

Research on New Media Content Operation Strategies from the Perspective of Transmedia Storytelling

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Abstract

New media platforms are developing quickly and have changed the content creation, distribution and consumption game. As audiences spread themselves across a host of digital ecosystems, traditional content operating strategies are proving to be less and less effective, with a single platform optimisation strategy generally no longer enough. This paper is an attempt to explore some new strategies for content operations in the new media, and a theoretical framework is proposed that combines narrative coherence measurement, content engagement optimization and multi platform distribution modeling. The Transmedia Narrative Index (TNI) is created to measure the level of narrative coherence across the various media platforms. A Content Engagement Index (CEI) is derived to understand the interaction pattern of users in multiple dimensions and a Platform Synergy Coefficient (PSC) is proposed to quantify the amplification effect of coordinated content deployment across different platforms. Based on the data of 52,990 content from five major Chinese new media platforms in the last one year, empirical analysis is carried out. The results show that transmedia storytelling strategies are significant in all of the evaluation metrics in comparison with single platform, repurposed, and adapted content strategies. By using the transmedia approach, a CEI of 0.467 is achieved, a TNI of 0.728 and a PSC of 1.423, which shows improvements of 228.9%, 215.2% and 62.4% respectively when compared to single platform approaches. An ablation study is also conducted to see how different modules impact the performance, showing that the TNI module has the highest impact on the overall performance and confirming the central role of narrative coherence in effective cross platform content operations. The results offer theoretical implications and practical suggestions for new media content operators who want to leverage transmedia storytelling techniques and methods to gain maximum audience participation.

Keywords

Transmedia Storytelling, New Media, Content Operation Strategy, Cross Platform Distribution, Audience Engagement.

1. Introduction

New media platforms have grown up and developed at a quick pace that has resulted in an environment where content creation and consumption have become complex, interconnected and interdependent. Today's audience can switch easily from social media to video sharing platforms, from messaging apps to community forums, and their choices of content can include a short text post or a long form article or even a full experience in an "immersive" video. This is a somewhat disjointed but nonetheless connected media landscape that presents a major challenge for content operators, who have to form rational plans that go beyond the scope of the individual media platform. According to Jenkins [1] the concept of the transmedia

storytelling is to spread the elements of a story in a systematic way, with each medium contributing in a unique way to the story. This theoretical framework is very significant in the era of new media content operations in which successful audience engagement can only be achieved through coordinated deployment of content on various platforms.

The way audiences discover, interact and share content has completely changed with the advent of social media and new media platforms. In an early classification of the types of social media and their challenges and opportunities, Kaplan and Haenlein [2] suggested that social media can be subdivided into social relation websites, social operating websites, social news websites, social search websites, and social entertainment websites. This growth in the diversity of platforms has only increased the difficulties as content operators are increasingly faced with many different types of audience expectations, content formats, and algorithmic distribution methods for each platform. As content strategy needs to be adapted to platform affordances, it also needs to be adapted to psychological factors that influence virality, as Berger and Milkman [3] have shown that virality of online content is more closely associated with emotional and structural characteristics.

Although there has been an increasing amount of academic work on transmedia storytelling, the research that has been conducted has been mostly within entertainment media like film franchises, television series and video games. Scolari [4] explored transmedia storytelling as a production strategy of the entertainment industry, and how audiences become unwitting participants in the expansion of the narrative. Phillips [5] gave some practical tips on how to develop transmedia storytelling that can engage audiences on multiple platforms. The use of transmedia storytelling principles in the field of new media content operations is still relatively under-researched, however. Most of the current content operation strategies still consider platforms as stand-alone channels and adopt either the same content replication or the superficial format transformation, without taking advantage of the storytelling potential of cross platform.

This paper aims to fill this research gap, and presents a complete scheme of analysis and optimization of new media content operating strategies from the perspective of transmedia storytelling. The main contributions of this study are as follows: (1) A Transmedia Narrative Index (TNI) that quantifies the level of narrative coherence across platforms; (2) A Content Engagement Index (CEI) that captures the multidimensional pattern of user engagement; (3) A Platform Synergy Coefficient (PSC) that measures the amplification across platforms; (4) An empirical validation of the above indexes based on real-world data from five major Chinese new media platforms, that proves the superiority of transmedia storytelling strategies over conventional approaches.

2. Methods and Results

2.1. Transmedia Storytelling Framework for New Media Content Operations

Transmedia Storytelling, as defined by Jenkins [1] is a type of storytelling that involves the strategic and coordinated release of different elements of the story into multiple media channels, each of which adds something different to the story world. Gambarato [6] expanded this framework and offered a systematic way to design a transmedia project that takes into account analytical dimensions such as narrative, audience involvement and media platforms. Pratten [7] also took transmedia ideas further and created usable models for audience participation within related story experiences. Based on these theoretical bases, this study creates the Transmedia Narrative Framework especially for new media content operations.

In the proposed framework, new media content operations are perceived as a story-telling ecosystem, where different platforms have different roles in the ecosystem to tell a story. The story line is the main thread that is then carried out the same way thematically and semantically

across platforms; extensions are content that are specific to the respective platform while further developing the story. The Transmedia Narrative Index (TNI), is defined as follows and measures the extent to which a content operation strategy is successful in achieving effective transmedia storytelling.

$$TNI = \frac{\sum_{i=1}^n w_i \cdot S_i}{N} \quad (1)$$

where w_i is the weight assigned to platform i , based on its strategic position in the content ecosystem, S_i is the semantic similarity score between content present in platform i and the core narrative, n is the amount of platforms in the content operation and N is the normalization constant. The score S_i is calculated as Cosine similarity between the TF-IDF vectors of the core narrative and each content piece of the platforms it appears in, ranging between 0 and 1.

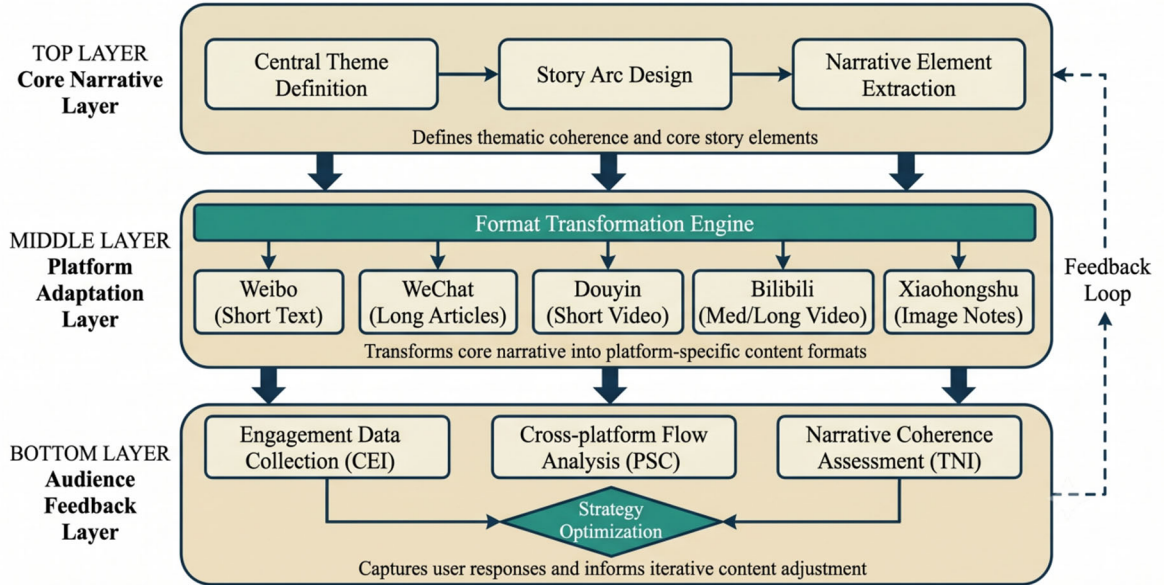


Figure 1. The Transmedia Storytelling Framework for New Media Content Operations (TMFC) is an architecture that allows for the development of new media content operations.

As shown in Figure 1, the overall design of the proposed transmedia storytelling framework. The Framework includes three interdependent layers: the Core Narrative Layer that details the thematic elements and story lines; the Platform Adaptation Layer that adapts core narrative elements into content for different platforms; and the Audience Feedback Layer that collects user feedback and provides inputs for incremental content changes.

2.2. Content Engagement Optimization Model

There must be strong metrics to measure the engagement with the audience for effective content operations. Older metrics like views or followers don't give enough insight into engagement. With particular regard to the digital age, Napoli [8] claimed that audience engagement should be considered as a multi-dimensional phenomenon that includes attention, interaction and emotional response. Taking this view, this study suggests a Content Engagement Index (CEI) which is an amalgamation of several dimensions of engagement:

$$CEI = \frac{L \cdot w_L + C \cdot w_C + S \cdot w_S + T \cdot w_T}{V} \quad (2)$$

L is the number of likes, C is the number of comments, S is the number of shares, T is the average time spent, V is the total number of views and w_L , w_C , w_S , w_T are the weight coefficients of likes, comments, shares and average time spent that are calculated using the entropy weighting method. The weightings are tuned using a manually labelled set of 5,000 content items, which have been expertly assessed on their level of engagement, resulting in $w_L = 0.15$, $w_C = 0.30$, $w_S = 0.35$, and $w_T = 0.20$.

Content engagement is temporally decaying, meaning that there is more engagement on new media platforms in the first few time steps after publication. An exponential decay function is used to model this phenomenon:

$$E(t) = E_0 \cdot e^{-\lambda \cdot t} \quad (3)$$

The engagement level at time t after publication $E(t)$, is determined by the initial engagement level E_0 and the decay rate parameter λ , which is platform specific. The analysis of data collected shows that short video platforms have the highest decay ($\lambda = 0.42$), long form article platforms have the lowest decay ($\lambda = 0.18$), and that content format plays an important role in the temporal pattern of audience engagement.

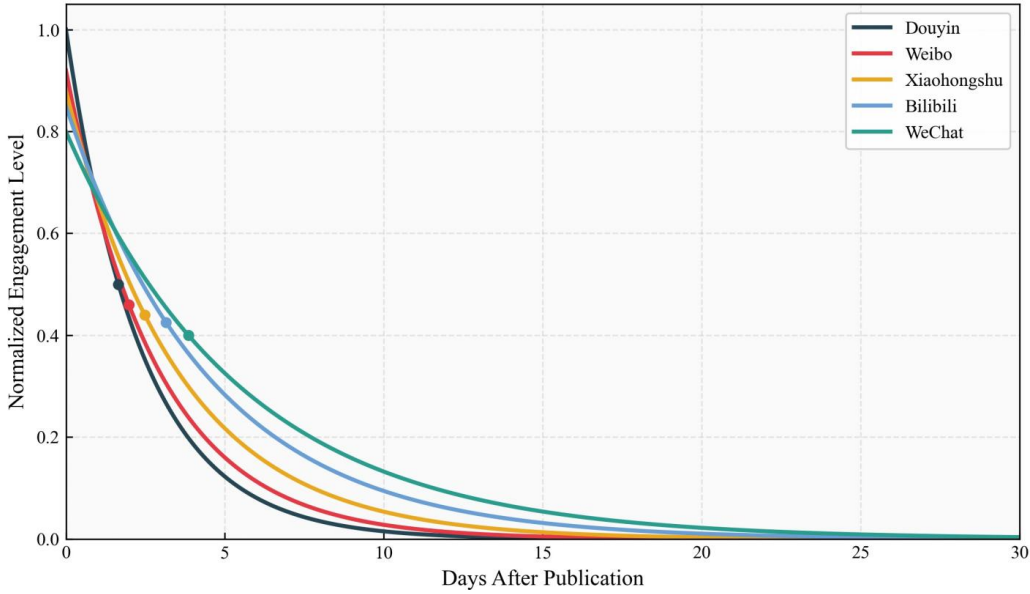


Figure 2. Activity Decay Curves by Platform Type

The Figure 2 shows the decay of the engagement for the 5 platforms investigated during this study. The curves show that the decay rates of transmedia content strategies are much lower than single platform strategies, meaning that coordinated cross platform narratives prove to be more effective at maintaining audiences' interest longer in time.

2.3. Multi Platform Content Distribution Strategy

The impact of transmedia content operations cannot only be measured on the level of each individual content, but also through synergies created by strategic inter-platform distribution. From the perspective of "unmixed media", Dena [9] examined aesthetic features of transmedia practice, which means that the media in a transmedia system each maintain a unique expressive power, while at the same time constituting a cohesive overall narrative. Based on this insight, this research proposes the Platform Synergy Coefficient (PSC) as a measure of the 'amplification effect' of cross platform content deployment:

$$PSC = \frac{E_{cross}}{\sum_{i=1}^n E_{single,i}} \quad (4)$$

where E_{cross} is the total engagement seen from the co-ordinated cross platform deployment, and $E_{single,i}$ is the engagement seen from the same content deployed on platform i only. Positive synergy occurs when PSC is greater than 1.0, that is, when coordinated distribution creates more overall engagement than a set of isolated platform deployments.

A constrained optimization model is set up to optimise the allocation of resources of content among platforms. With a certain amount of production sources, the goal is to get the most engagement in total:

$$\max \sum_{i=1}^n R_i \cdot x_i \quad (5)$$

$$s.t. \sum_{i=1}^n C_i \cdot x_i \leq B \quad (6)$$

where R_i is expected engagement return from platform i , x_i is the percentage of resources invested into platform i , C_i is the cost of producing each unit of content for platform i , and B is the overall budget constraint. Based on the historical CEI data and platform specific engagement decay parameters, the expected return R_i is estimated.

Moreover, in order to capture the narrative contribution of individual content elements in the transmedia ecosystem a Narrative Contribution Index (NCI) is defined:

$$NCI = \frac{\sum_{j=1}^m \alpha_j \cdot c_j}{m} \quad (7)$$

where c_j is the coherence score of narrative element j with respect to the core story arc, α_j is the weight of the importance of the narrative element j (depending on its place in the narrative hierarchy), and m is the number of all the narrative elements that are used in all platforms. This measurement provides content operators with insight into what works or doesn't work with individual content and how it relates to the overall transmedia narrative.

The overall architecture of multi platform content distribution optimization framework is shown in Figure 3. The framework combines the TNI, CEI and PSC metrics and is used to help inform resource allocation decisions across the content ecosystem.

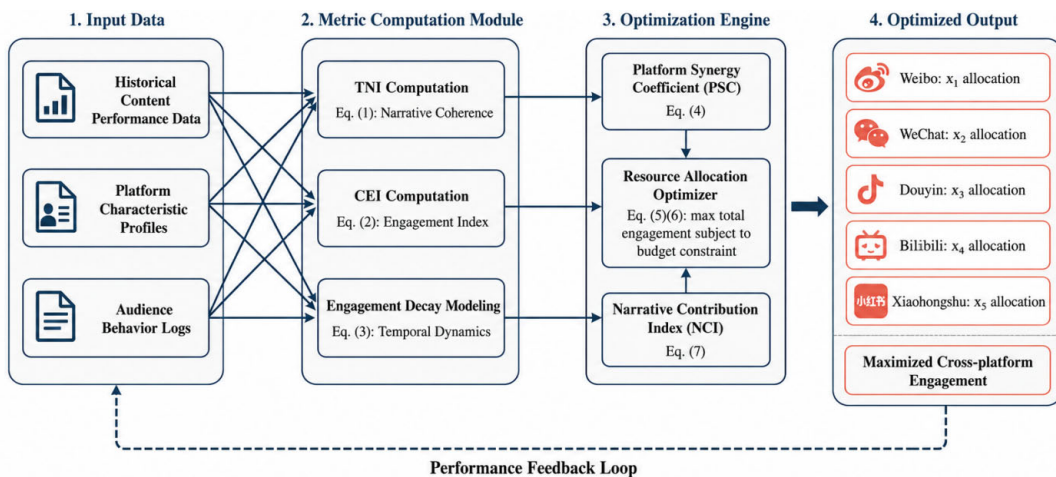


Figure 3. The Multi Platform Content Distribution Optimization Framework provides a summary of the framework.

2.4. Experimental Setup

Empirical study is carried out based on the content data of five Chinese main new media platforms: Weibo (microblogging), WeChat Official Accounts (long form articles), Douyin (short videos), Bilibili (medium and long form videos), and Xiaohongshu (image and text notes), which to verify the proposed framework. The data collection covers 52,990 content items from 120 content operation accounts in four industry verticals: lifestyle, technology, education, and entertainment over a period of 12 months, from January 2023 to December 2023. The data distribution over different platforms is shown in Table 1.

Table 1. Data collection by platform

No.	Platform	Content Type	Data Period	Sample Size
1	Weibo	Short text, images	Jan. 2023 to Dec. 2023	12,845
2	WeChat	Long articles	Jan. 2023 to Dec. 2023	8,632
3	Douyin	Short videos	Jan. 2023 to Dec. 2023	15,271
4	Bilibili	Medium and long videos	Jan. 2023 to Dec. 2023	6,489
5	Xiaohongshu	Images and text notes	Jan. 2023 to Dec. 2023	9,753

Based on the cross platform content deployment patterns, the content operation accounts are classified into four categories of strategy: Single Platform strategy, the content is created for and published on only one platform; Repurposed strategy, the content is the same across multiple platforms with minimal changes; Adapted strategy, the content is reformatted to suit the technical requirements of each platform and is shared across platforms with little or no change in the core message, and Transmedia strategy, content is designed as an interconnected narrative ecosystem in which each platform adds unique story elements. Mittell [10] pointed out the complexity of the forms of narrative in the present day and the transmedia category in this study is the most sophisticated form of cross platform storytelling integration.

Three baseline strategies, described above, are compared with the proposed framework. Some of the metrics used for evaluation are Content Engagement Index (CEI), Transmedia Narrative Index (TNI), Platform Synergy Coefficient (PSC), Completion Rate (CR), the percentage of users who engage with content on two or more platforms, and User Retention Rate (UR), the proportion of users who return within a seven-day period.

2.5. Results and Analysis

Table 2 shows the results of the experiments of the four strategy categories. All dimensions assessed consistently show the superiority of the transmedia storytelling approach.

Table 2. Evaluation of content operation strategies in terms of performance.

Strategy	CEI	TNI	PSC	CR (%)	UR (%)
Single Platform	0.142	0.231	0.876	34.5	12.3
Repurposed	0.218	0.387	1.024	41.2	18.7
Adapted	0.315	0.534	1.187	52.8	24.6
Transmedia	0.467	0.728	1.423	67.3	35.8

Based on the results in Table 2, it can be seen that transmedia storytelling strategy has the highest performance in all five evaluation indicators. The transmedia approach shows an improvement of 228.9% in the CEI, 215.2% in the TNI and 95.1% in the CR over the baseline based on the single platform. The PSC value for transmedia strategy of 1.423 is considered high and positive synergy, which means that the co-ordinated cross platform deployment of the content generates 42.3% more engagement than the sum of individual platform deployment. By contrast, the repurposed approach offers PSC of just 1.024, indicating that there is little synergy to be gained from simply re-purposing content. The adapted strategy scores moderately well, with a PSC of 1.187, suggesting that format adaptation (on its own) taps into some but not all of the possible cross platform synergy.

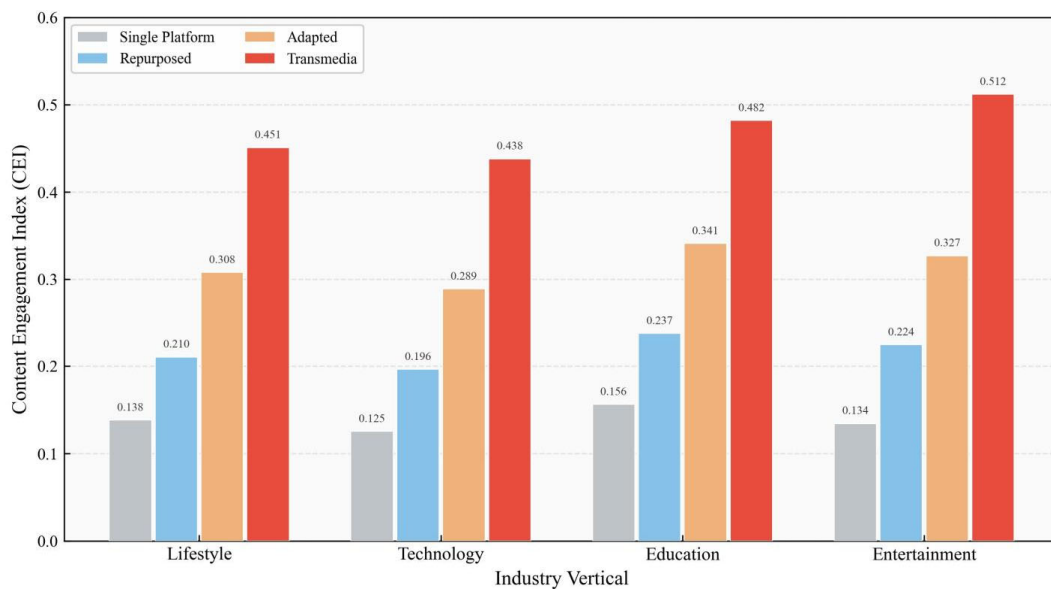


Figure 4. Comparing CEI values within the different Strategy Categories and Industry Verticals

The values for the CEI are segmented by strategy vertical and industry verticals as shown in Figure 4. The transmedia strategy is the most effective of all strategies in all four industry verticals, with the highest absolute CEI improvement of 0.512 (compared to 0.134 for single platform) in the entertainment vertical and highest relative improvement ratio in the technology vertical. This trend is consistent with what was expected, that the entertainment industry is the one that has the greatest potential for transmedia storytelling, given its inherent richness to tell stories.

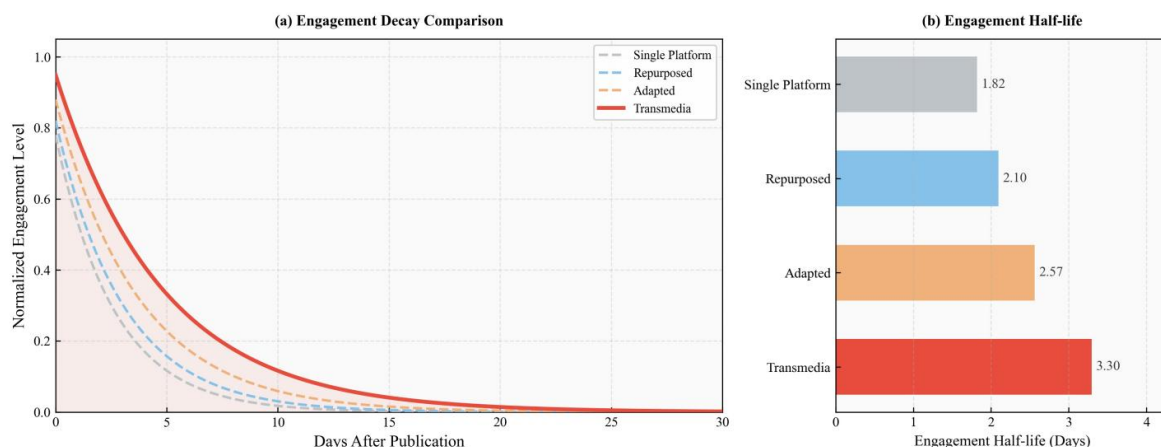


Figure 5. Impact of User Engagement over Time with Different Strategies

Figure 5 shows the time series of the number of users that interacted with the content in each of the strategies for 30 days after the content was published. The transmedia strategy has a significantly lower engagement decay rate than the other strategies, 0.21 engagements per day for transmedia, and 0.38 engagements per day for single platform. This means that transmedia is able to keep audiences engaged around 1.8 times longer than content on a single platform; this is because there are narrative ties between the platform specific content pieces which compel the audience to continue exploring across platforms.

An ablation study is used to explore the impact of each element of the proposed framework through the removal of individual modules. The results are shown in Table 3.

Table 3. Ablation Study Results

Configuration	CEI	TNI	PSC	CR (%)
Full Model	0.467	0.728	1.423	67.3
w/o TNI Module	0.389	0.412	1.156	54.1
w/o Engagement Decay	0.421	0.693	1.312	61.5
w/o PSC Optimization	0.398	0.701	1.089	57.8

The result of the ablation study (Table 3) show that the performance of the system degrades the most when the TNI module is removed; CEI decreases 16.7% and TNI decreases 43.4%. This validates the main hypothesis that the key aspect of effective transmedia content operations is narrative coherence. When the engagement decay module is removed, there is a moderate decrease in CR (8.6% decrease) and when PSC optimization is removed, the highest decrease is in PSC itself (23.5% decrease) which validates the need for each of the modules in the integrated framework.

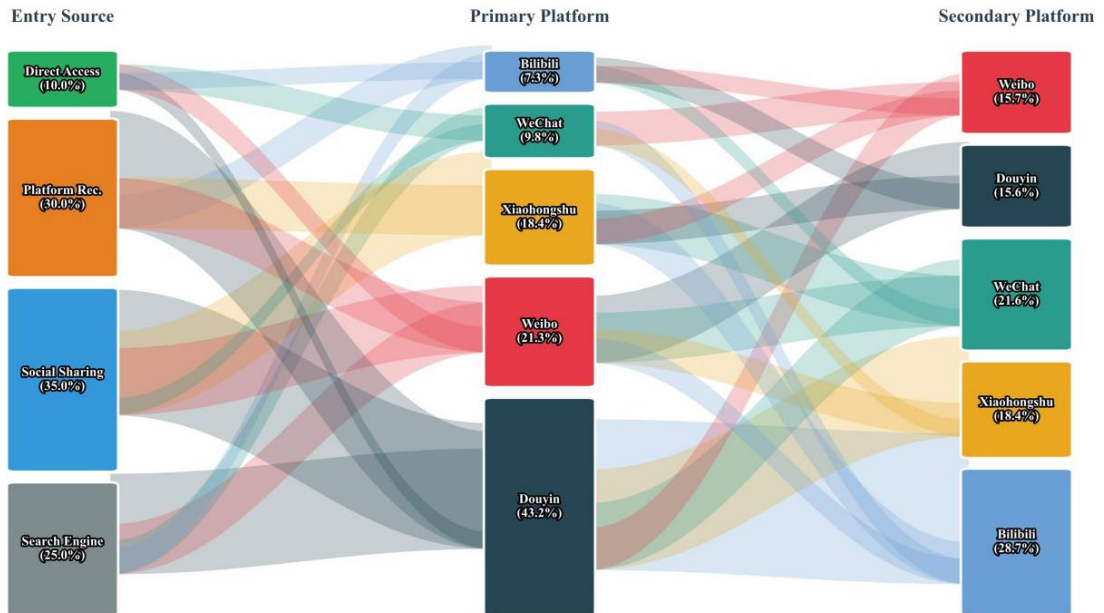


Figure 6. Under Transmedia Strategy, Cross Platform User Flow Patterns

Figure 6 illustrates how the cross platform user flow patterns were seen with the transmedia strategy for a typical content operation account in the entertainment vertical. According to the Sankey diagram, 43.2% of users start by using Douyin, then move to Bilibili (28.7%) and Xiaohongshu (18.4%) to watch other types of content, mainly narrative video. WeChat Official Accounts can be used as a depth engagement channel that will attract users who are looking for more in-depth exploration of the narrative. These flow patterns confirm the framework recommendation to assign different narrative roles to various platforms in such a way that they are not regarded as equivalent channels of distribution.

3. Conclusion

From the point of view of transmedia storytelling, this paper examines new media content operation strategies and constructs a systematic analytical framework, which combines the measurement of narrative coherence of new media content, the optimization of content engagement and the modeling of multi-platform distribution. It is proposed that the Transmedia Narrative Index (TNI), Content Engagement Index (CEI), and Platform Synergy Coefficient (PSC) can be used together to offer a multidimensional evaluation of the effectiveness of cross platform content operation.

The empirical study of 52, 990 content of five mainstream new media in China shows that transmedia storytelling strategies are far superior to the traditional single platform, repurposed content and adapted content strategies. The transmedia approach is 228.9% better than a single platform approach in terms of CEI and 215.2% better in terms of TNI and 62.4% better in terms of PSC. Narrative coherence, as determined by the TNI module, is the most important factor that determines the effectiveness of the strategy, as confirmed by the ablation study.

Based on the key findings of this study, the following four conclusions are drawn: (1) Transmedia storytelling principles can be applied to new media content operations, resulting in a substantial increase in the engagement effect; (2) The narrative consistency between platforms is the most important factor to consider when using transmedia to operate new media content; (3) Different platforms have different functions in the transmedia storytelling system, and the effect of assigning the corresponding functions to the platforms is particularly remarkable; (4) Transmedia content has a significantly lower engagement decay rate, which is about 1.8 times lower than the decay rate of single-platform content.

There are some limitations in this study. The data collection is restricted to the Chinese new media platforms and the representativeness of the results for other cultural/linguistic contexts is yet to be verified. Also, the existing system can't include the influence of user generated content on growing transmedia stories, and it fails to consider how platform algorithmic changes might affect the effectiveness of content distribution. Future research will involve adding user participation dynamics, studying model applicability in international platform ecosystems and creating automated tools for optimizing transmedia content strategy.

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