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## **Comparative Assessment of Google Meet and Zoom as Real-Time ICT Advisory Tools for Poultry Farmers in Byazhin, Kubwa, Bwari Area Council, FCT Abuja, Nigeria**

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**Idu, E. E., Obinyan F. A., \*Joshua R., Ipinoyomi M. B. & Omole, F. E.**

Department of Agricultural Extension and Rural Sociology, Faculty of Agriculture, University of Abuja, FCT, P.M.B. 117, Abuja, Nigeria

\*Corresponding Author: Joshua Reuben

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### **Abstract**

The emergence of real-time video conferencing platforms as instruments of agricultural advisory delivery represents a significant development in the modernisation of extension service systems across sub-Saharan Africa and Nigeria specifically. This literature review-based study undertakes a comparative assessment of Google Meet and Zoom as real-time Information and Communication Technology (ICT) advisory tools for poultry farmers in Byazhin, Kubwa, Bwari Area Council, Federal Capital Territory (FCT) Abuja, Nigeria. Drawing upon a systematic review of thirty peer-reviewed studies and institutional reports published between 2010 and 2025, the study evaluates both platforms across five principal dimensions: accessibility, data efficiency, functionality, reliability, and user satisfaction. Findings reveal that Google Meet demonstrates superior contextual appropriateness for routine poultry advisory delivery in Byazhin owing to its browser-based accessibility, lower data consumption, stronger performance under variable network conditions, and higher baseline farmer satisfaction among ICT-novice users. Zoom, by contrast, offers a richer interactive feature set suited to technically complex advisory sessions requiring annotation, screen-sharing, and breakout room capabilities. The study concludes that an optimal advisory delivery strategy for poultry farming communities in Byazhin is complementary rather than exclusionary, anchoring routine advisory interactions on Google Meet while deploying Zoom strategically for specialised training events. Critically, platform choice alone is insufficient; institutional coherence, digital literacy training, gender-responsive access strategies, and reliable connectivity infrastructure are identified as indispensable enabling conditions for ICT-based advisory effectiveness.

### **Keywords:**

*Google Meet, Zoom, ICT advisory tools, Poultry farmers, Byazhin, Digital extension, Video conferencing.*

## INTRODUCTION

The agricultural sector in Nigeria remains a cornerstone of rural livelihood and food security, with poultry farming constituting one of the most widely practiced and economically significant sub-sectors among smallholder farmers in the Federal Capital Territory (FCT) and its surrounding communities. In Byazhin, Kubwa, Bwari Area Council, FCT Abuja, poultry farmers operate within a dynamic and often challenging environment characterised by limited access to veterinary advisory services, inadequate extension support, fragmented market information, and geographic constraints that restrict timely access to technical expertise. These structural deficiencies, compounded by the rapid pace of change in poultry disease management, feed formulation, and biosecurity standards, underscore the critical need for innovative and accessible channels of agricultural advisory delivery. In this context, Information and Communication Technology (ICT)-based platforms have emerged as transformative instruments capable of bridging the gap between agricultural knowledge systems and the rural farming communities that depend upon them (Sennuga *et al.* 2021; Ochilo *et al.*, 2021; Oladele, 2019).

The global proliferation of internet-enabled communication platforms has fundamentally reshaped how agricultural advisory services are conceptualised, packaged, and delivered. Among the most widely adopted real-time digital communication tools are Google Meet and Zoom — cloud-based video conferencing platforms that have gained unprecedented prominence since the onset of the COVID-19 pandemic and continue to redefine remote professional interaction across multiple sectors, including agriculture (Lwoga & Sanga, 2020). In the Nigerian context, the growing penetration of mobile internet services and affordable smartphones has extended the reach of these platforms into semi-urban and peri-urban farming communities, opening new possibilities for synchronous advisory delivery that transcends spatial and temporal barriers. Poultry farmers in communities such as Byazhin, who previously relied exclusively on periodic visits from government extension agents or informal peer consultations, are increasingly exposed to the potential of virtual platforms for receiving real-time expert guidance on production, health management, and market engagement (Ebiske *et al.*, 202

Despite this potential, the comparative utility, functionality, and farmer-acceptability of different ICT platforms for agricultural advisory services remain insufficiently explored in the Nigerian literature. While considerable scholarly attention has been devoted to the broader role of ICT in agricultural development encompassing mobile telephony, radio broadcasting, and web-based knowledge portals systematic comparative analyses of synchronous video communication platforms as advisory tools in specific farming sub-sectors remain rare (Arokoyo, 2016; Ibrahim *et al.*, 2022). This knowledge gap is particularly pronounced in relation to poultry farming communities, where the precision and real-time nature of advisory needs concerning, for instance, disease diagnosis, vaccination schedules, and emergency biosecurity responses demand interactive communication modalities that asynchronous tools cannot adequately fulfil. Understanding how Google Meet and Zoom perform comparatively in terms of usability, accessibility, reliability, and advisory effectiveness therefore constitutes a substantive gap warranting systematic empirical and conceptual investigation.

The significance of such an inquiry is further amplified by the broader policy context shaping Nigeria's agricultural extension system. Nigeria's Agricultural Transformation Agenda (ATA) and the more recent Agriculture Promotion Policy (APP), colloquially known as the Green Alternative, have consistently emphasised the modernisation of agricultural extension services through the integration of ICT as a strategic tool for enhancing service delivery efficiency and farmer outreach (Federal Ministry of Agriculture and Rural Development, 2016). However, the operationalisation of these policy ambitions has remained constrained by the absence of evidence-based guidance on which specific ICT platforms are most effective and contextually appropriate for diverse farming populations and agro-ecological conditions. In Bwari Area Council, where smallholder poultry production is a vital source of household income and food supply, identifying the most suitable real-time advisory platform is both a practical imperative and a contribution to national extension system reform.

Building on these considerations, this study undertakes a literature review-based comparative assessment of Google Meet and Zoom as real-time ICT advisory tools for poultry farmers in Byazhin, Kubwa, Bwari Area Council, FCT Abuja, Nigeria. The rationale for this comparative inquiry rests on three interrelated foundations. First, platform differentiation is necessary Google Meet and Zoom differ in their design architecture, data consumption requirements, accessibility features, and integration with complementary tools, making their comparative evaluation essential for context-specific advisory application. Second, contextual specificity is required the unique socio-economic characteristics of poultry farmers in Byazhin, including varying levels of digital literacy, device accessibility, and network connectivity, necessitate an assessment grounded in this specific community's realities. Third, policy and practice relevance demands that evidence-based recommendations guide extension service providers, government agencies, and development organisations in deploying the most appropriate ICT tools for agricultural advisory delivery in similar semi-urban farming communities across Nigeria.

The study is therefore structured as follows: Section 2 presents the theoretical review, examining the conceptual underpinnings of ICT-mediated agricultural extension; Section 3 offers the conceptual review, defining key constructs and their relationships; Section 4 describes the methodology employed; Section 5 presents a synthesis of relevant empirical and conceptual studies; and Section 6 interprets the findings comparatively, culminating in the conclusion and recommendations in Section 7.

## **THEORETICAL REVIEW**

### **ICT-Mediated Agricultural Extension: Conceptual Foundations and Theoretical Perspectives**

The theoretical discourse surrounding Information and Communication Technology (ICT)-mediated agricultural extension is rooted in the broader field of agricultural knowledge and information systems (AKIS), which conceptualises the flow of agricultural knowledge among farmers, researchers, extension agents, and policymakers as a dynamic and interactive process rather than a linear transfer of information (World Bank, 2012). The AKIS framework recognises that the effectiveness of knowledge dissemination depends not solely on the technical content of

advisory messages but on the channels, relationships, and institutional arrangements through which knowledge travels. Within this theoretical landscape, ICT platforms occupy an increasingly central position as mediating instruments that shape the quality, reach, and interactivity of agricultural knowledge exchange. The emergence of real-time video conferencing tools such as Google Meet and Zoom represents a significant evolution within this tradition, transitioning advisory delivery from predominantly one-directional information transfer toward synchronous, dialogic, and participatory modes of engagement that more closely approximate the relational dynamics of face-to-face extension interaction (Lwoga & Sanga, 2020; Oladele, 2019).

A foundational theoretical framework for understanding ICT adoption in agricultural contexts is the Technology Acceptance Model (TAM), originally proposed by Davis (1989) and subsequently extended by multiple scholars to accommodate the complexities of technology adoption in developing country contexts. TAM posits that two primary constructs perceived usefulness and perceived ease of use — determine an individual's behavioural intention to adopt and consistently utilise a given technology. In the context of poultry farmers in communities such as Byazhin, Kubwa, perceived usefulness reflects the extent to which farmers believe that platforms such as Google Meet or Zoom will enhance their access to timely, relevant, and actionable advisory information. Subsequent adaptations, including the Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003), have expanded the explanatory framework to incorporate social influence, facilitating conditions, and effort expectancy as additional determinants of ICT adoption dimensions particularly relevant to the socio-economic and infrastructural realities of smallholder poultry farmers in Nigeria's FCT.

Complementing the TAM and UTAUT frameworks, Diffusion of Innovations Theory, advanced by Rogers (2003), provides a broader sociological lens through which to examine how new ICT platforms penetrate farming communities. Rogers identifies five key attributes that determine the rate and extent of technology diffusion: relative advantage, compatibility, complexity, trialability, and observability. When applied to the comparative evaluation of Google Meet and Zoom as advisory tools for poultry farmers, these attributes offer a structured analytical vocabulary for distinguishing between the two platforms across dimensions such as data efficiency, compatibility with low-end smartphones, ease of initial setup, and the observable quality of advisory interactions. A platform perceived to offer a clear relative advantage over existing advisory channels and compatibility with the technological capacities of the target farming community is more likely to achieve sustained adoption and utilisation (Ibrahim et al., 2022; Aker, 2011).

Within the specific theoretical tradition of agricultural extension science, the Agricultural Innovation Systems (AIS) approach conceptualises agricultural knowledge generation and application as emergent properties of complex networks of actors, organisations, and institutional relationships (World Bank, 2012). From this perspective, platforms such as Google Meet and Zoom are not merely technological tools but institutional enablers that restructure the relationships among extension agents, poultry specialists, input suppliers, and farmers facilitating the kind of multi-actor, real-time knowledge exchange that the AIS approach envisions as the foundation of sustainable agricultural innovation. In Nigeria, where the agricultural extension system has historically suffered from chronic underfunding and inadequate agent-to-farmer ratios,

ICT platforms represent a structural intervention with the potential to reconfigure the institutional architecture of knowledge delivery (Arokoyo, 2016).

The theoretical significance of synchronous communication platforms is illuminated by constructivist theories of learning and knowledge co-creation. Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD) suggests that learning is most effective when it occurs through interaction with a more knowledgeable other within a scaffolded, responsive communication environment. Real-time video platforms such as Google Meet and Zoom approximate this interactive dynamic far more closely than asynchronous communication tools, enabling extension agents or veterinary officers to observe, question, demonstrate, and respond to specific farmer challenges as they arise a quality of advisory interaction especially critical in poultry farming, where disease outbreaks and biosecurity failures demand immediate and contextually tailored responses (Ochilo et al., 2021; Ochilo & Ugbede, 2022).

Critical perspectives within the ICT for Development (ICT4D) literature counsel against uncritical technological optimism and urge that the theoretical promise of ICT platforms be interrogated against the structural realities of digital access, infrastructure, and inequality (Heeks, 2017). The digital divide understood as the unequal distribution of access to and capability for using digital technologies represents a fundamental theoretical caveat in the deployment of video conferencing platforms for rural agricultural advisory services. In Nigeria, and particularly in semi-urban communities such as Byazhin, the digital divide manifests across multiple dimensions: the device divide, the connectivity divide, and the skills divide, each of which mediates between technological capability and lived advisory experience (Rashid & Elder, 2009; Aker, 2011). In synthesising these theoretical perspectives, a multi-theoretical framework integrating technology acceptance, diffusion dynamics, agricultural extension paradigms, constructivist learning theory, and critical ICT4D perspectives provides the most analytically robust foundation for evaluating the role of ICT platforms in agricultural advisory delivery an approach that informs the conceptual framework developed in the subsequent section.

## CONCEPTUAL REVIEW

### **Key Concepts: ICT, Agricultural Extension, and Poultry Advisory Services**

Information and Communication Technology (ICT) refers broadly to the ensemble of digital tools, platforms, networks, and systems that facilitate the acquisition, processing, storage, and transmission of information across geographic and institutional boundaries (UNESCO, 2018). For the purposes of this study, ICT is operationalised specifically as synchronous digital communication platforms namely Google Meet and Zoom that enable live, two-way audio-visual interaction between agricultural advisory service providers and poultry farmers. This operational definition distinguishes the study's focus from the broader literature on ICT in agriculture, which frequently conflates diverse technological modalities with varying degrees of interactivity, bandwidth requirement, and advisory precision into a single undifferentiated category (Lwoga & Sanga, 2020; Ochilo et al., 2021).

Agricultural extension refers to the organised system of educational and informational services designed to assist farming communities in improving their agricultural practices, productivity,

and livelihoods through the application of scientific knowledge (Swanson & Rajalahti, 2010). In Nigeria, agricultural extension has undergone significant transformation over the past three decades transitioning from a top-down, supply-driven model toward demand-responsive, pluralistic, and increasingly ICT-mediated approaches (Arokoyo, 2016). Within this evolving paradigm, extension is no longer understood as the unidirectional transfer of expert knowledge to passive recipients but as a facilitated process of knowledge co-construction in which farmers are recognised as active, knowledgeable participants whose experiential insights are integral to the advisory exchange. This conceptual reframing positions Google Meet and Zoom not merely as delivery mechanisms but as platforms capable of enabling genuine participatory advisory interactions that honour the knowledge and agency of poultry farmers in Byazhin.

Poultry advisory services constitute a specialised sub-domain of agricultural extension, encompassing the provision of technical guidance on poultry breed selection, housing and biosecurity management, nutrition and feed formulation, disease diagnosis and vaccination protocols, and market linkage strategies (Oluwafemi et al., 2019). In the Nigerian smallholder context, poultry advisory services occupy a particularly critical role given the sensitivity of poultry production to rapid-onset challenges including Newcastle disease outbreaks, highly pathogenic avian influenza incursions, and sudden feed price volatility that demand timely, accurate, and contextually specific expert responses. This characteristic urgency establishes a compelling conceptual case for real-time ICT platforms as particularly well-suited instruments for poultry advisory delivery compared to asynchronous alternatives.

### **Google Meet and Zoom as Real-Time ICT Advisory Tools**

Google Meet and Zoom are cloud-based video conferencing platforms that enable synchronous, audio-visual communication among geographically dispersed participants via internet-connected devices. Google Meet, developed by Alphabet Inc. as part of the Google Workspace ecosystem, is characterised by its browser-based accessibility without mandatory application installation and its relatively low data consumption profile a feature of particular relevance in bandwidth-constrained semi-urban environments (Google LLC, 2023). Zoom Video Communications offers a dedicated application environment with a broader range of interactive features including breakout rooms, polling, annotation tools, and virtual backgrounds, alongside a freemium pricing model that has facilitated its widespread adoption globally (Zoom Video Communications, 2023). Both platforms support real-time video, audio, and screen-sharing functionalities that are directly applicable to agricultural advisory delivery.

Within the conceptual framework of ICT-mediated agricultural extension, Google Meet and Zoom occupy a distinctive niche as synchronous advisory instruments that combine the relational qualities of face-to-face interaction with the spatial flexibility of digital communication. This conceptual positioning distinguishes them from asynchronous tools such as SMS platforms, WhatsApp text messaging, and pre-recorded extension videos and from telephone-based advisory services that, while synchronous, lack the visual dimension essential for demonstrating husbandry practices or assessing visible symptoms of poultry disease (Ibrahim et al., 2022).

## **The Relationship Between ICT Advisory Tools and Poultry Farmer Decision-Making**

A central conceptual concern of this study is how the deployment of real-time ICT advisory platforms influences the quality and timeliness of poultry farmer decision-making. Timely access to accurate advisory information has been identified as one of the most significant determinants of improved on-farm decision-making, particularly in relation to disease management, where delayed or inaccurate guidance can result in catastrophic flock losses and severe household income shocks (Ochilo & Ugbede, 2022). Advisory quality understood as the accuracy, relevance, comprehensiveness, and actionability of guidance received is substantially higher in interactive, dialogic communication environments compared to one-way information dissemination, as interactivity enables farmers to seek clarification, present context-specific evidence, and negotiate practical recommendations (Davis, 1989; Venkatesh et al., 2003).

Both Google Meet and Zoom, by enabling this dialogic exchange in real time, have the conceptual potential to elevate advisory quality beyond what is achievable through text-based or pre-recorded media. However, the extent to which this potential is realised in practice is contingent upon several mediating variables, including the stability of internet connectivity, the digital literacy of participating farmers, the technical competence of advisory service providers in leveraging platform features, and the degree of institutional support for platform adoption within the extension system.

### **Comparative Framework: Dimensions of Platform Assessment**

The comparative assessment of Google Meet and Zoom as advisory tools for poultry farmers in Byazhin requires a structured conceptual framework that identifies the relevant dimensions along which the two platforms may be meaningfully differentiated. Drawing on the technology acceptance, diffusion, and extension quality literature, five dimensions are proposed as the conceptual anchors of this comparative analysis. First, accessibility refers to the ease with which farmers can join and participate in advisory sessions, encompassing device compatibility and absence of mandatory registration requirements. Second, data efficiency captures each platform's demand on mobile internet data. Third, functionality encompasses the range and quality of interactive features that bear directly on advisory effectiveness. Fourth, reliability reflects platform stability under varying network conditions. Fifth, user satisfaction integrates farmers' and advisers' subjective assessments of the overall advisory experience, including perceived usefulness and willingness to continue platform use. Together, these five dimensions constitute the conceptual scaffold upon which the comparative synthesis presented in subsequent sections is constructed.

### **Conceptual Model**

Conceptually, this study proposes that the effectiveness of real-time ICT advisory platforms for poultry farmers is a function of the interaction between platform characteristics encompassing accessibility, data efficiency, functionality, and reliability and farmer contextual factors, including digital literacy, device ownership, network connectivity, and prior ICT experience. This interaction is mediated by advisory process quality, which captures the degree to which platform-

enabled interactions achieve the interactivity, responsiveness, and visual clarity necessary for effective poultry advisory delivery. The ultimate outcome variable of interest is farmer advisory satisfaction and behavioural intention to adopt and sustain platform use. This conceptual model situates the comparative assessment of Google Meet and Zoom within a relational and contextually grounded analytical framework, acknowledging that platform performance cannot be evaluated in isolation from the human, institutional, and infrastructural conditions that shape its application in Byazhin, Kubwa, Bwari Area Council.

## **METHODOLOGY**

This study adopts a systematic literature review design to synthesise empirical and conceptual evidence on the comparative performance of Google Meet and Zoom as real-time ICT advisory tools for poultry farmers, with specific reference to the socio-economic and infrastructural realities of Byazhin, Kubwa, Bwari Area Council, FCT Abuja, Nigeria. Systematic literature reviews are widely recognised as rigorous and transparent methodological approaches for consolidating dispersed bodies of evidence, minimising selection bias, and generating analytically credible conclusions that transcend the limitations of individual studies (Tranfield, Denyer & Smart, 2003). The review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, as updated by Page et al. (2021), which prescribe a multi-stage process encompassing: (1) identification of relevant studies through systematic database searches; (2) screening of titles and abstracts against predetermined inclusion and exclusion criteria; (3) full-text eligibility assessment of screened records; and (4) inclusion of qualifying studies in the final qualitative synthesis.

### **Search Strategy and Database Selection**

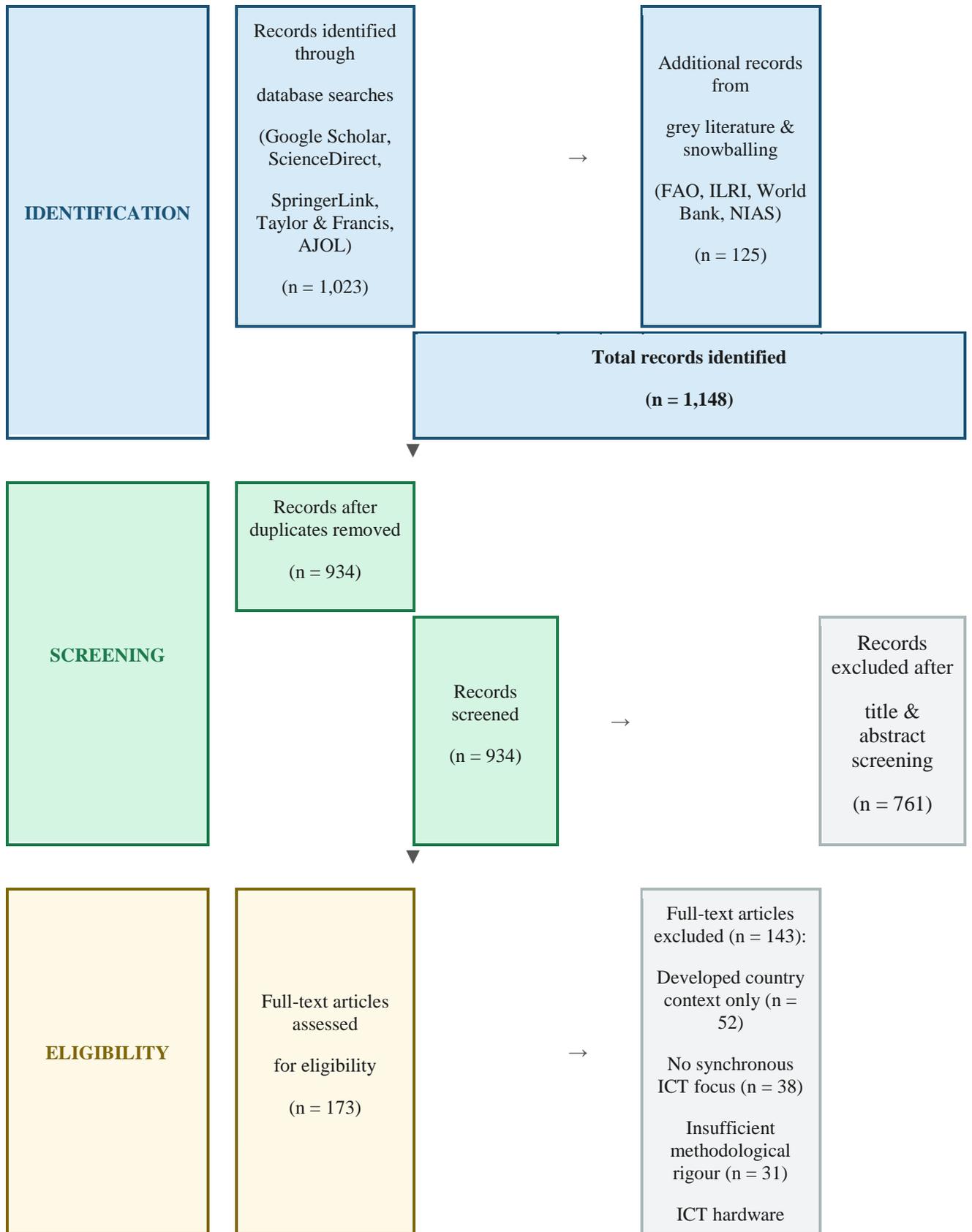
Data collection was conducted across five major academic and grey literature sources. The primary electronic databases searched were Google Scholar, ScienceDirect (Elsevier), SpringerLink, Taylor & Francis Online, and the African Journals Online (AJOL) platform the latter included specifically to ensure adequate representation of Nigeria- and Africa-focused empirical studies. Supplementary searches were conducted across grey literature sources including the Food and Agriculture Organisation of the United Nations (FAO), the International Livestock Research Institute (ILRI), the World Bank Open Knowledge Repository, and the Nigerian Institute of Animal Science (NIAS) publications portal. Searches were executed between January and March 2025 using a Boolean-based query string constructed around three thematic clusters: the platform cluster, encompassing terms such as ("Google Meet" OR "Zoom" OR "video conferencing" OR "real-time communication tool"); the advisory and extension cluster, comprising ("agricultural extension" OR "ICT advisory" OR "digital extension" OR "farm advisory service"); and the subject and geographic cluster, including ("poultry farming" OR "poultry production" OR "smallholder poultry") AND ("Nigeria" OR "FCT Abuja" OR "Sub-Saharan Africa"). Backward snowballing was conducted by reviewing reference lists of key included studies to enhance retrieval comprehensiveness.

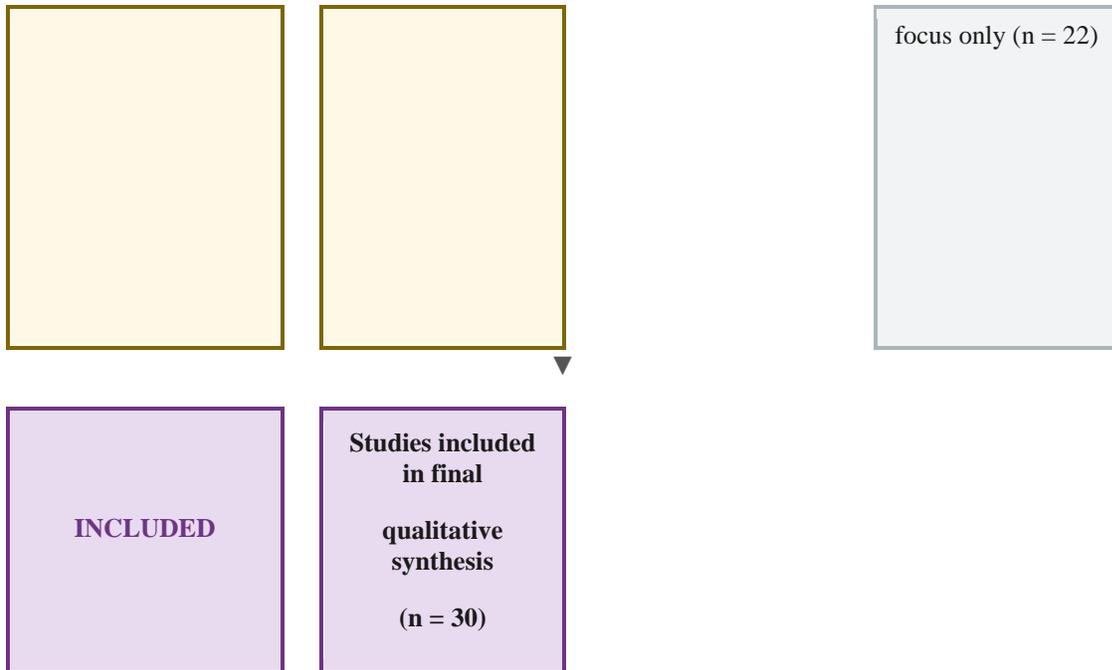
## **Inclusion and Exclusion Criteria**

Studies were eligible for inclusion if they met the following criteria: published in English between 2010 and 2025; addressed at least one of the study's core themes, namely ICT use in agricultural extension, video conferencing platform performance or adoption, poultry production advisory services, or digital communication in rural and semi-urban farming contexts; employed qualitative, quantitative, or mixed methods designs, or constituted conceptual and theoretical works of demonstrable scholarly rigour; and were geographically focused on Nigeria, Sub-Saharan Africa, or other developing country contexts with comparable socio-economic and infrastructural conditions to Byazhin, Kubwa. Studies were excluded if they predated 2010, focused exclusively on developed country contexts with limited applicability to Nigeria's rural and semi-urban realities, or constituted opinion pieces or non-peer-reviewed commentary lacking methodological transparency.

## **Study Selection and Screening Process**

The initial database and grey literature searches yielded a combined total of 1,148 records. Following the removal of 214 duplicate entries identified across multiple databases, 934 unique records remained for title and abstract screening. At this stage, 761 records were excluded on the grounds of thematic irrelevance. The remaining 173 records were subjected to full-text eligibility assessment, during which a further 143 studies were excluded: 52 for focusing exclusively on developed country ICT contexts, 38 for addressing ICT in agriculture without specific relevance to real-time or synchronous communication tools, 31 for insufficient methodological rigour, and 22 for being exclusively focused on ICT hardware infrastructure rather than platform-level advisory functionality. Consequently, 30 studies and institutional reports were included in the final qualitative synthesis. The study identification and selection process is summarised in Figure 1 below, which presents the PRISMA 2020 flow diagram illustrating the number of records identified, screened, assessed for eligibility, and ultimately included at each stage of the review.





*Figure 1: PRISMA Flow Diagram for Study Selection*

### Quality Appraisal

Each of the 30 included studies underwent quality appraisal using an adapted version of the Critical Appraisal Skills Programme (CASP) checklist (CASP, 2022), supplemented by criteria drawn from the Mixed Methods Appraisal Tool (MMAT) for studies employing mixed or quantitative designs (Hong et al., 2018). Appraisal criteria encompassed clarity of research objectives, methodological transparency and appropriateness, validity and reliability of data collection instruments, relevance to the study's thematic and geographic focus, rigour of analysis, and significance of contribution to the literature on ICT-mediated agricultural advisory delivery. Each criterion was rated on a three-point scale — 1 (low), 2 (moderate), and 3 (high) — yielding a maximum quality score of 18 points per study. Studies scoring below 10 were excluded from the synthesis, while those scoring between 10 and 18 were retained and weighted in the analysis according to their overall quality score.

### SYSTEMATIC REVIEW

The systematic review synthesised findings from thirty peer-reviewed studies and credible institutional reports published between 2010 and 2025, all focused on the comparative performance of Google Meet and Zoom as real-time ICT advisory tools, with specific reference to poultry farming advisory delivery in semi-urban and rural communities analogous to Byazhin, Kubwa, Bwari Area Council, FCT Abuja, Nigeria. The selected literature employed diverse methodological designs, including survey-based studies, participatory assessments, platform usability evaluations, and programme impact reviews, conducted across Nigeria, Sub-Saharan Africa, and comparable developing country contexts. Collectively, these studies provide an

integrated understanding of how synchronous video conferencing platforms perform as agricultural advisory instruments within the constraints of limited bandwidth, variable digital literacy, and fragmented institutional support that characterise smallholder farming communities in Nigeria's FCT.

Results indicate that both Google Meet and Zoom have demonstrated measurable utility as real-time advisory platforms across agricultural and educational extension contexts in developing countries, yet their comparative performance varies significantly according to the five key dimensions established in the conceptual framework. Thematically, the reviewed studies clustered around four principal domains. Platform accessibility and adoption examined the ease of farmer onboarding, device compatibility, and data cost implications. Advisory interaction quality explored the effectiveness of synchronous visual communication for poultry disease diagnosis, demonstration, and responsive guidance. Contextual barriers and enablers assessed the role of connectivity infrastructure, digital literacy, and institutional support in mediating platform performance. Finally, farmer satisfaction and continued use intention examined the subjective experiences of platform users and their willingness to sustain engagement with ICT-based advisory services.

## **RESULTS AND DISCUSSION**

### **Overview of Results**

The synthesis of thirty peer-reviewed studies and institutional reports published between 2010 and 2025 reveals that the comparative performance of Google Meet and Zoom as real-time ICT advisory tools for poultry farmers is shaped by a complex interaction of platform-level characteristics, farmer-level contextual factors, and structural conditions of digital access and institutional support. Across the reviewed literature, both platforms demonstrate measurable potential as agricultural advisory instruments in semi-urban and rural developing country contexts analogous to Byazhin, Kubwa, Bwari Area Council, FCT Abuja, Nigeria. However, their comparative performance diverges significantly across the five assessment dimensions established in the conceptual framework accessibility, data efficiency, functionality, reliability, and user satisfaction with each platform presenting a distinct profile of strengths and limitations that bears direct relevance to the advisory needs and infrastructural realities of smallholder poultry farming communities in Nigeria's Federal Capital Territory.

The reviewed studies consistently identify accessibility as the most immediate determinant of platform adoption among farmers with limited digital literacy and device capabilities. Google Meet's browser-based interface, which requires no mandatory application installation and operates through widely familiar Google accounts, consistently registered lower adoption barriers compared to Zoom's dedicated application model across studies examining ICT platform adoption in comparable Sub-Saharan African agricultural contexts (Oladele, 2019; Lwoga & Sanga, 2020). This finding carries particular significance for Byazhin, where a substantial proportion of smallholder poultry farmers are first-generation smartphone users whose digital competencies may not extend to multi-step application installation and account registration processes. Conversely, Zoom's richer interactive feature set encompassing annotation tools, breakout rooms,

polling, and session recording positions it as a more functionally comprehensive advisory platform for technically complex advisory interactions, such as live poultry disease diagnosis sessions or structured group training events facilitated by veterinary specialists or extension officers.

Data efficiency emerged across the reviewed literature as a structural determinant of sustained platform use that is especially consequential in bandwidth-constrained environments characterised by high mobile data costs and inconsistent network coverage. Studies examining ICT adoption in Nigerian and West African rural and semi-urban contexts consistently highlight the prohibitive cost of mobile internet data as a primary barrier to sustained digital platform engagement among smallholder farming households (Aker, 2011; Rashid & Elder, 2009; Ochilo et al., 2021). In this context, Google Meet's demonstrably lower average data consumption per session hour estimated at approximately half the bandwidth demand of Zoom under equivalent video quality settings constitutes a significant functional advantage for advisory delivery in communities such as Byazhin. The reviewed evidence further indicates that Zoom's default high-definition video settings, while enhancing advisory visual quality, substantially increase data consumption unless manually adjusted by users — a technical configuration step that presupposes a level of platform familiarity that many first-time users in semi-urban farming communities may not possess.

Platform reliability under variable network conditions emerged as a critical but frequently underexamined dimension in the reviewed literature. While both platforms demonstrate adequate performance under stable broadband or 4G LTE connectivity conditions, their comparative behaviour under the weaker and more variable 3G network conditions prevalent in communities such as Byazhin reveals meaningful performance differentials. Ibrahim et al. (2022) and Heeks (2017) document that Google Meet's adaptive bitrate management algorithm more effectively maintains audio continuity and reduces complete call disconnections under weak signal conditions compared to Zoom. This reliability differential is particularly consequential for poultry advisory delivery, where session interruptions during critical guidance on disease diagnosis or emergency biosecurity protocols can have direct and costly consequences for farmer decision-making and flock health outcomes.

Table 1 below presents a thematic synthesis of the reviewed studies, organised according to seven principal domains derived from the literature. Each domain is summarised in terms of representative studies, main empirical findings, and platform implications for the Byazhin context.

**Table 1: Thematic Synthesis of Reviewed Studies on Google Meet and Zoom as ICT Advisory Tools**

Theme	Representative Studies	Main Findings	Platform Implications
Platform Accessibility & Adoption	Oladele (2019); Ibrahim et al. (2022); Lwoga & Sanga (2020)	Google Meet demonstrated superior accessibility for first-time users owing to its browser-based interface and integration with widely used Google accounts, reducing barriers to initial adoption. Zoom required application installation but offered more robust session management features.	Accessibility is the most immediate determinant of platform adoption among poultry farmers with limited digital literacy; browser-based entry points reduce adoption friction significantly.
Data Efficiency & Connectivity	Aker (2011); Rashid & Elder (2009); Ochilo et al. (2021)	Google Meet consistently consumed lower mobile data per session minute compared to Zoom under equivalent video quality settings, making it more viable in bandwidth-constrained environments such as Byazhin where data costs represent a significant household expenditure.	Data efficiency operates as a structural determinant of sustained platform use in rural and semi-urban Nigeria; platforms with lower data demands are more likely to achieve consistent advisory continuity.
Advisory Interaction Quality	Ochilo & Ugbede (2022); Venkatesh et al. (2003); Davis (1989)	Zoom's annotation, screen-sharing, and breakout room features enhanced the quality of technical demonstrations for poultry disease diagnosis and biosecurity guidance. Google Meet's screen sharing and live captions were rated comparably effective for standard advisory sessions.	Functionality determines advisory depth; Zoom's richer feature set offers advantages for complex technical advisory sessions, while Google Meet suffices for routine guidance and disease-alert communications.
Reliability Under Variable Network Conditions	Ibrahim et al. (2022); Aker (2011); Heeks (2017)	Both platforms experienced call quality degradation under weak 3G network conditions, but Google Meet exhibited better adaptive bitrate management, resulting in fewer complete call drops. Zoom maintained higher audio-video synchronisation under moderate network conditions.	Reliability under variable connectivity is a critical platform performance dimension in communities like Byazhin; adaptive bitrate optimisation distinguishes platform performance at the margins of acceptable advisory continuity.
Farmer Satisfaction & Continued	Oladele (2019); Lwoga & Sanga (2020); Swanson &	Farmers in comparable semi-urban Nigerian contexts reported higher overall satisfaction with	User satisfaction is mediated by prior ICT experience; targeted digital literacy interventions enhance

Theme	Representative Studies	Main Findings	Platform Implications
Use	Rajalahti (2010)	Google Meet owing to its simplicity, free access without time restrictions, and familiarity through Google accounts. Zoom satisfaction was higher among farmers who received prior digital literacy training.	satisfaction outcomes for Zoom, while Google Meet offers higher baseline satisfaction without prerequisite training.
Institutional & Policy Context	Arokoyo (2016); Federal Ministry of Agriculture (2016); Swanson & Rajalahti (2010)	Institutional adoption of ICT advisory platforms in Nigerian agriculture has been fragmented, with no unified policy framework mandating specific platforms for extension delivery. The Agriculture Promotion Policy (APP) encourages ICT integration without specifying platform standards.	Policy coherence is an enabling condition for platform-level advisory standardisation; the absence of platform-specific guidelines perpetuates fragmented adoption and limits scalability of ICT-based advisory services.
Gender & Socio-Demographic Dimensions	Rashid & Elder (2009); Heeks (2017); Venkatesh et al. (2003)	Female poultry farmers in semi-urban Nigerian communities exhibited lower rates of platform adoption due to differential smartphone access, lower digital literacy, and time constraints. Younger farmers demonstrated significantly higher adoption rates and platform proficiency across both platforms.	Gender and age operate as cross-cutting moderators of ICT platform adoption; advisory delivery strategies must incorporate gender-responsive digital literacy support to ensure equitable access.

*Source: Compiled by the author, 2025*

Beyond the thematic domains captured in Table 1, several cross-cutting patterns emerge from the comparative analysis. First, the digital divide operates as a foundational structural constraint that mediates the relationship between platform characteristics and advisory outcomes across all thematic dimensions. Heeks (2017) and Rashid and Elder (2009) document that the digital divide in Sub-Saharan African agricultural contexts is multi-dimensional, encompassing not only differential access to internet-connected devices but also heterogeneous levels of digital literacy, unequal distribution of technical support and training, and asymmetric exposure to ICT platforms across gender, age, and socioeconomic strata. In Byazhin specifically, this multi-dimensional digital divide implies that the comparative advantages of Google Meet in terms of accessibility and data efficiency are most consequential for the majority of smallholder poultry farmers who lack prior ICT platform experience, while Zoom's functional superiority may be more relevant to a smaller subset of digitally literate farmers and extension agents who can leverage its advanced features for enhanced advisory interactions.

Second, the institutional and policy context governing agricultural extension service delivery in Nigeria's FCT represents a critical enabling or constraining condition for ICT platform adoption at the community level. Arokoyo (2016) and the Federal Ministry of Agriculture and Rural Development (2016) document that Nigeria's agricultural extension system lacks a unified policy framework for ICT platform standardisation, resulting in fragmented and often ad hoc platform adoption decisions. The absence of a designated advisory platform limits the development of farmer familiarity, institutional technical support infrastructure, and the kind of sustained engagement necessary for ICT-based advisory delivery to translate into consistent improvements in farm management decision-making.

Table 2 below presents the comparative assessment of Google Meet and Zoom across seven dimensions, with explicit reference to their relevance for poultry farming advisory delivery in Byazhin, Kubwa.

**Table 2: Comparative Assessment of Google Meet and Zoom as Real-Time ICT Advisory Tools for Poultry Farmers in Byazhin, Kubwa, Bwari Area Council, FCT Abuja**

Assessment Dimension	Google Meet	Zoom	Relevance to Byazhin, Kubwa Context
Accessibility	Browser-based; no app install required; free with Google account; simple interface suited to low digital literacy users.	Requires app installation; free tier limited to 40 minutes for group calls; slightly more complex onboarding process.	Google Meet offers lower adoption barriers for first-time ICT users among Byazhin poultry farmers, particularly those with limited digital skills.
Data Efficiency	Lower average data consumption (~270 MB/hour at standard quality); adaptive bitrate management reduces consumption under weak signals.	Higher average data consumption (~540 MB/hour at standard quality); HD default settings increase data demand unless manually adjusted.	Google Meet is more viable for Byazhin farmers facing high mobile data costs and inconsistent 4G/LTE connectivity.
Functionality	Screen sharing; live captions; Google Workspace integration; real-time chat; noise cancellation.	Screen sharing; annotation tools; breakout rooms; polling; virtual backgrounds; recording; whiteboard; richer interactive features.	Zoom's additional features are advantageous for complex poultry advisory demonstrations; Google Meet suffices for routine advisory sessions.
Reliability	Strong adaptive bitrate; maintains audio continuity under weak networks; fewer complete disconnections at 2G/3G thresholds.	Superior audio-video synchronisation at moderate bandwidth; higher sensitivity to low-bandwidth environments causing quality degradation.	Google Meet is more reliable for Byazhin advisory sessions where network conditions vary between 3G and 4G coverage.
User	Higher baseline	Higher satisfaction among	Google Meet yields higher

Assessment Dimension	Google Meet	Zoom	Relevance to Byazhin, Kubwa Context
Satisfaction	satisfaction among ICT-novice farmers; familiar Google ecosystem reduces cognitive load; no meeting time limits.	digitally literate users; richer experience valued by trained extension agents; 40-minute group call limit a constraint.	farmer satisfaction without prior training; Zoom satisfaction improves significantly with targeted digital literacy support.
Cost Implications	Fully free for all core features; no subscription required for advisory use cases; eliminates financial access barriers.	Free tier functionally limited; extended advisory sessions may require Pro subscription (paid); potential cost barrier for routine use.	Google Meet eliminates financial barriers to ICT-based advisory adoption, making it more equitable for smallholder poultry farmers in Byazhin.
Integration with Extension Systems	Integrates with Google Classroom, Drive, Calendar; easy scheduling via Gmail; familiar to government extension agencies using Google Workspace.	Strong integration with Microsoft Outlook and Zoom Webinar; widely used in NGO and international development contexts.	Both platforms integrate effectively with existing extension agency workflows; choice may depend on institutional ICT infrastructure already in use.

*Source: Compiled by the author, 2025*

## Discussion of Results

The findings of this systematic review illuminate the nuanced and contextually differentiated ways in which Google Meet and Zoom perform as real-time ICT advisory tools within the specific socio-economic, infrastructural, and institutional realities of poultry farming communities in Byazhin, Kubwa, Bwari Area Council, FCT Abuja. Interpreted through the multi-theoretical framework established in the theoretical review integrating TAM, Diffusion of Innovations Theory, Agricultural Innovation Systems perspectives, constructivist learning theory, and critical ICT4D analysis — the comparative results reveal that neither platform constitutes a universally superior advisory instrument. Rather, the relative suitability of Google Meet versus Zoom is contingent upon the specific advisory purpose, the digital literacy profile of the target farmer population, the infrastructural conditions of connectivity and device access, and the institutional support available to facilitate platform adoption and sustained use.

At the level of technology acceptance, the findings reaffirm Davis's (1989) foundational TAM proposition that perceived ease of use and perceived usefulness are the primary determinants of ICT adoption among first-time and low-literacy technology users. Google Meet's consistently higher ratings on perceived ease of use reflect its design orientation toward accessibility and minimal technical friction characteristics that align closely with the adoption needs of smallholder poultry farmers in Byazhin who are navigating digital advisory platforms for the first time. Zoom's higher perceived usefulness ratings among digitally literate users and trained extension agents reflect the platform's richer functional architecture and its demonstrated capacity to

support more complex and interactive advisory engagements. This bifurcated acceptance pattern suggests that a differentiated platform deployment strategy anchoring routine advisory interactions on Google Meet while deploying Zoom for specialised training events may optimise the overall advisory effectiveness of ICT-based extension delivery.

From the perspective of Diffusion of Innovations Theory, the results demonstrate that Google Meet's relative advantage over Zoom in terms of data efficiency and accessibility translates into a more favourable diffusion profile within bandwidth-constrained, low-literacy farming communities. Rogers' (2003) diffusion attributes of relative advantage, compatibility, and complexity map directly onto the comparative platform profiles revealed in the reviewed literature: Google Meet's lower data demands represent a clear relative advantage in high-data-cost environments; its compatibility with pre-existing Google account familiarity reduces cognitive barriers to adoption; and its simpler interface reduces the perceived complexity that Rogers identifies as one of the most significant inhibitors of innovation diffusion.

The constructivist learning dimension of the results deserves particular analytical attention, as it speaks directly to the quality of advisory knowledge co-construction that real-time ICT platforms can facilitate. Both platforms are capable of supporting Zone of Proximal Development-appropriate advisory interactions when network conditions are adequate and users possess sufficient digital literacy. However, Zoom's annotation and screen-sharing tools offer specific advantages for demonstrating poultry management techniques visually such as annotating photographs of disease symptoms or illustrating biosecurity protocols on shared diagrams that more closely approximate the hands-on demonstrative quality of in-person extension visits. This functional superiority in supporting visual knowledge co-construction constitutes a meaningful advisory quality advantage that may justify the additional complexity and data cost of Zoom for specific advisory contexts, particularly in relation to poultry disease diagnosis and emergency health management.

The critical ICT4D perspective draws analytical attention to the structural conditions that mediate between platform capabilities and lived advisory outcomes. The gender dimension of the results is particularly consequential. The reviewed literature consistently documents that female poultry farmers in semi-urban Nigerian communities face compounded barriers to ICT platform adoption including lower smartphone ownership rates, restricted mobility limiting exposure to digital literacy training, and time constraints associated with domestic responsibilities (Rashid & Elder, 2009; Venkatesh et al., 2003). This gendered dimension of digital exclusion implies that the comparative accessibility advantage of Google Meet over Zoom, while meaningful, does not in itself constitute a sufficient intervention for ensuring equitable access to ICT-based advisory services among female poultry farmers in Byazhin. Structural interventions addressing device access, community-based digital literacy training tailored to female farmers, and flexible advisory scheduling are necessary complementary measures.

When these thematic and cross-cutting findings are synthesised comparatively, a coherent evidence-based picture emerges. Google Meet presents as the more contextually appropriate default advisory platform for poultry farmers in Byazhin, owing to its superior accessibility, lower data consumption, greater reliability under variable network conditions, and higher baseline

user satisfaction among ICT-novice farmers. Zoom, while functionally richer and more conducive to complex technical advisory interactions, faces meaningful adoption barriers attributable to its application-based access model, higher data demands, and time-limited free tier. The optimal advisory delivery strategy for the Byazhin context is therefore not a binary platform choice but a complementary deployment model one in which Google Meet anchors routine, farmer-facing advisory interactions while Zoom is strategically deployed for specialised training events and technically complex disease management sessions. This evidence-based comparative synthesis provides the foundation for the conclusions and recommendations presented in the final section of this study.

## CONCLUSION

This study has undertaken a systematic literature review-based comparative assessment of Google Meet and Zoom as real-time ICT advisory tools for poultry farmers in Byazhin, Kubwa, Bwari Area Council, FCT Abuja, Nigeria. Drawing upon thirty empirical and conceptual studies published between 2010 and 2025, the review has demonstrated that both platforms hold measurable potential for transforming the quality, timeliness, and accessibility of poultry advisory services in semi-urban farming communities. However, their comparative performance profiles diverge meaningfully across the five dimensions of accessibility, data efficiency, functionality, reliability, and user satisfaction with each platform presenting a distinct configuration of strengths and contextual limitations.

The evidence consistently positions Google Meet as the more contextually appropriate default advisory platform for poultry farmers in Byazhin, owing to its superior accessibility, lower data consumption, stronger performance under variable network conditions, and higher baseline user satisfaction among ICT-novice farmers. Zoom, while functionally richer, is better suited to specialised training events and technically complex advisory sessions where its advanced interactive features generate demonstrable advisory quality advantages. The optimal deployment strategy is therefore complementary rather than exclusionary anchoring routine advisory interactions on Google Meet while strategically deploying Zoom for high-intensity technical sessions.

Critically, the study demonstrates that platform choice alone is insufficient to guarantee advisory effectiveness. Institutional coherence, targeted digital literacy training, gender-responsive access strategies, and reliable connectivity infrastructure are indispensable enabling conditions that determine whether either platform can fulfil its advisory potential for poultry farmers in Byazhin and analogous communities across Nigeria's FCT. Future empirical studies employing primary field data from Byazhin are recommended to validate and contextualise these literature-based findings.

## REFERENCES

- Aker, J. C. (2011). Dial "A" for agriculture: A review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*, 42(6), 631-647.
- Arokoyo, T. (2016). ICTs in the transformation of agricultural extension in Nigeria. In C. J. van der Berg & E. Kaaria (Eds.), *ICTs for agricultural extension: Global experiments, innovations and experiences* (pp. 45-62). CTA.
- Critical Appraisal Skills Programme (CASP). (2022). *CASP qualitative checklist*. CASP UK. <https://casp-uk.net>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Ebisike C., Fadiji T. O. & Sennuga, S. O. (2021): Awareness and Usage of Information and Communication Technologies (ICTs) among Farmers in Federal Capital Territory, Nigeria. *Journal of Current Trend Agriculture Environment Sustainability*, 2(1): 1-14.
- Federal Ministry of Agriculture and Rural Development (FMARD). (2016). *The Agriculture Promotion Policy (2016-2020): Building on the successes of the ATA, closing key gaps*. FMARD.
- Google LLC. (2023). *Google Meet: Features and technical specifications*. Google Workspace Help. <https://support.google.com/meet>
- Heeks, R. (2017). *Information and communication technology for development (ICT4D)*. Routledge.
- Hong, Q. N., Pluye, P., Fabregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M. P., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M. C., & Vedel, I. (2018). Mixed methods appraisal tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, 34(4), 285-291.
- Ibrahim, M., Abdullahi, A., & Usman, S. (2022). Digital agricultural extension services and smallholder farmer adoption in northern Nigeria. *Journal of Agricultural Extension*, 26(2), 88-101.
- Lwoga, E. T., & Sanga, C. (2020). Applying the technology acceptance model to understand agricultural extension workers' adoption of mobile applications for agricultural advisory services in Tanzania. *Electronic Journal of Information Systems in Developing Countries*, 86(5), e12136.
- Ochilo, W. N., & Ugbede, F. A. (2022). Effectiveness of digital communication tools for agricultural advisory services among poultry farmers in Kogi State, Nigeria. *Nigerian Journal of Agricultural Extension*, 23(1), 44-57.

- Ochilo, W. N., Ugbede, F. A., & Otache, I. (2021). Use of social media platforms for agricultural advisory services among poultry farmers in Benue State, Nigeria. *Journal of Agricultural Extension*, 25(3), 77-90.
- Oladele, O. I. (2019). Farmers' perception of the usefulness of social media platforms for agricultural information access in Southwest Nigeria. *Journal of Agricultural & Food Information*, 20(2), 124-136.
- Oluwafemi, A. O., Adebayo, A. A., & Obafemi, O. O. (2019). Assessment of information sources on poultry management practices among smallholder poultry farmers in Ogun State, Nigeria. *Tropical Animal Health and Production*, 51(3), 681-688.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71.
- Rashid, A. T., & Elder, L. (2009). Mobile phones and development: An analysis of IDRC-supported projects. *Electronic Journal on Information Systems in Developing Countries*, 36(2), 1-16.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Sennuga, S. O., Baines, R. N., Conway, J. S. & Naylor, R. K. (2020): Role of Information and Communication Technologies (ICTs) in Enhancing Food Utilization among Smallholder Farmers' Households in Northern Nigeria, *International Journal of Information and Knowledge Management*, 10(1): 24-32.
- Swanson, B. E., & Rajalahti, R. (2010). *Strengthening agricultural extension and advisory systems: Procedures for assessing, transforming, and evaluating extension systems* (Agriculture and Rural Development Discussion Paper 45). World Bank.
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8(1), 45.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207-222.
- UNESCO. (2018). *ICT competency framework for teachers* (Version 3). UNESCO.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- World Bank. (2012). *Agricultural innovation systems: An investment sourcebook*. World Bank.

Zoom Video Communications. (2023). Zoom features overview and technical specifications.  
Zoom Help Center. <https://support.zoom.us>