Scientific Research Publishing

Advances in Journalism and Communication, 2025, 13(3), 97-118
https://www.scirp.org/journal/ajc
ISSN Online: 2328-4935
ISSN Print: 2328-4927

Challenges Congolese Broadcast Stations Face in Adopting and Integrating ICT in Their News Processing and Dissemination Practices

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How to cite this paper: Mbuku, J. G. (2025). Challenges Congolese Broadcast Stations Face in Adopting and Integrating ICT in Their News Processing and Dissemination Practices. *Advances in Journalism and Communication, 13,* 97-118.
https://doi.org/10.4236/ajc.2025.133007

Received: July 23, 2025
Accepted: September 19, 2025
Published: September 22, 2025

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Abstract

This research assesses the difficulties that Congolese broadcast stations experience in the adoption and integration of Information and Communication Technology (ICT) in news processing and dissemination in the Democratic Republic of Congo (DRC). Data was collected from 300 respondents working as journalists, editors, technical staff, and management to assess the use of ICT, its adoption barriers, and its perceived importance using a cross-sectional survey design. There is some adoption of ICT tools in the stations, especially computers, the internet, and mobile applications, but 74.3% of the stations reported having less than 50% operational dependence on ICT. Therefore, there is limited integration of the systems. The main barriers were high costs, poor infrastructure, lack of training, and political or regulatory obstacles, with the respondents revealing that 51% of them faced such challenges. The political economy of the DRC is, thus, unfriendly to the media. There were polarized perceptions of the importance of ICT, as 56% assessed its importance as high (4 or 5 on a 1 - 5 scale), while 37% rated it low because of barriers they face to adopting ICT. Statistical analyses verified the existence of significant variance in the use of ICT tools, operational dependence, and barriers to the integration of ICT, while the demographic distributions were found to deviate from the expectation of no change. The research highlights ICT's transformative role in audience engagement and reporting vis-a-vis mobile penetration, but calls for necessary ad hoc measures to remedy economic, infrastructural, and regulatory challenges. Suggestions comprise provision of allowances, education, construction, and policy modification for the use of ICT technology in Congolese broadcasting.

Keywords

ICT Adoption, Congolese Broadcast Stations, News Processing, News

Dissemination, High Costs, Inadequate Infrastructure, Lack of Training, Regulatory Challenges, Mobile Penetration and Media Environment

1. Introduction

The rapid evolution of Information and Communication Technology (ICT) has profoundly impacted various industries, including media and journalism. In developed countries, the ICT integration has revolutionalised how the news is collected, analyzed and delivered with aspects such as real-time reporting, audience participation and the dissemination of the content across the world (Williams & Tkach, 2022; Frère, 2012; Frère, 2009). The rapid evolution of Information and Communication Technology (ICT) has profoundly impacted various industries, including media and journalism. When Marshall McLuhan, the renowned media scholar, conceived the idea of a "global village" decades ago, little did he know that his prediction would materialise sooner than he had thought (Constance & Isabirye, n.d.). Today, no facet of human life has not been affected by the Internet and other paraphernalia of information and communication technologies. For developing nations such as the Democratic Republic of Congo (DRC) though, the integration of ICT in the media sector is still a challenge.

The socio-political context also has a significant influence on the process. The freedom of the press in the Democratic Republic of Congo is generally limited; the press is regularly threatened, intimidated or attacked. This hostile environment hampers innovation and investment in ICT because broadcasters focus on the imperative of staying alive rather than on evolving. Additionally, regulatory frameworks governing ICT use in the media sector are either outdated or poorly implemented, leaving broadcasters without clear guidance on how to integrate technology effectively (Pantserev et al., 2019; Berger, 2006; Yonazi et al., 2012).

However, there are barriers to the provision of better news services and yet the demand for such services is on the rise. The population of Congo is gradually getting connected through mobile phones and social media and this is a chance for broadcasters to cover new segments of the population (Manyozo et al., 2011). There are contingency measures for LDC categories in the context of international agreements and organizations and by individual countries, educational institutions and others with a view to helping these countries. LDCs operate collectively in many forums and in most of the intergovernmental discussions on development especially in trade and climate change negotiations within which they advance their collective agenda (Geniets, 2013). To the broadcast stations, ICT is not an option, but a necessity for them to be relevant and competitive in the current global media market.

In this paper, the Congolese media is discussed about its historical development in light of political, economic and social factors. Broadcast stations have been central in passing information to the public, and in many cases, the main source of

information in the urban and rural areas. However, Congolese media outlets are faced with weak infrastructure, political interference and financial vulnerability. These factors have therefore made the adoption and integration of ICT as a complex process despite the potential of ICT to transform news operations (Itulelo, 2021; França, 2014; Frère, 2011; 알피에, 2023).

1.1. Scope of the Research

The research therefore aims at establishing and discussing the factors that hinder broadcast stations in the Democratic Republic of Congo (DRC) to embrace and incorporate ICT in their news processing and disseminating activities. It aims to examine the historical, political, economic and social context of ICT uptake, evaluate the status of ICT development in the Congolese media industry, and discuss possible ways of addressing these factors. It also involves a look at the presence of international support and policies in meeting the needs of the broadcasting Congolese industry (Livingston, 2011). Additionally, the research explores the effects of technology integration on the production and distribution of media content, the preparedness of local broadcasters to adapt to technological change, and the social consequences of raising ICT penetration in the sector. Thus, it endeavours to offer a broad view of the challenges and the prospects of ICT in the Congolese media context.

1.2. Research Questions

1) What challenges do Congolese broadcast stations face in adopting and integrating ICT?

2) How do political, economic, and social factors influence the integration of ICT in the DRC's media sector?

3) What are the current ICT infrastructure and regulatory frameworks in the Congolese broadcasting industry?

4) What strategies can be employed to overcome the barriers to ICT adoption and integration in the DRC's media sector?

5) How can international support and policies aid in addressing these challenges effectively?

2. Literature Review

Today's technology is ultra-advanced, which we are experiencing in our day-to-day life either through personal experience or through the media around us. Satellites, drones, mobiles, artificial intelligence, virtual reality, internet, 3D printing, robotics and blockchain are all disrupting the world today (Frère, 2016; Mwangi, 2021; Nghitongo, 2019; Maiga, 2015; Kurmanbekova, 2023). Advancement in science and technology has made people believe that technological advancement will lead to machines and robots replacing human beings, rendering large swaths of the population jobless, while some section sees enormous potential for least developed countries (LDCs) to leapfrog along their development trajectories

(Mambwe, 2013; Myers, 2008; Frère, n.d.). Although technology poses many challenges for LDCs, who want to take advantage of the opportunities presented by the fourth industrial revolution (4IR), these countries will need to put in place certain measures to tackle issues around accessibility, affordability and the application of technologies. ICT has been widely discussed in the context of media transformation, as extant literature shows that media utilisation of ICT can improve the effectiveness, scope and quality of news delivery (Ntshangase, 2021). For instance, Bowman (2019) suggests that ICT enhances audience participatory and vicarious journalism in a way not seen before. In developed countries, the use of ICT has promoted the development of new media organizations that disseminate information through computerized devices such as social networks, applications on mobile devices, and other technology-based means in real-time.

However, the story is quite different for developing countries. Namasinga (2018) points out that infrastructural development gaps, high costs, and low computer literacy are major challenges to the integration of ICT in Africa media sectors. The Democratic Republic of Congo (DRC), especially, has been indicated as an example of these barriers being worsened by political instability and unfavourable legal environments (Cibangu, 2020). Interference by political leaders tends to compromise media freedom, and therefore discourages investment in technologies that may help promote political accountability.

It is also important to examine the historical antecedents of media development in the DRC to understand current problems. Conventional broadcasting in the country has remained largely dominated by the state with few possibilities of the expansion of the private sector (Asule et al., 2023). This has led to a media system that is underfinanced and operating on archaic technology as is experienced today. Insufficient capital investment in contemporary structures has hampered the efficiency of the broadcasters in the integration of the ICT tools (Gebremeskel, 2017; Voss et al., 2021; Veglis, 2013).

Economic factors also make these challenges worse. Veglis (2013) points out that the price of ICT equipment and services in the DRC is among the highest in the subregion. These economic barriers include denial of basic amenities like internet, cloud solutions as well as modern broadcasting equipment's. Also, the poor levels of ICT literacy among industry players and the populace, contributes to functional literacy deficiency, thus limiting ICT access.

When Marshall McLuhan, the media scholar, first came up with the notion of a "global village" many years ago, he could hardly have imagined how quickly it would all come to pass artificial intelligence, virtual reality, internet, 3D printing, robotics and blockchain are all shaking up the world as we know it (Gaible & Burns, 2005). Advancement in science and technology has made people to believe that technological advancement will lead to machines and robots replacing human beings, rendering large swaths of the population jobless, while some section sees enormous potential for least-developed countries (LDCs) to leapfrog along their development trajectories. Although technology poses many challenges for LDCs,

who want to take advantage of the opportunities presented by the fourth industrial revolution (4IR), these countries will need to put in place certain measures to tackle issues around accessibility, affordability and the application of technologies (Roche et al., 2013).

However, there are prospects for development, even though there are challenges. The increased use of mobile phones and social media in the DRC can therefore offer an opportunity for media development. As stated by Laskar & Bhattacharyya (2021), mobile penetration in the DRC is now above 40%, which presents a channel for broadcasters to get through to the population regardless of geographic location. Facebook and WhatsApp have remained important news sharing platforms, which helps the broadcasters reach the public without hindrances of bad roads and lack of electricity (Gaible & Burns, 2005; Binzaka et al., 2024; Balasha et al., n.d.; Choruma et al., 2024).

The same as internal support, international support is also vital to respond to ICT challenges in the DRC. Some funding has come from international organisations and this includes UNESCO and the World Bank, where the emphasis has been on capacity building by offering training to the media houses and physical infrastructure to the country. These strategies support the argument that integration of ICT in teaching and learning is a teamwork affair and cannot be achieved by a single institution (Legatis, 2015). The Fourth Industrial Revolution (4IR) brings other possibilities of media change in the DRC. Dynamic technologies including artificial intelligence, blockchain and cloud computing present an opportunity of changing the way news are processed and disseminated (Nwagwu, 2006).However, the successful implementation of these technologies will largely depend on the establishment of an environment that supports the implementation of these technologies in order to address issues of cost, access and usage (Ragasa et al., 2021). Concisely, the literature points out that DRC media has both risks and potential in ICT use. However, infrastructural, economic, and political challenges remain an issue of concern because the population of Congo is increasingly connected and there is international support. If these challenges are overcome systematically, it will be easy for broadcasters in the DRC to exploit the ICT to improve their operations and service delivery (Perera et al., 2019).

3. Research Methodology

3.1. Research Design

This research employed a quantitative method of data collection to examine the challenges as well as the potential that Congolese broadcast stations encountered in implementing and incorporating ICT in their operations. Quantitative methods offered understandable and tangible findings and also made it easy to assess relations between variables and analyze trends. The study used cross-sectional survey design to obtain data at a certain period, which would help in determining the challenges and opportunities facing the Congolese media sector.

3.2. Target Population

The target population for this study comprised of employees of the broadcast stations in DRC including journalists, editors, technical crew and management staff. For this purpose, civil servants in charge of ICT policy and media regulation in the DRC and representatives of international organizations involved in media development in the DRC were also interviewed.

3.3. Sampling Technique

To ensure better representativeness and minimize bias, this study employed a multi-stage sampling strategy. Initially, broadcast stations were selected using purposive sampling to ensure coverage across public, private, and community-based categories. Within each selected station, random sampling was employed to select participants—journalists, editors, technical staff, and management. This approach enhanced the external validity of the findings by ensuring that various perspectives within the media sector were adequately captured. The sample size was determined based on the estimated population of broadcast station employees and balanced against the need for statistical significance and practical feasibility.

3.4. Data Collection Instruments

Data was collected using a structured questionnaire designed to capture information on various aspects of ICT adoption.

1) Perceived barriers to ICT integration (e.g., infrastructure, costs, regulatory challenges).

2) Current usage levels of ICT tools and technologies.

3) Perceptions of the benefits of ICT in news processing and dissemination.

4) Recommendations for overcoming challenges to ICT adoption.

The questionnaire was pre-tested with a pilot group to ensure clarity, relevance, and reliability before full deployment.

3.5. Data Collection Procedure

Some of the questions were given in an online format while others were given face to face especially to the respondents with disabilities. Because of limited internet connection, especially in rural areas, trained research assistants assisted in data collection. Issues of ethics such as consent and privacy were always upheld in the process of the study.

3.6. Data Analysis

Quantitative data analysis was applied through descriptive (mean, median, frequency) and inferential (Chi-square, regression) analysis. Results were reported in tables, charts, and graphs since these formats are easy to understand.

3.7. Ethical Considerations

This research was conducted in compliance with acceptable ethical research prac-

tice in the following ways: informed consent was sought from all participants, anonymity, and confidentiality were maintained, and the study was done under the approval of a recognized ethical review board. All the participants were read and explained their rights to withdraw from study at any time with no reason asked from them. Through this highly technical approach, the study offered practical solutions concerning the difficulties and possibilities of ICT adoption in the Congolese media sector.

4. Data Analysis

4.1. Introduction

This study sought to understand the problems Congolese broadcast stations encounter in the adoption and integration of Information and Communication Technology (ICT) in their news processing and publication activities. A quantitative method was utilized in the form of a cross-sectional survey which was administered to 300 employees of broadcast stations located in the Democratic Republic of Congo (DRC). These participants were journalists, editors, technical staff, management, and other functions that capture all features of the media industry. The survey captured demographic information such as age, job titles, and the degree of organizational dependence on ICT, among other variables. This section describes the results concerning respondents' ages, professional structures of the broadcasting stations, and the percentage of ICT dependence of the organizations. This is ICT adoption Congolese broadcasters sample and the data is about the horrendous situation of ICTs in Congolese broadcast stations which are the basics for analyzing the issues and prospects of adopting ICT.

4.2. Descriptive Statistics

Respondents' age ranges are summarized in Table 1. The sample was equally split for all four age categories. The biggest group were those aged 46 and over who made up the largest proportion of the sample at 28.3% (n = 85), followed by the 18 - 25 age bracket at 25.7% (n = 77). The 26 - 35 age range and the 36 - 45 age range contributed 23.3% (n = 70) and 22.7% (n = 68) of the respondents, respectively. In total, 49.0% of respondents were 35 years or younger which shows there is a considerable number of younger professionals in the broadcasting industry, while the other 51.0% were older than 36 years which shows there is a good mix of experience.

Table 1. Descriptive statistics of the participants.

Age group					
		Frequency	Percent	Valid percent	Cumulative percent
Valid	18 - 25	77	25.7	25.7	25.7
	26 - 35	70	23.3	23.3	49.0
	36 - 45	68	22.7	22.7	71.7

Continued

	46 and above	85	28.3	28.3	100.0
	Total	300	100.0	100.0	
What is your professional role in the broadcasting station?					
Valid	Editor	66	22.0	22.0	22.0
	Journalist	55	18.3	18.3	40.3
	Management	65	21.7	21.7	62.0
	Other	61	20.3	20.3	82.3
	Technical staff	53	17.7	17.7	100.0
	Total	300	100.0	100.0	
What percentage of your organization's operations depend on ICT?					
Valid	25% - 50%	51	17.0	17.0	17.0
	51% - 75%	91	30.3	30.3	47.3
	Less than 25%	81	27.0	27.0	74.3
	More than 75%	77	25.7	25.7	100.0
	Total	300	100.0	100.0	

The above analyses suggest that the Congolese broadcasting sector has a wide range of age distribution, which may impact ICT uptake. I believe that younger professionals aged between 18 and 35 years may be more willing to use new technologies because they are more proficient with digital devices while older professionals aged 36 and above may offer more experience but struggle with ICT skills as discussed in the literature review (Namasinga, 2018). This opportunity is relevant because analysts can explore the relationship between age and perception of ICT significance and age barriers in future studies. Table 2 summarizes the professional roles of the respondents within their broadcasting stations. Editors constituted the largest group, making up 22.0% of the sample, while management were closely followed at 21.7%. The "Other" category which is most likely to contain support staff or unidentified positions made up 20.3%. Journalists and technical represented 18.3% and 17.7% of the respondents, respectively. Together, 40.3% of the respondents were editors or journalists, who were directly involved in news processing and dissemination, while the rest were made up of management, technical staff, and other non editorial roles who support the operational and technical functions of broadcasting.

Table 2. Hypothesis testing and results.

	Null hypothesis	Test	Sig.[a,b]	Decision
1	The categories defined by Gender = Female and Male occur with probabilities 0.500 and 0.500.	One-sample binomial Test	0.603	Retain the null hypothesis.

Continued

2	The categories of Age group occur with equal probabilities.	One-sample Chi-square test	0.499	Retain the null hypothesis.
3	The categories of What is your professional role in the broadcasting station? occur with equal probabilities.	One-sample Chi-square test	0.687	Retain the null hypothesis.
4	The categories of How many years of experience do you have in the broadcasting industry? occur with equal probabilities.	One-sample Chi-square test	0.690	Retain the null hypothesis.
5	Which categories of ICT tools and technologies are currently used in your broadcasting station? occur with equal probabilities.	One-sample Chi-square test	0.000	Reject the null hypothesis.
6	The categories of On a scale of 1 - 5, how would you rate the importance of ICT in news processing and dissemination in your organization? occur with equal probabilities.	One-sample Chi-square test	0.429	Retain the null hypothesis.
7	The categories of What percentage of your organization's operations depend on ICT? occur with equal probabilities.	One-Sample Chi-Square Test	0.000	Reject the null hypothesis.
8	The categories defined by Does your station have a dedicated budget for ICT investment? = No and Yes occur with probabilities 0.500 and 0.500.	One-sample binomial test	0.326	Retain the null hypothesis.
9	What are the primary barriers to ICT adoption in your station? (Select all that apply) occurs with equal probabilities.	One-sample Chi-square test	0.000	Reject the null hypothesis.
10	The categories of How would you describe the state of ICT infrastructure in your organization? occur with equal probabilities.	One-sample Chi-square test	0.728	Retain the null hypothesis.
11	The categories defined by Have you encountered any political or regulatory restrictions affecting ICT adoption? = No and Yes occur with probabilities 0.500 and 0.500.	One-sample binomial test	0.773	Retain the null hypothesis.

a. The significance level is .050. b. Asymptotic significance is displayed.

The evidence of role allocation supports the claim that the workforce composition in Congolese broadcast stations is diverse. The large number of editors and journalists indicates that this sample is likely to be knowledgeable about the role of ICT in news work, as the study's focus is on this. The managerial body's representation (21.7%) shows that there are many decision makers who, from the perspective of ICT investment and policy, are important for understanding organizational obstacles such as financial resources. The existence of technical personnel (17.7%) guarantees that there are external and internal views about the infrastructure and technical difficulties. The "Other" category also enriches the sample as it captures some non-primary but non-negligible roles that deal with ICT in differ-

ent ways.

The results show that there is a different level of dependence on ICT by Congolese broadcast stations. The fact that almost a third of respondents (30.3%) said they have moderate to high dependence (51% - 75%) suggests that ICT is very important to many stations, probably in terms of news delivery via mobile applications or internet platforms, as stated in the literature review (Laskar & Bhattacharyya, 2021). On the other hand, the significant proportion (27.0%) having low dependence (less than 25%) is consistent with the study's setting of poor infrastructure and socio-economic encumbrances of the DRC which hinders ICT integration. 25.7% of stations that had high dependence (more than 75%) implies that some broadcasters have incorporated ICT, possibly responding to the growing use of mobile phones and social media as pointed out in the literature. This variability points out the need to investigate the factors such as high costs, insufficient infrastructure, and inadequate staff training that might constrain more wide-scale adoption of ICT for all broadcasters.

4.2.1. ICT Tools Currently in Use

The data presented in **Figure 1** shows a histogram depicting the frequencies of ICT tools and technologies used by Congolese broadcast stations as reported by 300 respondents. The data proves that ICT tools adoption is diverse, the most frequently reported being a combination of Computer, Internet, Mobile Apps, Cloud Systems, and Others that was given by around 20 respondents. Other notable combinations are Computers, Internet, Mobile Applications (about 15 respondents) and Computers, Internet, Mobile Applications and Cloud Systems (also about 15 respondents).

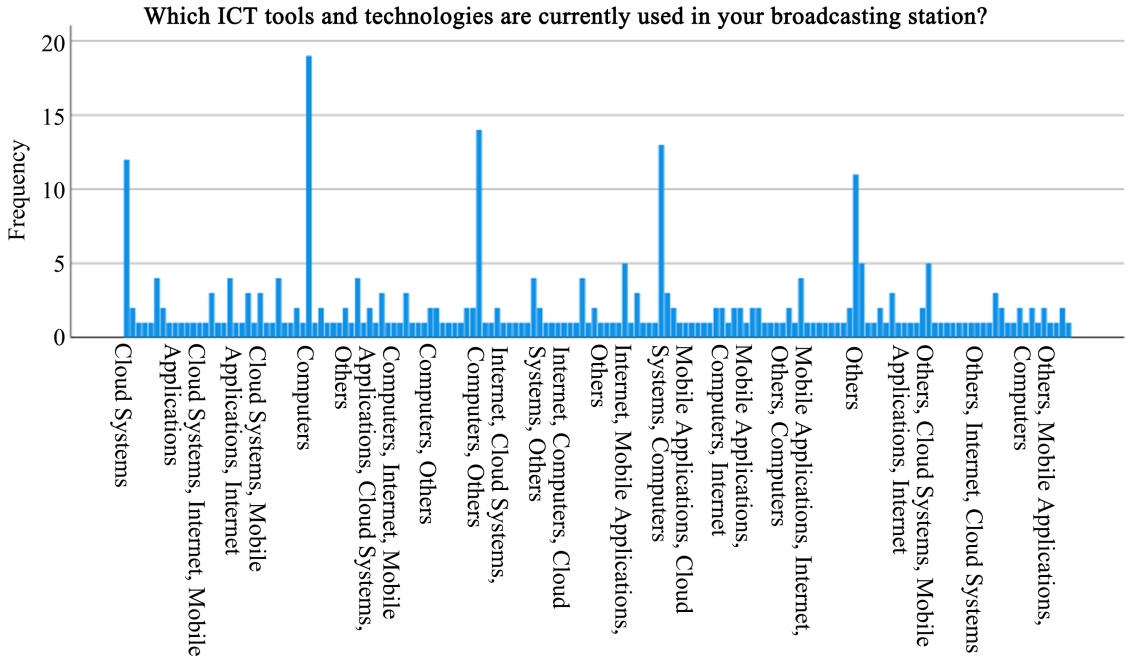

Figure 1. ICT tools and technologies used in broadcasting stations.

Notably, most combinations were given by less than five respondents signaling heterogeneity in the uptake of ICT across stations. This does correspond with the context of weak infrastructure and other economic constraints the DRC is indeed grappling with, as was covered in the literature review (Namasinga, 2018), which might subsist the use of sophisticated technologies such as Cloud Systems. The wide variety of Computers and Internet emphasize their basic role as the tools utilized in the processing of news, but the use of Mobile Applications, which Laskar and Bhattacharyya (2021) noted, illustrates that the facilities are harnessing the penetration of mobile phones (now over 40%) in the DRC to broadcast news. The high occurrence of "Others" signifies the use of other tools, in particular, satellite communication, which could be important in places with limited terrestrial service infrastructure. Overall, this clearly supports the alternate view of ICTs and broadcasting in Congo; that there are opportunities, together with obstacles, in the adoption and integration of the technologies.

4.2.2. Importance of News Processing and Dissemination

Figure 2 demonstrates how the 300 participants from Congolese broadcast stations perceive the importance of ICT in news management. Using a 5-point Likert scale, respondents consistently ranked ICT's importance above average - the highest single ranking, 4, was awarded by 29% of participants (n = 87), meaning they consider ICT significantly valuable. Additionally, 27% (n = 81) of respondents assigned the maximum rating of 5. Almost all these groups totaling (56%) respondents view ICT as important (ratings 4 and 5 combined). On the other end of the spectrum, there was a sizeable minority which placed ICT's importance below average - 22% (n = 66) rated ICT at 2 and 15% (n = 45) awarded a 1. Only 7% (n = 21) regarded ICT as moderately important and recorded a score of 3. This shows that there are competing views relating to the role of ICT in Congolese broadcasting, with many participants giving it thumbs up probably because of its reporting and audience participation features as noted in the literature (Bowman, 2019).

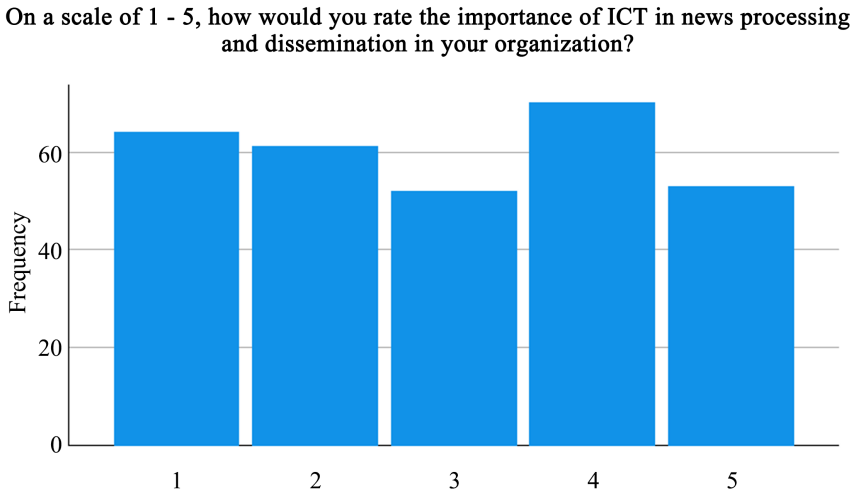

Figure 2. Importance of ICT in news processing.

4.2.3. Primary Barriers to ICT Adoption

The histogram in Figure 3 shows the frequency distribution of the major barriers to ICT adoption from 300 employees of Congolese broadcast stations who were allowed to choose more than one barrier. The most frequently cited combination identified by approximately 125 respondents was High Costs, Inadequate Infrastructure, Lack of Training, Regulatory Challenges, and Others. This implies that a significant part of the sample faces multifaceted challenges. Other combinations also include High Costs, Inadequate Infrastructure, and Lack of Training, which had approximately 75 respondents, and High Costs and Others with approximately 50 respondents. But many combinations received less than 25 respondents which indicates the complex and diverse nature of barriers among stations. These findings correspond with literature, particularly Namasinga (2018) which cites overwhelming costs, poor infrastructure, and low ICT literacy as major stumbling blocks in African media sectors including the DRC. The high frequency of selection of "Others" indicates additional contextual barriers such as unreliability of electricity as mentioned in previous responses. The pervasiveness of regulatory challenges, frequently accompanied by other barriers, highlights the adverse socio-political context articulated in the study with limited press freedom and outdated or poorly enforced legislation. The detailed description of obstacles has raised the necessity for an integrated approach to tackle economic, infrastructural, and regulatory ICT adoption challenges in Congolese broadcasting.

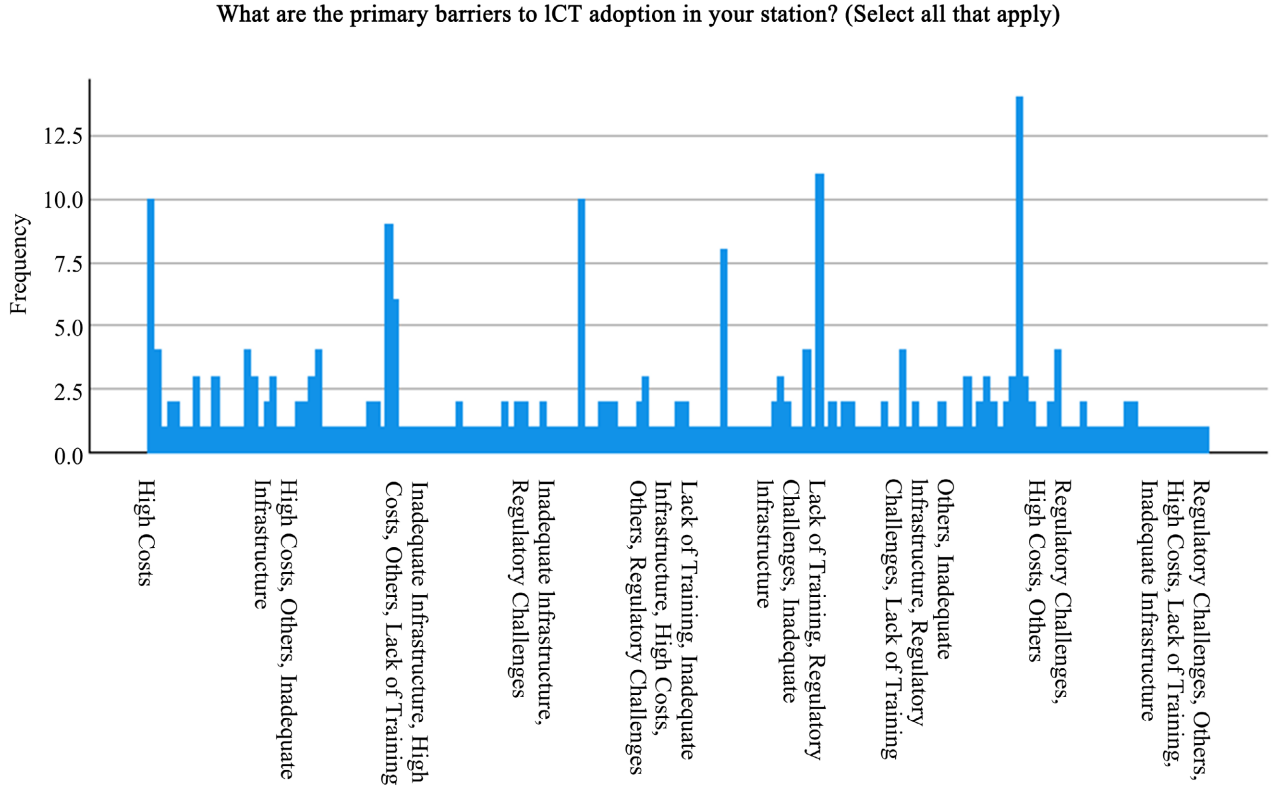

Figure 3. Primary barriers to ICT adoption in the station.

4.3. Hypothesis Test Summary

The results from the statistical tests that were carried out to understand the distribution and relationships relating to the ICT adoption in the Congolese broadcast stations is done using the sample of 300 respondents in the hypothesis test overview in Table 2. The primary methods were one-sample binomial tests and one-sample chi-square tests at the alpha level of 0.05. For the demographic variables of gender, Sig. = 0.603; age group, Sig. = 0.499; professional role, Sig. = 0.687; and years of experience, Sig. = 0.690 all failed to reject the null hypothesis which claims that these categories exist with equal chances in the sample. These values indicate that the null hypothesis could not be rejected, meaning there is no statistically significant difference in the distribution of these variables. This result suggests that the sample was relatively balanced in terms of demographics, reinforcing the representativeness and reliability of the data.

As with all perceptions, there were no significant differences in the assessment of the importance of ICT (Sig. = 0.429) and the state of ICT infrastructure (Sig. = 0.728), which remains unchallenged. The perception of ICT importance (Sig. = 0.429) and the presence of a dedicated ICT budget (Sig. = 0.326) were not statistically significant. This means that opinions on the importance of ICT are fairly evenly distributed, and the allocation of ICT budgets does not differ substantially across organizations. However, this does not negate the importance of ICT; it highlights the inconsistent institutional prioritization across different stations, possibly due to limited financial capacity or differing management outlooks. The former budget allocation for ICT (Sig. = 0.326) and meeting with some political or bureaucratic constraints (Sig. = 0.773) also maintained the null hypothesis, suggesting no significant difference from 50/50 probability for answers Yes/No. These results are highly significant ($p < 0.001$), indicating that the distributions are not random and reflect genuine variations in ICT adoption across broadcast stations. This supports the observation that some stations are highly reliant on ICT tools (e.g., internet, mobile apps), while others use them minimally due to cost and infrastructural challenges.

Figure 4 presents the results of the One-Sample Binomial Test conducted to examine whether the distribution of gender among respondents deviates significantly from the hypothesized equal distribution (50% male and 50% female). The figure shows that the observed proportion (48.3% for one gender and 51.7% for the other) is nearly identical to the hypothesized 50 - 50 split. On the other hand, the categories ICT tools used (Sig. = 0.000), the percentage of operations that depend on ICT (Sig. = 0.000), and the primary obstacles of ICT adoption (Sig. < 0.001) showed relevant differences which brought along the rejection of null hypothesis options. The results reinforce the assertion that the types of ICT tools, levels of ICT dependence, and barriers which Congolese broadcast stations face, as cited in the literature, are not evenly distributed (Namasinga, 2018). There are no differences in demographic distributions which guarantee a representative sample, and differences in significant results for ICT interventions show need of adoption and barriers being uncovered.

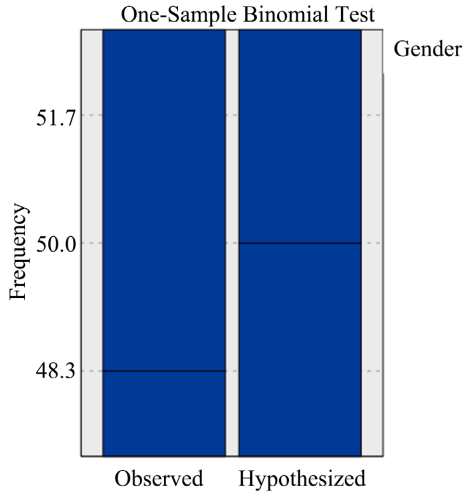

Figure 4. Binomial test result.

The histogram in **Figure 5** illustrates the actual and expected breakdowns of professional positions in Congolese broadcast stations based on the responses of 300 employees. The observed frequencies (blue) indicate that Editors lead in representation, with 66 respondents, followed by Management (65), Other roles (61), Journalists (55), and Technical Staff (53). On the other hand, their assumed frequencies (in green), which predict equal allocation for all five categories, is set at 60 for each role (300 respondents divided by 5 categories). Regarding the former frequency, the observed frequencies of Editors and Management surpassed the anticipated value of 60 (by 6 and 5, respectively), while the frequencies of Journalists and Technical Staff fell short (by 5 and 7, respectively). Other roles were within striking distance of the expected value (61 vs 60). Nonetheless, as is pointed out in the hypothesis test summary (**Table 2**, Sig. = 0.687), a One-Sample Chi-Square Test did not reject the null hypothesis which means these discrepancies are not truly significant and that the category of professional roles are distributed with approximately equal chances.

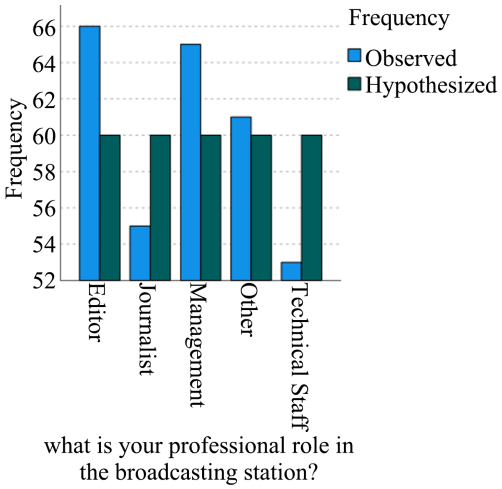

Figure 5. Professional role in broadcasting stations.

The representation of Editors, Journalists, Management staff, and Technical Staff in the sample is very well balanced which reflects their respective roles in broadcasting. This is important as ICT adoption challenges in the broadcasting industry need various perspectives. Editors and Management may be overrepresented because their involvement in news processing and decision-making ICT integration defined relevance context to the study.

The formats for categoric variable responses outlined in Table 3 presents the results on the frequency and the binary coding responses pertaining to the main challenges in the adoption of ICT in the Congolese broadcast stations derived from a sample of 300 respondents. For the primary barriers to ICT adoption, High Costs had a response of 72 (coded as 1), Inadequate Infrastructure had a response of 48 (coded as 1), Lack of Training had a response of 68 (coded as 1), Others had a response of 111 (coded as 1), and Regulatory Challenges had a response of 53 (coded as 1), where all non-responses were coded as 0. This distribution, already reviewed in Figure 3, describes the existence of a multiplicity of barriers and the option "Others" seems to suggest the existence of additional problems, including those of a local nature, such as the absence of stable electricity supply.

Table 3. Categorization of varables.

Category	Frequency	(1)	(2)	(3)	(4)
Primary barriers to ICT adoption					
High cost	72	1.000	0.000	0.000	0.000
Inadequate	48	0.000	1.000	0.000	0.000
Lack of	68	0.000	0.000	1.000	0.000
Others	11	0.000	0.000	0.000	1.000
Others (duplicate category)	48	0.000	0.000	0.000	0.000
Regulatory	53	0.000	0.000	0.000	0.000
% of operations dependent on ICT					
25% - 50%	51	1.000	0.000	0.000	0.000
51% - 75%	90	0.000	1.000	0.000	0.000
66% - 75% (possible coding error)	1	0.000	0.000	1.000	0.000
Less than 25%	81	0.000	0.000	0.000	1.000
More than 75%	77	0.000	0.000	0.000	0.000
State of ICT infrastructure					
Average	73	1.000	0.000	0.000	
Excellent	81	0.000	1.000	0.000	
Good	78	0.000	0.000	1.000	
Poor	68	0.000	0.000	0.000	
Political/Regulatory restrictions					
No	147	1.000			
Yes	153	0.000			

This percentage of the operation based on dependence on ICT shows 51 respondents reporting between 25 and 50 percent (coded as 1), 90 respondents reporting between 51 and 75 percent (also coded 1), 1 respondents with an outlier value of 666,313 (which is a likely data entry error, coded as 1), 81 respondents reporting less than 25 percent (coded as 1) and 77 respondents reporting greater than 75 percent (also coded 1). 74.3% of the respondents have 50 dependence on ICT which denotes lack integration that is coherent with underlying structures and cost barriers (Namasinga, 2018). The state of average ICT infrastructure was rated by 73 respondents (coded as 1), Excellent by 81 respondents (coded as 1), Good by 78 respondents (coded as 1), and Poor by 68 respondents (coded as 1). This showed that there is an average relative balance perception, The substantial "Poor" responses (22.7%) is poor which supports the weak infrastructure paradigm of the study. Lastly, 147 respondents reported no political regulatory restrictions (coded as 1) whereas 153 reported yes (coded as 0). The near divide as per Table 4 (Sig. = 0.773) is not significant and demonstrates the remarkable yet underlying intertwined effect of regulation which confounds the media sector of the DRC as ICT infrastructure. The responses to the survey help understand and analyze set barriers, perceive level of dependence on ICT, infrastructure.

Table 4. Contingency table for hosmer and lemeshow test.

Step	Observed (No)	Expected (No)	Observed (Yes)	Expected (Yes)	Total
1	20	20.181	10	9.819	30
2	19	18.051	11	11.949	30
3	14	16.096	16	13.904	30
4	19	14.982	11	15.018	30
5	10	14.162	20	15.838	30
6	17	13.191	13	16.809	30
7	8	12.917	23	18.083	31
8	14	11.663	16	18.337	30
9	12	10.727	18	19.273	30
10	8	9.029	21	19.971	29

4.4. Contingency Table for Hosmer and Lemeshow Test

The contingency table in Table 3 shows the outcome of a Hosmer and Lemeshow Test that measures the fit of a logistic regression model aimed at finding the relationship between the existence of a dedicated budget for ICT investment (Yes/No) and an ordinal variable (Steps 1 - 10) in regard to the adoption of ICT at Congolese broadcasting stations. The table contains observed as well as expected frequencies across 10 steps, each of which had an average of 30 respondents (except Step 10 which had 29), resulting in 300 respondents. For stations without a dedicated

budget (No), the observed frequencies are 8 (Steps 7 and 10) and 20 (Step 1). For those with a budget (Yes), they are 10 (Step 1) to 23 (Step 7). The expected frequencies, which are computed under the null hypothesis of the logistic regression model, closely match the values that are observed apart from some inaccuracies (e.g. Step 1: 20 observed versus 20.181 expectations for No; 10 observed versus 9.819 expectations for Yes). The Hosmer and Lemeshow test which is generally used for evaluating model fit would evaluate if these observed and expected frequencies have sufficient model fit to data with them.

Even though the test statistics and p-value are absent from the table, the minimal differences between what is observed and expected imply a reasonable fit, because significant deviations would suggest a poor model fit. With relation to this research, the table indicates that the existence of a specific budget set aside for ICT investments does not significantly differ across the steps, which is consistent with the finding (Table 2, Sig. = 0.326) that the presence of budgets is not significantly different from the logit model estimation of a 50/50 probability. Hence, this suggests that budgeted resources may not be adequate explanatory variables for ICT adoption effects in this sample, due to other, more dominant obstacles such as high costs and inadequate infrastructure, as recognised in Figure 2.

4.5. Perceptions and Recommendations

Strategies recommended to overcome the challenges to ICT adoption

"*To address the obstacles associated with the acceptance and integration of ICT, I propose several strategies. The first suggestion is government funding in the form of subsidies or tax breaks. These policies would help lower the prices associated with ICT equipment and services that are now too expensive for many stations. More media professionals also need training in advanced ICT tools, such as cloud systems, which require the creation of more comprehensive ICT literacy programs. Improving infrastructure will go a long way toward solving the problem; reliable electricity and internet access should be made available through public-private partnerships. Finally, less political meddling and more progressive media policies and deregulation are vital in facilitating the rapid pace of innovation in the ICT environment.*"

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4.6. How International Support Can Be Better Utilized to Address ICT Challenges in Your Organization

"*Focusing on three main funnels may yield better results when utilizing international support. To begin with, organizations such as UNESCO and The World Bank could grant us the capital in the form of modern ICT equipment such as computers and cloud-based systems which are presently too costly. Secondly, they could set aside funds for developing workshops or training programs that would aid in teaching staff the proper usage of ICT tools particularly in real-time reporting and audience engagement. Thirdly, international partners could use their influence to persuade the DRC government to grant further media freedom by changing existing laws and regulations to allow greater ease of adopting new technologies without fear of censorship or shutdowns.*"

The reply makes use of international endorsement from UNESCO and the World Bank, concentrating on funds, capacity building, and advocacy which were some of the areas noted in the study's literature review. It tackles economic constraints (high costs), skill deficiencies (low ICT literacy), and legal obstacles, which are in line with the study's results on the absence of collaboration concerning the integration of ICTs in the DRC.

5. Conclusion

This study examines the problem Congolese broadcast stations experience with the adoption and integration of Information and Communication Technology (ICT) in the processing and dissemination of news through a cross-sectional survey of three hundred {300} respondents with different functions within the DRC media industry. This study has gone a long way towards building the idea that ICTs have had considerable impacts on broadcast activities in Edo State Nigeria. It is clear from this study that the impact is predominant during the processes of information collection as well as circulation. Just like a rose flower with thorns, ICTs have also brought a number of problems to the broadcast operations of the stations in Congo (Asule et al., 2023). The results of the research brought to light the relative landscape of adopting ICTs which offers opportunities but is also filled with serious challenges. The sample was stratified on age, job title, and seniority to accurately represent the demographic's views on using technology in broadcasting (Choruma et al., 2024). Descriptive analysis established that many respondents use ICT tools such as computers, the internet, and mobile applications, but there is low, and many participants reported using a combination of "Other" tools which includes satellite communication signifying poor terrestrial infrastructure (Gaskell et al., 2016; Manda & Chapota, 2015; Mwaniki et al., 2017).

The perceived relevance of ICT in news processing and dissemination was split, with 56% of respondents rating it high (4 or 5) and 37% giving it low marks (1 or 2), presumably because of high costs, poor infrastructure, and insufficient training which were said to be barriers. It is also of great concern that 74.3% of stations

stated that 50% or less of their operations were driven by ICT which shows lack of incorporation, although some 25.7% with high dependence (over 75%) show hope for improvement, especially with mobile penetration which is over 40% in the DRC (Laskar & Bhattacharyya, 2021). Statistical analyses showed reliance on various tools of ICT and operational dependence as well as barriers had significant changes which means the null hypothesis of uniform distribution had to be rejected, while demographic factors and attitude towards the ICT infrastructure did not show any significant difference from normal expectations (Dwivedi et al., 2022). The almost equal distribution of respondents facing political or regulatory obstacles (51% Yes, 49% No) emphasizes the DRC's socio-political context, which seems to have a simultaneously major and negligible influence on media innovation.

While ICT has the potential to transform Congolese broadcasting in terms of audience participation and reporting capturing, the major economic and infrastructural challenges along with regulatory barriers remain aligned with other studies in the African media context (Namasinga, 2018).

6. Recommendation

Respondents claimed that, at 72, the cost of ICT equipment was a major barrier. In conjunction with international organizations like UNESCO and the World Bank, the DRC government must offer subsidies or tax exemptions to broadcasting stations for the purchase of equipment such as computers, cloud systems, and mobile applications. Moreover, grant forms or low interest loans would allow stations to modernize their technologies and relieve some financial burden while encouraging wider usage. 76 In ADDITION, perhaps RESIDUAL, funds would be made available, improving financial capability for investment {mixed infinitive used here "relieve some…"} as well as allow signal improvement.

The training deficit was another barrier to ICT literacy for media personnel, resulting in 68 responses. Specific courses must be designed to facilitate the use of ICTs in the production and dissemination of information. These programs could be organized by international partners or local media associations concentrating on cloud editing, reporting, social media, and real time webcasting. These initiatives would help junior staff members (25.7% aged 18 - 25) encourage ICT adoption to improve older staff skill levels (28.3% aged 46 and above).

As pointed out by the respondents in Section D, international assistance can address the ICT issues that the country faces. Apart from the aid related to finances, international partners need to extend support for Congolese media practitioners through exchange programs with other countries that have sound ICT integration (Adu et al., 2022). Moreover, funding sponsorships for infrastructure projects and the provision of cloud systems or mobile application services would enable the stations to take advantage of the increasing mobile penetration in the DRC, which provides an opportunity for broadcasting news to larger audiences.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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