

From Immersion to Insularity: How Personalized Recommendations Shape User Behavior and Information Cocooning on Douyin

LiLinfang¹ & Balakrishnan, B.²

¹Department of Multimedia Creative, Faculty of Art, Sustainability and Industry Creative, Universiti Pendidikan Sultan Idris, Tanjong Malim, Perak, MALAYSIA

²Department Of Art and Design, Faculty of Art, Sustainability and Industry Creative, Universiti Pendidikan Sultan Idris, Tanjong Malim, Perak, MALAYSIA

*Corresponding Author: balab@fskik.upsi.edu.my

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Abstract: This paper examines the operational principles and socio-behavioral impacts of personalized recommendation systems on short video platforms, with a particular focus on their role in shaping immersive experiences and contributing to the formation of information cocoons. By leveraging algorithms such as collaborative filtering and deep learning, these systems continuously refine user profiles based on behavioral data, thereby reinforcing content preferences and narrowing information exposure. Drawing on immersion theory and filter bubble theory, this study analyzes how prolonged algorithm-driven engagement leads to unidirectional consumption patterns and diminished cognitive diversity. The article also highlights the risks associated with algorithmic feedback loops, such as attention fixation, preference solidification, and reduced motivation to seek alternative viewpoints. In response, it offers a series of recommendations aimed at users, platforms, and policymakers to promote information diversity, algorithmic transparency, and critical digital literacy. This qualitative analysis contributes to a deeper understanding of algorithmic influence in the contemporary media landscape and proposes pathways toward more balanced and inclusive content ecosystems.

Keywords: Personalised recommendation systems, algorithmic bias, user behavior, digital media governance

1. Introduction

The boom of short-video apps such as TikTok (Douyin) has reshaped everyday media use. These services personalise each feed by analysing a viewer's watch history, clicks and inferred tastes, creating an experience that feels "just for you". The goal is to maximise satisfaction and keep people on the platform. Yet as the matching process grows ever more precise, it can also narrow the pool of information a user sees, reinforcing cognitive biases and reducing exposure to diverse viewpoints (Pariser, 2011; Nguyen et al., 2014).

Younger audiences are especially susceptible. Surveys show that teens open TikTok habitually, spend more time on it than intended, and rarely venture beyond the familiar material served to them. Because the clips echo what they already like, opposing perspectives seldom appear, and a digital "bubble" forms in which alternative voices fade from sight (Sunstein, 2018). The design of these apps makes the pull even stronger. A never-ending stream of short, emotionally charged clips reinforced by likes, comments, and instant replies draws viewers into a flow state in which minutes pass unnoticed (Montag et al., 2021). Many users report that, after an extended scroll, they realise they have tuned out their surroundings, lost track of time, and been swept along by the feed. Immersion, while heightening enjoyment, also reshapes cognitive frames and behavioural expectations, leaving viewers more open to algorithmic steering.

This paper therefore examines how personalised recommendations, immersive design, and information-cocoon effects intersect. By mapping the psychological, technical, and cultural links among these factors, it shows how online settings channel user choice and filter the information that reaches them (Kitchens et al., 2020). The discussion also

considers what these dynamics mean for platform governance, everyday media habits, and public debate, and proposes practical steps toward a more diverse and balanced digital sphere.

2. Methodology

This study employed a quantitative research design, collecting data from 499 active Douyin users in China through an online survey. The questionnaire was adapted from established scales and tailored to the Douyin context, covering four dimensions: perceptions of personalised recommendations, immersive experience, unidimensional behaviour, and the information cocoon effect. All items were measured using a five-point Likert scale. Data were collected via the Wenjuanxing platform, ensuring anonymity and informed consent. Reliability and validity tests were conducted, followed by Structural Equation Modelling (SEM) and regression analysis to examine the relationships among personalised recommendations, immersion, and information cocooning.

3. Analysis and Result

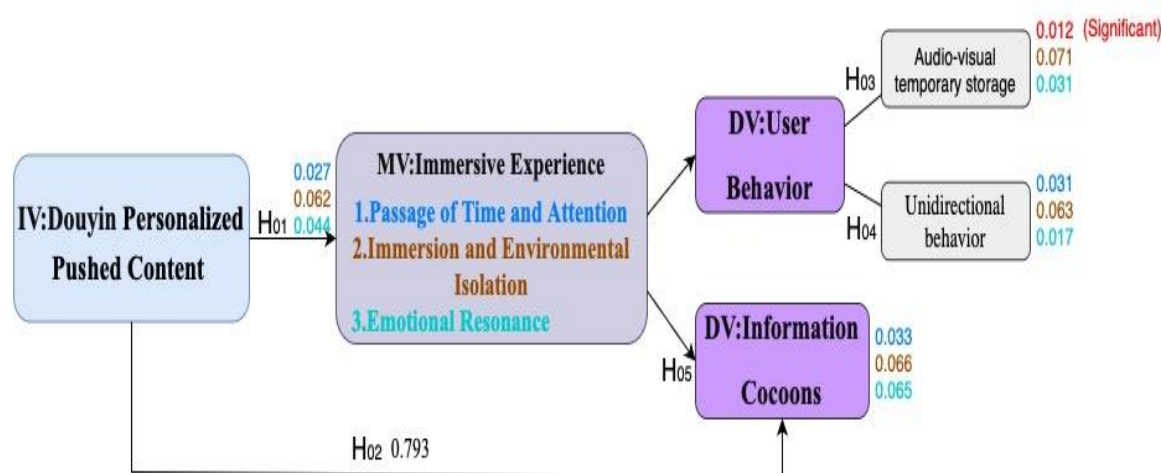


Figure 1. Variable regression analysis results

The findings of this study demonstrate that personalised recommendation content is significantly correlated with all three dimensions of immersive experience. Regression analysis further reveals that personalised recommendations exert the strongest influence on immersion and environmental isolation, followed by emotional resonance, while their impact on time perception and attention is comparatively weaker. In addition, personalised recommendations are found to have a strong and statistically significant positive correlation with the formation of information cocoons, confirming that algorithmic personalisation is a key driving force in the development of informational insularity.

Regarding user behavioural responses, the three dimensions of immersive experience all show statistically significant positive effects on audiovisual temporary storage behaviour. Among these, immersion and environmental isolation demonstrate the strongest predictive power, followed by emotional resonance. In contrast, the dimension of time perception and attention (MAM) is not significant in the regression model ($p = 0.15 > 0.05$), indicating that it does not effectively predict audiovisual storage when other conditions are controlled.

Finally, all three dimensions of immersive experience exert significant positive effects on the information cocoon. Immersion and environmental isolation again emerge as the strongest predictor, followed by emotional resonance, with time and attention showing the weakest effect. These results collectively suggest that personalised recommendations and immersive experience mechanisms are central drivers of information cocoon formation on Douyin.

4. Discussion

4.1 The Operational Logic and Impacts of Personalised Recommendation Systems

In the digital media landscape, personalised recommendation systems have emerged as the structural backbone of content delivery on platforms such as TikTok (Douyin), YouTube, and Netflix. These systems are not merely content curators; they function as attention architects, behavioural predictors, and, increasingly, ideological filters (Gillespie, 2014; Striphas, 2015). Their operational logic draws upon a combination of algorithmic principles, including collaborative filtering, content-based filtering, deep learning, and real-time behavioural feedback loops, all of which are integrated through complex data infrastructures (Jannach & Adomavicius, 2016).

At the core of most recommendation systems lies collaborative filtering, which suggests content to users based on the preferences of others with similar behaviour patterns. Collaborative filtering rests on the idea that viewers with comparable watching patterns are apt to enjoy the same material. While this approach quickly surfaces items of likely interest, it also amplifies mainstream content and sidelines niche or dissenting material (Nguyen et al., 2014). To offset

that bias, platforms often pair it with content-based techniques that examine the features of clips a user has already watched say, promoting additional lip-sync dance videos after the viewer engages with one.

Platforms now rely on deep-learning tools convolutional and recurrent neural networks among them to pick up subtle cues in user videos, from sound patterns and colour schemes to the tone of captions, and turn those cues into highly specific interest predictions (Naumov et al., 2019). The resulting data feed ever-richer user profiles that record age, gender, location, device, watch time, interaction history, and, in some cases, even micro-expressions captured by the front camera. Because these profiles update after every click, the system can guess not only what viewers want now but also what they will look for next. This technical sophistication, however, is inseparable from a central paradox: while personalised recommendations enhance perceived relevance and user satisfaction, they also constrain informational diversity. Recommendation algorithms create what scholars have termed “algorithmic feedback loops,” wherein users are repeatedly exposed to similar types of content, reinforcing their existing preferences and marginalising novel or oppositional viewpoints (Nguyen et al., 2014; Pariser, 2011). Because the system rewards metrics like watch time, likes, shares, and comments, posts that trigger strong emotional reactions climb to the top, crowding out more balanced or less familiar viewpoints (Kitchens et al., 2020).

This feedback mechanism has critical implications for user attention. Douyin’s interface is built to keep people watching: a single swipe brings the next clip, autoplay starts it instantly, and the scroll never ends. Paired with its recommendation engine, this smooth design nudges viewers to keep absorbing whatever appears instead of searching for something new. Each tap and pause updates the user’s profile, and the app answers by serving even more of the same, locking in habits of attention. This leads to preference entrenchment, a process whereby user tastes become more rigid and less exploratory over time. The data stream that powers these systems is far from neutral. Every time users click, pause, replay, or react, they supply new signals that fine-tune the algorithm. In that sense, people act not only as audiences but also as co-authors of the very logic that organises their feeds. This blurs the line between autonomy and automation: although users may believe they control what they see, their preferences are continually moulded and limited by the system responding to them. Scholars describe this dynamic as “algorithmic determinism,” warning that the apparent freedom of personalised feeds can mask deeper structures of influence (Evans & Stanovich, 2013).

The risks associated with such systems are especially pronounced in the context of youth and emerging digital citizens. Research shows that younger users, who often lack the media literacy to critically interrogate digital interfaces, are more vulnerable to attention capture, preference reinforcement, and behavioural modulation (Kitchens et al., 2020). Over time, the compound effect of algorithmic filtering may contribute to the formation of information cocoons, where users repeatedly consume homogeneous content, reducing their exposure to diverse cultural, ideological, or informational inputs (David & Cambre, 2016).

In summary, while personalised recommendation systems are technological achievements that enhance convenience and user satisfaction, they also pose structural risks to diversity, cognitive autonomy, and informational agency. These systems influence far more than the content that reaches a screen; they reshape how audiences interpret, feel about, and act on information. Meaningful critique of algorithmic media must therefore grapple with both their technical workings and their wider cultural effects.

4.2 Changes in how people use things and immersive experiences

In the world of short video platforms that use algorithms, immersion is not merely a mental side effect; it is a carefully intended goal. Platforms like TikTok (Douyin) have made immersive experiences a big part of keeping users interested by using personalised recommendation systems, audiovisual stimulation, and easy-to-use interfaces (Montag et al., 2021). This unique structure makes the app more fun and keeps people on it longer, but it also changes what they do, watch, and how they think about what they see. Immersion is when a person is so into an activity that they forget about the outside world and time. Short video platforms promote flow by giving users quick access to content, leveraging emotionally strong content, and keeping them engaged all the time. Usually, videos are short less than a minute and include catchy music, over-the-top facial expressions, and cultural references that make sense. The brain effortlessly assimilates all these elements due to their logical arrangement. This structure makes it easy for the mind to convert to a state of continual, frictionless attention, where the user stays mentally locked into the stream of content.

Immersion affects more than attention it reshapes how people experience time. Frequent TikTok users, for example, often say they lose track of how long they have been scrolling, a pattern researchers describe as “time displacement”. Unlike traditional media, where each article or film requires a conscious choice, short-video feeds reduce viewing to a single swipe. Because the stream offers no natural pause, viewers slip into “infinite-scroll inertia,” continuing well past the moment they meant to stop. This habit can disrupt daily routines and crowd out longer, more reflective forms of media use. Immersion also leaves a “sensory echo.” Song snippets, catchphrases, or gestures from short clips often resurface hours later, even offline. Experimental work on working-memory intrusion suggests this effect blurs the line between active focus and passive intake; fragments stored during viewing re-emerge as mimicry, repeated phrases, or the unintentional uptake of values embedded in popular videos.

One of the most remarkable things about immersive experiences is that they modify how we think about time. People who use these sites a lot often say they don't know how much time they spend on them. People call it “time displacement.” You have to make many choices when you watch traditional media, like which movie to watch or which

article to read. When watching brief videos, however, you only need to make one decision: to swipe. Experts call it "infinite-scroll inertia" when users feel trapped because the program doesn't have any natural places to stop. They keep scrolling even though they don't remember when they started or when to stop. This habit disrupts people's daily planning and replaces deep reading or thought with a constant stream of quick sensory inputs (Montag et al., 2021).

Another change in behaviour that arises when people watch or listen to media in an immersive fashion is the audiovisual retention effect, which is also known as "sensory echo." People often remark that they can't help but remember video music, phrases, gestures, or visual elements from short-form content, even when they're not on the site. Working-memory intrusion can help us figure out how immersive media makes it difficult to tell the difference between actively focusing and passively taking in information. People mimic viral gestures, recite catchphrases, or unintentionally adopt the attitudes displayed in the most watched clips. These little bits stay in your thoughts and can show up later in real life.

Furthermore, immersive experiences make people respond in a one-dimensional fashion, where they rely increasingly on passive reception instead of actively looking for information (Hertwig, 2021). People naturally seek things that are easy to comprehend and recognise. People are less likely to look for other points of view, question what they perceive, or dig further as that tendency grows stronger. The app then becomes its own closed space, driving away the more common ways people used to hunt for information.

These kinds of things have a wider impact on society as a whole. People prefer to watch the same kinds of clips, performers, and points of view since the app keeps them watching with intense feelings. Thereafter, algorithms make such links even stronger. Rather than engaging in conversation, users establish connections by viewing similar content, resulting in small groups of individuals who share similar perspectives and are connected by their shared interests rather than their shared language. The result is a form of digital tribalism, where people display their group identity through media rituals like liking, sharing, and commenting instead of having real conversations or debates. This form of behavioural convergence might bring groups closer, but it can also make them more divided and keep them from hearing other points of view.

Not only does immersion alter how individuals perceive objects, but it also alters their perceptions and assessments of the world. When short videos repeatedly address the same subjects, they frequently present complex social or political issues as simple parodies or brief emotional outbursts. This trend makes it tougher for people to think critically about things since it replaces analytical thinking with emotional resonance and performative responses (Hertwig, 2021). Immersive experiences impact not only how people act, but also how they think, learn, judge, and believe.

In conclusion, personalised suggestions that lead to immersive experiences have become a big part of how individuals behave online. It changes how people think about time, helps them recall things better, makes them more passive, and even changes how they form their identities and think. These modifications demonstrate that users are altering their modes of interaction with digital media, transitioning from individuals who actively seek information to those who are guided by algorithms in an immersive environment that is seamlessly constructed.

4.3 How information cocoons form and what they do to our brains

In 2006, Cass Sunstein came up with the concept of the "information cocoon", which outlines how individuals might become ensnared in a relatively consistent information environment by selecting what they see and employing algorithms to block out other information. People popularised this concept to describe the phenomenon. In this kind of setting, users are more likely to come across ideas, attitudes, and principles that support their own beliefs, while they are often shielded from varied or opposing arguments. On personalised content platforms like Douyin (TikTok China), this effect is amplified by immersive recommendation processes, which place a higher priority on user involvement than informational diversity (Kitchens, 2020; Cinelli et al., 2021).

The information cocoon phenomenon is primarily driven by this feedback loop between algorithmic prediction and user activity. People think that clicking, liking, sharing, and commenting are all signs of interest. As these behavioural signals build up, the recommendation engine learns to give its users material that is more and more in line with what they seem to like. By raising user engagement with comparable content, the system enhances its prediction model, thereby decreasing the scope of future recommendations. As a consequence, this process leads to a loop that reinforces itself: the likelihood of consumers coming across different points of view lowers as they consume more specific content. The term "filter bubble effect" is frequently used to describe this phenomenon (Pariser, 2011; Dubois & Blank, 2018).

The old gatekeeping models of information delivery are distinct from the algorithmic recommendation systems because the former are not visible to the user, the latter are subject to change, and the latter are individualised for each user. An unknown algorithm often selects the content shown to users. The cocoon effect is especially awful because you can't see it in the algorithm. Users don't consciously avoid different points of view; they merely never notice them in the first place (Helberger, Karppinen, & D'Acunto, 2020). In addition, platforms often suggest content that is highly contentious or emotionally charged, particularly if it aligns with the user's views. This procedure is done to maintain viewership and engagement (Cinelli et al., 2021; Lyu et al., 2024). This reduces the diversity of information and intensifies emotional polarisation.

One of the mental effects of being around information cocoons all the time is the false sense of agreement. Users who consistently observe similar opinions may develop the impression that these views are universally held (Tucker et

al., 2018). This illusion is made worse by the fact that social media platforms value affirmation (likes, shares, favourable remarks) more than contradiction. Epistemic closure occurs when users stop seeking or accepting competing explanations for the world's facts. Li and Wang (2023) say that this not only makes it harder to think critically, but it also encourages a weak type of digital tribalism, where users strongly identify with content communities and don't want to hear other points of view.

Desensitisation and habituation are two additional effects on the mind. When individuals are repeatedly presented with the same types of information, regardless of whether it is humorous, visually appealing, or ideological, they develop a diminished interest in novel and intricate subjects. It may be more challenging to comprehend subtle distinctions, evaluate facts, and navigate uncertainty as a result. The algorithm fundamentally reduces the world to a series of emotionally resonant fragments, while users progressively abandon the practice of posing challenging questions or examining broader contexts (Pennycook & Rand, 2021).

The information sanctuary also affects how users judge credibility. Content within the cocoon is not established as authoritative due to its empirical accuracy or source reliability but rather through algorithmic prominence and emotional resonance. Rather than the most verifiable, users begin to trust the most visible and engaging content. Because of this, there is a credibility inversion, where relatability and virality win out over truthfulness and balance. Long-term, this erosion of the epistemological foundations necessary for democratic discourse distorts users' standards for truth.

Information cocoons are a big danger to social cohesiveness and public debate when it comes to their effects on society. When a lot of people live in different informational settings that don't intersect, it becomes harder to find common ground (Tucker, 2018). This makes it harder for people to make decisions together, makes it more likely that they will misunderstand one another, and makes it more likely that they will have ideological disagreements (Cinelli et al., 2021). Also, in authoritarian or semi-authoritarian contexts, this type of algorithmic segmentation can be employed on purpose to divide those who disagree, distribute false information, and enhance the stories that are already out there (Bradshaw et al., 2021). This makes the information cocoon a tool for managing things online.

But it's important to realise that the algorithm isn't the only element that creates information cocoons. Users themselves show a psychological predisposition to prefer information that supports what they already believe (Hertwig, 2021; Pennycook & Rand, 2021). The combination of algorithm design and how people naturally think makes it easier for enclaves to form. To decrease the information cocoon effect, we need to do more than just repair the technical flaws. We also need to teach people and set norms.

Some possible solutions are algorithmic transparency, which means that platforms should show how recommendations are made diversity-by-design, which means that algorithms should sometimes show users different points of view and algorithmic literacy education, which helps users understand and deal with the curated nature of digital content (Tucker et al., 2018). If these kinds of things don't happen, the platforms' immersive and personalised experiences could come at the cost of freedom of thought and variety in society. In brief, information cocoons happen on short-video platforms because of how recommendation algorithms work, how users act while they are watching, and how our brains work. These cocoons impact how people see the truth, handle information, and interact with the world around them. We need to grasp how digital information ecosystems work and what they do to make them healthier.

4.4 Breaking Out of the Information Cocoon: Practical Strategies

With personalised feeds increasingly fencing users into narrow information zones, it is vital to develop remedies that work at several levels individual, platform, and policy. The aim is not only to broaden what people see but also to restore habits of critical, self-directed media use so that algorithm-driven ecosystems can coexist with cognitive diversity and an informed public.

4.4.1 Building Algorithm Awareness

The first step is to help users recognise how recommendation engines shape what appears on their screens. Unaware that past clicks and inferred preferences filter every clip, many people assume their feeds are neutral or exhaustive. Basic "algorithm literacy" delivered through school curricula, workplace training, or public campaigns can make a difference. Even a brief explanation of how recommendations are generated has been shown to prompt users to seek a wider range of sources.

4.4.2 Designing for Diversity

From the engineering side, "diversity-by-design" should be a guiding principle. Platforms can deliberately inject contrasting viewpoints, unfamiliar topics, or low-visibility creators into the feed, for example, with "counterpoint" tags or an optional "surprise me" button. Algorithms could also reward curiosity and novelty, not just watch time or likes, so users encounter fresh material without losing the sense that the feed still reflects their interests.

4.4.3 Platform Accountability and Openness

Service operators must accept that their recommendation logic shapes public discourse. Clear, public guidelines on how personalisation works, paired with user controls to reset or adjust interest profiles, are essential. External audits are

equally important in areas with high social stakes. Emerging “algorithm accountability” rules in several jurisdictions now require companies to evaluate and disclose the broader risks posed by automated systems (Yeung, 2018).

4.4.4 Policy Safeguards

Governments can set baseline rules for transparency, content variety, and data protection. In China, for instance, the Personal Information Protection Law and the forthcoming Regulations on Network Data Security Management lay out privacy and algorithmic-governance duties. Policymakers might also back publicly funded digital spaces dedicated to reliable, diverse information and support research and education to raise society-wide media literacy.

4.4.5 Re-establishing Critical Habits

Finally, breaking the cocoon requires personal effort. Users should verify sources, seek opposing views, and reflect on their scrolling routines. “Slow information” habits reading long-form journalism, pausing to consider a clip’s claims, or jotting down questions help counter the autopilot mode encouraged by endless scroll (Nielsen et al., 2020). Design tweaks can nudge reflection, too, with prompts such as “What’s a different angle on this story?” or “Who benefits from this message?”.

Combining transparent algorithms, diversity-first design, effective oversight, and strong critical skills can loosen the grip of personalised feeds. Only through cooperation among users, platforms, and regulators can we create a healthier, more open, and genuinely plural digital information space.

5. Conclusion

More advanced recommendation algorithms now influence both the information people see and how they think about it. This study explored how the design of these algorithms, the use of immersive short videos, and the creation of information cocoons are connected, showing that technical choices limit what users consider and change what media they consume. Personalized matching techniques collaborative filtering, deep-learning models, detailed user profiles excel at delivering highly tailored clips, yet they do so by filtering out unfamiliar viewpoints and reinforcing established preferences. In short-video environments, friction-free swiping, rapid content flow, and instant feedback intensify this tendency, encouraging quick gratification and discouraging active exploration. Over time, the result is a self-contained information sphere that can restrict public debate and weaken critical reflection.

To counter these effects, a multi-layered response is required. Key steps include promoting algorithmic literacy, embedding diversity targets into system design, subjecting recommendation engines to an external audit, and adopting policies that protect information pluralism. Equally vital is cultivating user habits of skepticism, slow reading, and cross-platform comparison. Personalized recommendations need not be discarded; instead, their purpose should be re-imagined. Shifting the goal from maximizing engagement to fostering informed, autonomous digital citizenship would allow recommendation systems to support rather than diminish the diversity, openness, and integrity of today’s information ecosystem.

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Conflict of Interest

The authors declare no conflicts of interest

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