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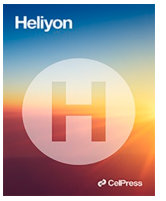

Research article

Dilemma and coping strategies of news communication based on artificial intelligence and big data

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ABSTRACT

News dissemination is an important way for people to obtain information. With the development of new technologies, traditional news dissemination models have been impacted. It has problems with information filtering and bias, and has certain limitations in news quality, dissemination efficiency, etc., which makes it difficult to effectively meet people's information needs. In order to improve the quality and efficiency of news dissemination, promote the positive impact of news dissemination on society, this article combined artificial intelligence and big data technology to conduct in-depth research on the difficulties and coping strategies of news dissemination. This article first analyzed the characteristics and functions and influencing factors of news dissemination, then provided an overview of the difficulties and coping strategies in news dissemination. Finally, using association rule algorithms, personalized recommendations for news dissemination are achieved. To verify the effectiveness of artificial intelligence and big data in coping with the dilemma of news dissemination, this article conducted experimental analysis from the perspectives of news content quality, dissemination efficiency, objectivity, and dissemination cost. The experimental results show that under the application of news dissemination strategies based on artificial intelligence and big data, the quality of news content and dissemination efficiency have been improved by 4.76 % and 3.63 %, respectively. The conclusion indicates that artificial intelligence and big data can help improve the quality and dissemination efficiency of news content, and meet the diverse needs of the public for information.

1. Introduction

In the era of information explosion, the field of news communication is facing unprecedented challenges and opportunities. This not only affects news organizations and practitioners, but also profoundly shapes the way the public receives and views information. Improving traditional news dissemination methods and increasing the effectiveness of news dissemination has become an important task in the current development process of the media industry. With the deepening development of computer science theory, artificial intelligence and big data technology have achieved great progress and are widely applied in various professional fields. Artificial intelligence has high intelligence and learning ability, while big data technology has real-time and value density characteristics. In news dissemination, personalized news recommendations can be provided based on big data analysis and artificial intelligence algorithms. This helps users to more effectively obtain information of interest, reduce information overload, and enhance public trust in news media. It also promotes the sustainable development of the communication industry and has important practical value.

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News dissemination is an effective medium for communication between people and society, and many scholars have studied it. Kong L H believed that the existing news communication concept was relatively backward, and the communication concept of news communication workers should be updated in time [1]. Qin C studied the reform of news communication in the new media environment, and put forward some specific reform strategies from the perspective of news communication methods and the educational function [2]. Gao S analyzed the role of news communication in dealing with public crisis events, and believed that news communication should control the direction of public opinion when conveying information to the public to avoid the public being guided by wrong values [3]. Zhao L Q studied the communication characteristics and modes of communication between different media, and believed that traditional media already had some characteristics of new media, as well as explored the media integration mode of news communication [4]. Wang Y discussed the development status of traditional media in the context of the rise of self-media. After analyzing the communication methods of self-media and the functions of traditional media, he proposed specific measures on how to use big data technology in news communication [5]. Huang S L conducted research on the news dissemination mode of network news. He believed that online news had more advantages than traditional media news in terms of timeliness of dissemination autonomy, but it was inferior to traditional media news in terms of news rigor and authenticity [6]. Liu S T believed that the way of news dissemination had not kept pace with the development of the times and could not meet people's actual needs for news. Based on psychology and big data technology, he proposed strategies such as breaking technical barriers and cultivating big data news talents [7]. The research on the current difficulties and response strategies in news communication has made great progress, but there are still certain limitations in improving the quality and efficiency of news communication through current research methods.

In recent years, AI and big data have developed rapidly and have been widely used in many fields. Xu Y M established an intelligent medical imaging teaching mode based on AI technology, and proved that the intelligent medical imaging teaching mode could improve students' learning efficiency and academic level through experiments [8]. Qin W J established a smart library service system based on AI technology, which met the personalized and diversified knowledge service needs of library users [9]. Wang Y used AI technology to establish a classroom management system model for English distance education. He used this model to locate students and analyze their status, so that the state of students could be grasped in a timely and effective manner [10]. Chen J P applied AI technology in the field of mechatronics engineering and developed an intelligent assistance system for mechatronics production and operation [11]. Chen L L established a power grid big data monitoring model for power grid monitoring of the condition, loss and safety by analyzing the operation, maintenance and management data of the power grid [12]. Wang Z X applied big data technology to audit work and optimized the audit workflow, so as to improve the efficiency of audit work and reduce the workload of auditors [13]. Li H W introduced big data technology into the field of human resource management and optimized the management mode of human resources, which made human resource management more efficient and accurate [14]. Saeed M H used an adaptive neuro fuzzy inference system and a multi-layer perceptron model to predict the bandgap of transition metals, and experimental results showed that the proposed method has good predictive performance [15]. Lakhan A proposed a CNN-LSTM (FCNN-LSTM) scheme that supports federated learning and applied it to detect autism spectrum disorders in children on a multimodal dataset. He integrated all training datasets into aggregation nodes and made final decisions for patients with autism spectrum disorder based on decision process trees. Simulation results showed that his proposed framework achieved approximately 99 % detection accuracy compared to all existing frameworks for pediatric autism spectrum disorders [16]. Zhang Y conducted a comprehensive review of TSK fuzzy system fusion, providing insights for further research and development. Following the direction of TSK fuzzy system fusion, he conducted a detailed study of the current integration strategies for hierarchical, wide layer, and stacked layer fusion, and discussed their differences, advantages and disadvantages from the perspectives of time complexity, interpretability (model complexity), and classification performance [17]. Zhang Y established a transfer learning model to utilize knowledge from multiple feature spaces. In the modeling process, the assumption that the training and testing data have the same distribution always holds, and the utility of the model in multi feature space analysis has been demonstrated through experimental analysis [18]. Artificial intelligence (AI) algorithms have good data analysis performance and efficiency, but in the field of news communication, current research still has certain limitations in meeting the information needs of different users.

In order to improve the quality and efficiency of news dissemination and meet the different levels of public demand for news, this article combines artificial intelligence and big data to conduct in-depth research on the difficulties and coping strategies of news dissemination. The main contribution of this article is.

(1) Optimization of news dissemination: through artificial intelligence and big data technology, the algorithms of news dissemination platforms can be optimized, improving the accuracy and credibility of information dissemination, and reducing the spread of false information and rumors.
(2) Personalized recommendation of news content: based on artificial intelligence and big data technology, personalized recommendation of news information is achieved, and relevant news content is recommended to users according to their interests and preferences, improving user experience and information acquisition efficiency.
(3) Analysis and mining of news communication: artificial intelligence and big data technology can be used to conduct in-depth analysis and mining of news communication data, discover patterns and trends in news communication, and provide scientific basis for news communication decision-making.

This article is divided into five chapters, and the organizational structure of each part is as follows: firstly, in Chapter One, this article briefly introduces the research significance of news communication difficulties and response strategies, as well as the current research status of news communication difficulties and response strategies in the world; in Chapter 2, the characteristics and functions of news dissemination and the factors that affect the effectiveness of news dissemination were analyzed, and the difficulties faced by

news dissemination and corresponding response strategies were studied; then, in Chapter 3, the application of artificial intelligence big data algorithms in news dissemination was introduced, using association rule algorithms to calculate user interest and achieve personalized news recommendations; in Chapter 4, an experimental analysis was conducted on the application effect of artificial intelligence big data algorithms in coping strategies for news communication difficulties. The evaluation was conducted from four levels: news content quality, communication efficiency, objectivity, and communication cost; finally, the work of this article is summarized in Chapter 5.

2. News communication dilemma and coping strategies

2.1. (1) The characteristics and functions of news communication

With the understanding of the characteristics of news communication, the effect of news communication can be better optimized [19], and the specific characteristics of news dissemination are shown in Fig. 1.

As shown in Fig. 1, the characteristics of news dissemination are reflected in three aspects: timeliness, objectivity and integration. The timeliness of news dissemination is one of the basic characteristics of news dissemination, which is mainly reflected in two aspects: newness and suitability. In the definition of news, the novelty of news dissemination has been reflected, which mainly emphasizes the speed and timeliness of news dissemination. With the rapid development of information communication technology, the public's requirements for the latest news are also further improved. Timeliness emphasizes the timing of news publication. News communication should not only pursue the speed of communication, but also pay attention to the timing of news publication. If there is a political event in a country or region, it would seem out of place to publish news stories about entertainment news at this time. Objectivity means that the content of news dissemination should be based on real events, including both the truth of the event content and the way of expression. At the same time, in the process of news dissemination, news events should be viewed fairly and rationally from the perspective of a third party, and there should be no overly subjective emotional expression in news reports. In terms of reporting and forecasting news events, scientific news communication and reporting methods should be adopted on the basis of analyzing a large amount of real data, so as to increase the authenticity and objectivity of news communication and create a good news dissemination atmosphere for news audiences.

News dissemination has functions of reporting, education, publicity, and entertainment. The role of news dissemination is multifaceted. In terms of reporting, news dissemination can convey various information to the public, including political, economic, social, cultural, and other aspects. In terms of education, news dissemination can help the public understand various knowledge and information, including science, technology, culture, history, and other aspects. Through news reporting, the public can learn different perspectives, thereby improving their knowledge level and thinking ability. In terms of publicity, through news reporting, the government and enterprises can convey information to the public, improve their image and visibility. In terms of entertainment, news dissemination can provide various entertainment information, including movies, music, sports, and other related information. Through news reporting, the public can learn about various interesting things, thereby relaxing their mood and reducing stress. These functions help to understand the world and establish social culture, as they can help the public understand different perspectives, thereby better understanding the world and society. In addition, news dissemination can also promote cultural exchange and diversity, thereby enriching social culture.

2.2. (2) Factors that affect the effect of news dissemination

News communication is the process of using news media to convey information to the public [20]. In the process of news dissemination, there are many factors that affect the effect of news dissemination, as shown in Fig. 2.

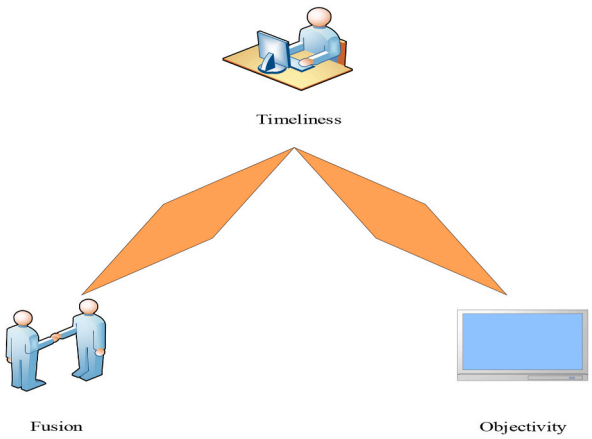

Fig. 1. The characteristics of news communication.

As shown in Fig. 2, the factors that affect the effect of news dissemination include environmental factors, the factors of the news receivers themselves, and the factors of the news disseminators themselves. The influence of environmental factors on the effect of news communication is reflected in three aspects: belief environment, institutional environment and cultural environment. Faith environment means that people of different faiths receive the same news differently. The institutional environment means that news dissemination must conform to a certain social system, and news that violates the social system cannot be disseminated, otherwise news dissemination would be restricted by the social system. For example, the degree of reception of a piece of political news is affected by the institutional environment. The country in which the position of the political news is biased would have a higher degree of reception of the political news. Cultural environment means that people are more willing to accept news that conforms to their national culture and habits. For example, in countries that use chopsticks as the main dining tool, news reports that believe that chopsticks should be used as the main dining tool have better dissemination effects, and people's acceptance is also higher.

The factors of news receivers themselves are reflected in four aspects: receiving ability, receiving experience, receiving position and receiving interest. The effect of receiving ability is reflected in the fact that some news audiences cannot understand the content of news due to the limitation of knowledge and culture level. The influence of receiving experience is reflected in the fact that some news audiences would interpret the content and emotions expressed by news based on their own experience, which may misunderstand the original intention of news disseminators. The influence of the receiving position is reflected in the fact that news audiences would judge the authenticity of news from their own position, and they are unwilling to receive news that harms their own interests. In addition, the evolution of the Internet and mobile terminal devices has changed the public's expectations and needs for news consumption, making it more focused on real-time, convenience, diversity, personalization, interactivity, participation, credibility, and authenticity. This also puts higher demands on news media, requiring continuous innovation and adaptation to public needs to meet their expectations for news.

The factors of the news disseminator are reflected in three aspects: the news content should be timely, and the news content should be easy to understand, as well as the news values should conform to the policy. News content should be time-sensitive means that news events should be the latest events, which is the basic requirement of news dissemination. News content should be easy to understand means that news communicators should not use too many obscure language in the process of news dissemination, but should use easy-to-understand language to express news content and their own emotions. News values should conform to policies means that news communicators should abide by relevant policies in the process of dissemination, and unrighteous values and reactionary news cannot be disseminated.

2.3. (3) Dilemma faced by news dissemination

Only by analyzing the problems existing in the event, these problems can be taken effective measures [21]. This paper studies some problems existing in the process of news dissemination, and the specific content is shown in Fig. 3.

As shown in Fig. 3, some problems in news communication are reflected in three aspects: backward news communication methods, and weak awareness of news communication, as well as lack of effective management of news communication. The backwardness of news dissemination methods is reflected in the fact that some news disseminators still use traditional news dissemination methods to work and use inefficient methods to develop news data. The backward way of news dissemination not only reduces the efficiency of news dissemination, but also makes the news seriously lack the flavor of the times. News works cannot adequately reflect news events, and the efficacy of news is limited. Weak awareness of news communication can be described from two aspects: The main aspect is that journalists have weak awareness of news communication. The traditional news dissemination method is still used to develop data news, and the traditional news dissemination method is not improved by using advanced technology. In the actual news work, the

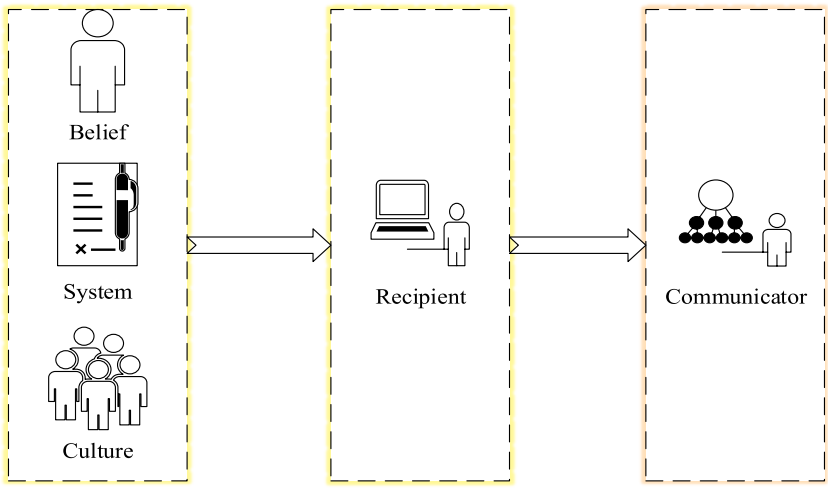

Fig. 2. Factors that affect the effectiveness of news dissemination.

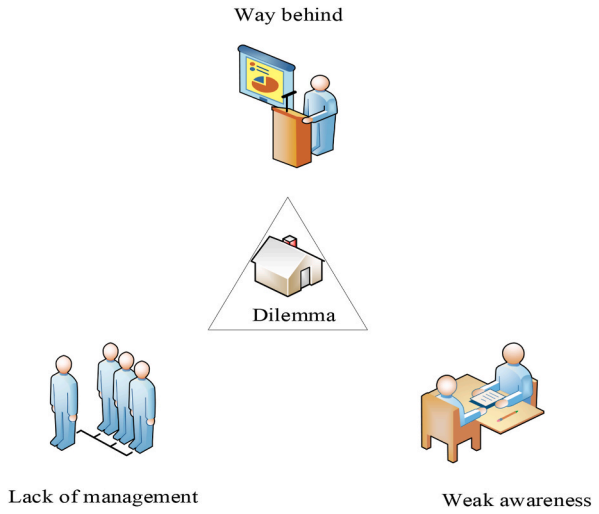

Fig. 3. The dilemma facing news communication.

advanced news dissemination methods are not paid attention, resulting in the serious restriction of the development pace of news dissemination; the secondary aspect is that the government does not pay enough attention to the work of news dissemination, and the government does not play a leading role in improving the way of news dissemination and strengthening the awareness of dissemination. In solving the weak awareness of news communication, the government should realize the importance of news communication. The lack of effective management of news communication is reflected in the management ability and method of news communication. If the management ability of media managers is insufficient, a realistic, scientific and reasonable overall plan for news communication cannot be formulated, and the relationship between news communication efficiency, news content quality and news communication costs cannot be coordinated. Insufficient management ability of media managers would restrict the efficiency and quality of news dissemination. The management style of media managers can also have a great impact on news communication work. The existing management methods can no longer meet the needs of the development of the times, and are not conducive to the improvement of the efficiency of news dissemination, as well as lack effective means of supervision. If some news disseminators commit fraud in pursuit of communication efficiency, it would affect the image and economic benefits of the media, and may even be subject to administrative penalties.

In addition, some of the main factors among the multiple challenges faced by traditional news dissemination include:

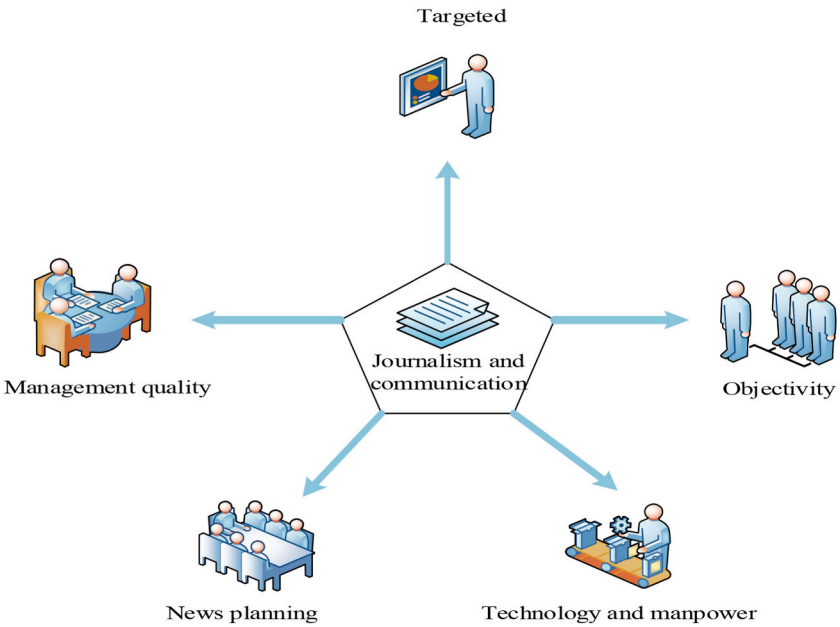

Fig. 4. Coping strategies for news communication dilemmas.

Information overload: the digital age has brought massive amounts of information, making it difficult for people to effectively filter, process, and understand information, leading to information overload and reducing the value and credibility of information.

False information and quality issues: false information is rampant, challenging the authenticity and credibility of news reporting. Traditional news media find it difficult to deal with the accuracy of information sources and the authenticity of content.

Business model transformation: the business model of traditional media has been impacted by digital transformation and the Internet, and problems such as declining advertising revenue and difficulties in payment models have become increasingly prominent, affecting the operation and sustainability of news organizations.

Reader needs and personalization: users tend to have personalized and diversified demands for news, and traditional news is difficult to meet the needs of users at different levels and interests.

These challenges prompt people to explore strategies based on artificial intelligence and big data. Artificial intelligence and big data applications can effectively address the challenges faced by traditional news dissemination, improve the quality, authenticity, and user experience of news content, and also help promote innovation and development in the news industry.

2.4. (4) Coping strategies for the dilemma of news communication

By solving the problems existing in news communication, the efficacy of news communication can be better played [22]. By analyzing the dilemma faced by news communication, this paper proposes some measures to deal with the dilemma of news communication based on AI and big data, and the specific content is shown in Fig. 4.

As shown in Fig. 4, the strategies for coping with the dilemma of news communication based on AI and big data mainly include five contents: improving the pertinence of news communication; ensuring the objectivity of news communication; combining AI technology with manpower in the process of news communication; grasping the planning link of news communication; enhancing the management quality of media managers.

With the support of AI and big data, journalists can provide users with personalized news information. In the process of pushing, journalists can continuously optimize the quality and mode of news dissemination according to the user's browsing experience, so as to provide users with a better news experience. However, this privately customized news dissemination mode is also flawed, which can easily lead to the phenomenon of information cocooning. In addition to considering the personal interests of users, journalists should appropriately increase news types and enrich news content when disseminating news. By utilizing big data analysis techniques to conduct in-depth analysis of the audience's interests, preferences, and needs, more precise news dissemination strategies can be formulated to ensure the targeted and effective dissemination of information.

When a hot event occurs, various media would express different opinions because of their different positions. The content of news contains different subjective colors, which are difficult for news users to identify. If the subjective would contained in the news content is so strong that it seriously affects the objectivity of the information, users would question the authenticity of the news content, and their trust in news dissemination would also decline. By using AI and big data, all kinds of hot information can be aggregated, and the information can be identified, processed and data mined, as well as real news information can be selected. In the process of using AI technology for news editing and promotion, a strict information review mechanism can be established to ensure the objectivity and impartiality of news content, and to avoid information bias caused by deviations.

The combination of AI technology and manpower can improve the efficiency of news production. The way of writing news by manpower can no longer keep up with the development of the times. In the context of the rapid development of AI and big data, news information can be written through AI and big data. However, the news content written by AI lacks information depth, and the logical expression is only reflected in the shallow layer, so it is impossible to write high-quality news information.

In the planning of news dissemination, the three key factors of authenticity, popularity and information depth should be coordinated. The relationship between the authenticity of news, the needs of news audiences, and the depth of news information should be well coordinated. In news planning, the principles of authenticity and objectivity in news dissemination must be adhered to. People cannot publish news that violates social order and good morals in order to meet the needs of certain users, nor can they publish fake news to attract traffic. In the era of big data, the difficulty of obtaining information is getting lower and lower. After filtering out the real information that meets the needs of users by using AI and big data, it is necessary to increase the depth of news information to increase the effect of news dissemination. Big data analysis technology can be used to finely manage and optimize the planning process of news communication. From news topic selection to content production, it is necessary to fully utilize the results of data analysis to guide decision-making.

The management quality of media managers greatly affects the effect of news dissemination. To enhance the quality of news communication management of media managers, it is necessary to strengthen media managers' news communication business ability, and improve management methods, as well as cultivate media managers' news communication awareness. In the face of the development of AI and big data technology, it is necessary to have more comprehensive management qualities, including the ability to understand and apply technology, as well as a profound understanding and innovation ability in the news and communication industry. At the same time, it is also necessary to have the ability to respond to crises and manage risks to ensure the quality and reliability of news dissemination.

3. Use of algorithms in the process of news dissemination

Association rule algorithms are often used in personalized recommendation [23]. In this paper, the association rule algorithm is applied to the personalized recommendation of news communication, so as to improve the accuracy of news communication

recommendation and ensure the authenticity of news communication content.

The formulas of the traditional mining algorithm are:

$$T(P_u) = \left\| \left(S_p \middle| P_u \subseteq S_p\right) \right\| / \left\| E \right\| \tag{1}$$

$$D\left(u : P_p \to P_q\right) = T\left(P_p \cup P_q\right) / T\left(P_p\right) \tag{2}$$

Traditional association rule algorithms are prone to generate a large number of redundant candidates, and the computational efficiency is not high [24]. Therefore, this paper uses a fast association rule mining algorithm for personalized recommendation. The definition of formula parameters is shown in Table 1.

It is assumed that the transaction set is E and the item set is P, the following formulas are obtained [25]:

$$S = \left(S_1, S_1, ..., S_\beta\right)' \tag{3}$$

$$S = \begin{Bmatrix} s_{11} & \cdots & s_{1\beta} \\ \vdots & \ddots & \vdots \\ s_{\alpha 1} & \cdots & s_{\alpha\beta} \end{Bmatrix} \tag{4}$$

$$s_{pq} = \begin{cases} 1 \; P_q \in S_p \\ 0 \; P_q \notin S_p \end{cases} \tag{5}$$

If S_p contains P_q, then $S_{pq} = 1$; if not, then $S_{pq} = 0$.

The absolute support of an item item is [26]:

$$TX\left(P_q\right) = \sum_{p=1}^{\alpha} s_{pq} \tag{6}$$

The item support are [27,28]:

$$T\left(P_q\right) = TX\left(P_q\right) / \alpha \tag{7}$$

$$T\left(P_q\right) = \sum_{p=1}^{\alpha} s_{pq} \Big/ \alpha \tag{8}$$

Frequent 1-term mining:

First, the support of the candidate item set D_1 is calculated. Compared with the minimum support, the following formula can be obtained [29]:

$$H_1 = \left\{ TX\left(P_q\right) \geq T_{\min} \right\} \tag{9}$$

After a series of calculations, the following formula can be obtained [30]:

$$\overline{S} = \left\{ S_p \middle| \sum_{q=1}^{\beta} s_{pq} < 2 \right\} \tag{10}$$

Frequent C-term mining [31]:

First, the frequent item set H_{c-1} is used to generate the candidate item set D_c. The $\alpha \times \beta$ matrix composed of D_c and zero vector rows is constructed, and the following formulas are obtained [32,33]:

$$W^c = \left(W_1^c, W_2^c, ..., W_\alpha^c\right)' \tag{11}$$

$$W^c = \left(D_C, D_C, ..., D_C, 0, ..., 0\right)' \tag{12}$$

$$V = \left(v_{pq}\right)_{\alpha \times \alpha} \tag{13}$$

Table 1
Definition of formula parameters.

Sequence	Parameter	Meaning
1	T	Support level
2	D	Confidence level
3	E	Transaction Set
4	P	Project Set

$$V = W^c \cdot S_c^{'} \tag{14}$$

$$f\left(v_{pq}\right) = \begin{cases} 1 \ v_{pq} = c \\ 0 \ v_{pq} = c \end{cases} \tag{15}$$

Among them, V is a β-dimensional matrix constructed from D_c and zero vector rows.
From the matrix V, an α-dimensional column vector λ is constructed, which are formulated as [34]:

$$\lambda = \left(\lambda_p\right)_{\alpha \times 1} \tag{16}$$

$$\lambda = \left(\sum_{p=1}^{\lambda} f\left(v_{1p}\right), \sum_{p=1}^{\lambda} f\left(v_{2p}\right), \ldots, \sum_{p=1}^{\lambda} f\left(v_{ap}\right)\right)^{'} \tag{17}$$

If the number of elements contained in the frequent itemset H_{c-1} is $B_c < c$ and $H_c = \varnothing$, then the algorithm would stop, otherwise the frequent itemsets H_c would continue to be mined.
The definition formula of validity is [35]:

$$\kappa(U) = L(\chi, \gamma) - L(\overline{\chi}, \gamma), \kappa \in [-1, 1] \tag{18}$$

It is assumed that the minimum support degree of the user's highest interest is $TD_{\min}$ and $(TD_{\min})\varepsilon = \frac{1}{2}$, then the user index is:

$$\varepsilon = \log_{TD_{\min}} \frac{1}{2} \tag{19}$$

The definition formula of interest degree is:

$$P(U) = (L(\chi, \gamma) - L(\chi)L(\gamma))^{\varepsilon} \cdot |\kappa(U)| \tag{20}$$

4. Experiment on coping strategies for news communication dilemma

This paper proposes strategies to deal with the dilemma of news communication based on AI and big data. Through the experimental research on the strategies to deal with the dilemma of news communication, it is proved that the strategies proposed in this paper are effective and can promote the combination of news communication and the times, and improve the efficiency and quality of news dissemination, as well as meet the news needs of the public.

Two media companies are selected, and the scale and benefit data of the two media companies are similar. One media enterprise carries out news communication activities in combination with the coping strategies of news communication dilemma proposed in this paper, and this media enterprise is called enterprise Q; the other media enterprise insists on the original traditional news communication method to carry out news communication activities, and this media enterprise is called enterprise P. This article set a 6-month experimental period for experimental observation and data collection. It can ensure that both companies execute their respective communication strategies within the same time period. In data collection, qualitative data such as user perspectives, attitudes, and satisfaction are collected through focus group discussions, user surveys, and other methods. Internal data can be collected from media companies, including website platform data such as click through rates, views, and reading volumes. An experimental study was conducted on the news dissemination activities of Q and P enterprises from four aspects: news content quality, news dissemination efficiency, objectivity, and dissemination cost. After the experiment, the experimental results were observed and analyzed.

4.1. (1) Content quality of news

The quality of news content affects the effect of news dissemination. High-quality news content has a better dissemination effect and a higher degree of reception by people. The consideration of content quality in news mainly focuses on the accuracy and objectivity of information, as well as the depth and breadth of content. Using an indicator method, multi-dimensional evaluations are conducted on data indicators such as word count statistics, interaction volume, and sharing rate of content depth, forming the content

Table 2
Content quality of news.

	Enterprise Q	Enterprise P
1	82.29	80.26
2	84.29	82.63
3	86.42	83.41
4	88.38	83.19
5	90.25	84.39
6	94.33	83.53
Average 1–6	87.66	82.9

quality index of news. This paper analyzes and compares the news content quality of enterprise Q and enterprise P. The content quality index of news ranges from 1 to 100, and the experimental results are shown in Table 2.

As shown in Table 2, the quality index of news content of enterprise Q is increasing gradually. The quality index of enterprise Q in the first month is 82.29, and the quality index in the second month is 84.29. In the sixth month, the quality index of enterprise Q reaches 94.33, which is 12.04 higher than the quality index of the first month. The quality index of enterprise P in the first month is 80.26, and the quality index in the sixth month is 83.53, as well as the quality index of enterprise P in the sixth month is 3.27 higher than that in the first month. From the perspective of the comparison results of the quality indicators in the first month and the sixth month, the coping strategies of the news communication dilemma proposed in this paper still have a certain effect. In the process of news dissemination, the combination of AI technology and manpower can improve the quality of news content. Enterprise P's news content quality index fluctuates more frequently, and the average news content quality index of enterprise Q is 87.66, as well as the average news content quality index of enterprise P is 82.9. Compared with the average news content quality index of enterprise P, the average news content quality index of enterprise Q increases by 5.74 %. Artificial intelligence can help news media achieve automated content generation, generate news reports, abstracts, or titles, and improve the efficiency and quality of reporting. Big data technology can help news media mine valuable information from massive data, discover potential trends and correlations of news events, improve the depth and comprehensiveness of reporting, and thus achieve effective improvement in news quality.

4.2. (2) The dissemination efficiency of news dissemination

The efficiency of news dissemination is measured through several aspects, including content production efficiency, audience positioning and personalized push, as well as user participation and interaction. Through the experimental research on the news communication efficiency of enterprise Q and enterprise P, the indicators of news communication efficiency are obtained. The value range of the news dissemination efficiency index is 1 %–100 %, and the results are shown in Fig. 5.

As shown in Fig. 5, from the perspective of the change trend of news communication efficiency, the news communication efficiency of enterprise Q and enterprise P are both on the growth trend, and the news communication efficiency of each month is higher than that of the previous month. However, from the perspective of the growth rate of news dissemination efficiency, enterprise Q is faster than enterprise P. From the specific data results, the news dissemination efficiency of enterprise Q in the sixth month is 93.24 %, and the news dissemination efficiency of enterprise P in the sixth month is 86.9 %. In the sixth month, the news dissemination efficiency of enterprise Q is 6.34 % higher than that of enterprise P. The average news dissemination efficiency of enterprise Q is 87.01 %, and the average news dissemination efficiency of enterprise P is 83.38 %, as well as the average news dissemination efficiency of enterprise Q is 3.63 % higher than that of enterprise P. In news production, using AI technology for semantic analysis and content summarization can quickly extract key information, accelerate the news processing process. Big data analysis can deepen understanding of the audience's interests and behavioral habits, achieve more accurate audience positioning, and provide support and feedback to decision-makers through real-time analysis of data through AI and big data technology, helping to make more accurate decisions.

4.3. (3) The objectivity of news dissemination

Maintaining the authenticity and objectivity of news dissemination can improve the effect of news dissemination, and enhance the acceptance of news dissemination by users, as well as help media companies win the recognition of users. The objectivity of news dissemination is measured through indicators and representations such as factual verification and diversity of sources, information integrity and objectivity, as well as balanced and multi angle reporting. After conducting experimental research, this paper records the news communication objectivity index of enterprise Q and enterprise P. The value range of the news communication objectivity index is 1–100, and the specific results are shown in Fig. 6.

As shown in Fig. 6, from the overall point of view, the monthly news dissemination objective index of enterprise Q is greater than

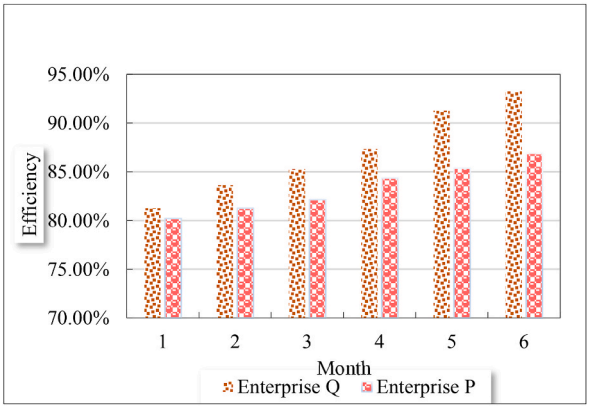

Fig. 5. The dissemination efficiency of news dissemination.

that of enterprise P. The news communication objectivity index of enterprise Q in the first month is 85.29, and the news communication objectivity index in the sixth month was 93.25, as well as the difference between the two is 7.96. Enterprise P's news communication objectivity index in the first month is 83.63, and the news communication objectivity index in the sixth month is 85.69, as well as the difference between the two is 2.06. In the experimental environment, the objective indicators of traditional news dissemination methods are also improved, but the improvement effect is not obvious. The average news communication objectivity index of enterprise Q is 89.65, and the average news communication objectivity index of enterprise P is 85.17. Compared with enterprise P, the average news communication objectivity index of enterprise Q is increased by 4.48 %. In terms of ensuring the objectivity of news dissemination, the coping strategies base on AI and big data play a practical role. AI quickly verifies the authenticity of information, identifies false information, and improves the credibility of news reporting. Big data analysis collects and integrates data from multiple sources, evaluates the consistency and differences of different reports, helps evaluate the objectivity and comprehensiveness of reports, and effectively improves the objectivity of news dissemination.

4.4. (4) The dissemination cost of news dissemination

The cost of news communication can reflect the effectiveness of the strategies to deal with the dilemma of news communication. The experimental study is carried out on the news communication cost of enterprise Q and enterprise P, and the data about the news communication cost is obtained. The decrease in news dissemination costs is mainly determined by the calculation of news production costs, audience positioning and personalized push costs, content optimization and improvement costs, and communication channel optimization costs. The basic unit of news dissemination cost is 10,000 yuan, and the specific data is shown in Fig. 7.

As shown in Fig. 7, on the whole, the news communication cost of enterprise Q is lower than that of enterprise P, which shows that the coping strategy of news communication dilemma based on AI and big data can help media companies reduce news communication costs. The news dissemination cost of enterprise Q in the first month is 36,700 yuan, and the news dissemination cost of enterprise P in the first month is 37,800 yuan.as well as the news dissemination cost of enterprise Q is 1100 yuan lower than that of enterprise P. In addition, from the first month to the sixth month, the news dissemination cost of enterprise Q is lower than that of enterprise P. Judging from the news dissemination cost of the last month, the news dissemination cost of enterprise Q is 28,700 yuan, and the news dissemination cost of enterprise P is 31,700 yuan, as well as the news dissemination cost of enterprise Q is 9.46 % lower than that of enterprise P. The average news dissemination cost of enterprise Q is 32,100 yuan, and the average news dissemination cost of enterprise P is 34,500 yuan. Compared with enterprise P, the average news dissemination cost of enterprise Q is 6.96 % lower. AI technology can generate news articles, abstracts, and even reports based on data and models, reducing the time and cost of manual writing, and accurately targeting the target audience based on audience behavior and preferences, reducing unnecessary advertising push costs. By analyzing big data, the most effective communication channels were selected, avoiding resource waste and achieving a reduction in overall news costs.

In order to gain a deeper understanding of the effects of artificial intelligence and big data on coping strategies for news communication difficulties before and after application, this article takes experimental data from the sixth month as the object and compares the quality of news content, dissemination efficiency, objectivity, and dissemination cost before and after the application of artificial intelligence and big data, as shown in Table 3.

From the comparison results in Tables 3 and it can be seen that Q Enterprise, which applies the news dissemination dilemma response strategy based on artificial intelligence and big data, has more ideal performance in terms of news content quality, dissemination efficiency, objectivity, and dissemination cost. In terms of news content quality, by analyzing and filtering news texts through artificial intelligence and big data, potential biases and errors in news reporting can be discovered, helping news media improve reporting quality. In terms of communication efficiency, artificial intelligence and big data can help news media better understand the needs and preferences of audiences, thereby optimizing the production and dissemination strategies of news content. In terms of objectivity, through artificial intelligence and big data analysis, news media can timely detect and correct biases and

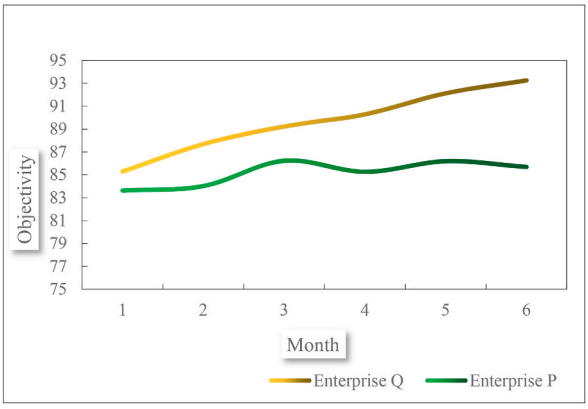

Fig. 6. The objectivity of news dissemination.

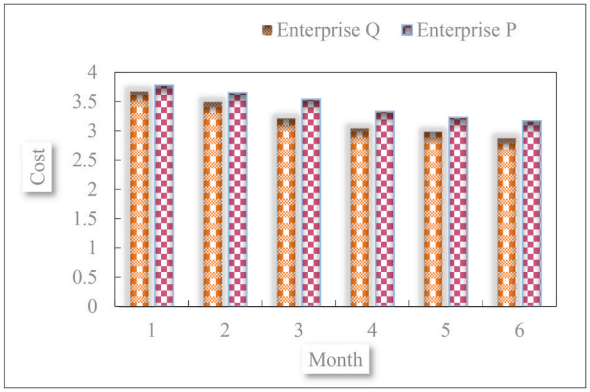

Fig. 7. The dissemination cost of news dissemination.

Table 3
The pre - and post application effects of strategies to address the dilemma of news communication.

Sequence	Index	Enterprise Q	Enterprise P
1	News content quality	94.33	83.53
2	Communication efficiency	93.24	86.90
3	Objectivity	93.25	85.69
4	Communication costs	2.87	3.71

tendencies in news reporting, enhancing the objectivity and credibility of news reporting. In terms of communication costs, through the automation technology and data analysis of artificial intelligence, news media can improve production efficiency, reduce labor costs, and better cope with communication difficulties.

5. Conclusions

In the current context of the information age, there are still problems with outdated communication methods, weak communication awareness, and unscientific management methods in news dissemination. In order to effectively address the challenges of news communication and fully leverage the functions of news communication, this article proposes a strategy based on artificial intelligence and big data to address the challenges of news communication.

With the support of artificial intelligence and big data algorithms, this article not only significantly improves the quality and efficiency of news dissemination, but also enhances the objectivity of news dissemination to a certain extent. On this basis, it has reduced the cost of news dissemination and promoted the development of intelligent news dissemination.

In practical applications, artificial intelligence and big data algorithms can be used to automate the production of media content, achieve automatic summarization, translation, sentiment analysis, etc., of news content, and improve the efficiency and quality of news production. Based on the user's historical browsing and interests, personalized news content is recommended to improve the user experience, increase user stickiness, and help news organizations better cope with the dilemma of news penetration.

Although the research on coping strategies for news communication dilemmas based on artificial intelligence and big data algorithms can to some extent promote the high-quality development of news communication, there are still limitations in the research process. When using big data algorithms, it may involve the collection and analysis of a large amount of user data, which poses risks of privacy leakage and data security. This article has not conducted in-depth and effective analysis of user data security in news dissemination. In future research, we will enhance the security of data collection and analysis technology from the perspective of privacy protection, in order to solve the problems of user privacy leakage and data security. It explores how to reduce the technological barriers of artificial intelligence and big data algorithms in news dissemination, making them more popular and applicable to news organizations of different sizes.

Data availability statement

All data generated or analyzed during this study are included in this published article.

CRediT authorship contribution statement

Wen Zhou: Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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