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Study on the Value of Long-Tail Information in Internet News Dissemination

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Abstract: *The concept of long-tail distribution in statistics and commercial sales is applied to the analysis of the dissemination value of reader comment information in Internet news dissemination, and the long-tail distribution phenomenon of reader comment information is proposed. Through the statistics and analysis of reader comments on 5 news stories, it is shown that readers' comments increase the content of news information, forming two interrelated and distinct components: news body and value-added information. The opinions expressed in the reader comment area are caused and generated by news information, but they go beyond the scope of news information itself, and obviously expand the meaning of news information transmission in terms of connotation. The "1+N" information generation mode and the value of big data public opinion observation in the long-tail distribution area are summarized.*
Keywords: *Internet News, Reader Comments, Long-tail Distribution, Information Value-added, Public Opinion Observation.*

1. Introduction

The concept of long tail distribution is mainly used in statistics and commercial sales. It means that in the company's product configuration, best-selling products and non-best-selling products have equally important sales value and can bring a lot of profits to the company. The concept of long tail distribution was proposed by Chris Anderson in 2004. He believed that products with low demand or low sales volume can jointly constitute market share and match or exceed the relatively few current best-selling products. The long tail is a business strategy that allows companies to achieve considerable profits by selling a small number of hard-to-find goods to many customers, rather than just selling a large number of popular goods in small quantities. In applied research, researchers generally use the concept of "long tail users", put "long tail users" and "head users" on a par, and study "long tail users".

Figure 1

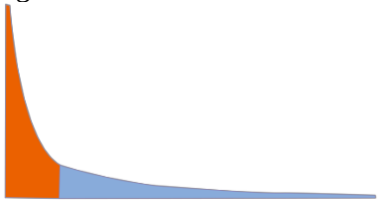

Figure 1 Schematic diagram of long-tail distribution The yellow part is the main part, representing a small number of products with large sales; the gray part represents the majority of products with small sales and low attention; the gray part is the "long tail" part。

2. Research Background

Currently, researchers have conducted applied research on the long-tail distribution phenomenon in the areas of commercial sales strategies, user recommendation algorithms, learning model construction, and population classification.

Based on the distribution of user interaction frequency, some researchers regard users with high frequency interaction as head users, and most users with low interaction frequency as long-tail

users, and propose a sequence recommendation algorithm based on long-tail users. (Ren Yonggong, Zhou Pinglei, Zhang Zhipeng, 2024). Liu Xin et al. proposed a long-tail user sequence recommendation algorithm based on contrastive learning. (Liu Xin, Yang Dawei, Shao Changheng, Wang Haiwen, Pang Mingjiang (2024) Li Yanru proposed "Hierarchical multi-label classification of public demands for long-tail distribution"; Zhao Qihao (2024), "Image recognition algorithm for real-world long-tail data"; Pan Lihu(2024), "Solving the long-tail problem in multi-label text classification"; Li Jian (2024), "Image classification algorithm for long-tail distribution data"; Wu Jiagao (2024), "Personalized federated learning framework for long-tail heterogeneous data"; Wu Zhenyu (2024), "Federated learning algorithm under long-tail distribution and domain offset"; Wang Mian (2024), "Cognitive diagnosis model based on intra-layer similarity relationship under long-tail distribution"; Yang Jinye, "Multi-granularity generalized long-tail classification based on leading forest"; Ye Yanli (2024), "Object detection algorithm for long-tail distribution of data"; Wen Aijun (2024), "Research on truth value discovery method for privacy protection of long-tail data"; Liu Zhanyang (2024), "Incremental learning of long-tail classes based on causal reasoning"; Xu Ji (2024), "Multi-granularity long-tail classification based on invariant feature learning"; Du Jiangfeng (2024), "Long-tail point of interest recommendation based on cross-domain data enhancement"; Guo Jialin (2024), "Model calibration research for deep long-tail learning".

In the field of cultural news communication, a small number of researchers have keenly paid attention to the potential huge value of long-tail users. Researchers regard long-term potential users who are relatively dispersed in time as long-tail users. Long-tail users play an important role in information The dispersion and long-term phenomenon displayed during reception, in terms of information transmission, the reception effect of long-tail users is more significant. For example, Chen Yingying (2024) on "The Long Tail Effect in the Transformation of China's Art Market"; Liang Xiaoxia (2024), "The Long Tail Theory in the Innovative Development of Movie Websites"; Zhu Xinran (2024), "The Innovation of Literary Films under the Long Tail Theory" Marketing"; Jie Fei (2024), "The long tail effect in the cross-media communication of cultural TV variety shows"; Huang Juan (2024), "The long tail effect maximizes the value of second-run dramas"; Li Bin (2024), "Pay attention to the long-tail effect of high-quality communication"; Liu Zikun (2024), "Application of long-tail theory in the communication planning of niche cultural variety shows"; Wang Haining (2024), "Long-tail theory in the differentiated communication of integrated media news products" Strategy".

In the dissemination of Internet news information, using the long tail theory to observe the phenomenon of Internet news information dissemination can better discover the value of Internet news dissemination. For Internet news readers, Internet news actually consists of two parts: news information released by news media organizations, and comments posted by readers in the comment area. The former is the head product part of the news information, the main part, which attracts a large number of head users, and the latter is the derivative part, the long tail part of the news information, which is gradually generated along with the news dissemination process and gradually generates long tail users. The setting of the comment area expands the information content of the news and has a relatively obvious long tail effect.

In the dissemination of Internet news, news has changed from the traditional dissemination form dominated by news media discourse to an interactive dissemination form in which news consumers participate together. Consumers express their views and opinions on news information through comments in the comment area, expressing readers' understanding and evaluation of news information. As the news dissemination process extends, many readers' opinions gather to form an information library. And as the dissemination process continues to extend, the amount of information contained will continue to increase. Readers' opinions may actually meet the personalized information needs of later readers. The "permanently online, permanently connected" communication environment not only creates new ways of obtaining and consuming information, but also promotes users' selective exposure (Hefner, Rinke, & Schneider, 2018).People not only see different news, but also interpret news in different ways. In the online field, various value-oriented information is constantly intersecting and merging, and information overload has greatly increased the amount of available factual knowledge.

Figure 2

Figure 2 Schematic diagram of the long-tail distribution of news information The yellow part is the main part of the news, which represents the part that attracts the most attention from the audience, but it is a minority part; the blue part represents the comment area of the news, which contains more information.

"In the process of platform social transformation and the development of digital journalism, the new communication revolution has subverted the original information order, emerging technologies have reshaped the traditional news industry, and the network of multiple actors has become the main body of digital journalism practice." (2023 China News Development Report: Rethinking Digital News Practice) There are differences in what is valued from the news depending on the moment, the medium and the individual. (Hess, 2020) The role of the audience has changed from passively receiving information to timely obtaining and publishing information, becoming part of information participatory design. Qu Yundong, 2019). The media movement process of "contact-conflict-communication-fusion-integration" is the movement process of information complementarity. (Wang Xiaoxian, 2015) The content of communication tends to be based on the extension and extensive reshaping of digital technology to convey simulation. (Xu Peijun, 2007) "The greater the span, the greater the results of cross-border cooperation, and the stronger the vitality and competitiveness of new things" (Wang Jing, Cui Junxia 2010). Finally, the leap from information to communication is completed. (Qu Yundong, 2019) The integration of readers' news comments into the process of news information dissemination is an important manifestation of the reform of news dissemination, which has brought about a significant change in the value of news information. However, the long-tail phenomenon in the news comment area has not received enough attention.

Through data analysis of news comment areas, the paper summarizes the value and significance of the long-tail phenomenon generated during the dissemination of Internet news.

Data Analysis

First, we designed a questionnaire survey to collect Internet news users' evaluation data on the news comment area and conduct data analysis.

The questionnaire assumes that the factors affecting readers' news acceptance include "viewpoints in the comment area", "news events", "author's views", "release time" and "release channels". We collected a total of 568 valid questionnaires and used data analysis software to extract and analyze the influencing factors. The data analysis results show that "viewpoints in the comment area" is the most influential factor.

Communalitie

	initial	extract
Opinion in the comment sectio	1.000	.826
News Event	1.000	.742
Author's viewpoint	1.000	.734
Release time	1.000	.658
Publish media	1.000	.583

Figure 3

parameter estimation

		valuation	standard error	Wald	df	significance	confidence interval upper limit	confidence interval lower limit
[threshold Like count =1]		-.153	.401	.146	1	.702	-.940	.633
[threshold Like count =0]		1.75	.53	11.475 5.674	1	.001	.756	2.834
position	FAC1	-.994	.417	.233	1	.017	-1.813	-.176
	FAC2	-.202	.419	2.237	1	.629	-1.024	.620
	FAC3	.646	.432	.766	1	.135	-.201	1.492
	FAC4	.333	.381	.385	1	.381	-1.080	.413
	FAC5	-.249	.368	.509	1	.535	-.951	.494

Figure 4

Then we sorted the data, using linear regression and ordered regression methods, using the number of likes a piece of news received as the dependent variable, "comment area views", "news events", "author's views", "publication time" and "publication channel" Five influencing factors were used as independent variables for regression analysis. Through linear regression and ordered

regression calculations, in the ordered regression, the data showed that "views in the comment area" was the most significant influencing factor.

Secondly, we further analyze the information value added achieved by news comment areas in the process of news dissemination through content analysis of the comment areas of five news articles. We analyze the content of the comment areas of five news articles and summarize the long tail phenomenon of news information and its news information value.

We analyze the content of the comment area of five news articles and summarize the long-tail phenomenon of news information and its news information value. The analyzed news information comes from "Today's Headlines" on October 3, 2024. The five pieces of information are four self-media author news and one mainstream media Xinhua News Agency news, representing mainstream media and self-media respectively. Xinhua News Agency's rural news "my country has achieved the first kilometer-high terahertz wireless communication transmission based on superconducting reception", and self-media news includes "Aunt who has lived in the United States for 20 years returns to visit relatives" (Xingzhe Wujiang ZHFSrO), "A 49-year-old man in Guangxi and his 19-year-old girlfriend have 15 babies in 21 years" (Haohan Shehai), "Niece brings her only son's boyfriend home" (Suiyuan), "My motherland, my home, salute to Chinese border guards" (Tiantian Kaixinya). The contents of the five news articles are "People's Livelihood Daily Life News" and "Political Current Affairs News". The five news stories are presented in the following forms: "My Motherland, My Home, Salute to Chinese Border Guards" (Tiantian Kaixinya), which is a video news story; Xinhua News Agency's "my country's First Kilometer-Earth Terahertz Wireless Communication Transmission Based on Superconducting Reception" is a Vlog video news story; self-media news "Auntie who has lived in the United States for 20 years returns to visit relatives" (Xingzhe Wujiang ZHFSrO), "A 49-year-old man in Guangxi has 15 babies in 21 years with his 19-year-old girlfriend" (Haohan Shehai), and "Niece brings her only son's boyfriend home but is opposed by her mother" (Suiyuan), all of which use graphic reports. None of the five news stories use conventional news titles, but directly go into the narrative. The five news stories cover both mainstream media and self-media in terms of the source of the media, and cover the two major types of "hard news" and "soft news" in terms of content.

Table 1 Statistics of long tail area information of 5 news items

News	Rele-ase	Po-st	Like	Coll-ection	Comments	Emotional Expressio-n
My aunt who has lived in the United States for 20 years returned to China to visit her relatives.	Xingzhe Wujiang ZHFSr-O	838	1052	67	①Commenting on the backwardness of the U.S. infrastructure ② Condemning the view of the elder aunt that she affirmed the U.S. and belittled her motherland	Accusation, sarcasm
①A 49-year-old man from Guangxi province and his 19-year-old	Haohan Shehai	19	48	6	①Criticizing the man for not being able to educate 15 children	Criticize

girlfriend gave birth to 15 children in 21 years ②Their lives						
①The niece brought her boyfriend home ②The boy is an only child and his mother disagreed and a dispute occurred	Suiyuan	149	295	119	①Agree with the benefits of having only one child ②Oppose the mother's point of view	Objective and calm
my country has achieved the first kilometer-long terahertz wireless communication transmission based on superconducting reception	Xinhua News Agency	89	1832	120	①I don't understand the meaning of terahertz, please help②Explain terahertz③④Praise the powerful technology and the powerful motherland	Proud, admirable
My motherland, my home, salute to China's border guards	Tiantian Kaixiny-a	3074	250000	1654	①Salute to the border guards and thank them	Praise

Through the comments in the comment area of 5 news articles, the results of data collection are as follows. Chart 1 shows the number of "comments", "likes" and "collections" in the comment area of 5 news articles, the number of comments in the comment area, and the basic opinions and emotions expressed by readers in the comment area.

From the number of comments posted by readers in the comment section, the one with the most comments is "My motherland, my home, salute to Chinese border guards" (Tiantian Kaixinya), with 3074 comments from readers in the comment section; the second is "My aunt who lived in the United States for 20 years returned to China to visit relatives" (Xingzhe Wujiang ZHFSrO), with 838 comments from readers in the comment section; the third is "My niece brought her only son's boyfriend home" (Suiyuan), with 149 comments from readers in the comment section; the fourth is the Xinhua News Agency news "my country has achieved kilometer-high terahertz wireless communication transmission based on superconducting reception for the first time", with 89 comments from readers in the comment section; the one with the least comments from readers in the comment section is "A 49-year-old man in Guangxi and his 19-year-old girlfriend gave birth to 15 babies in 21 years" (Haohan Shehai), with 19 comments from readers.

Judging from the number of "likes" from readers in the comment section, the comment with the most "likes" is "My motherland, my home, salute to Chinese border guards" (Tiantian Kaixinya), with 25,000 "likes" in the comment section; the second is "my country's first kilometer-high terahertz wireless communication transmission based on superconducting reception" (Xinhua News Agency), with 1,832 "likes" in the comment section; the third is "The eldest aunt who lived in the United States for 20 years returned to China to visit relatives" (Xingzhe Wujiang ZHFSrO), with 1,052 "likes" in the comment section; the fourth is "Niece brought her only son's boyfriend home" (Suiyuan), with 295 "likes" in the comment section; the fifth is "A 49-year-old man in Guangxi and his 19-year-old girlfriend gave birth to 15 babies in 21 years" (Haohan Shehai), with 48 "likes" in the comment section.

Judging from the number of "collections" in the comment section, the comment with the most "likes" is "My Motherland, My Home, Salute to Chinese Border Guards" (Tiantian Kaixinya), with 1,654 "collections" in the comment section; the second is "my country's first kilometer-high terahertz wireless communication transmission based on superconducting reception" (Xinhua News Agency), with 120 "collections" in the comment section; the third is "Niece brought her only son's boyfriend home" (Suiyuan), with 119 "collections" in the comment section; the fourth is "The eldest aunt who lived in the United States for 20 years returned to China to visit relatives" (Xingzhe Wujiang ZHFSrO), with 67 "collections" in the comment section; the fifth is "A 49-year-old man in Guangxi and his 19-year-old girlfriend gave birth to 15 babies in 21 years" (Haohan Shehai), with 6 "collections" in the comment section.

From the comments and opinions posted by readers in the comment area, the most popular comment is "my country has achieved the first kilometer-high terahertz wireless communication transmission based on superconducting reception", which contains 4 opinions in 89 comments from readers, namely ①I don't understand what "terahertz" is, please explain ②Explain the concept of "terahertz" ③Praise the development and progress of science and technology in the motherland. Readers in the comment area make up for the lack of "terahertz" knowledge popularization in news event reports and meet the needs of more readers. The second is "The aunt who lived in the United States for 20 years returned to China to visit relatives", (Xingzhe Wujiang ZHFSrO), which contains 2 comments and opinions in 838 comments from readers, namely ①Commenting on the backwardness of the infrastructure in the United States ②Condemning the aunt's view of affirming the United States and belittling the motherland. The views of readers in the comment area show the readers' patriotic sentiments on the one hand, and also provide readers who have not been to the United States with certain relevant information about the current situation and reasons of the infrastructure construction in the United States, expanding the information content of the news itself. "The niece brought the only son's boyfriend home", the opinions expressed in 149 comments from readers can be summarized into 2, namely ①Agreeing with the benefits of only children ②Opposing the mother's view. From the readers' comments, we can see the readers' attitude towards the marriage of only children. At the same time, it also reflects people's current marriage values from one side, that is, they do not want to bear too heavy family responsibilities. If their children marry into a family with too many children, it will increase the family burden after marriage. These views are not contained in the news report itself. "My motherland, my home, salute the Chinese border guards", the views expressed by readers in 3074 comments can be summarized into one view, salute the border guards, thank the border guards. In the comments of this news, we see the readers' positive affirmation of positive events, and see the good social atmosphere and people's positive social values. "A 49-year-old man in Guangxi province married a 19-year-old girlfriend for 21 years and gave birth to 15 children", the views expressed in 19 comments by readers can be summarized into one, criticizing the man for not being able to educate 15 children well. The comments of this news reflect the readers' emphasis on children's education and the strong sense of social responsibility of parents.

Judging from the emotions expressed in the comments posted by readers in the comment area, "my country has achieved the first kilometer-high terahertz wireless communication transmission based on superconducting reception", readers expressed the same emotion in the comment area, "admiration and pride" for the achievements made in the development of science and technology in the motherland. "The eldest aunt who has lived in the United States for 20 years returned to China to visit relatives", (Xingzhe Wujiang ZHFSrO), readers expressed the same emotion in the comment

area, "condemnation, disgust and disapproval" of this behavior. "The niece brought her only son's boyfriend home", readers expressed the same emotion in the comment area, objectively and calmly analyzing and evaluating. "My motherland, my home, salutes the Chinese border guards", readers expressed the same emotion in the comment area, praising and thanking the border guards. "A 49-year-old man in Guangxi and his 19-year-old girlfriend gave birth to 15 children in 21 years", readers expressed the same emotion in the comment area, condemning and criticizing the irresponsible and willful behavior of the couple in the news.

Statistical data show that (1) readers pay close attention to and evaluate news events with obvious value orientation, whether they are positive news events or news events with negative values and orientations. Readers' comments increase the content of news information, forming two interrelated and distinct components: news body and value-added information, as shown in the light blue and dark blue parts in Figure 2, namely "News Information" + "Reader Information".

The opinions expressed in the reader comment area are caused and generated by news information, but they go beyond the scope of news information itself, and obviously expand the meaning of news information in terms of connotation. As shown in the light blue and dark blue parts in Figure 2, "News Information" < "Reader Information".

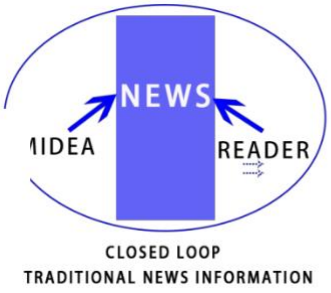

Figure 5

Figure 6

3. Conclusion

Based on the above data analysis, we draw the following conclusions: Compared with the news dissemination model of traditional paper media and television media, one of the biggest changes in the news dissemination model based on the Internet platform is the construction of readers' real-time and dynamic comment areas. It has transformed news dissemination from a one-dimensional dissemination model of news media facing readers to an interactive dissemination model between media and readers. Readers' comments and feedback are added to the dissemination process, forming a "1+N" information generation model and a big data public opinion observation window. As shown in Figures 1 and 2. Readers are recorded in real time at the level of meta-media dissemination practice, from the temporary "absence" in the era of face-to-face communication and mass communication to the constant "presence" in the era of meta-media. (Zhao,2018)

Figure 5 shows the traditional news dissemination process. The media and readers lack communication channels. News information is the only way to interpret each other. News information becomes the center and focus of dissemination. The traditional process is a closed circle. Figure 6 shows that the Internet news dissemination process increases the interaction between the media and readers. Readers' comments and opinions are added to the dissemination process. The news information dissemination process is also a value-added process in which news continuously increases its information content. The audience's comments and opinions constitute the reaction of public opinion and provide a window for observing public opinion.

The "1+N" information generation model of Internet news. Reader comments in the long tail area are a huge expansion of the value of news information. The information value they contain is often greater than the news information itself. We can use the "1+N" model to express the significance of reader comments in generating news value information. "1" refers to the news itself, and "N" refers to reader comments. When the news is released, the content of the news information is increased through the comments of readers, providing other readers with a richer perspective on understanding the news event and increasing the rich information content. Since the number of readers is large and increasing, the reader comment area constitutes a dynamically growing

information base.The communication value of news in the process of communication is far greater than the news information itself. Comments, forwarding, and even collective editing or creation of communication content in response to each other's communication or communication activities. They are encoded and integrated into different social relationships. Media users' "tags", "likes", and forwarding of web pages and pictures are actually participating in the encoding of metadata, and then participating in the actual creation of communication texts. (Zhao, 2018) Dutch social semiotician Theo van Leeuwen pointed out that different symbolic resources are integrated into multimodal discourse and communicative behavior through four ways: rhythm, composition, information link, and dialogue.

Big data and public opinion observation. The audience comment area in the long tail area of news can provide not only the audience's response to news information, but also the readers' concentrated response to a certain news event, providing a window for public opinion observation. Due to the large number of readers, it has the significance of big data statistics. Various government departments can use it to analyze and monitor public opinion. This is an important function that is almost impossible to have in traditional news dissemination. Semiotician Robert Jacobson's (2011) "Six-factor Theory of Symbols" points out that any symbolic text contains six factors: sender, text, object, medium, code and receiver. When one of the factors becomes the dominant factor in the text, it will lead to a corresponding special interpretation of meaning. That is, the symbolic text itself provides relevant clues to interpret itself. Under the guidance of technical meta language factors, such as "register", "tag", "like", "share", and "forward", users mobilize different meta languages to produce and reproduce the meaning of symbolic texts. (Zhao, 2018) The system re-integrates the data information left by users in media communication activities and publishes it to advertisers, market managers, or government agencies, etc.

In short, the long-tail distribution of information in news dissemination is a manifestation of the continuous appreciation of news information in the dissemination process. News dissemination based on the Internet platform adds readers' comments to the news dissemination process, making the news dissemination process also a process of continuous enrichment and appreciation of news information.

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