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Short-Form Videos for Public Library Marketing: Performance Analytics of Douyin in China

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Abstract: Short-form video platforms have become an important marketing channel for library resources and services. However, such promotions' actual performance is not as good as expected. This research examined the performance of library marketing on the dominant short-form video platform in China, Douyin (aka TikTok worldwide), with social media analytics, including topic and correlation analysis. Results indicated that the number of fans of an account is positively correlated with the number of likes ($p < 0.001$) and independent of the number of videos ($p > 0.05$). Libraries post videos most often on the topic of "Reading Promotion"(31%), but the marketing performance on this topic is average (Mean DMI = 90.27). The most popular topics for patrons are "Hot Topics" and "Knowledge Quiz" (Mean DMI = 207.00). Using short-form videos for library marketing is a new practice, and scant studies have evaluated such performance, especially in Asia. Our results strengthen library practitioners' awareness and reflections on conducting new media services and short-form video promotion, especially for the newer generation.

Keywords: short-form videos; public libraries; social media; Douyin; marketing; outreach

1. Introduction

Librarians are constantly discovering and exploring platforms to build connections with their patrons. Libraries have been extending their service fronts from offline venues to online websites, Facebook, Twitter, Instagram, and WeChat. However, the social media landscape is constantly changing. Many libraries have recently adopted Douyin (aka TikTok worldwide) to capture the attention of patrons to increase circulation, reader engagement, database use, and social impact. Milwaukee Public Library (@milwaukeepubliclibrary) on TikTok has garnered more than 3 million likes and 93,100 followers in six months, which has sparked massive interest in the global library industry. Its staff commented on this TikTok account, "we had a higher engagement with patrons, some of the items we were featuring had more circulation, and we had increases in database usage" [1].

What is Douyin, and why does it perform so well? Douyin, known in the international market as TikTok, is a short-form music video platform owned by the Chinese tech giant ByteDance. It mainly hosts music videos of up to 60 s, primarily user-generated rather than professionally generated content [2]. Douyin has become a media giant with a massive user base. The 49th statistical report on China's Internet development, released on 25 February 2022, predicted the number of short-form music video users in China to reach 934 million by December 2021 [3]. Douyin has been the leading short-form video platform for the fourth consecutive year, accounting for 87.9% of overall short-form video users [4]. In the international market, TikTok reached the 1 billion monthly active users milestone in September 2021, more quickly than several of its rivals, including Facebook and Instagram [5]. Douyin provides a better platform for libraries to provide services suitable for short-form video presentations rather than text-based and long-form video-based social

media. Douyin's content recommendation mechanism allows the content of the library to reach potential users who are interested in it.

However, as an emerging social media platform, many libraries cannot use Douyin accounts effectively to promote resources and services information to users. There is a distinct lack of available public library channels on Douyin. As of 1 April 2022, only 91 of the 3196 public libraries had created official Douyin accounts [6]. Except for the Jiangxi Provincial Library, which has 420,000 followers, few libraries have exceeded 100,000 followers. Unfortunately, these videos' likes, comments, and shares are fewer than other public cultural accounts, such as museums [7].

Thus, this research analyzes the success of popular short-form videos and high-fan channels of public libraries in Mainland China on Douyin. The following research questions (RQs) guide this study:

RQ1. *What are the characteristics of Douyin usage in public libraries in Mainland China?*

RQ2. *What is the marketing performance of Mainland public libraries' Douyin channels and their short-form videos?*

RQ3. *What topic categories of short-form videos lead to high marketing efficiency?*

2. Literature Review

2.1. Douyin and Library Marketing

Kotler and Zaltman [8] established the notion of non-profit marketing for the first time. They define marketing in non-profit organizations as a "social and managerial process by which individuals and organizations obtain what they require and desire by creating, offering, and exchanging value-added products and services". Since then, the concept of marketing has also evolved in the library sector. However, Renborg [9] pointed out that "library marketing has been around for a long time" because the idea of improving the relationship between libraries and their readers originates in 1876 [10].

From the 1970s onwards, libraries began to support the idea of marketing and consider it a tool to accomplish the library's overall objectives. From the mid-1970s onwards, library marketing-related research also grew [11]. In 1998, IFLA established the Management and Marketing Committee, which introduced the concept of "marketing" to the library community [12]. This marketing concept was further applied to the library field to keep users and interested parties informed of collections, services, and events relevant to their needs and preferences [13]. Thus, this research defines Douyin marketing for libraries as using Douyin as a media platform to link library products and services to patrons and potential users.

2.2. Douyin in Libraries Context

Current research on Douyin in the library field tends to separate public and academic libraries because of the differences in their objectives and service subjects. For public libraries, studies mainly focus on operating short-form video accounts in libraries [14]. Early TikTok video contents include brief event promotions and snapshots of the libraries and collections [15]. Librarians utilizing TikTok recognize its creative social media nature for interacting with the newer generation frustrated with Facebook, Instagram, and Twitter [16]. There is relatively little research on how public libraries use TikTok and more research on how public libraries use Douyin.

Shan et al. [17] studied the Zhejiang Library Douyin for reading promotion and suggested that library short video operations should have a clear positioning, a professional team, an emphasis on content quality, an understanding of the platform algorithm, and active message interaction. Based on the Technology Acceptance Model (TAM), Rong [18] proposes a Douyin strategy to identify patrons' needs, cultivate their interests, and drive their attention to practice. Tai [19] used data envelopment analysis (DEA) to evaluate the operational efficiency of provincial public libraries' Douyin, with operation days, numbers of dynamics and replies as input index, and numbers of followers, likes, forwarding, and

comments as output index. Wang et al. [20] constructed an evaluation model of public library short video dissemination capability by combining the entropy weighting method to determine the index weights around the four aspects of users, network, video, and communication characteristics of Douyin accounts.

For academic libraries, TikTok can help strengthen the relationship between libraries and academic departments [16]. Librarians already use TikTok to disseminate videos to recommend their favorite books [21]. For example, Nicholls Library has employed the application to promote its facilities at the university, and the TikTok account @nichollslibrary is essential to the library's marketing identity [22]. Some libraries already have active interaction and followers on their TikTok accounts [23]. As a new user engagement platform, librarians inevitably consider its security, privacy, and safety. A library media specialist at the Great Valley High School opined that TikTok is as safe and secure as any other social media app [24]. Based on the SOR framework, Hu [25] proposed influencing factors of short video users' continuous attention intention in university libraries, and used structural equation analysis and fuzzy set qualitative comparison analysis to conduct empirical analysis. That study found that communication interaction, content quality, social environment, and perceived trust constitute the influencing factors of the continuous attention intention of short video users in university libraries.

2.3. DMI

Research about Douyin's real-time data generally relies on third-party data platforms. Liu et al. [26] use the FeiGua Data Analysis System to obtain new increments, new likes, new comments, new shares, new fans, total fans, and total likes of videos during the research period. Some studies [26–28] have used the Douyin Communication Index (DCI) released by the QingBo Big Data Platform to evaluate the communication influence of Douyin accounts in public libraries. DCI quantifies communication performance through three dimensions: posting index, interaction index, and coverage index. These studies also adopted the Douyin Marketing Index (DMI) calculation formula from Newrank to determine the effectiveness of music videos in public library marketing on Douyin.

Newrank [29] is a professional data value assessment organization with academic and technical support from the School of Journalism of Fudan University. Newrank offers minute-by-minute monitoring, periodic data comparison techniques, and a constantly optimized algorithmic formula to generate an open and transparent NewRank Index. Metrics about the spread of Douyin accounts and videos primarily revolve around the number of followers and entries on the channels and the number of likes, comments, and favorites on the videos. Its variables have good explanatory power and are available publicly. The formula and explanation of the variables are as follows:

Douyin Marketing Index (DMI) = 0.5 × Popularity Score + 0.5 × Posts Score

Popularity score = [ln (number of followers + 1)/ln (theoretical maximum number of followers)] × 1000

Work score = (0.4 × [ln (follower increment + 1)/ln (follower increment theoretical maximum)] + 0.3 × [ln (share count + 1)/ln(share count theoretical maximum)] + 0.2× [ln(comment count +1)/ln(comment count theoretical maximum)] + 0.1 × [ln(like count +1)/ln(like count theoretical maximum)]) × 1000

- "Number of followers" means the number of followers of the Douyin account at the time of the statistical cut-off in the evaluation period.
- "Follower increment" means the increase in the number of followers that Douyin counts at the time of the statistic cut-off in the statistic cycle compared to the same moment in the previous cycle.
- "Number of shares" means the sum of the number of shares received by all the posts posted by this Douyin account during the evaluation period.
- "Number of comments" is the total number of comments received for all the posts on Douyin in the evaluation period.

- "Likes" refers to the sum of the number of likes received by all the posts on Douyin in the evaluation period.
- "Number of posts" refers to those posted on Douyin in the evaluation period.

2.4. Research Gap

Many studies on library marketing have investigated short-form videos, but they have mainly focused on Instagram [30–32] instead of Douyin. A few recent positional reports pointed out the feasibility of using TikTok for library marketing in the Western world [16,22]. Libraries can benefit from using TikTok to market their services, facilities, and spaces [33]. TikTok can enhance library resource usage [21] and improve library reader advisory programs [34]. Librarians also use Douyin for library marketing, and some studies use empirical methods to examine the effectiveness and strategies from an operational or behavioral perspective. As Douyin is a short-form video platform with primarily user-generated content rather than professionally generated content, it is more inclusive of the creative style and video form [2]. Despite random shots or unedited cuts, a video with a popular topic and content can get massive likes. Thus, identifying what kind of video topics are more popular with patrons is crucial for libraries to develop Douyin marketing. Some studies believe that the topic of the short-form video is the key to influencing marketing and have used some criteria to classify topic categories, as shown in Table 1. As these classifications are summarized from a general scope, it is necessary to refine the classification further to provide a more practical reference.

Some studies focused on short-form videos, arguing that the primary means of library marketing lies in videos. Bai and Guo [35] investigated the posting content, interaction effects, and characteristics of libraries' Douyin accounts regarding library operations. Shen [36] used content analysis to study the content characteristics of the popular videos posted by library Douyin accounts. The research results show that videos with detailed titles, topic guides, and subtitles are more likely to become popular. Additionally, short videos featuring celebrities are popular, and short videos with strong emotions are easier to gain user recognition. However, these studies were published in Chinese, and few related studies are in English. As Garoufallou et al. [37] suggest that as libraries in different countries and regions have different social contexts and cultures, there is a need for more regionalized case studies. To fill the research gap, this study focuses on the Douyin platform to examine the correlation between the categories of short-form video topics and the marketing performance of public libraries with social media analytics.

Table 1. Selected literature about video topic classification criteria.

Reference	Topic Classification Criteria
[38]	The content and dynamic information of the library's Douyin posts are categorized into news and announcements, recommendations of library resources, and promotion of brand activities.
[39]	The content of short-form videos of university libraries can be divided into image promotion, activity promotion, quality education, social hotspots, resource recommendation, usage strategy, and service notices.
[40]	Social network services promote library collections, including knowledge sharing, information dissemination, communication, and knowledge gathering.
[41]	Public libraries use Douyin for marketing, involving four categories of content, sharing knowledge, reading promotion, functional promotion, and cultural activities.
[42]	The original content focusing on the marketing of knowledge services includes seven primary areas: subject services, reading promotion, promotion of knowledge services activities, knowledge services resources, literacy education, space services, and IT equipment services.
[43]	Provincial public library short-form video services can be divided into five categories, including library work, event promotion, book recommendations, hot topics, and others.

3. Methodology

The focus of library media marketing is not to create video pop-ups that users watch once and forget but to consistently link users and readers [44]. Therefore, besides videos, this research examines the entire Douyin channel for these public libraries. This paper first investigates the use of Douyin by public libraries, then analyses the types of video content posted by public libraries, evaluates their marketing performance with the help of DMI, and finally determines the video topics suitable for posting on Douyin and the correlation between a high-fan account and its videos' likes and entries. In response to the research questions, this research uses a data analytics approach, as shown in Table 2. Quantitative methods capture relationships between content types of music videos and marketing efficiency and trends among channel followership, video likes, and entries [45], while qualitative research captures the characteristics of these libraries on Douyin as shown by the account to gain unexpected information [46].

Table 2. Research design.

Research Question	Research Method	Sample Selection	Data Collection	Data Analysis
(RQ1) What are the characteristics of Douyin usage by public libraries in mainland China?	Qualitative Analysis	Douyin accounts for 21 provincial, municipal, and autonomous libraries in mainland China Data (short-form videos and DMI) in April 2022	Online observation	Web content analysis
(RQ2) What is the marketing performance of Mainland public libraries' Douyin channels and their short-form videos?	Quantitative Analysis			DMI Partial correlation Analysis
(RQ3) What topic categories of short-form videos lead to high marketing efficiency?				Kruskal–Wallis test

This research investigated the characteristics of Douyin use and marketing performance of provincial public libraries in China through online observation and web content analysis, comprising the following six steps.

1. Identify the official Douyin accounts of the public libraries.
2. Search the Douyin app to collect data (names, number of followers, number of posts, and number of likes/favorites/retweets of videos) for 26 library accounts.
3. Obtain DMI values for these accounts through the NewRank platform.
4. Classify the videos by topic categories.
5. Analyze the relationship between content types and marketing performance.
6. Analyze the relationship channel between followership, video likes, and entries.

Table 3 shows the 26 provincial libraries included in this research. Five libraries were excluded from this study when comparing marketing performance between libraries because they did not release videos during the investigation period, and their marketing performance could not be adequately assessed.

- Following the notion of Douyin marketing for libraries in this study and the video topic classification criteria in Table 1, we manually classified the video topics posted during the evaluation period into five broad categories, as shown in Table 4. As this research focuses on which video topics achieve better marketing results, the five broad categories are further broken down into 18 sub-categories to show the topic categories in more detail.

Table 3. General information of Douyin account of 26 public libraries (as of 5 May 2022).

Name (Douyin Account in Chinese)	Fans	Likes	Videos	Created Date
Anhui Provincial Library (安徽省图书馆)	3682	4256	139	5/25/2020
Capital Library (首都图书馆)	11,396	43,098	33	4/22/2019
Chongqing Library (重庆图书馆)	21,575	149,337	290	4/16/2019
Fujian Provincial Library (福建省图书馆)	633	1570	40	2/5/2020
Gansu Provincial Library (甘肃省图书馆)	566	576	32	3/24/2021
Guangdong Zhongshan Library (广东省立中山图书馆)	255,766	2,727,922	650	7/26/2019
Guizhou Provincial Library (贵州省图书馆)	1425	2205	40	4/23/2020
Hebei Provincial Library (河北省图书馆)	3286	5062	184	4/22/2019
Heilongjiang Provincial Library (黑龙江省图书馆)	568	987	50	4/22/2020
Hubei Provincial Library (湖北省图书馆)	18,025	73,137	362	4/22/2019
Hunan Provincial Library (湖南图书馆)	3274	10,732	227	9/14/2018
Inner Mongolia Autonomous Region Library (内蒙古自治区图书馆)	189	160	14	4/22/2019
Jiangxi Provincial Library (江西省图书馆)	408,987	8,944,984	150	12/18/2019
Jilin Provincial Library (吉林省图书馆)	7659	240,623	506	8/14/2019
Liaoning Provincial Library (辽宁省图书馆)	1453	3022	160	4/21/2020
Ningxia Hui Autonomous Region Library (宁夏回族自治区图书馆)	364	286	33	11/16/2020
Qingchun Lutu (青春鲁图)	3499	25,111	320	8/3/2018
Qinghai Provincial Library (青海省图书馆)	5937	4635	149	5/21/2019
Shaanxi Provincial Library (陕西省图书馆)	15,045	330,126	617	4/22/2019
Shanghai Library (上海图书馆)	38,316	88,253	950	4/22/2019
Shanxi Provincial Library (山西省图书馆)	1184	1081	36	4/24/2020
Sichuan Provincial Library (四川省图书馆)	3593	46,097	192	9/19/2019
Tibet Autonomous Region Library (西藏自治区图书馆)	320	457	22	4/22/2021
Xinjiang Library (新疆图书馆)	1499	2651	81	8/3/2019
Yunnan Provincial Library (云南省图书馆)	1809	4733	153	5/9/2020
Zhejiang Library (浙江图书馆)	272,338	3,345,245	178	12/13/2019

Table 4. Eighteen categories of video topics.

Code	Topic Categories	Sample References
C1	**Library Affairs**	
S1	Announcements	Notice the requirement to provide proof of a negative COVID-19 test within 48 h for admission to the library
S2	Daily News	A day in the life of a librarian in the Department of Local Literature
S3	Recruitment Information	Applications are being accepted for the Lakeland career examinations
S4	Policies	What should I do if my book loan is overdue?
S5	Library Promotion	A letter to readers from Guangdong Zhongshan Library (Librarians lead you around the library)
C2	**Event Promotion**	
S6	Reading Promotion	4.23 World Book Day, reading lets us meet the most romantic things
S7	Exhibition Promotion	Chivalry and the Heart of Writing—An Exhibition of Jin Yong's Martial Arts Classics, enjoy listening to resources, a punch card area, and an interactive area
C3	**Knowledge Sharing**	
S8	Article Sharing	Green Grass Storytelling Salon, Issue 53: The Story of the Fox
S9	Book recommendation	Librarians' recommendations, introductory history books to get to know
S10	Documentaries	Jiangxi Intangible Cultural Heritage—Documentary on Zhangshu Pharmaceutical
S11	General Knowledge	How did ancient food compare to modern times?

Table 4. *Cont.*

Code	Topic Categories	Sample References
S12	Cultural and Historical Knowledge	A look at the love tokens in the Book of Songs
S13	Knowledge Quiz	[Challenge Friday] Tweet your friends to increase your knowledge!
C4	**Current Affairs**	
S14	Today's Topics	What are your reading habits?
S15	Traditional Festivals	Remembering loved ones at Qingming Festival
S16	Today in History	Every year on April 1, the number "81192" hits the screen. On April 1, 2001, a US reconnaissance aircraft violated our airspace in the South China Sea.
S17	Hot Topics	Recently, the MBTI personality test has become popular on the Internet, and even Gu Ailing said in an interview that she was an "introverted" INTJ.
S18	Special Events during the Epidemic	Famous Erhu player Ma Xiaohui's original Erhu poem "To the Spring Light in D Major" to cheer for Shanghai.

Data Analysis

This study used IBM SPSS Statistics 27 to conduct descriptive and inferential statistics on the data from the short-form video accounts of the 26 public libraries. Descriptive statistics use tabulations, classifications, graphs, and the calculation of generalized data to characterize data [47]. This research started with descriptive statistics to count the number of followers and posts of each library's account posted to reveal their basic promotion characteristics.

Next, we applied correlation analysis to study the correlation between random variables by examining whether there is some dependence between phenomena and exploring the direction and degree of correlation for specific dependent phenomena [48]. Because the data distribution (Table 5) does not satisfy the normal distribution ($p < 0.001$), a multiple independent samples non-parametric test, the Kruskal–Wallis test, was used to determine the possible significant differences between DMI and topic categories. Further, partial correlation measures the strength and direction of a linear relationship between two continuous variables while controlling for the effect of one or more continuous variables [49]. This research used partial correlation analysis to determine the correlation between an account's number of followers, posts, and likes.

Table 5. Data distribution of DMI and content topic code.

	Test of Normality					
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
DMI	0.277	225	<0.001	0.824	225	<0.001
	a. Lilliefors Significance Correction					

4. Results

Table 3 also shows the general information of the 26 library accounts, including the number of followers, date of creation, number of entries, and number of likes received since its creation. The Jiangxi Library has the most followers and likes but is just average regarding the number of posts. The Shanghai Library has the most posts, with videos updated almost daily. Most libraries launched their Douyin accounts in 2019 and 2020.

Table 6 shows the distribution of video topic categories during the evaluation period. "Knowledge Sharing" is the predominant video topic category, followed by "Event Promotion" following closely behind, with "Current Affairs" being the last. The topic categories appeared far more frequently in "Reading Promotion (S6)" and "Book recommendation

(S9)" and least frequently in "Policies (S4)". Compared to the Guangdong Zhongshan Library, which covered ten video types, Qingchun Lutu, the Capital Library, the Xinjiang Library, and the Tibet Autonomous Region Library only covered one category, including "Announcements (S1)," "Reading Promotion (S6)", "Reading Promotion (S6)", "Reading Promotion (S6)".

Table 6. Topic categorization of video from April 2022.

Topic Categories		No. of Posts	Percentage	
C1	S1	13	6%	
	S2	9	4%	
	S3	3	1%	18%
	S4	1	0%	
	S5	14	6%	
C2	S6	69	31%	33%
	S7	6	3%	
C3	S8	2	1%	
	S9	50	22%	
	S10	4	2%	37%
	S11	7	3%	
	S12	17	8%	
	S13	3	1%	
C4	S14	4	2%	
	S15	3	1%	
	S16	5	2%	12%
	S17	7	3%	
	S18	8	4%	
	Total	225	100%	

Based on the categories reported in Table 3, Figure 1 shows the breakdown of video topics in each provincial library.

The Kruskal–Wallis H test was utilized in this study to assess the difference in median change in marketing performance (as reflected through DMI values) across the 18 video categories. The results of the Kruskal–Wallis test (Table 7) showed a significant relationship between video categories and DMI (H (17) = 58.664, $p < 0.001$). Furthermore, the results show that the best-performing marketing genres were the "Hot Topics (S17)" and "Knowledge Quiz (S13)", and the worst was the "Today's Topics (S14)" category.

Next, we used partial correlation analyses (Table 8) to determine the correlation between the number of fans, posts, and likes of these libraries' accounts. With the number of likes as the control variable, there was no significant correlation between the number of fans and posts ($p > 0.05$). In contrast, with the number of posts as the control variable, results indicated a significant correlation between the number of fans and the number of likes ($p < 0.001$) and a positive correlation.

Table 7. Kruskal–Wallis Test results for video categories and DMI.

Post Categories		N	Mean Rank	Kruskal–Wallis H	df	Asymp. Sig.
DMI				58.664	17	<0.001
C1	S1	13	95.88			
	S2	9	101.28			
	S3	3	177.33			
	S4	1	184.00			
	S5	14	121.71			
C2	S6	69	90.27			
	S7	6	108.33			

Table 7. *Cont.*

	Post Categories	N	Mean Rank	Kruskal–Wallis H	df	Asymp. Sig.
C3	S8	2	96.00			
	S9	50	105.22			
	S10	4	117.75			
	S11	7	101.86			
	S12	17	181.41			
	S13	3	207.00			
C4	S14	4	68.50			
	S15	3	92.00			
	S16	5	114.30			
	S17	7	207.00			
	S18	8	132.00			
	Total	225				
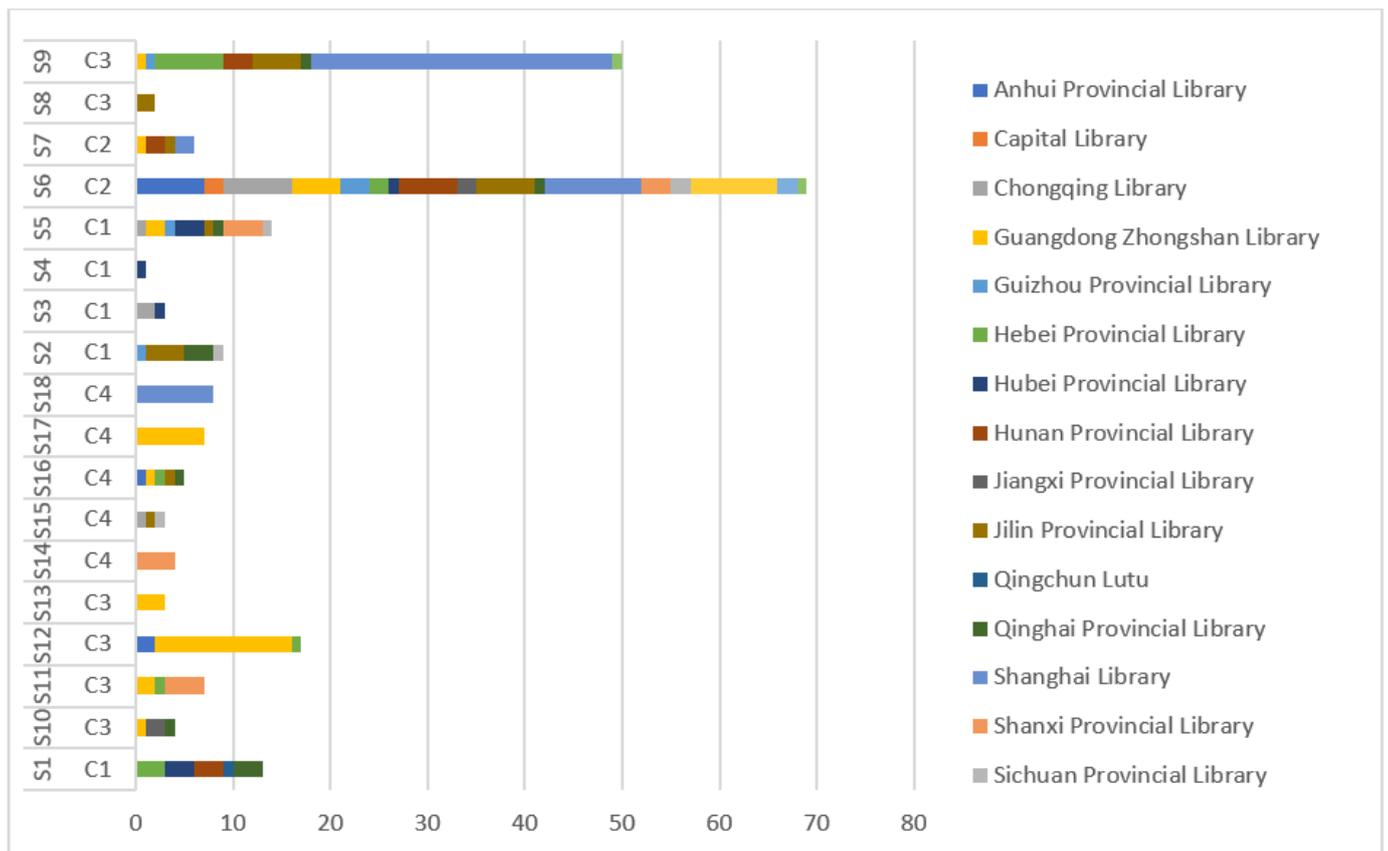
Figure 1. Breakdown of video topics in each public library.

Table 8. Partial correlation analysis of the number of fans, posts, and likes (as of 5 May 2022).

Correlations				Total fans
Control Variables				Total fans
No. of likes	No. of posts	Correlation		0.39
		Significance (2-tailed)		0.054
		df		23
Control Variables				Total fans
No. of posts	No. of likes	Correlation		0.957
		Significance (2-tailed)		0.000
		df		23

5. Discussion

5.1. Characteristics of Douyin Usage by Public Libraries in China (RQ1)

As of 5 May 2022, China's 26 provincial public libraries have 1,082,388 followers, 5608 videos posted, and 160,563,446 likes received on the Douyin platform. The highest number of fans on a single channel is 408,987, the highest number of videos is 950, and the highest number of likes is 894,984. The overall performance of public library channels was fair, but there were wide disparities between provincial accounts.

Concerning video topics, Douyin can share information and promotions just like Facebook and Twitter [50], which is consistent with the results of "Knowledge Sharing" being the most frequently posted type of video topic and "Reading Promotion" the second. However, our findings differ from Joo et al. [51] in that the most common topic category posted on Facebook was announcements of upcoming library events in their research about US public libraries. Another study on NYC public libraries' Tweets found that the top three topic categories were announcement, recommendation, and information sharing [52]. Facebook and Twitter often serve to post passive announcements, while Douyin tends to deliver more active promotion videos, which may be related to their attributes [53]. In addition, Douyin has a search engine function like Facebook [54], so patrons can actively retrieve the information they need rather than just passively receiving short-form videos.

The total number of appearances of these two video topic categories, "Reading Promotion (S6)" and "Book Recommendation (S9)," far exceeds the number of other categories of content combined, which confirms the conclusion that Douyin is a tool for public libraries to provide online services and resources to the public. Additionally, this aligns with recent findings that patrons receive Instagram promotions well [31,32]. Notably, during the lockdown of the COVID-19 pandemic [32], more patrons tended to use mobile Internet to access library services. Douyin and other short-form videos are low-cost and unrestricted by space and time, facilitating the public to access library services because these promotions can provide related content and links [55].

Libraries vary in their choice of content topic categories within their accounts, with some tending to create an account with wide content varieties, while others focus on similar content categories to produce thematic video series. This research also revealed some public libraries' accounts with little work and few followers.

5.2. Marketing Performance of Mainland Public Libraries on Douyin Channels (RQ2)

Our findings indicated a positive correlation between the number of fans and the number of likes but no significant correlation between the number of fans and posts. For example, Jiangxi libraries have the highest number of fans and likes, but the number of posts is average. Jilin Library has 90,000 more likes than Chongqing Library but has 10,000 fewer followers than Chongqing Library. The high number of likes for Jilin Library is just due to more videos posted. Although the total number of likes for Jilin Library is higher than that of Chongqing Library, the average number of likes for its videos is lower than that of Chongqing Library.

Thus, the effectiveness of new media promotion is closely related to the quality of the promoted content and whether patrons are interested in them [55]. It is more effective to produce quality videos popular with users than to rely on the number of videos to accumulate likes. Data from another library support this view. The Shanghai Library produces videos at the rate of one per day, eight times that of the Jiangxi Library, but receives only nine one-thousandths of the likes and nine percent of the followers of the Jiangxi Library. Therefore, a better strategy for libraries is to post high-quality videos that are more popular with patrons to achieve good marketing results [55].

Notably, there is still much room for progress in short-form videos for libraries. The overall Douyin marketing performance of mainland public libraries was low. The highest DMI of 626 for the Guangdong Provincial Library compares favorably to other cultural and educational accounts, with a DMI of up to 900 [29].

5.3. Topic Categories of Short-Form Videos Lead to High Marketing Efficiency (RQ3)

The best-performing marketing genres were "Hot Topics (S17)". By taking advantage of trends, such as social and current trends, popular films and TV shows, and the effect of celebrities, librarians can find the current trends to create Douyin posts, which can enhance their communication power [56]. The Milwaukee Public Library TikTok account (@milwaukeepubliclibrary), which has already amassed more than 1 million likes and about 50,000 followers in six months, emphasizes the strategy to reimagine TikTok trends to promote the library and its resources [57]. Moreover, under COVID-19, the Jiangxi Provincial Library released a short-form video titled "Jiangxi lost, Nanchang lost, God bless China, God bless Jiangxi", which has received positive interaction from fans, with 185,000 likes, 27,000 retweets, and 134 comments.

Highly interactive "Knowledge Quiz (S13)" videos also achieved good marketing performance, in line with previous research findings [2] that show that such videos usually receive more comments, thus increasing the spread of the video. The more frequently users interact with videos posted by the library, the more the Douyin content algorithm assumes users like the content and push more videos from that library. This feedback and push mechanism is similar to that of Facebook and Twitter [58].

The worst-performing marketing genre was "Today's Topics (S14)". Fun and usefulness are the key strategies for user attraction [59], and such videos are rare. The results are similar to previous studies on using Facebook and Instagram by university libraries, in which users accepted the use of Facebook and Instagram but wanted them to change their uninteresting style for the posts [31]. Libraries can change their stereotypical image as serious, boring, and unapproachable institutions by introducing their services in a more innovative, relaxed, and fun way to bring the public closer to the library [60]. For example, the Jiangxi Library released a popular video about library robots "fighting" in 2020 which received 2.14 million likes (https://v.douyin.com/jcqRWmy/ accessed on 1 June 2022), with one comment saying, "I want to go to the library immediately to see these two robots; it's so cute". Short-form videos of 15 to 60 s on Douyin differ from those on YouTube, which is more suitable for posting popular "breaking news" in less than a minute. At the same time, YouTube is more suitable for long instructional videos [58].

5.4. Recommendations on Douyin Short-Form Videos for Public Libraries

Practitioners in public libraries may consider strengthening their awareness of new media services, recognizing the importance of short-form video platforms such as Douyin, and actively constructing short-form video platforms in libraries [31,32]. This research offers some suggestions on positioning short-form video accounts in terms of video topics, working teams, and operational planning.

This research found that short-form videos closely following Douyin's trends can gain more traffic and thus achieve better marketing results. Librarians can adopt a Douyin trend by connecting it to library services, online resources, and staff. Thus, librarians should brush up on their videos and keep up with Douyin trends to recreate trendy videos from popular accounts with a library twist [61]. From long-term operation perspectives, public libraries can accumulate two aspects of the topic categories: trend topics relevant to trends to attract users and general affairs topics to address business needs and patrons' problems.

Behind a great video, there are also many contributors in various functions. Derek Reilly and Fawn Siemsen-Fuchs are the two managerial masterminds behind the account The Milwaukee Public Library TikTok (@milwaukeepubliclibrary). Still, there are also 68 enthusiastic staffers helping out by starring in the videos [57]. Libraries can emphasize training short-form video talents and establishing professional teams for promotion by recruiting professionals specializing in short-form video editing, filming, publishing, and operations management. At the same time, libraries can develop relevant management systems and incentive mechanisms to include the management of short-form video accounts in their assessment and performance rewards, arouse the enthusiasm of short-form video staff, and uphold the positive development of the channels [32].

This research found that many library accounts have the problem of irregular update frequency. Sometimes the posts reach several updates per day, but sometimes even less than once per month. This situation can easily lead to a decline in followers [14]. Therefore, a stable update frequency is required to attract fans' attention and enhance user stickiness [22]. In terms of platform functionality, the advantages of Douyin's social attributes rely on audiences' frequent interaction with one another on the platform to maintain user stickiness and increase account activity. Libraries can also use the live-streaming function of the Douyin platform, such as opening live Q&A sessions with experts, lecture forums with experts and scholars, and live streaming of library collections, with timely interaction with fans through messages [62]. A clever strategy implemented by Nicholls Library is creating live content through Instagram or Facebook, then reposting the videos to TikTok [22].

Due to differences in collection size, local traditions, library missions, and service targets, librarians can utilize their resource advantages to create specialized and distinctive video content relevant to the local context [33]. For example, during the 7th Shaanxi Reading Culture Festival, the Shaanxi Library Service Alliance launched a province-wide "Library Shake It Up" short-form video campaign, with the organizer's new media operations team responsible for reviewing all video entries [63]. Selected works were posted on the official Shake It Up channel, and the best ones were rewarded. As a result, librarians plan online and offline activities to let more users understand, participate in, and enjoy library short-form video accounts.

6. Conclusions

As the new generation of library users is currently fascinated by social media, libraries need to market themselves and reach out to these users innovatively to share information, resources, and services continuously. Douyin/TikTok continues to grow in use and popularity as a platform for sharing video content on a global scale, with a variety of individuals participating regardless of age, geographic area, or occupation. Librarians should also embed themselves in the platforms where their users are.

This research has used a data analytics approach to examine public libraries' use of Douyin and explore the relationship between short-form video topic categories and their marketing performance. Based on the findings, this research has suggested some recommendations for managing short-form video platform accounts to expand and improve the dissemination of library resources and services to the public.

This research used DMI as a quantitative basis for assessing the marketing performance of the library's Douyin account and explored what categories of topics in short-form videos create better account reach by examining the posting of videos on the channel. Our results indicated that libraries post videos on "Reading Promotion" most often, but the marketing performance on this topic is average. The most popular topics for patrons are "Hot Topics" and "Knowledge Quiz", which emphasize the importance of keeping up with trends on the Douyin platform and increasing user interactions. In addition, due to the positive correlation between the number of fans and the number of likes, making videos that users like effectively increases the attention on their channels.

There are some limitations to this research. NewRank can monitor the real-time incremental likes/favorites/retweets of short-form videos to provide accurate data. However, considering that some library accounts may have inconsistent content and frequency of monthly updates, follow-up studies could expand the sample length and longitudinal studies. Further content and sentiment analysis on user comments can help understand users' preferences and feedback.

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