported audience engagement outcomes?

Literature Review

Conceptual Review

Emerging technologies, as a concept, refer to innovations that are currently developing or will be developed in the near future, and which are likely to significantly alter the way businesses, economies, and society operate (Storsul & Krumsvik, 2013). In the media context, emerging technologies encompass the digital tools, platforms, and systems that are reshaping how content is produced, distributed, and consumed. They are characterised by novelty, rapid development, relatively uncertain outcomes at the point of adoption, and the potential to fundamentally disrupt existing structures and practices (Dogruel, 2022). For radio broadcasting specifically, the most pertinent emerging technologies include online audio streaming, social media integration, mobile applications, podcasting, and artificial intelligence-assisted tools each representing a different degree of disruption to the traditional broadcast model.

Innovation in media organisations is not a recent preoccupation of communication scholars. Dogruel (2022) traces the concept through several decades of media economics and management research, distinguishing between product innovation (new content formats), process innovation (new workflows), and business model innovation (new revenue strategies). Storsul and Krumsvik (2013) argued that the term had historically been applied too loosely in media studies, often conflating technological novelty with editorial change. More recent work by Küng (2020) returned to this concern, noting that successful innovation in media organisations depends less on technology per se and more on organisational cultures capable of absorbing it. This distinction is particularly relevant to the Nigerian context, where a radio station may technically adopt streaming infrastructure while its editorial team continues to produce content designed solely for terrestrial broadcast.

Innovation diffusion within media organisations has also been examined through the lens of institutional inertia. Hang and Van Weezel (2020) found that legacy broadcasters frequently exhibited what they term 'innovation theatre', adopting surface-level technologies while leaving core editorial and commercial structures intact. The structural constraints facing Nigerian stations including inconsistent electricity supply, limited broadband infrastructure, and regulatory ambiguity around digital broadcasting standards create barriers to substantive innovation that purely market-centred theories of diffusion may not adequately account for (Adewunmi, 2021).

Online audio streaming is perhaps the most consequential technology reshaping terrestrial radio globally. Platforms such as TuneIn, Mixcloud, and station-owned streaming portals allow FM broadcasters to extend their reach to diaspora audiences and younger listeners who consume audio primarily through smartphones (Bottomley, 2020). In Nigeria, station-owned streaming has grown steadily since the mid-2010s, with Cool FM and Beat FM among the earliest to deploy simultaneous FM and internet streams (Adeyemi & Lawan, 2022).

Social media integration has emerged as the most widely adopted digital engagement strategy among Lagos broadcasters. Platforms function simultaneously as audience acquisition channels, real-time feedback mechanisms, and supplementary content distribution systems. Napoli (2019) argues that social media has transformed radio audiences from passive recipients to active co-creators, a shift with significant implications for programme design and presenter training.

Podcasting represents a structurally different relationship between radio content and its audience. Where streaming replicates the broadcast experience online, podcasting converts radio content into an asynchronous media object that competes in a global, on-demand audio market. For radio stations, the strategic value of podcasting lies in audience retention: a listener who

subscribes to a podcast version of a programme is more deeply committed than one who tunes in incidentally (Goodman, 2022).

Artificial intelligence tools have entered the radio production environment more recently and with considerably more variation in application. At the most basic level, AI-driven analytics platforms allow stations to track digital audience behaviour in real time. More sophisticated deployments involve AI-assisted content scheduling, automated news summary generation, and voice cloning for continuity purposes (Srivastava, 2023). In the Lagos context, AI adoption in editorial workflows remains nascent, but its trajectory is important to monitor.

Empirical Review

Empirical scholarship on Nigerian radio and digital technology has expanded in recent years, though unevenly. Adeyemi and Lawan (2022) conducted an audience survey examining digital media habits among Lagos radio listeners, finding that while a significant majority used smartphones to access radio content, station apps and podcasts were far less utilised than social media platforms. Their study, however, did not examine station-level adoption data or test relationships between specific technologies and audience outcomes. Obiechina and Okonkwo (2021) addressed the regulatory dimension of digital broadcasting in Nigeria, documenting the NBC's evolving policy on online streaming and arguing that ambiguity in the digital licensing framework was a material constraint on innovation. Osei-Bonsu (2021) conducted a comparative analysis of radio digitisation across Ghana, Nigeria, and Senegal, noting that Nigerian stations showed the highest social media engagement of the three but the weakest podcast penetration.

International studies offer points of comparison. Bottomley (2020) examined podcast strategies among public and commercial radio broadcasters in the United Kingdom and United States, identifying a tension between the radio brand and the podcast identity that many stations struggle to resolve. Goodman (2022) surveyed radio technology adoption in twelve African cities, finding that Nairobi and Accra led in AI tool adoption while Lagos stations showed stronger social media integration. Srivastava (2023) reviewed AI applications in radio production globally, identifying scheduling optimisation and audience analytics as the most commercially viable near-term uses, while cautioning against the use of synthetic voice without editorial oversight. These studies, taken together, provide useful context but leave unanswered the specific question of which technologies produce measurable audience growth and engagement returns in the Lagos commercial radio market. This study was designed to fill precisely that gap.

Theoretical Foundations

This study is anchored in two theoretical frameworks that together illuminate both the audience dimension and the organisational dimension of digital technology adoption in radio broadcasting.

The Uses and Gratifications Theory, first systematically articulated by Katz et al. (1974) and subsequently expanded by Rubin (1994) and others, provides the most enduring framework for understanding why audiences consume specific media. The theory posits that audiences are active, goal-directed agents who select media based on perceived capacity to fulfil specific needs: information, entertainment, social interaction, personal identity, and escape. Its application to digital broadcasting contexts has been productive. Webster (2014) demonstrated that the theory could accommodate streaming and on-demand behaviours, arguing that the active-audience assumption becomes even more warranted when audiences possess the technical means to customise their media exposure. Martens et al. (2021) applied Uses and Gratifications to podcast adoption specifically, finding that informational and habitual gratifications were stronger predictors of podcast subscription than social ones, a finding with implications for how radio stations frame their podcast offerings. This theory directly informs the study's analysis of audience

engagement scores by predicting that technologies which best serve active gratification-seeking will produce the highest engagement returns.

Everett Rogers' Diffusion of Innovations Theory (Rogers, 2003) offers a process model of technology adoption within organisations and social systems. Rogers identified five categories of adopter, from innovators to laggards, and five attributes of innovations that shape adoption rates: relative advantage, compatibility, complexity, trialability, and observability. These attributes map usefully onto the Lagos radio context. Streaming technology, for example, scores high on relative advantage and observability competitors' streaming presences are publicly visible but faces complexity barriers related to infrastructure and personnel capacity. AI tools score high on potential relative advantage but are perceived as complex and lack direct trialability for resource-constrained stations. This theory directly informs the study's analysis of differential adoption rates across technology types and stations.

Methodology

Research Design

A concurrent mixed-methods design was adopted, combining quantitative survey methods with qualitative in-depth interviews. This design choice reflects the nature of the research questions: quantitative methods allow systematic measurement of technology adoption rates and their association with audience engagement outcomes, while qualitative methods illuminate the organisational contexts, strategic intentions, and operational challenges that statistical data alone cannot capture. The concurrent approach enabled triangulation of findings across both strands, strengthening the validity of conclusions drawn about causal mechanisms (Creswell & Creswell, 2023).

Study Area

Lagos State was selected as the study area for three reasons. First, it hosts the largest concentration of licensed FM radio stations in Nigeria, making it the most competitive and technologically active broadcast market in the country. Second, Lagos has the highest rate of smartphone and internet penetration among Nigerian states, meaning that digital radio technologies are more likely to reach listeners there than in most other parts of the federation (NCC, 2023). Third, the sociodemographic diversity of Lagos spanning multiple ethnolinguistic communities, income groups, and educational levels provides a study population from which findings about urban Nigerian radio audiences can be drawn. Five stations were purposively selected based on ownership diversity, audience size, and documented digital activity (see Table 1 below).

Table 1: *Selected Radio Stations: Profile and Characteristics*

S/N	Station Name	Ownership	Frequency	Year Est.
1	Beat 99.9 FM	Private (Cool FM)	99.9 MHz	2005
2	Cool FM Lagos	Private (Cool FM)	96.9 MHz	1999
3	Lagos Talks 91.3 FM	Private	91.3 MHz	2012
4	Wazobia FM Lagos	Private (Prima Grafia)	94.1 MHz	2008
5	Nigeria Info 99.3 FM	Private	99.3 MHz	2013

Note. Information compiled from NBC (2022) and station websites.

Population and Sampling

The study population comprised two distinct groups. The first consisted of radio listeners in Lagos who were regular consumers of content from at least one of the five selected stations. The second consisted of senior editorial and digital content staff at the five stations, including programme directors, digital managers, and heads of social media.

A multi-stage sampling procedure was used for the audience component. Lagos was stratified into five local government areas representing distinct socioeconomic profiles: Ikeja, Lagos Island, Surulere, Alimosho, and Lekki. Within each area, a systematic random sample was drawn from shopping centres, university campuses, and transit hubs, targeting adults aged eighteen and above who self-identified as regular radio listeners. The sample size of 380 was determined using Yamane's (1967) formula: $n = N / (1 + N(e)^2)$, where N represents the estimated adult population of Lagos and e represents a margin of error of 0.05, yielding a minimum sample of approximately 400. A total of 400 questionnaires were distributed, of which 380 were returned usable, yielding a response rate of 95 percent. It is acknowledged that recruiting respondents in shopping centres, university campuses, and transit hubs may have introduced a systematic bias toward younger and more educated participants. To partially mitigate this, sampling points were deliberately distributed across five LGAs with contrasting socioeconomic profiles, and interviewers were instructed to recruit across visible age and occupational groups. Nonetheless, this limitation is discussed in relation to findings where relevant. For the qualitative strand, purposive sampling was applied, selecting two to three senior staff members per station based on their direct involvement in digital strategy, resulting in twelve interview participants across the five stations.

Data Collection Instruments

The structured questionnaire comprised four sections. Section A collected demographic information. Section B assessed listening habits and technology use. Section C measured perceived engagement across six dimensions: informational gratification, entertainment gratification, social interaction, content accessibility, content interactivity, and loyalty intent. Items were rated on a five-point Likert scale anchored at 1 (strongly disagree) and 5 (strongly agree). Section D collected respondents' evaluations of specific technologies deployed by their primary station. The questionnaire was pre-tested with thirty Lagos residents not included in the main sample, and reliability was assessed using Cronbach's alpha. The coefficient for the engagement subscale was 0.83, while the technology perception subscale yielded a coefficient of 0.79, both exceeding the 0.70 threshold recommended by Nunnally and Bernstein (1994). In-depth interviews were conducted using a semi-structured interview guide developed around four themes: current technology portfolio, adoption decision processes, perceived audience effects, and future strategic intentions. Interviews lasted between forty-five and seventy-five minutes, were recorded with participants' consent, and transcribed verbatim.

Data Analysis

Quantitative data were analysed using IBM SPSS Statistics version 28. Descriptive statistics (frequencies, means, standard deviations) characterised the sample and the distribution of technology adoption. Pearson bivariate correlations examined the direction and strength of associations between individual technology variables and engagement scores. Multiple linear regression assessed the predictive contribution of each technology type to the composite audience engagement score, controlling for demographic variables. Qualitative data were analysed using Braun and Clarke's (2006) six-phase thematic analysis protocol, with initial coding performed inductively on interview transcripts before themes were reviewed against the theoretical

framework. Analyst triangulation was applied: two members of the research team independently coded a subset of transcripts, achieving an inter-rater agreement coefficient of 0.81.

Results

Demographic Profile of Respondents

The demographic characteristics of the 380 respondents are presented in Table 2. The sample skewed slightly toward younger adults, with 58.2 percent falling between the ages of 18 and 35. The gender distribution was near-even (52.1 percent male, 47.9 percent female). A high proportion of respondents held undergraduate or postgraduate qualifications (73.1 percent). Station preference was relatively evenly distributed across the five selected stations.

Table 2: Demographic Profile of Survey Respondents (N = 380)

Variable	Category	Frequency	Percentage (%)
Age	18–25	87	22.9
	26–35	134	35.3
	36–45	98	25.8
	46 and above	61	16.0
Gender	Male	198	52.1
	Female	182	47.9
Education	Secondary School	54	14.2
	Undergraduate	178	46.8
	Postgraduate	100	26.3
	Other	48	12.7
Station Preference	Beat 99.9 FM	91	23.9
	Cool FM Lagos	83	21.8
	Lagos Talks 91.3 FM	72	18.9
	Wazobia FM	68	17.9
	Nigeria Info 99.3 FM	66	17.4

Technology Adoption Across Selected Stations

Table 3 reports the technology adoption status across the five selected stations, as determined through a combination of station-provided documentation, content analysis of digital platforms, and interview verification. All five stations had adopted online streaming and social media integration at the time of data collection. Mobile app deployment was present at four of the five stations, with Wazobia FM the exception. Podcast archiving was confirmed at three stations, though the depth of commitment varied considerably. AI tool adoption was the most uneven category: two stations reported using AI-assisted analytics dashboards, two others described

limited use of AI scheduling tools, and only one station reported integration of AI in any editorial function.

Table 3: Technology Adoption Status Across Selected Lagos Radio Stations

Technology	Adopted (%)	Partially Adopted (%)	Not Adopted (%)	Audience Reach Impact*
Online Streaming	100	0	0	High
Social Media Integration	100	0	0	High
Mobile App	80	0	20	Moderate–High
Podcast Archiving	60	20	20	Moderate
AI Scheduling Tools	40	40	20	Moderate
Interactive SMS/WhatsApp	80	20	0	Moderate–High
Website Live Chat	60	20	20	Moderate
Audience Analytics Tools	60	40	0	Moderate

Audience Engagement Scores by Technology Type

Audience responses to individual engagement indicators are summarised in Table 4. Social media integration recorded the highest mean engagement score (M = 4.36, SD = 0.68), with 86.1 percent of respondents agreeing or strongly agreeing that their preferred station's social media presence extended the reach of programming content beyond broadcast hours. Online streaming returned a comparably strong score (M = 4.21, SD = 0.74), with 81.3 percent endorsing its positive effect on their listening access. Interactive features, including WhatsApp engagement and SMS call-ins, also returned a strong mean score (M = 4.08 and M = 4.19 respectively). Mobile app usage returned a positive mean (M = 4.12, SD = 0.82). AI content tools produced the most modest engagement score (M = 3.54, SD = 1.02), with the largest standard deviation, suggesting heterogeneity in audience awareness and perception.

Table 4: ***Audience Engagement Scores by Technology Indicator (N = 380)***

Engagement Indicator	Mean Score (1–5)	Std. Dev.	% Agree/Strongly Agree	Interpretation
Online streaming increased listenership	4.21	0.74	81.3	Strong positive effect
Social media extends reach	4.36	0.68	86.1	Very strong effect
Podcasting retains audience	3.89	0.91	71.2	Positive effect
Mobile apps improve access	4.12	0.82	78.9	Strong positive effect
AI tools improve content quality	3.54	1.02	61.4	Moderate effect
Interactive features boost loyalty	4.08	0.87	76.6	Strong positive effect
WhatsApp engagement is effective	4.19	0.79	80.5	Strong positive effect

Note. Items rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Regression Analysis: Predictors of Audience Engagement

A multiple linear regression was conducted with composite audience engagement score as the dependent variable and six technology adoption indicators as predictors (see Table 5). The full model was statistically significant, $F(6, 373) = 41.27$, $p < .001$, and accounted for approximately 39.9 percent of variance in engagement scores ($R^2 = .399$, adjusted $R^2 = .389$). Online streaming adoption emerged as the strongest predictor (Beta = .341, $p < .001$), followed by social media integration (Beta = .318, $p < .001$) and interactive features (Beta = .276, $p < .001$). Mobile app usage and podcast availability returned moderate but statistically significant beta coefficients. The AI content tools variable approached but did not achieve conventional significance at the $p < .05$ threshold (Beta = .127, $p = .059$).

Table 5: *Multiple Regression Analysis: Technology Adoption as Predictors of Audience Engagement*

Predictor Variable	B	SE	Beta	t	p
Online Streaming Adoption	0.412	0.078	0.341	5.28	.000
Social Media Integration	0.389	0.082	0.318	4.74	.000
Podcast Availability	0.261	0.091	0.198	2.87	.004
Mobile App Usage	0.298	0.086	0.241	3.47	.001
AI Content Tools	0.178	0.094	0.127	1.89	.059
Interactive Features	0.334	0.080	0.276	4.18	.000

Note. Dependent variable: Composite audience engagement score. $R^2 = .399$, Adjusted $R^2 = .389$, $F(6, 373) = 41.27$, $p < .001$.

Qualitative Findings: Organisational Dynamics of Technology Adoption

Three dominant themes emerged from thematic analysis of the twelve station interviews. The first theme, strategic opportunism, describes the pattern by which technology adoption decisions were driven by observed competitor behaviour rather than deliberate innovation strategy. Multiple interviewees acknowledged that their stations had adopted streaming and social media primarily because rival stations had done so. The programme director at Beat 99.9 FM noted that the station went live on Facebook because Cool FM had already done so and listeners were asking why the station was absent. The second theme, capacity constraint, appeared consistently across stations of varying size. Interview participants described shortages of digitally skilled personnel as the primary barrier to deeper technology adoption. Three of the five stations reported that their social media activity was managed by existing on-air staff with no formal training in digital audience management. The digital manager at Lagos Talks 91.3 FM stated that the station had identified podcast development as a strategic priority two years prior but had been unable to hire a qualified podcast producer at the salary the station could offer. The third theme, regulatory uncertainty, was raised unprompted by six of the twelve interviewees. The NBC's evolving position on digital-only streaming licences, the ambiguity surrounding advertising rules for social media content produced by licensed broadcasters, and the unresolved question of whether podcast distribution requires separate licensing were all cited as factors that discouraged investment in new digital formats.

Discussion of Findings

This section interprets the findings reported above in relation to the study's theoretical framework, prior empirical literature, and the specific conditions of Nigerian commercial radio broadcasting. The aim is not to restate results but to explain why they occurred and what they imply for theory, practice, and policy.

Audience-Facing Technologies and Engagement: Theoretical Interpretation

The dominance of social media integration and online streaming as predictors of audience engagement is consistent with the central premise of Uses and Gratifications Theory (Katz et al., 1974). Audiences are, as the theory posits, selecting technologies on the basis of their gratification potential, and stations that deliver on those potentials are rewarded with higher engagement scores. The high mean score for social media (M = 4.36) aligns with Napoli's (2019) observation that social platforms are now structurally integrated into how audiences relate to audio content. The strong streaming score (M = 4.21) supports Bottomley's (2020) finding that streaming is the primary mechanism through which radio retains younger listeners who do not own FM radios. The interactive features results, particularly the WhatsApp engagement score (M = 4.19) are consistent with Uses and Gratifications literature predicting that social interaction and personal identity gratifications will be served by interactive broadcasting features (Martens et al., 2021). Interview data reinforced this finding: the programme director at Nigeria Info 99.3 FM noted that WhatsApp call-in formats had generated the station's highest sustained listener response since a major political broadcast in 2019, and that the station now considers WhatsApp integration non-negotiable in its programming policy.

The Diffusion of Innovations Theory (Rogers, 2003) provides the most nuanced account of why adoption has proceeded unevenly across technology types. The regression finding that audience-facing technologies account for substantially more variance in engagement than back-end technologies such as AI scheduling maps directly onto Rogers' relative advantage attribute: technologies perceived as offering immediate, visible benefit are adopted first and used more deeply. The adoption pattern in Table 3 (streaming and social media at 100 percent adoption; AI tools at 40 percent) is entirely consistent with this prediction. Stations in the early majority

category, such as Beat FM and Cool FM, demonstrate adoption patterns consistent with high relative advantage perception across multiple technology types, while stations with less digital infrastructure align more closely with Rogers' late majority profile. The programme director at Beat 99.9 FM's account of adopting Facebook because a competitor had done so exemplifies the observability mechanism that Rogers identified as a key driver of diffusion among this adopter category.

Organisational Themes and Their Implications

The three qualitative themes are strategic opportunism, capacity constraint, and regulatory uncertainty which reveal dimensions of the adoption-engagement relationship that quantitative analysis alone cannot capture. Strategic opportunism suggests that Lagos radio stations are largely reactive innovators, following competitor behaviour rather than pursuing deliberate digital strategies. This pattern is consistent with Hang and Van Weezel's (2020) finding of 'innovation theatre' in legacy broadcasters, and with Küng's (2020) argument that organisational culture is the primary determinant of innovation depth. The implication is that even full adoption of a technology platform does not guarantee substantive integration if the editorial and operational cultures remain broadcast-centric.

Capacity constraint as the primary barrier to deeper adoption is a finding with significant practical and policy implications. The inability to hire a qualified podcast producer at an affordable salary reported by Lagos Talks 91.3 FM is not an isolated case but a structural feature of the current media labour market in Nigeria. This finding extends and contextualises Küng's (2020) work on organisational capacity in media firms by demonstrating that the capacity problem in Nigerian radio is not simply a matter of training but of wage competition with better-resourced digital employers. Regulatory uncertainty, raised unprompted by half of all interviewees, extends Obiechina and Okonkwo's (2021) work on broadcasting regulation and identifies it as a moderating variable on the adoption-engagement relationship. The chilling effect of ambiguous digital licensing rules on investment decisions is a mechanism that the quantitative strand of this study cannot directly measure but that the qualitative evidence clearly documents.

Demographic Profile and Its Implications

The demographic skew toward younger, more educated respondents (58.2 percent aged 18–35; 73.1 percent with undergraduate or higher qualifications) is broadly consistent with the sociodemographic composition of digitally active Lagos residents and with prior Nigerian audience surveys (Adeyemi & Lawan, 2022). However, this skew also means that the engagement scores reported here are likely to be more favourable toward digital technologies than would be found in a fully representative sample of Lagos radio listeners. Older and less formally educated audiences who account for the remaining 41.8 percent and 26.9 percent respectively may interact with digital radio technologies differently. This limitation implies that the strong association between social media integration and engagement found in this study may overestimate the effect for the total Lagos audience, and that future research using probability-based sampling is needed to establish population-level estimates.

Conclusion

This study examined the relationship between emerging technology adoption and audience growth and engagement at five selected commercial radio stations in Lagos, Nigeria. Using a mixed-methods design that combined a structured survey of 380 listeners with in-depth interviews at five stations, the study found that audience-facing digital tools principally social media integration, online streaming, and interactive features such as WhatsApp engagement were significantly and positively associated with audience engagement outcomes. Podcast archiving and AI tools showed promise but remain inadequately deployed and inconsistently supported by the

skills or institutional structures needed to realise their impact. Three organisational factors strategic opportunism, capacity constraint, and regulatory uncertainty were identified as moderating variables that shape the adoption-engagement relationship in ways that quantitative methods alone cannot capture.

The study makes a methodological contribution by providing the first multi-station, mixed-methods examination of the technology-engagement relationship in Lagos commercial radio using primary data. Theoretically, it demonstrates that Uses and Gratifications Theory and Diffusion of Innovations Theory together offer a coherent account of audience behaviour and station adoption patterns in this context.

Four specific recommendations follow from the findings. First, radio station managers should immediately hire dedicated social media and podcast producers rather than continuing to assign these responsibilities to on-air talent without digital training on the evidence presented here confirms that this investment will yield measurable engagement returns. Second, stations that have not launched structured podcast archives should begin by converting existing long-form programming, requiring minimal additional cost, before commissioning original podcast productions. Third, stations should formalise WhatsApp audience communities with assigned editorial managers and consistent content schedules, given the strong engagement data associated with this channel. Fourth, the National Broadcasting Commission should, as a priority, publish clear and operationally specific guidelines governing advertising, sponsorship, and distribution for digital content produced by licensed FM broadcasters, covering podcasts and social media channels the regulatory ambiguity documented in this study constitutes a material barrier to digital investment that the NBC alone has the authority to remove.

This study is not without limitations. The purposive selection of five stations and the survey sample's skew toward younger, educated respondents limit generalisability. The cross-sectional design provides a single-point snapshot; longitudinal data would be needed to confirm the causal direction of the technology-engagement relationship. Future research should address these limitations through probability-sampled surveys, longitudinal panel designs, and comparative studies extending analysis to Abuja, Kano, and Port Harcourt.

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