

Original Article

CROSS-PLATFORM NEWS JOURNEYS: MAPPING AUDIENCE ENGAGEMENT ACROSS SOCIAL MEDIA, MESSAGING APPS, AND NEWS WEBSITES

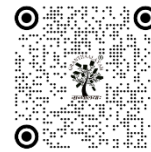
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ABSTRACT

The proliferation of digital communication technologies has significantly transformed the way audiences discover, consume, and engage with news content. Rather than relying on a single information source, modern users navigate across multiple digital platforms, including social media, messaging applications, and dedicated news websites, creating complex cross-platform news journeys. Understanding these interconnected audience behaviours is essential for digital publishers, researchers, and policymakers seeking to improve audience engagement and optimize news dissemination strategies. This study proposes a comprehensive analytical framework for mapping audience engagement across multiple digital communication platforms by integrating behavioural analytics, audience journey reconstruction, engagement measurement, network analysis, and machine learning techniques. The proposed methodology captures user interactions from heterogeneous platforms, reconstructs chronological news consumption pathways, and analyses engagement patterns, platform transitions, and information diffusion within the digital news ecosystem. Furthermore, the framework employs network-based analysis to identify dominant navigation pathways and influential communication platforms, while predictive machine learning models evaluate audience engagement using cross-platform behavioural features. The findings demonstrate that social media platforms primarily function as gateways for news discovery, messaging applications facilitate trusted interpersonal sharing, and news websites promote deeper content engagement and audience retention. The study further reveals that effective audience engagement depends on coordinated cross-platform communication strategies rather than isolated platform optimization. By providing a unified computational approach for analysing audience behaviour, the proposed framework contributes to the fields of digital journalism, communication studies, and computational media analytics. The outcomes offer valuable insights for media organizations seeking to enhance content distribution, audience retention, and personalization, while also supporting researchers and policymakers in understanding information diffusion and digital communication dynamics within rapidly evolving news ecosystems.

Keywords: Cross-Platform News Journeys, Audience Engagement, Digital Journalism, Social Media Analytics, Messaging Applications, News Websites, Behavioural Analytics, Network Analysis, Machine Learning, Information Diffusion

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INTRODUCTION

The rapid advancement of digital communication technologies has fundamentally reshaped the global news ecosystem, transforming how information is produced, distributed, consumed, and shared. Traditional news consumption was largely confined to newspapers, television, and radio, where audiences followed linear and predictable information pathways. However, the widespread adoption of smartphones, social networking platforms, messaging applications, and high-speed Internet has shifted news consumption toward a highly interconnected digital environment [Herrero-Diz et al. \(2020\)](#). Contemporary audiences no longer depend on a single source of information; instead, they navigate dynamically across multiple platforms, including Facebook, X (formerly Twitter), Instagram, YouTube, WhatsApp, Telegram, and dedicated news websites, during a single news consumption session. This evolution has given rise to cross-platform news journeys, where users continuously transition between platforms for news discovery, verification, discussion, and redistribution. The increasing complexity of digital news consumption has significantly expanded the role of audience engagement in modern journalism. Engagement is no longer measured solely through page views or website traffic but encompasses diverse user interactions such as reading duration, likes, comments, shares, reposts, subscriptions, bookmarking, and revisit behaviour across multiple communication platforms [Ku et al. \(2019\)](#). Social media platforms primarily facilitate rapid news discovery and public interaction through algorithmically curated feeds, while messaging applications enable trusted interpersonal sharing and collaborative discussion within private communities. Dedicated news websites continue to provide comprehensive reporting and investigative journalism, supporting deeper audience engagement and long-term reader retention. Consequently, understanding how audiences move among these interconnected platforms has become essential for developing effective digital journalism strategies [Schmidt et al. \(2017\)](#).

Recent advances in artificial intelligence, recommendation algorithms, and behavioural analytics have further transformed digital news ecosystems. Personalized content delivery, algorithmic ranking systems, and intelligent recommendation engines increasingly influence the visibility of news stories and shape audience navigation patterns. Although these technologies improve content relevance and accessibility, they also introduce challenges related to information overload, selective exposure, filter bubbles, misinformation propagation, and fragmented audience attention [Kitchens et al. \(2020\)](#). As a result, researchers have devoted considerable effort to investigating digital news engagement using computational methods such as web analytics, social network analysis, clickstream analysis, sequence modelling, and machine learning. Despite these developments, most existing studies remain platform-centric, focusing on audience engagement within individual communication channels rather than considering the complete cross-platform journey. Studies investigating Facebook, X, YouTube, or publisher websites independently provide valuable insights into platform-specific behaviour but fail to capture the dynamic transitions that characterize real-world news consumption. Similarly, research on messaging applications often remains limited due to restricted access to interaction data and privacy constraints [Levy \(2021\)](#). Consequently, there remains a significant gap in developing unified analytical frameworks capable of integrating heterogeneous interaction data and modelling audience engagement across the entire digital news ecosystem.

To address these limitations, this study proposes a comprehensive computational framework for mapping audience engagement across social media platforms, messaging applications, and news websites. The proposed framework integrates multi-source behavioural data, audience journey reconstruction, engagement measurement, transition analysis, network science, and machine learning into a unified analytical pipeline. By reconstructing complete audience journeys, the framework enables systematic investigation of user navigation patterns, platform transitions, engagement dynamics, and information diffusion throughout interconnected digital communication environments. Furthermore, predictive machine learning models are employed to estimate audience engagement using cross-platform behavioural features, while network analysis identifies influential platforms and dominant transition pathways within the digital news ecosystem.

The proposed methodology provides valuable practical implications for digital publishers, media organizations, researchers, and policymakers. Understanding audience navigation behaviour enables news organizations to optimize referral strategies, improve content personalization, strengthen audience retention, and enhance cross-platform communication effectiveness. Moreover, the analytical framework supports broader investigations into information diffusion, digital media governance, and audience behaviour in rapidly evolving communication environments.

CONTRIBUTIONS OF THE RESEARCH

- Proposes a unified framework for analysing cross-platform news journeys across social media, messaging applications, and news websites.
- Develops a behavioural analytics and machine learning approach to reconstruct audience journeys and predict user engagement.
- Introduces a multidimensional engagement model using interaction, sharing, reading duration, and revisit behaviour for comprehensive analysis.
- Provides practical insights to optimize digital news distribution, audience retention, personalization, and media decision-making.

- The remainder of this paper is organized as follows. Section 2 reviews the existing literature on digital news consumption, audience engagement, and cross-platform communication. Section 3 describes the proposed research methodology and analytical framework. Section 4 presents the cross-platform audience journey analysis, while Section 5 discusses the experimental results and comparative evaluation. Finally, Section 6 concludes the paper by summarizing the key findings, outlining research limitations, and suggesting future research directions.

LITERATURE REVIEW

The transformation of digital communication technologies has significantly altered the manner in which audiences discover, consume, interpret, and disseminate news. The convergence of online news portals, social networking platforms, instant messaging applications, search engines, and multimedia-sharing services has created a highly interconnected digital news ecosystem. Unlike traditional mass media, where information typically flowed from publishers to audiences through a single communication channel, contemporary news consumption involves continuous movement across multiple digital platforms. Users often begin their news journey on one platform, continue reading on another, discuss the information within private messaging groups, verify facts through search engines, and subsequently redistribute the content via social media [Lou et al. \(2021\)](#). This multidirectional movement has given rise to the concept of cross-platform news journeys, emphasizing the dynamic pathways that audiences follow throughout the information consumption process.

Understanding audience engagement within such complex digital environments has become an important research area in journalism studies, communication science, computational social science, information systems, and digital marketing. Researchers have investigated various dimensions of audience behaviour, including news discovery mechanisms, information diffusion, social sharing, recommendation algorithms, content personalization, misinformation propagation, and user interaction patterns. Numerous analytical approaches—including network analysis, clickstream analysis, sequence modelling, machine learning, sentiment analysis, and behavioural analytics—have been employed to better understand digital news ecosystems [Kalogeropoulos \(2021\)](#). Despite these advancements, most existing studies focus on individual platforms, providing limited understanding of how audiences transition across multiple digital environments during actual news consumption.

This chapter reviews the existing body of literature related to digital news consumption and audience engagement across multiple communication platforms. It examines the evolution of digital journalism, the role of social media and messaging applications in news dissemination, audience engagement theories, cross-platform behavioral analysis, computational techniques used for audience journey mapping, and the major research gaps that motivate the present study.

EVOLUTION OF DIGITAL NEWS CONSUMPTION

The digital revolution has fundamentally transformed the structure of news production and dissemination. Traditional journalism primarily relied on newspapers, television broadcasts, and radio networks, where editorial organizations exercised centralized control over information distribution. The emergence of the World Wide Web during the 1990s introduced online news websites that enabled continuous publishing, multimedia integration, and global accessibility. Initially, online news largely replicated print journalism in digital form; however, rapid advances in mobile computing, broadband Internet, and social networking technologies subsequently reshaped the entire news ecosystem [Lottridge and Bentley \(2018\)](#). The proliferation of smartphones has significantly increased the accessibility of digital news. Mobile devices enable audiences to receive real-time updates regardless of geographic location, encouraging continuous interaction with news throughout the day. News notifications, personalized recommendations, and location-aware services have further enhanced immediacy, making news consumption an always-connected activity rather than a scheduled routine.

Another major transformation involves the shift from publisher-driven distribution to audience-cantered discovery. Instead of visiting newspaper websites directly, users increasingly encounter news through search engines, social networking platforms, messaging applications, recommendation systems, podcasts, newsletters, and video-sharing platforms. Consequently, audience behaviour has become increasingly fragmented, with individuals utilizing multiple digital channels for discovering, validating, discussing, and sharing information. Artificial intelligence has further accelerated this transformation by enabling personalized news recommendations. Recommendation algorithms analyse browsing history, user interests, engagement behaviour, and demographic information to deliver customized news feeds [Masip et al. \(2021\)](#). While personalization improves relevance and user satisfaction, it simultaneously raises concerns regarding filter bubbles, selective exposure, ideological polarization, and algorithmic bias. The continuous integration of artificial intelligence, cloud computing, mobile technologies, and social networking platforms has therefore created a highly interconnected digital news environment where audience behaviour extends beyond isolated platforms and encompasses complex cross-platform interactions.

SOCIAL MEDIA AS NEWS DISTRIBUTION PLATFORMS

Social media has become one of the dominant gateways for digital news consumption worldwide. Platforms such as Facebook, X (formerly Twitter), Instagram, YouTube, LinkedIn, Reddit, and TikTok enable rapid dissemination of information through user-generated interactions and algorithmically curated feeds. These platforms facilitate immediate distribution of breaking news while encouraging active audience participation through commenting, sharing, reacting, reposting, and live discussions. Unlike traditional journalism, where audiences primarily consumed professionally produced content, social media enables every user to become both a consumer and a producer of information [Herrero et al. \(2020\)](#). Citizen journalism, eyewitness reporting, live streaming, and user-generated multimedia have significantly expanded the diversity of available news sources. Consequently, news dissemination has evolved into a decentralized communication network where information spreads through interconnected communities rather than exclusively through institutional media organizations.

Algorithmic recommendation systems play a central role in determining the visibility of news content. Engagement signals such as likes, shares, comments, viewing duration, and user interactions influence ranking algorithms that prioritize content appearing in personalized feeds. These mechanisms substantially affect public attention by amplifying certain stories while reducing the visibility of others. Social media also accelerates information diffusion through network effects. Highly connected users, influencers, journalists, and public institutions frequently act as information hubs that distribute news to millions of followers within minutes [Yoo et al. \(2023\)](#). Viral dissemination patterns have therefore become an essential research topic in computational journalism and network science. Despite these advantages, social media presents significant challenges. Rapid information sharing increases the likelihood of misinformation, fake news, clickbait, and manipulated content spreading widely before professional verification occurs. Researchers have consequently emphasized the importance of understanding audience behaviour across social media ecosystems to improve digital media literacy and platform governance.

NEWS WEBSITES AND AUDIENCE RETENTION

Despite the growing influence of social media, dedicated news websites remain the primary providers of comprehensive journalism. These platforms offer detailed reporting, investigative articles, editorials, multimedia presentations, and subscription-based premium content that are generally unavailable through social networking platforms. Most audience journeys ultimately converge on publisher websites following referrals from search engines, social media posts, newsletters, or messaging applications [Kalogeropoulos and Rossini \(2023\)](#). Consequently, news organizations increasingly focus on audience retention metrics rather than simple visitor counts. Common engagement indicators include session duration, pages viewed, bounce rate, scroll depth, reading completion, subscription conversion, and return visits.

Data analytics tools such as Google Analytics, Adobe Analytics, and proprietary newsroom dashboards enable publishers to monitor audience behaviour in real time. These insights support editorial decision-making by identifying high-performing content, reader preferences, and optimal publication strategies. The transition from social platforms to publisher websites represents a critical stage within the cross-platform news journey because it reflects the movement from information discovery toward in-depth engagement [Ohme et al. \(2020\)](#). Consequently, understanding referral pathways has become increasingly important for sustainable digital journalism.

RESEARCH METHODOLOGY

INTRODUCTION

This study adopts a comprehensive computational research methodology to investigate audience engagement across multiple digital news platforms, including social media, messaging applications, and news websites. The proposed methodology is designed to capture the complete audience journey by integrating user interactions from heterogeneous digital environments into a unified analytical framework. Unlike conventional studies that evaluate audience behaviour on individual platforms, the present research considers the interconnected nature of modern news consumption, where users frequently transition among several communication channels before completing a news consumption cycle. The methodology combines behavioural analytics, web analytics, network science, machine learning, and statistical modelling to identify audience navigation patterns, engagement characteristics, and information diffusion mechanisms. The overall workflow consists of data acquisition, integration, preprocessing, audience journey reconstruction, engagement measurement, computational analysis, visualization, and interpretation, thereby providing a holistic understanding of cross-platform news consumption behaviour.

OVERALL RESEARCH FRAMEWORK

The proposed framework models digital news consumption as a continuous sequence of interactions occurring across multiple digital platforms. Each user interaction is considered an event within a larger audience journey, enabling the reconstruction of complete navigation pathways rather than isolated platform activities. The framework begins with the acquisition of interaction data

from various digital news channels, followed by preprocessing and integration into a unified repository. The integrated dataset is subsequently analysed using behavioural analytics to identify engagement patterns, transition frequencies, and audience movement between platforms. Network analysis is then employed to model platform connectivity and information diffusion, while machine learning algorithms are utilized to predict user engagement and classify behavioural patterns. Finally, the analytical outcomes are presented through visual dashboards and network visualizations to facilitate interpretation of cross-platform audience behaviour. The proposed framework therefore provides an end-to-end computational pipeline capable of capturing the complexity of contemporary digital journalism ecosystems.

Figure 1

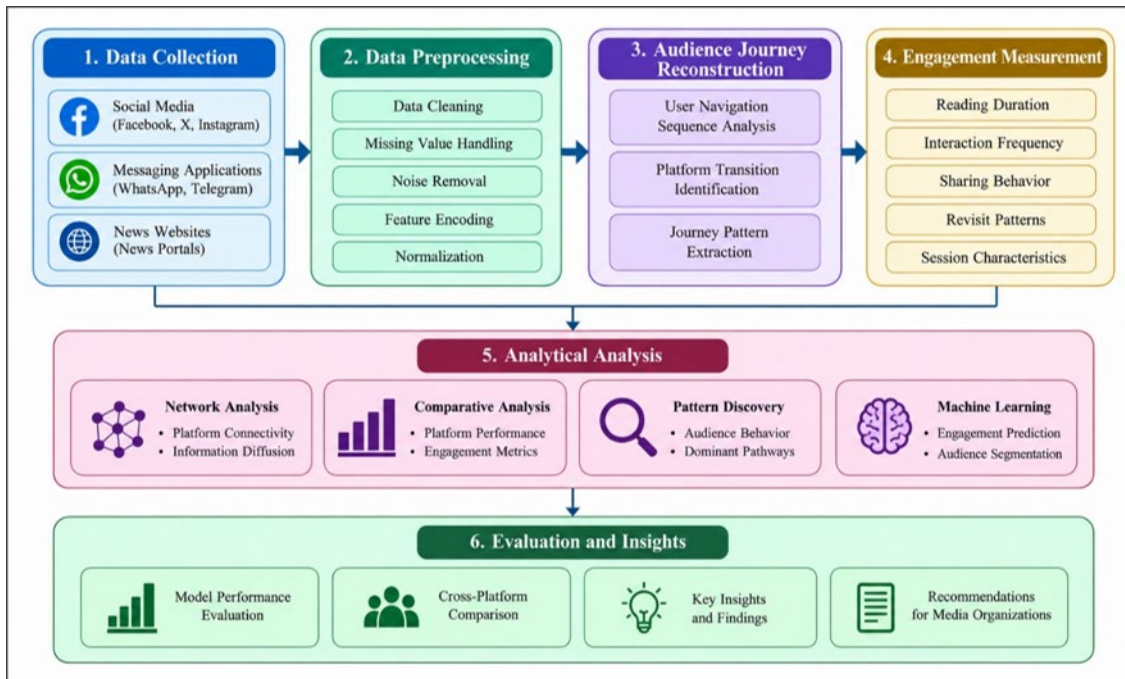


Figure 1 Proposed Research Methodology

RESEARCH DESIGN

The present investigation follows a quantitative observational research design supported by computational data analytics. Rather than manipulating user behaviour through controlled experiments, the study analyses naturally occurring interactions generated during routine news consumption activities. This approach enables the observation of authentic audience behaviour across multiple digital platforms under real-world conditions. The research combines descriptive analytics to summarize audience characteristics, behavioural analytics to identify engagement patterns, network analysis to model information flow, sequence analysis to reconstruct audience journeys, and predictive analytics to estimate future engagement behaviour. Integrating these analytical perspectives provides a comprehensive understanding of how audiences navigate among different communication platforms during news consumption.

DATA SOURCES

The analytical framework utilizes interaction data collected from a diverse range of digital communication platforms that collectively represent the contemporary online news ecosystem. These platforms include major social networking services such as Facebook, X (formerly Twitter), Instagram, LinkedIn, Reddit, and YouTube; private messaging applications including WhatsApp and Telegram; dedicated news websites; search and news aggregation services such as Google News; and syndicated RSS feeds. Each interaction generated on these platforms contributes to the reconstruction of individual audience journeys. For every recorded interaction, several behavioural attributes are collected, including anonymized user identifiers, session identifiers, timestamps, platform names, referral sources, device information, news categories, article URLs, reading duration, page scrolling behaviour, click events, likes, comments, shares, reposts, bookmarks, and subscription activities. These variables collectively describe both the sequence and intensity of audience engagement across multiple digital environments, enabling detailed computational analysis of user navigation behaviour.

DATA COLLECTION STRATEGY

Data collection is performed using multiple complementary acquisition techniques to ensure broad coverage of audience interactions across different digital platforms. Depending on platform accessibility and privacy policies, interaction records are obtained through official application programming interfaces (APIs), website analytics services, clickstream logs, browser event tracking systems, social media analytics dashboards, publicly available engagement datasets, and structured user surveys. Collecting data from multiple sources enables the framework to capture the diverse pathways through which audiences discover, consume, and share digital news. The observation period is selected to include both routine news consumption and periods characterized by high public interest, such as breaking news events, elections, or emergency situations. This strategy allows the proposed framework to evaluate audience behavior under varying communication dynamics. To preserve user privacy and comply with ethical research standards, all personally identifiable information is removed before analysis, and anonymized identifiers are used throughout the computational workflow.

DATA INTEGRATION

Because audience interactions originate from heterogeneous digital platforms, data integration represents one of the most important stages of the proposed methodology. Interaction records collected from multiple sources differ considerably in format, structure, timestamp conventions, and metadata representation. Therefore, the collected datasets are first standardized into a common schema before being merged into a unified analytical repository. The integration process includes timestamp synchronization, duplicate record elimination, URL normalization, anonymous user mapping, session reconstruction, and platform identification. These operations ensure that interactions associated with the same audience member are accurately linked into chronological sequences regardless of the originating platform. The resulting integrated dataset provides a comprehensive representation of cross-platform audience behaviour, allowing researchers to reconstruct complete news journeys and examine user transitions among multiple communication environments.

DATA PREPROCESSING

Data preprocessing is an essential stage in the proposed research methodology because the collected audience interaction data originate from heterogeneous platforms with varying structures, formats, and quality levels. Raw datasets often contain missing values, duplicate records, inconsistent timestamps, invalid URLs, and noisy interaction logs that may adversely affect the reliability of subsequent analytical models. Therefore, a comprehensive preprocessing pipeline is implemented to improve data quality, ensure consistency across multiple sources, and prepare the integrated dataset for audience journey reconstruction and computational analysis. Duplicate interaction records are subsequently identified using combinations of anonymized user identifiers, timestamps, URLs, and platform identifiers. Duplicate entries may arise due to repeated API retrievals, synchronization delays, or multiple event logging mechanisms. Removing these redundant observations ensures that each user interaction contributes only once to the audience journey, thereby preventing overestimation of engagement metrics.

Since the collected data originate from multiple digital platforms, timestamp standardization is performed to establish a consistent temporal reference. All interaction times are converted to a common time zone and standardized date-time format, allowing accurate chronological reconstruction of audience journeys. Furthermore, URLs associated with news articles are normalized by removing session identifiers, tracking parameters, and marketing tags to ensure that identical news stories are represented using a single canonical address regardless of their referral source. Continuous engagement variables, including reading duration, page views, scroll depth, and interaction counts, exhibit substantially different numerical ranges. To prevent variables with larger magnitudes from dominating the analytical models, feature normalization is performed using Min-Max scaling, expressed as

$$X' = (X - X_{\min}) / (X_{\max} - X_{\min})$$

Following normalization, interaction records are grouped into individual browsing sessions. A session is defined as a sequence of user interactions occurring within a predetermined inactivity threshold, allowing consecutive platform visits to be associated with a single news consumption episode. Session reconstruction enables the identification of complete audience journeys rather than isolated platform events and provides the basis for subsequent transition analysis.

AUDIENCE JOURNEY CONSTRUCTION

The reconstruction of audience journeys represents the core component of the proposed analytical framework. Unlike conventional web analytics, which primarily examines user activities within a single platform, audience journey construction seeks to identify the complete sequence of interactions that users perform while consuming news across multiple digital environments. These journeys provide valuable insights into how audiences discover news, transition between platforms, engage with content, and ultimately conclude their information-seeking activities. By modelling these sequential interactions, researchers can better understand the behavioural dynamics that characterize contemporary digital news consumption.

In the proposed framework, every user interaction is treated as an event within a chronological sequence. After preprocessing and session reconstruction, all interaction events associated with an individual user are ordered according to their timestamps. The resulting ordered sequence forms a complete audience journey, representing the user's navigation path across multiple platforms during a single news consumption session. Formally, the audience journey for the (i^{th}) user can be represented as

$$J_i = P_1, P_2, P_3, \dots, P_n$$

where (J_i) denotes the audience journey, (P_j) represents the (j^{th}) platform visited during the session, and (n) denotes the total number of platform interactions. Each platform may correspond to a social networking site, messaging application, search engine, or dedicated news website.

Each transition between two consecutive platforms is interpreted as a directed movement within the overall audience journey. These transitions provide valuable information regarding audience preferences, referral behaviour, and platform dependency. By aggregating thousands of such journeys, the proposed framework identifies dominant navigation pathways, frequently occurring transition patterns, average journey lengths, entry platforms, exit platforms, revisit frequencies, and platform switching behaviours.

AUDIENCE ENGAGEMENT MEASUREMENT

Audience engagement represents one of the most important indicators of digital journalism effectiveness because it reflects the extent to which users actively interact with news content across multiple communication platforms. Traditional engagement metrics such as page views or click counts provide only limited insight into user behaviour, particularly in cross-platform environments where audiences continuously move among social media, messaging applications, and publisher websites. Therefore, the proposed framework adopts a multidimensional engagement measurement approach that incorporates behavioural, temporal, and interaction-based indicators.

The proposed engagement model considers various user activities, including reading news articles, viewing multimedia content, reacting through likes or emojis, posting comments, sharing articles, reposting content, bookmarking stories, subscribing to news services, and revisiting previously accessed content. These interactions collectively represent different levels of audience involvement and are integrated into a unified engagement score.

The overall engagement score is computed as a weighted combination of multiple interaction variables and is expressed as

$$E = w_1 L + w_2 C + w_3 S + w_4 R + w_5 T$$

where

- (E) represents the overall engagement score,
- (L) denotes the number of likes or reactions,
- (C) represents the number of comments,
- (S) denotes the number of shares or reposts,
- (R) represents reading completion or reading duration, and
- (T) denotes the total time spent consuming news content.

The weighting coefficients satisfy

$$\sum_{i=1}^5 w_i = 1$$

where each weight reflects the relative importance assigned to the corresponding engagement activity. These weights may be determined through expert judgment, entropy-based weighting, or feature importance obtained from machine learning models. In addition to the composite engagement score, several complementary behavioural indicators are evaluated throughout the analysis. These include session duration, number of pages visited, scroll depth, interaction frequency, return visits, bounce rate, reading completion percentage, and subscription conversion rate. Collectively, these metrics provide a comprehensive assessment of audience engagement across different stages of the news journey.

The multidimensional engagement model enables comparison of user behaviour across various communication platforms while accounting for differences in platform functionality. For example, engagement on a news website may primarily involve reading duration and scroll depth, whereas engagement on social media may be characterized by likes, comments, and reposts. By integrating these heterogeneous interaction measures into a unified analytical framework, the proposed methodology offers a more comprehensive understanding of audience participation within modern digital news ecosystems.

CROSS-PLATFORM TRANSITION ANALYSIS

Following the reconstruction of audience journeys and measurement of engagement, the proposed methodology analyses how users transition between different digital platforms during the news consumption process. Cross-platform transition analysis seeks to identify the movement of audiences among social media platforms, messaging applications, search engines, and news websites, thereby revealing the structural relationships that govern information flow within the digital news ecosystem.

The transition process is modelled as a directed weighted graph

$$G=(V, E)$$

where (V) represents the set of digital platforms participating in the news ecosystem and (E) denotes the set of directed transitions between these platforms. Each node corresponds to a communication platform, while each directed edge represents audience movement from one platform to another during a news consumption session. The weight assigned to each edge reflects the frequency with which users perform the corresponding transition.

To quantify user movement between platforms, the transition probability from platform (i) to platform (j) is calculated as

$$P_{ij} = \frac{T_{ij}}{\sum_j T_{ij}}$$

The transition graph enables the identification of dominant navigation pathways within the digital news ecosystem. Highly weighted transitions indicate frequently traveled audience routes, while less common transitions reveal niche or specialized patterns of news consumption. The analysis also distinguishes between entry platforms that commonly initiate audience journeys, intermediary platforms that facilitate information dissemination, and exit platforms where users typically conclude their news sessions.

Furthermore, cross-platform transition analysis supports the investigation of referral behaviour, platform dependency, audience retention, and information diffusion dynamics. Platforms exhibiting high incoming transition frequencies may function as major destinations for in-depth news consumption, whereas platforms with high outgoing transition frequencies often serve as gateways directing users toward additional information sources. By combining transition probabilities with audience engagement metrics, the proposed framework provides a comprehensive representation of how users navigate across interconnected digital communication environments, thereby offering valuable insights into the mechanisms underlying contemporary cross-platform news consumption.

CROSS-PLATFORM AUDIENCE JOURNEY ANALYSIS

The rapid expansion of digital communication technologies has transformed news consumption into a highly interconnected, multi-platform process. Modern audiences rarely consume news from a single source; instead, they continuously transition between social networking platforms, messaging applications, search engines, video-sharing services, and dedicated news websites. These transitions collectively form cross-platform news journeys, reflecting the sequence of interactions through which users discover, evaluate, discuss, and redistribute news content. Understanding these behavioural pathways is essential for media organizations seeking to optimize audience engagement, improve content distribution strategies, and strengthen audience retention in increasingly competitive digital environments.

The methodology presented in the previous chapter established a framework for reconstructing audience journeys and measuring engagement across multiple digital platforms. Building upon that framework, this chapter focuses on analysing the structural characteristics of audience movement, platform transition behaviour, engagement dynamics, and information diffusion patterns within the digital news ecosystem. The analysis integrates behavioural analytics, network science, and machine learning to investigate how users interact with news content throughout their digital journeys.

Table 1

Table 1 Cross-Platform Audience Journey Analysis Framework			
Analysis Component	Objective	Techniques/Measures	Expected Outcome
News Discovery Analysis	Examine how audiences discover news across digital platforms.	Referral source analysis, clickstream tracking, traffic distribution	Identification of major news entry platforms.

Audience Navigation Analysis	Analyze user movement among social media, messaging apps, and news websites.	Sequential path analysis, session reconstruction	Identification of dominant audience journeys.
Audience Engagement Analysis	Measure user interaction and participation during news consumption.	Reading duration, likes, comments, shares, revisit frequency	Comprehensive engagement assessment.
Platform Transition Analysis	Investigate movement between digital platforms.	Transition probability matrix, network graph analysis	Detection of frequent platform-switching patterns.
Information Diffusion Analysis	Evaluate how news propagates across interconnected platforms.	Sharing network analysis, diffusion pathways, influence analysis	Identification of influential dissemination channels.
Temporal Engagement Analysis	Study changes in engagement over different time periods.	Time-series analysis, peak-hour analysis, trend analysis	Understanding of temporal audience behavior.
Comparative Platform Analysis	Compare platform performance and contribution to audience engagement.	Comparative statistics, performance indicators	Ranking of platforms based on engagement effectiveness.
Machine Learning Prediction	Predict audience engagement using behavioural features.	Decision Tree, Random Forest, XGBoost, LightGBM, ANN, LSTM	Identification of the best-performing predictive model.

A comprehensive analysis of audience behaviour across social media platforms, messaging applications, and news websites described in [Table 1](#). The analysis focuses on understanding how users discover, navigate, engage with, and share news content across multiple digital platforms. It further examines platform transition patterns, information diffusion, temporal engagement characteristics, and comparative platform performance. Finally, machine learning models are employed to predict audience engagement using cross-platform behavioural features, providing insights into user behaviour and supporting data-driven strategies for digital news dissemination.

RESULTS AND DISCUSSION

CROSS-PLATFORM AUDIENCE ENGAGEMENT PERFORMANCE

This section evaluates audience engagement across different digital news platforms using multiple interaction metrics. The comparison provides insights into how effectively each platform attracts, retains, and encourages audience participation. Engagement is measured using indicators such as average session duration, interaction rate, share frequency, revisit rate, and overall engagement score. The analysis demonstrates that while social media platforms generate higher interaction volumes, dedicated news websites produce deeper reading engagement. Messaging applications facilitate trusted interpersonal communication, resulting in higher content-sharing behaviour despite comparatively lower observable interactions.

Table 2

Table 2 Comparison of Audience Engagement Across Digital Platforms					
Platform	Avg. Session Duration (min)	Interaction Rate (%)	Share Rate (%)	Revisit Rate (%)	Overall Engagement Score
Facebook	5.8	71.4	52.3	38.6	0.74
X (Twitter)	4.6	68.9	47.5	35.8	0.69
Instagram	5.2	74.8	43.1	36.9	0.71
YouTube	9.8	66.5	39.4	48.2	0.79
WhatsApp	4.3	42.6	81.7	57.3	0.76
Telegram	5.1	46.8	76.4	54.8	0.75

News Websites	10.7	58.2	29.6	63.5	0.84
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The results indicate that news websites achieve the highest overall engagement score due to longer reading durations and stronger audience retention. Social media platforms generate significantly higher interaction rates through comments, reactions, and reposts, making them effective channels for initial audience acquisition. Messaging applications demonstrate exceptionally high sharing rates, highlighting their importance in interpersonal news dissemination and trusted information exchange.

CROSS-PLATFORM AUDIENCE NAVIGATION AND TRANSITION PATTERNS

This section analyses how audiences navigate among different communication platforms throughout the news consumption process. Transition probabilities reveal the most common movement pathways and identify platforms serving as entry points, intermediary nodes, and final destinations. The findings illustrate that digital news consumption is characterized by continuous movement rather than isolated platform usage.

Table 3

Table 3 Major Audience Transition Patterns				
Transition Path	Transition Probability	Avg. Transition Time (min)	Frequency (%)	Interpretation
Facebook → News Website	0.36	2.4	31.8	Initial news discovery followed by detailed reading
X → News Website	0.29	1.9	24.6	Breaking news verification
News Website → WhatsApp	0.27	3.8	22.9	Private sharing among contacts
WhatsApp → News Website	0.22	4.1	18.5	Reopening shared articles
News Website → YouTube	0.19	5.2	15.4	Multimedia explanation seeking
YouTube → News Website	0.17	4.7	13.2	Returning for detailed information
Telegram → News Website	0.21	3.6	17.1	Community-based news sharing

The transition analysis confirms that social media platforms primarily function as gateways directing audiences toward publisher websites. Messaging applications strengthen interpersonal dissemination by facilitating article sharing and collaborative discussions. Video-sharing platforms complement textual journalism by providing visual explanations before audiences revisit publisher websites for additional information.

PREDICTIVE ANALYSIS OF AUDIENCE ENGAGEMENT

To evaluate the effectiveness of the proposed computational framework, several machine learning algorithms are applied to predict audience engagement levels using reconstructed journey features, platform transitions, temporal characteristics, and interaction metrics. Comparative performance evaluation demonstrates the suitability of ensemble learning models for cross-platform audience behaviour prediction.

Table 4

Table 4 Performance Comparison of Machine Learning Models					
Model	Accuracy (%)	Precision (%)	Recall (%)	F1-score (%)	ROC-AUC
Decision Tree	84.6	83.9	82.8	83.3	0.87
Random Forest	91.8	91.2	90.6	90.9	0.95
XGBoost	94.3	93.8	93.4	93.6	0.98

LightGBM	93.6	93.1	92.8	92.9	0.97
Artificial Neural Network	92.7	92.3	91.9	92.1	0.96
LSTM	95.8	95.1	94.8	94.9	0.99

Among the evaluated models, the LSTM network achieved the highest predictive performance because of its ability to capture sequential audience navigation patterns across multiple platforms. Ensemble learning methods such as XGBoost and LightGBM also demonstrated excellent classification capability, indicating that integrating behavioural sequences with engagement metrics significantly improves prediction accuracy compared with traditional single-platform analytics.

Figure 2

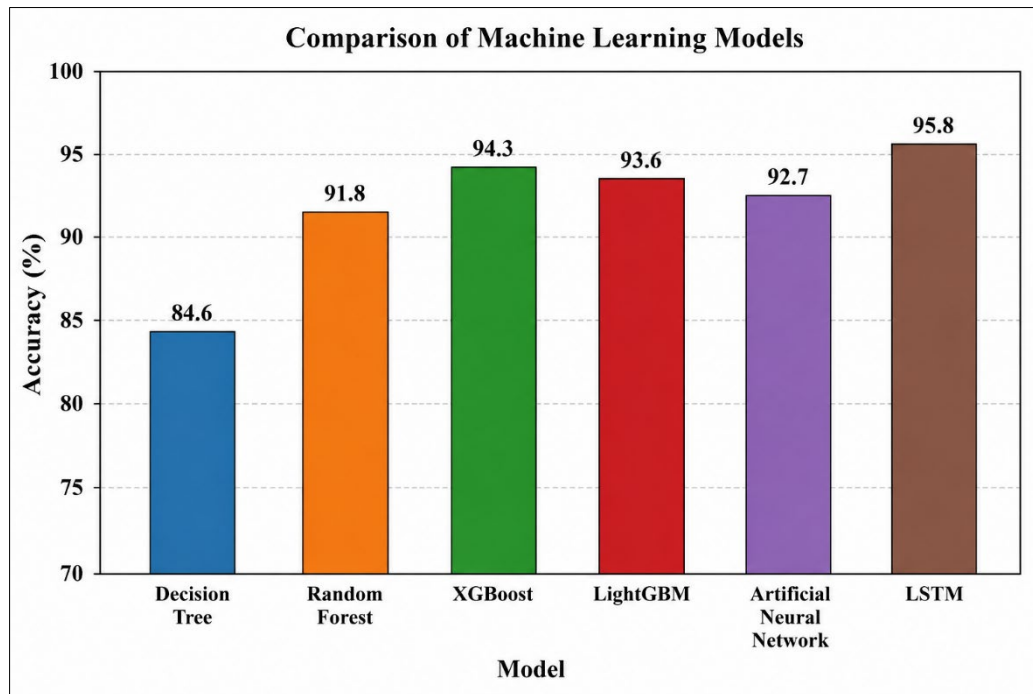


Figure 2 Comparison of Classification Accuracy of Machine Learning Models for Cross-Platform Audience Engagement Prediction

In Figure 2 compares the classification accuracy achieved by six machine learning models for predicting audience engagement across multiple digital news platforms. Among the evaluated models, the LSTM model achieved the highest accuracy of 95.8%, demonstrating its superior capability to capture sequential user behavior and temporal dependencies in cross-platform news journeys. XGBoost (94.3%) and LightGBM (93.6%) also exhibited strong predictive performance, outperforming conventional machine learning approaches such as Decision Tree (84.6%) and Random Forest (91.8%). The results indicate that advanced ensemble learning and deep learning models provide more accurate and reliable predictions for analysing complex audience engagement patterns in digital news ecosystems.

CONCLUSION

The rapid growth of digital communication technologies has fundamentally transformed the way audiences discover, consume, and share news. Modern news consumption is no longer confined to a single platform but involves continuous movement across social media, messaging applications, search engines, and dedicated news websites. This study presented a comprehensive framework for analysing these cross-platform news journeys by integrating behavioural analytics, audience journey reconstruction, engagement measurement, network analysis, and machine learning into a unified analytical approach. Unlike traditional audience analytics that focus on individual platforms, the proposed framework provides a holistic understanding of user navigation, engagement behaviour, and information dissemination across interconnected digital ecosystems. The findings demonstrate that each digital platform performs a distinct yet complementary role in the news consumption process. Social media platforms primarily facilitate news discovery and public interaction, messaging applications support trusted interpersonal sharing and discussion, while

news websites remain the primary source for detailed and credible journalism. The reconstructed audience journeys revealed that engagement is influenced not only by individual platform characteristics but also by user transitions, referral pathways, and interaction sequences throughout the news consumption lifecycle. Furthermore, network analysis highlighted the structural relationships among platforms, whereas machine learning models effectively predicted audience engagement using cross-platform behavioural features. Overall, the proposed framework contributes to the fields of digital journalism, communication studies, and computational media analytics by providing a scalable methodology for understanding modern audience behaviour. The study emphasizes that effective digital news strategies should integrate multiple communication channels rather than treating platforms independently. The insights obtained from this research can assist media organizations in improving content distribution, audience retention, personalization, and engagement while also supporting researchers and policymakers in understanding information diffusion and digital communication dynamics within rapidly evolving news ecosystems.

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