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Article

A Study on Path Optimization of Digital Computing Methods in International Dissemination of Rural Revitalization Literature with High Quality Enhancement

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Abstract: The dissemination of rural revitalization stories helps to promote mutual integration and communication between countries and enhance China's influence in the global governance system. This project combines digital computing methods, constructs an evaluation index system, and uses fuzzy hierarchical analysis and grey multilevel evaluation model to assess the effect of international dissemination of rural revitalization literature. Then, combining correlation analysis and support vector machine model, it mines the relationship between each influencing factor and the international dissemination of rural revitalization literature, and thus proposes the optimization path of high-quality international dissemination of rural revitalization literature. The results show that the international dissemination effect of the sample rural revitalization literature is at an average level, with the overall score ranging from 1.57 to 3.96, among which 94.66% of the literary works have a score below 3.5. The factors that have the greatest influence on the international dissemination effect of rural revitalization literature are graphic type, cultural content and neutral attitude of content, with characteristic importance values of 0.089, 0.080 and 0.079 respectively.Based on this, this paper proposes the communication strategy of diversifying the dissemination subject, civilianizing the dissemination content, and innovating the dissemination method, in order to promote the high-quality international dissemination of rural revitalization literature.

Keywords: fuzzy hierarchical analysis; gray multilevel evaluation model; support vector machine; rural revitalization literature; international communication effect

1. Introduction

Since the reform and opening-up, China has established close ties with the world by focusing on economic development. The “Five Connectivities” proposed in the later stages of the Belt and Road Initiative demonstrate that China is strengthening its connections with the world in all aspects [1-2]. As China's comprehensive national strength continues to grow and its international influence significantly increases, it has begun to emerge as a major player on the world stage [3]. However, in the face of an increasingly complex and challenging international landscape, China's positive development trajectory has inevitably faced scrutiny from other nations within the international community, leading to various ideological conflicts. This has resulted in some Western countries developing misguided biases toward China, giving rise to a series of defamatory statements and actions such as the “China Threat Theory” and the “China Failure Theory” [4-7]. In response, China urgently seeks to establish a voice commensurate with its international status, and international communication efforts have thus taken on the crucial responsibility of speaking for China [8-9]. Against this backdrop, in August 2013, the important concept of “telling China's story well” was first proposed, marking a significant step in strengthening China's international communication capabilities and enhancing its international voice [10]. Literature, as an

important medium for China's stories, has seen its international communication pathways gain increased attention.

Since achieving victory in the battle against poverty, China's poverty alleviation efforts in rural areas have yielded remarkable results, accumulating valuable experience conducive to poverty reduction and rural development [11-12]. Meanwhile, globally, most developing countries remain in a state of poverty, with the majority of poverty occurring in rural areas. The large population living in poverty has an urgent need for poverty alleviation experiences, and China's accumulated development experiences in rural areas can precisely meet this demand. Therefore, poverty alleviation experiences have been disseminated to multiple countries through various forms, and China has actively provided poverty alleviation assistance to other countries [13-16].

Against this backdrop, an increasing number of rural literary works have been produced. On one hand, this fulfills the concept of a community with a shared future for mankind, promoting China's experiences and solutions in rural development to the world and deepening the exchange of experiences among countries. On the other hand, it presents a real, three-dimensional, and comprehensive image of China to the world, transforming its perception of China [17-19]. It is worth noting that with the in-depth implementation of the rural revitalization strategy, new impetus has been injected into rural development, and the content of Chinese rural literature has become increasingly rich [20]. However, looking at the current situation, rural literature receives relatively little attention, and the topic is not a priority in China's international communication efforts. Therefore, conducting research on the international dissemination of rural revitalization literature and proposing feasible recommendations is particularly important.

Throughout history, literary dissemination has undergone various transformations. Literature [21] summarizes the evolution of dissemination forms for classic literary works, including textual forms (standard-pictographic-cuneiform-phonetic), carrier forms (papyrus-clay tablets-bamboo-wood-pottery-bronze-printing), presentation forms (oral-written), and media forms (printing-cross-media). For the international dissemination of literature, the primary issue to address is the series of problems arising from cross-cultural communication. Literature [22] points out that due to cultural backgrounds, reader preferences, language transformations, and other factors, even some literary works that have undergone multiple language transformations exhibit variations in their dissemination, hindering their spread. Meanwhile, literature [23] describes the contributions and influence of the Chinese Literature Overseas Dissemination Project on the dissemination of Chinese literature abroad, serving as a model for the international dissemination of Chinese literary works. Document [24] analyzes the dissemination forms of Yu Xiuhua's poetry in the internet, as well as the current status and limitations of its dissemination. The internet dissemination form is the primary form of dissemination for domestic works in China today. Most literary works disseminated online are presented in digital form, which facilitates translation for international dissemination and expands the scope of dissemination [25].

In the current digital age, the international dissemination of literary works has ushered in a new era, particularly in addressing issues related to cultural background and language translation interference in literary works. Literature [26] leverages digital language service systems to optimize the international dissemination of Tang poetry, including the creation of cross-cultural data analysis platforms, professional translation tools, talent development, and diverse dissemination methods. However, there is currently a lack of planning for the dissemination pathways of rural literature. Rural literature is constrained by factors such as the digital literacy of rural writers and misunderstandings in the translation of rural culture, necessitating optimization through digital methods.

The study constructs an evaluation index system for the international dissemination effect of rural revitalization literature from the dimensions of content value and social value. After confirming the index weights using the fuzzy hierarchical analysis method, the study evaluates the dissemination effect of rural revitalization literature by using the grey multilevel evaluation model with respect to a number of rural revitalization literature works collected and their dissemination data. Subsequently, the influencing factors of the international dissemination of rural revitalization literature are screened and research hypotheses are put forward, and rural revitalization literary works are coded according to the selected variables. The correlation between the influencing factors and the dissemination effect is analyzed through non-parametric tests, and the support vector machine model is used to explore the degree of influence of each influencing factor on the international dissemination effect of rural revitalization literature. On this basis, we explore the optimization path of high-quality international dissemination of rural revitalization literature, and put forward strategies to improve its international dissemination effect from the three levels of dissemination subject, dissemination content and dissemination method.

2. Assessment of the Effectiveness of International Dissemination of Rural Revitalization Literature

2.1. System of Evaluation Indicators

The process of evaluating the effectiveness of the international dissemination of rural revitalization literature involves Chinese local culture and its overseas dissemination, and it is necessary to take into account both the characteristics of local culture and dissemination laws, as well as the influence of culture and social image. This paper adopts the Delphi method to determine the evaluation indexes of the international dissemination effect of rural revitalization literature. In order to ensure the overall reliability of the results, the sample sources are as comprehensive and authoritative as possible, i.e., the members of the expert group are all experts or scholars in the literature and communication industry. The experts' scores on the factors were statistically sorted and ranked from 1 to 5 in terms of importance, with a full score of 5. After several rounds of solicitation and adjustment, the evaluation indexes of the international communication effect of rural revitalization literature are finally summarized as shown in Table 1. The first-level indicators are determined as content value and social value. In the second-level indicators, five indicators are included, including content quality, author level, readers' favoritism, readers' participation and cultural acceptance, and 16 third-level indicators are specifically subdivided.

Table 1. Evaluation index of the international communication effect of rural rejuvenation literature.

Primary indicator	Secondary indicator	Tertiary index
Content value A1	Content quality B1	Translation quality C1
		Story development C2
		Spread body diversity C3
		Dissemination of content C4
		Channel richness C5
	Author level B2	Author experience C6
		Work number C7
Social value A2	Reader preference B3	Emotional analysis score C8
		Receive a number of likes C9
	Audience engagement B4	Views C10
		Original comment number C11
		Review quality C12
		Comment response C13
	Cultural acceptance B5	Positive comment ratio C14
		Neutral comment ratio C15
		Negative comment ratio C16

2.2. Methodology for Evaluating the Impact of Dissemination

In the indicator system, the importance of each indicator to the target is different, when measuring the contribution of each indicator to the target, different weights should be given, and the important ones are given larger weights. In this paper, the fuzzy hierarchical analysis method is used to determine the weights of the indicators for assessing the international communication effect of rural revitalization literature, and then the gray multilevel evaluation model is used to obtain the evaluation results of the international communication effect.

2.2.1. Fuzzy Hierarchy Analysis

Fuzzy hierarchical analysis is a derivative of hierarchical analysis, fuzzy hierarchical analysis is the same idea as hierarchical analysis, the same is a scientific decision-making algorithm that divides the complex system into multiple levels and establishes the comparison criteria, and through the comparison of the relative importance of the indexes, it turns the subjective into the objective, and turns the qualitative into the quantitative to arrive at the priority of the indexes or the weighting of a scientific decision-making algorithm.

However, considering the limitations of the native application scenarios of hierarchical analysis, such as the existence of more than four indicators in the complex program system, it may be difficult to pass the consistency test of the hierarchical analysis method or the allocation of weighting results can not be used, fuzzy hierarchical analysis introduces the fuzzy concepts and the idea of comprehensive evaluation,

to triangular fuzzy number reflecting the scale of the worst, the most probable, and the best of each indicator relative to the indicators being compared, and construct the relative fuzzy evaluation interval. The relative fuzzy evaluation interval is constructed, which is more in line with the actual situation that the decision makers' decisions are mostly fuzzy in the face of complex decisions. A fuzzy judgment matrix is established to determine its relative importance, and the corresponding consistency check is accomplished through the fuzzy consistency matrix.

Each indicator factor is compared two by two, and the fuzzy judgment matrix is constructed:

$$A=\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \tag{1}$$

Provide that the fuzzy complementary matrix of the fuzzy judgment matrix A satisfies $0<a_{ij}<1$, $a_{ij}+a_{ji}=1$, $a_{ij}=0.5(i=j)$.

Sum the matrix A by rows:

$$a_i=\sum_{k=1}^{n} a_{ik},\left(i,k=1,2\cdots n\right) \tag{2}$$

Find the weight vector for each factor w_i:

$$W_i=\frac{1}{n}-\frac{1}{2\alpha}+\frac{a_i}{n\alpha} \tag{3}$$

$$W_i=\begin{bmatrix} w_1 & w_2 & \cdots & w_n \end{bmatrix}^T \tag{4}$$

Among them:

$$\alpha=\frac{n-1}{2} \tag{5}$$

Construct the weight matrix w_{ij} and calculate the consistency test value CI:

$$w_{ij}=\alpha\left(w_i-w_j\right)+0.5 \tag{6}$$

$$W=\begin{bmatrix} w_{11} & w_{12} & \cdots & w_{1n} \\ w_{21} & w_{22} & \cdots & w_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ w_{n1} & w_{n2} & \cdots & w_{nn} \end{bmatrix} \tag{7}$$

$$CI\left(A,W\right)=\frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|w_{ij}-a_{ij}\right|}{n^2} \tag{8}$$

The stipulation that $CI<0.1$ then passes the consistency test requirement that the division of weights w_i representing each indicator factor is logical and meets the requirements for use.

2.2.2. Gray Multilevel Evaluation Model

The research object of gray system theory is a “small sample” and “poor information” uncertain system with “part of the information known and part of the information unknown”. It is through a certain level of observation information to mathematical processing, to achieve a higher level of understanding

of the system's internal trends, interrelationships, control processes and other mechanisms.

The specific steps of the gray multilevel evaluation method are as follows:

(1) Determine the evaluation level

Evaluation indicators U_{ij} are qualitative indicators, which can be transformed into quantitative indicators by formulating evaluation indicator rating standards. Evaluation of evaluation indicators U_{ij} evaluation grade is divided into excellent, good, general, poor, poor 5 levels, respectively, assigned to 1, 2, 3, 4, 5 points, the index level between the two neighboring grades, the corresponding score of 1.5, 2.5, 3.5, 4.5 points.

(2) Determine the weights of evaluation indexes U_i and U_{ij}

In this paper, the AHP method is utilized to determine the weight of each indicator.

The weight set of the first-level evaluation indicator U_1 is $W=\left(W_1,W_2,W_3,W_4\right)$, where $W\geq 0$. $\sum_{i=1}^{4}W_i=1$. The set of weights for the secondary evaluation indicator U_{ij} is $W_i=\left(W_{11},W_{i2},\cdots,W_{ij}\right)$, where $W_i\geq 0$, $\sum_{j=1}^{a_i}W_{ij}=1$.

(3) Organize evaluation experts' scores

Let the serial number of evaluation experts be k, $k=1,2,\cdots\cdots,m$, i.e., there are m evaluation experts. Organize m evaluation experts to score the x th rural revitalization literary work according to the evaluation index U_{ij} scoring level standard, and fill in the evaluation experts' scoring form.

(4) Determine the evaluation sample matrix

According to the evaluation expert scoring table, that is, according to the score U_{ij} given by the k evaluation experts to the x rural revitalization literary works according to the evaluation index $d_{ijk}^{(x)}$, the evaluation sample matrix of the x rural revitalization literary works $D^{(x)}$ was obtained:

$$D^{(x)}=\begin{bmatrix} d_{111}^{(x)} & d_{112}^{(x)} & \cdots & d_{11m}^{(x)} \\ d_{121}^{(x)} & d_{122}^{(x)} & \cdots & d_{12m}^{(x)} \\ \vdots & \vdots & \vdots & \vdots \\ d_{211}^{(x)} & d_{212}^{(x)} & \cdots & d_{21m}^{(x)} \\ \vdots & \vdots & \vdots & \vdots \\ d_{461}^{(x)} & d_{462}^{(x)} & \cdots & d_{46m}^{(x)} \end{bmatrix}\begin{matrix} U_{11} \\ U_{12} \\ \vdots \\ U_{21} \\ \vdots \\ U_{46} \end{matrix}=d_{ijk}^{(x)21\times m} \tag{9}$$

(5) Determine the evaluation gray category

Due to the limitations of the level of experts and differences in understanding, only one gray number of whitening value can be given. In order to truly reflect the degree of belonging to a certain class, the need to determine the evaluation of gray class, that is, to determine the number of levels of evaluation of gray class, gray number of gray class and gray number of whitening weight function. Set evaluation gray class serial number h, $h=1,2,\cdots,n$, both n evaluation gray class. The evaluation gray categories are taken as excellent, good, fair, poor, and poor five levels, i.e., $n=5$. In order to describe the above gray categories, it is necessary to determine the whitening weight function of the evaluation gray categories.

The 1st gray category is "excellent" $\left(h=1\right)$, set the number of grays $\otimes_1\in[0,1,2]$, and the whitening weight function is f_1:

$$f_1(d_{ijk}^{(x)})=\begin{cases} 1 & d_{ijk}^{(x)}\in[0,1] \\ 2-d_{ijk}^{(x)} & d_{ijk}^{(x)}\in[1,2] \\ 0 & d_{ijk}^{(x)}\notin[0,2] \end{cases} \tag{10}$$

The 2nd gray class is "good" $(h=2)$, set the number of grays $\otimes_2 \in [0,2,4]$, and the whitening weight function is f_2:

$$f_2(d_{ijk}^{(x)}) = \begin{cases} d_{ijk}^{(x)} / 2 & d_{ijk}^{(x)} \in [0,2] \\ (d_{ijk}^{(x)} - 4) / (-2) & d_{ijk}^{(x)} \in [2,4] \\ 0 & d_{ijk}^{(x)} \notin [0,4] \end{cases} \tag{11}$$

The 3rd gray category is "general" $(h=3)$, with a set number of grays $\otimes_3 \in [0,3,6]$, and a whitening weight function of f_3:

$$f_3(d_{ijk}^{(x)}) = \begin{cases} d_{ijk}^{(x)} / 3 & d_{ijk}^{(x)} \in [0,3] \\ (d_{ijk}^{(x)} - 6) / (-3) & d_{ijk}^{(x)} \in [3,6] \\ 0 & d_{ijk}^{(x)} \notin [0,6] \end{cases} \tag{12}$$

The 4th gray category is "worse" $(h=4)$, set the number of grays $\otimes_4 \in [0,4,8]$, and the whitening weight function is f_4:

$$f_4(d_{ijk}^{(x)}) = \begin{cases} d_{ijk}^{(x)} / 4 & d_{ijk}^{(x)} \in [0,4] \\ (d_{ijk}^{(x)} - 8) / (-4) & d_{ijk}^{(x)} \in [4,8] \\ 0 & d_{ijk}^{(x)} \notin [0,8] \end{cases} \tag{13}$$

The 5th gray class is "poor" $(h=5)$, setting the number of grays $\otimes_5 \in [5,\infty)$, and the whitening weight function is f_5:

$$f_5(d_{ijk}^{(x)}) = \begin{cases} d_{ijk}^{(x)} / 5 & d_{ijk}^{(x)} \in [0,5] \\ 1 & d_{ijk}^{(x)} \in [5,\infty) \\ 0 & d_{ijk}^{(x)} \notin [0,\infty) \end{cases} \tag{14}$$

(6) Calculate the gray evaluation coefficient

For the evaluation index U_{ij}, the grey evaluation coefficient of the x rural revitalization literature belonging to the h evaluation grey category is denoted as $M_{ijh}^{(x)}$, and there is:

$$M_{ijh}^{(x)} = \sum_{k=1}^{m} f_h\left(d_{ijk}^{(x)}\right) \tag{15}$$

For the evaluation index U_{ij}, the grey evaluation coefficient of the x th rural revitalization literary work belonging to each evaluation grey category is denoted as $M_{ij}^{(x)}$, and there are:

$$M_{ij}^{(x)} = \sum_{h=1}^{n} M_{ijh}^{(x)} \tag{16}$$

(7) Calculate the gray evaluation weight vector and weight matrix

All evaluation experts on the evaluation index U_{ij}, the grey evaluation weights for the x evaluated rural revitalization literature claiming the h gray category are recorded as $q_{ijh}^{(x)}$, then:

$$q_{ijh}^{(x)} = M_{ijh}^{(x)} \Big/ M_{ij}^{(x)} \tag{17}$$

Considering that there are five gray categories, i.e., $h=1,2,3,4,5$, there is the x th evaluation indicator of the evaluated rural revitalization literature U_{ij} for each gray category with the gray evaluation weight vector $q_{ij}^{(x)}: q_{ij}^{(x)}=\left(q_{ij1}^{(x)}, q_{ij2}^{(x)}, q_{ij3}^{(x)}, q_{ij4}^{(x)}, q_{ij5}^{(x)}\right)$.

From this, we obtain the gray evaluation weight matrix $Q_i^{(x)}$ of the x th evaluated rural revitalization literary work of the U_i belonging to the indexes U_{ij} for each evaluated gray category, and we have:

$$Q_i^{(x)}=\begin{bmatrix} q_{i1}^{(x)} \\ q_{i2}^{(x)} \\ \vdots \\ q_{ij}^{(x)} \end{bmatrix}=\begin{bmatrix} q_{i11}^{(x)} & q_{i12}^{(x)} & q_{i13}^{(x)} & q_{i14}^{(x)} & q_{i15}^{(x)} \\ q_{i21}^{(x)} & q_{i22}^{(x)} & q_{i23}^{(x)} & q_{i24}^{(x)} & q_{i25}^{(x)} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ q_{ij1}^{(x)} & q_{ij2}^{(x)} & q_{ij3}^{(x)} & q_{ij4}^{(x)} & q_{ij5}^{(x)} \end{bmatrix} \tag{18}$$

(8) Comprehensive Evaluation

For the x th rural revitalization literary work of the evaluation index U_{ij} to make a comprehensive evaluation, and its comprehensive evaluation result is recorded as $B_i^{(x)}$, then there are:

$$B_i^{(x)}=W_i\times Q_i^{(x)}=\left(b_{i1}^{(x)}, b_{i2}^{(x)}, b_{i3}^{(x)}, b_{i4}^{(x)}, b_{i5}^{(x)}\right) \tag{19}$$

The comprehensive evaluation result $B_i^{(x)}$ from U_{ij} yields a matrix of gray evaluation weight coefficients $Q^{(x)}$ of the U_i indicators of the x rd evaluated rural revitalization literature for each evaluated gray category:

$$Q^{(x)}=\begin{bmatrix} B_1^{(x)} \\ B_2^{(x)} \\ \vdots \\ B_5^{(x)} \end{bmatrix}=\begin{bmatrix} b_{11}^{(x)} & b_{12}^{(x)} & b_{13}^{(x)} & b_{14}^{(x)} & b_{15}^{(x)} \\ b_{21}^{(x)} & b_{22}^{(x)} & b_{23}^{(x)} & b_{24}^{(x)} & b_{25}^{(x)} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ b_{51}^{(x)} & b_{52}^{(x)} & b_{53}^{(x)} & b_{54}^{(x)} & b_{55}^{(x)} \end{bmatrix} \tag{20}$$

Thus, doing a comprehensive evaluation of the U_i indicators for each of the assessed rural revitalization literary works in x, whose comprehensive evaluation result is noted as $B^{(x)}$, we have:

$$B^{(x)}=W\times Q^{(x)}=\left(b_1^{(x)}, b_2^{(x)}, b_3^{(x)}, b_4^{(x)}, b_5^{(x)}\right) \tag{21}$$

(9) Calculate and rank the comprehensive evaluation values

The comprehensive evaluation result $B^{(x)}$ of the x th respondent is a vector which represents a description of the degree of the x th respondent's comprehensive status into gray categories. The information provided by $B^{(x)}$ can be used to determine the gray level to which the respondent belongs according to the principle of taking the maximum. However, the result of judging according to this principle is sometimes valid, and sometimes tends to be invalid because this judgment principle loses too much information, and the important issue is that $B^{(x)}$ can not be directly used for sorting and selecting the best among the assesses. For this reason, $B^{(x)}$ is further processed to make $B^{(x)}$ single-valued, i.e., to calculate the composite evaluation value $R^{(x)}$ of the x th appraisee. If each evaluation gray level is assigned a value according to the “gray level”, then each evaluation gray level value vector $C=\left(1,\ 2,\ 3,\ 4,\ 5\right)$. Thus, the composite evaluation value $R^{(x)}$ of the x th evaluated project is calculated according to the following formula:

$$R^{(x)} = B^{(x)} \cdot C^{T} \left(\begin{array}{l} \text{Where } C^{T} \text{ is the transpose of the} \\ \text{rank-valued vector for each} \\ \text{evaluation grey category} \end{array} \right) \tag{22}$$

After the comprehensive evaluation value $R^{(x)}$ is derived, it can be used to give a high or low ranking of the dissemination effects of the x evaluated rural revitalization literary works according to the size of $R^{(x)}$.

2.3. Determination of Indicator Weights

Using the fuzzy hierarchical analysis method, the weights of the indicators at all levels of the international dissemination effect of rural revitalization literature are calculated, and the results of the weights of the indicators at all levels are shown in Table 2. The weights of content quality A1 and social value A2 are 0.363 and 0.637 respectively, and among the second-level indicators, the weights of reader participation B4 and content quality B1 are the largest, at 0.299 and 0.290, followed by reader favoritism B3 and cultural acceptance B5. Among the third-level indicators, the weights of the number of likes received C9, the number of views of the work C10, and the number of original comments C11 are all greater than or equal to 0.090, which have the greatest influence on the evaluation of the international dissemination effect of rural revitalization literature.

Table 2. The weight of indicators at all levels.

Primary indicator	Weight	Secondary indicator	Weight	Tertiary index	Weight
Content value A1	0.363	Content quality B1	0.290	Translation quality C1	0.054
				Story development C2	0.069
				Spread body diversity C3	0.051
				Dissemination of content C4	0.068
				Channel richness C5	0.048
		Author level B2	0.073	Author experience C6	0.044
				Work number C7	0.029
Social value A2	0.637	Reader preference B3	0.174	Emotional analysis score C8	0.068
				Receive a number of likes C9	0.106
		Audience engagement B4	0.299	Views C10	0.099
				Original comment number C11	0.090
				Review quality C12	0.065
				Comment response C13	0.045
		Cultural acceptance B5	0.164	Positive comment ratio C14	0.088
				Neutral comment ratio C15	0.043
				Negative comment ratio C16	0.033

2.4. Evaluation of Communication Effectiveness

Using the international communication effect assessment system of rural revitalization literature constructed in the previous section, the relevant data of 150 rural revitalization literary works collected from the Internet were used to analyze the international communication effect of rural revitalization literature as follows.

2.4.1. Basic Situation Analysis

In order to eliminate the differences between the factors and normalize the factor scores, this paper normalizes the values of the factors, and the values of all the factors are based on a 5-point scale. The normalization processing method provides a unified measurement method for the factors in the 2 dimensions of content value and social value of each rural revitalization literature, and the descriptive statistical results of the sample data are shown in Figure 1. From the descriptive analysis of the dissemination data of rural revitalization literature, the variables of translation quality C1, story

development C2, diversity of dissemination subjects C3, content richness C4, and channel richness C5 are all scored using a 5-point scale, with mean values of 4.27 and 4.19 for C1 and C2, and the values of C3~ C5 are basically comparable, at around 3.50. While the mean values of the number of original comments C11, the number of likes received C9 and the number of views of works C10 are all less than 3.60, the dispersion is also larger, i.e., there is a large gap in the data between different rural revitalization literary works, which also reflects that there is a large difference in the degree of attention paid to rural revitalization literary works.

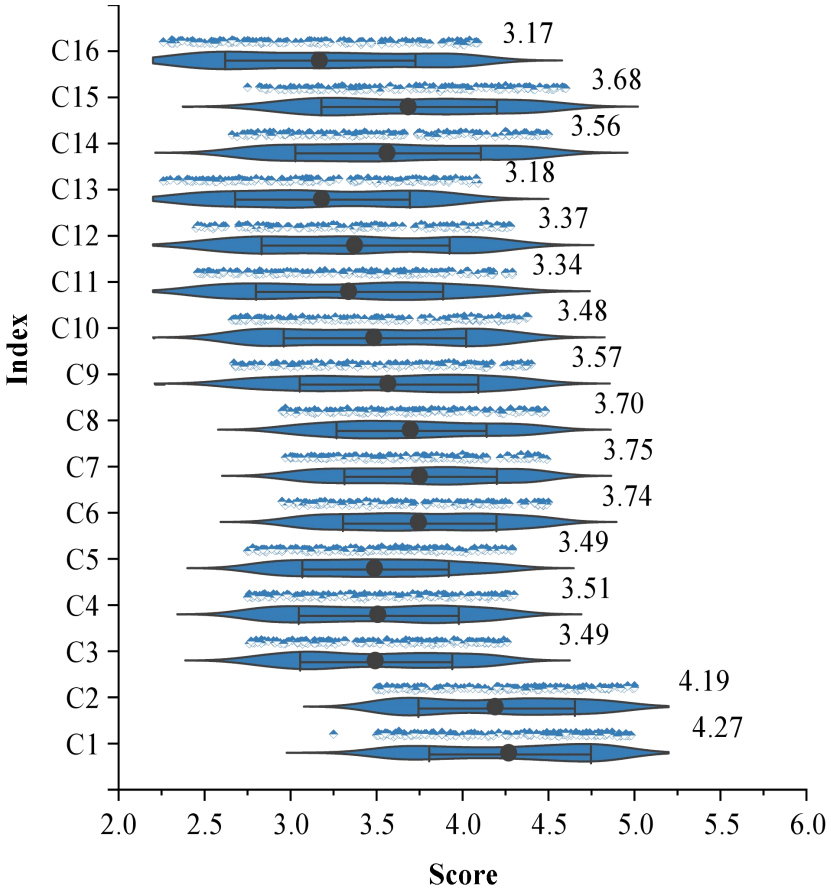

Figure 1. Descriptive statistical results of sample Numbers.

2.4.2. Analysis of Dissemination Effects

Using the grey multilevel evaluation model, while considering the comprehensive weight of each factor, the comprehensive score of each rural revitalization literary work is finally obtained. The comprehensive score of each rural revitalization literary work is shown in Figure 2. The scores of each rural revitalization literary work are mainly distributed between 1.57 and 3.96, with a median of 2.46. The percentage of works with scores of 0 to 1.5 is 0, indicating that all the indicators of rural revitalization literary works in the sample have a positive impact on the international dissemination of rural revitalization literature. The percentage of works scoring 1.5 to 2.5 is 51.33%, indicating that most of the rural revitalization literary works have an average effect on the international dissemination of rural revitalization literature. The percentage of works with a score of 2.5 to 3.5 is 43.33%, which indicates that nearly half of the works have a more positive effect on the international dissemination of rural revitalization literature. The proportion of works with a more significant effect on the international dissemination of literature on rural revitalization is not high, only about 5.33% (works with a score of 3.5 to 4.5).

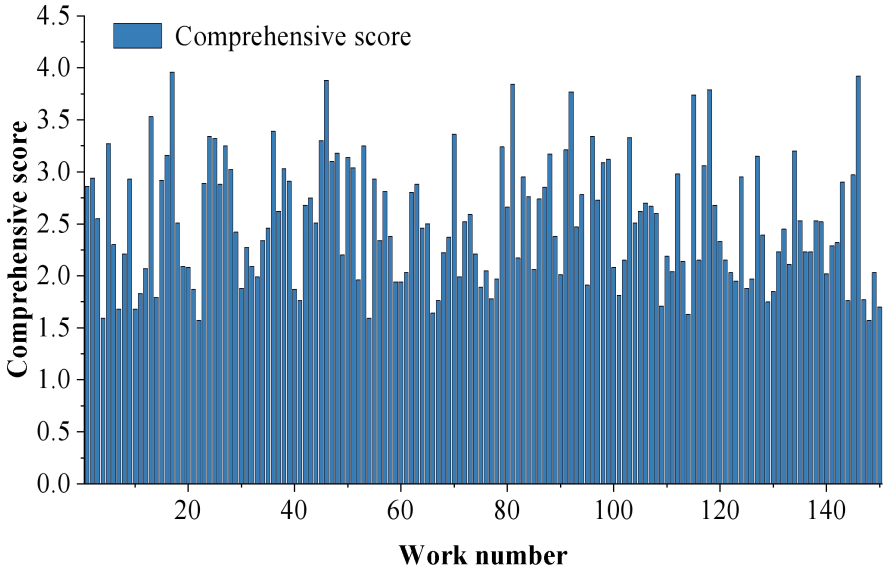

Figure 2. Comprehensive grading of rural revitalization literature.

3. Analysis of Factors influencing the International Dissemination of Rural Revitalization Literature

On the basis of assessing the effect of international dissemination of rural revitalization literature, it explores the influencing factors of international dissemination of rural revitalization literature in order to subsequently optimize the enhancement path of high-quality international dissemination of rural revitalization literature.

3.1. Selection of Variables and Research Hypotheses

3.1.1. Selection of Variables

(1) Dependent variable: the effect of international dissemination of rural revitalization literature

(2) Independent Variable: Selection of Indicators for Influencing Factors of Communication Effectiveness

Although the influencing factors of communication effect are different, they are all based on the three dimensions of communication subject, communication content and communication object to expand other major influencing factors.

Combined with the characteristics of rural revitalization literature, the credibility of the information source is set up as an influencing factor in the dimension of communication subject. In the dimension of communication content, we set up the influence factors of content expression, emotional attitude and theme classification. In the dimension of communication object, the emotional attitude of users' comments is set up as an influencing factor.

3.1.2. Research Hypotheses

(1) Credibility of information sources

Information sources are categorized into two groups according to official and unofficial sources, and domestic and foreign sources, and the following hypotheses are proposed:

H1a: The influencing factors of communication effects are related to all information sources, and official sources can positively influence communication effects more than unofficial sources.

H1b: The influencing factors of communication effects are related to all information sources, and domestic sources can positively influence communication effects more than foreign sources.

(2) Content presentation

According to the characteristics of the collected data, the content presentation forms are categorized into three types: text-only, graphic, and text-video. The following hypotheses are proposed:

H2a: The influencing factors of the dissemination effect are related to the content presentation form of rural revitalization literature, and the text-video type of information can more positively influence the dissemination effect.

(3) Content Emotional Attitude

The three main emotions of positive, neutral and negative are taken as the main emotional tendencies of rural revitalization literature. Based on the three main emotions, the following hypotheses are proposed:

H3a: The communication effect is related to all three emotions, and the positive emotional tendency can positively influence the communication effect more than the other emotional tendencies.

(4) Classification of content themes

Rural revitalization literature is classified into five categories according to themes: political, economic, social, cultural, and human geography, and the following hypothesis is proposed:

H4a: The communication effect is related to different thematic contents, and all thematic contents positively affect the communication effect.

(5) Users' emotional attitudes

The emotional attitudes towards rural revitalization literature contained in user comments are divided into three categories: positive, neutral and negative, and the following hypotheses are proposed based on the three emotions:

H5a: The dissemination effect is related to all three tendencies of the comments, and the positive emotional tendency positively affects the dissemination effect compared to other emotional tendencies.

3.1.3. Variable Coding

The purpose of coding was to convert non-numeric research objects into numbers for quantification and to design a coding table for each variable based on the selected variables. Then five coders coded 200 rural revitalization literatures. The “Holsti formula” was used to test the reliability of the content analysis method, and the final average reliability of the five coders was 0.950, which exceeded the standard value of 0.8, and further represented a high degree of consistency in the analysis results of the five coders.

3.2. Impact Level Test Methodology

The support vector machine model is selected for calculation, and the degree of influence of different influencing factors on the dissemination effect is judged by the feature importance ranking. The larger the value of feature importance, the stronger the influence on the international dissemination effect of rural revitalization literature.

The mechanism of SVM is to find an optimal classification hyperplane that meets the classification requirements according to the principle of minimizing structural risk, and at the same time maximize the distance between the hyperplane and the sample sets of different classes. This process can be reduced to solving an optimization (convex programming) problem. To solve nonlinear classification problems, Support Vector Machines (SVMs) are based on Mercer's kernel expansion theorem, which maps the sample space to a high-dimensional or infinite-dimensional feature space (Hilbert space) through a nonlinear mapping, thus using a linear learning machine to solve highly nonlinear classification and regression problems in the feature space.

First introduce the notion of a perfect decision surface to the nearest data interval. The directed distance $\tilde{d}_i$ from any sample x_i to the decision surface $x_i\beta + \beta_0 = 0$ is:

$$\tilde{d}_i = \frac{x_i^T \beta + \beta_0}{\|\beta\|^2} \tag{23}$$

The interval from the perfect decision surface to the nearest data is formed by turning the directed distance into an absolute distance and the sample x_i into the nearest sample:

$$d_i = \frac{\min_i \left\{ y_i \left(x_i^T \beta + \beta_0 \right) \right\}}{\|\beta\|^2} \tag{24}$$

where maximizing the interval is the most desired and only perfect decision surface:

$$\beta_0^*, \beta^* = \arg\max_{\beta^a, \beta} \left\{ \frac{\min_i \left\{ y_i (x_i^T \beta + \beta_0) \right\}}{\|\beta\|^2} \right\}_{\alpha \geq 0} \tag{25}$$

Set the numerator to 1 and also turn the numerator into a constraint. Turn the optimization problem above into a denominator minimization problem with constraints:

$$\beta_0^*, \beta^* = \arg\min_{\beta_0, \beta} \left\{ \frac{1}{2} \|\beta\|^2 \right\}, \min_i \{ y_i (x_i^T \beta + \beta_0) \} = 1 \tag{26}$$

That is, it reduces to a constrained quadratic programming problem with constraints:

$$\begin{aligned} &\beta_0^*, \beta^* = \arg\min_{\beta_0, \beta} \left\{ \frac{1}{2} \|\beta\|^2 \right\} \\ &\min_i \left\{ y_i (x_i^T \beta + \beta_0) \right\} \geq 1, i = 1, \cdots, m \end{aligned} \tag{27}$$

Then construct the Lagrangian function $L(\beta_0, \beta; \alpha)$ containing the multipliers, and thus the above optimization problem becomes:

$$\beta_0^*, \beta^* = \arg\min_{\beta_0, \beta} \max_{\alpha \geq 0} L(\beta_0, \beta; \alpha) \tag{28}$$

$$L(\beta_0, \beta; \alpha) = \frac{1}{2} \|\beta\|^2 - \left(\sum_{i=1}^{m} \alpha_i y_i x_i^T \right) \beta - \left(\sum_{i=1}^{m} \alpha_i y_i \right) \beta_0 + \sum_{i=1}^{m} \alpha_i \tag{29}$$

Solve for α, β_0, β, which in turn gives the model:

$$y = sign\left(\sum_{i=1}^{m} \alpha_i y_i x_i^T x + \beta_0 \right) \tag{30}$$

Support vector machine classification algorithms can be simply summarized as achieving classification through dimensionality and linearization. In this paper, we use support vector machines to solve the nonlinear multiclassification problem of factors influencing the effect of international dissemination of rural revitalization literature.

The nonlinear classification problem, in essence, is to map the input vectors to a high-dimensional feature space through nonlinear changes, and then solve the optimal linear classification surface in this new space. The kernel function can map the original data to a high-dimensional feature space without computing the mapped vectors. This is because the kernel function uses the dot product form to compute the inner product of two vectors in the new feature space, thus avoiding the need to perform explicit vector computation. This allows the use of linear classification algorithms in the new high-dimensional feature space to solve the nonlinear classification problem of the original data. Common kernel functions are listed below:

① Linear kernel function: $K(x_i, x_j) = (x_i^T x_j)$.

② Polynomial kernel function: $K(x_i, x_j) = (x_i^T x_j + 1)^p$.

③ Radial basis kernel function: $K(x_i, x_j) = \exp\left(-\frac{\|x_i - x_j\|^2}{g} \right)$.

④ Sigmoid kernel function: $K(x_i, x_j) = \tanh\left(\beta (x_i^T x_j) + c \right)$.

In this paper, the radial basis kernel function is used for calculation.

3.3. Correlation *Test*

3.3.1. The Dimension of the Communicator

The results of the test of the independent variables related to the source of information and the dissemination effect are shown in Table 3. The test results show that the probability values of the four independent variables related to the source of information are less than 0.05 for official and unofficial, and greater than 0.05 for internal and external, which further indicates that the independent variables of

the source of information are related to the dissemination effect for official and unofficial, and are not related to the dissemination effect for internal and external.

Table 3. The results of the information source variable and the propagation effect.

Two-sample	Wilcoxon	rank-sum	(Mann-Whitney)	test
Prob(official)	>	|z|	=	0.005
Prob(unofficial)	>	|z|	=	0.004
Prob(churchyard)	>	|z|	=	0.078
Prob(abroad)	>	|z|	=	0.072

3.3.2. Dissemination of the Content Dimension

The communication content dimension contains content expression form, content emotion attitude and content theme classification, and the test results of the communication content dimension are shown in Table 4. The test results show that among the probabilities (Prob) of the three independent variables related to content expression form, except for the text-video type which is greater than 0.05, the probabilities of the other independent variables are less than 0.05, which further indicates that among the independent variables related to content expression form, the text-video type has no correlation with the communication effect, and the text-only and graphic-text type are both related to the communication effect. The probabilities (Prob) of the three independent variables related to content emotional attitudes are all greater than 0.05, further indicating that none of the three types of emotions of rural revitalization literature content are correlated with the dissemination effect. Among the probability values of the five independent variables related to the content theme classification of rural revitalization literature, the values of economy and culture are less than 0.05, and the rest are all greater than 0.05, further indicating that among the independent variables of the content theme classification, the themes of economy and culture are related to the international dissemination effect of rural revitalization literature, and the rest of the variables are not related to the dissemination effect.

Table 4. The test results of the content dimension of the propagation.

	Two-sample	Wilcoxon	rank-sum	(Mann-Whitney)	test
Content expression	Prob(pure text)	>	|z|	=	0.001
	Prob(image-text)	>	|z|	=	0.003
	Prob(text video)	>	|z|	=	0.323
Content emotion	Prob(positive)	>	|z|	=	0.284
	Prob(neutral)	>	|z|	=	0.539
	Prob(negative)	>	|z|	=	0.382
Content topic classification	Prob(politics)	>	|z|	=	0.623
	Prob(economy)	>	|z|	=	0.009
	Prob(society)	>	|z|	=	0.452
	Prob(culture)	>	|z|	=	0.008
	Prob(geography)	>	|z|	=	0.553

3.3.3. The Object Dimension of Communication

The independent variables related to the emotional attitude of user reviews are positive, neutral and negative. The results of the test of user reviews emotional attitudes are shown in Table 5. The test results show that among the probability values of the three independent variables related to the emotional attitude of user comments, the values of positive and neutral emotions are less than 0.05, and the value of negative emotions is greater than 0.05, which further indicates that the positive and neutral emotions in user comments are related to the communication effect, and the negative emotions are not related to the communication effect.

Table 5. The test results of emotional attitude of user comments.

Two-sample	Wilcoxon	rank-sum	(Mann-Whitney)	test
Prob(positive)	>	|z|	=	0.008
Prob(neutral)	>	|z|	=	0.019
Prob(negative)	>	|z|	=	0.472

3.4. Impact Level Test

The feature importance value is a machine learning measure of the degree of influence of the independent variable on the dependent variable, the larger the value of the feature importance of the independent variable, the stronger the influence on the dependent variable, the higher the ranking. The support vector machine (SVM) model is used to calculate the feature importance value of the influencing factors of the international dissemination effect of rural revitalization literature, and the results of the ranking of the feature importance of the influencing factors are shown in Figure 3. From the viewpoint of rural revitalization literature content presentation, graphic type and plain text type have relatively greater influence on communication effect, with feature importance values of 0.089 and 0.076. From the viewpoint of content theme classification cultural and economic themes have the greatest influence, with feature importance values of 0.080 and 0.068. In terms of credibility of the source, the country-specific difference of the source has a greater influence than the identity difference. In terms of the emotional tendency of rural revitalization literature content, neutral attitude reports have a more prominent impact on the communication effect, with a characteristic importance value of 0.079. And the influence of positive emotion on communication effect is the strongest among the affective attitudes of user comments with a characteristic importance value of 0.067, followed by neutral affective attitudes of 0.060.The hypotheses H3a and H4a of this paper passed the test.

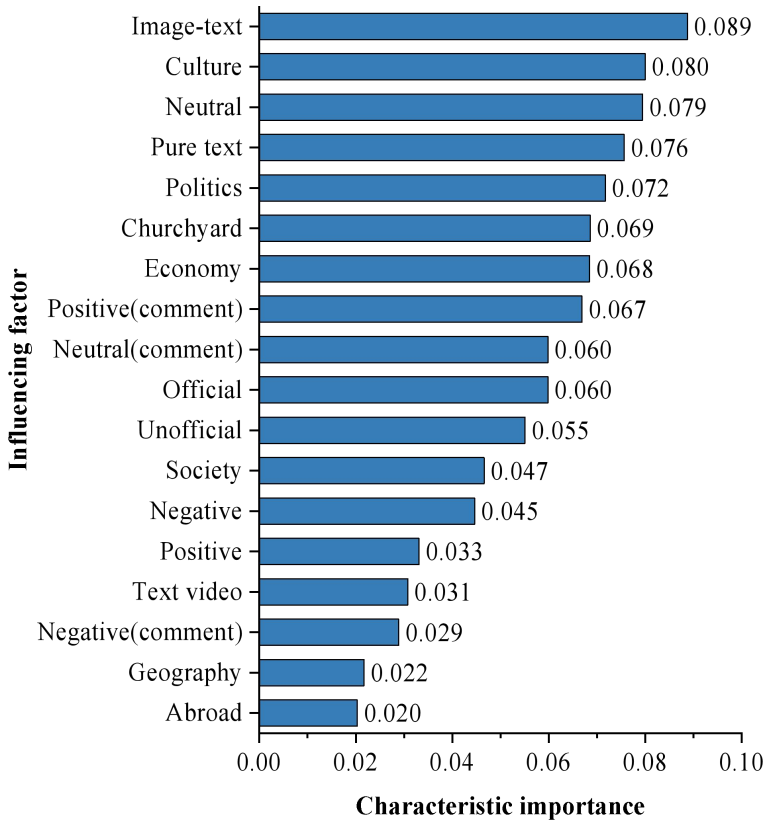

Figure 3. The sorting results of the significance of the factors.

4. The Path of Enhancing the International Dissemination of Rural Revitalization Literature

After the above discussion on the assessment of the international communication of rural revitalization literature and its communication influencing factors, it is found that the communication effect of rural revitalization literature is significantly related to its communication subject, communication content, communication mode, etc. Therefore, from several aspects, it puts forward the high-quality enhancement path of the international communication of rural revitalization literature.

4.1. Diversification of Communication Subjects

The international dissemination of rural revitalization literature cannot rely solely on the official media as the main body of communication. Folk subjects, especially the youth group as the main active

users of social platforms, have the linguistic characteristics and preferences of multicultural platform communication, and these youth groups can produce strong interaction and good dialogues between the subjects when they carry out cross-cultural communication with young netizens in the international media environment. In the process of foreign communication, civil communication subjects can make up for the differences between the mainstream media and government media and other countries in terms of space, discourse expression, communication themes and communication methods in international communication, thus forming a real pattern of “universal foreign communication”. Therefore, civil society should take the initiative to play a dynamic role in spreading the story of rural revitalization, and further transmit the experience of rural revitalization to the international community. At the same time, as the number of international students going abroad increases year by year, young netizens abroad should also actively participate in telling the story of China's rural revitalization on the Internet platform, and even take the initiative of communication from the perspective of those who have experienced it, so as to improve the understanding of rural revitalization of overseas audiences.

4.2. Civilization of Communication Content

In the process of external communication, the content of the story chosen plays a crucial role in the final effect of the communication. The author's goal of persuasion can be effectively achieved by projecting certain characteristics onto the readers through the language text, if these characteristics match those of the actual readers, or if the readers are willing to accept this projection on their own initiative. In the international dissemination work of rural revitalization literature, it is all the more important for the propagandist to start from the perspective of the recipient of the text, so as to facilitate the reader's reading and acceptance. In China's many years of rural revitalization history, many touching stories have emerged. By showing the spiritual connotation of ordinary poor households and touching examples of poverty-alleviation cadres and villagers waiting to be lifted out of poverty, the storytelling news takes “emotion” as a guide, starting from a small point to trigger the emotional resonance of western audiences, and tells the common people's stories to To gain the recognition of the recipients of the text, we take the initiative to focus on the common textual approach of the international community, and to narrow the distance between us and the people of the world in a cross-cultural context.

4.3. Innovative Modes of Dissemination

With the development of the emerging technology of the Internet, various new media forms such as graphic reports, Internet live broadcasting, short videos, vlogs, H5, etc. have begun to appear. When the communication process of rural revitalization literature strengthens the integration and interaction between different media forms, it can improve the personalization and infectiousness of the overall communication content. The interaction and integration of media is also more conducive to the all-round, diversified and in-depth presentation of the changes in China's countryside since its revitalization. The addition of non-text media such as video, pictures and audio also reduces to a certain extent the deviation of the audience's understanding of the theme content, and effectively supplements the content explained in the literature on rural revitalization.

In addition to the integration of different media forms, through the exchange of media of different cultural backgrounds and the further formation of a common discourse system, it is also possible to solve the problem of “cultural divide” in communication, help the media grasp the initiative of public opinion in the diversified and complicated international public opinion environment, and carry out the international dissemination of rural revitalization literature effectively. At the same time, exchanges and cooperation between media of different cultural backgrounds can also help to effectively integrate resources, lower communication barriers and expand the scope of dissemination.

5. Conclusion

The study constructs an evaluation index system to assess the international dissemination effect of rural revitalization literature. Then it selects the influencing factors of its international communication, discovers the correlation between the influencing factors and the communication effect, and explores the sound effect of each influencing factor on the international communication of rural revitalization literature by using the support vector machine model. On this basis, the optimization path of high-quality international communication of rural revitalization literature is proposed.

Reader participation and content quality have the greatest contribution to the evaluation of the effect of international dissemination of rural revitalization literature, with weights of 0.299 and 0.290 respectively, and the number of likes received, the number of views of works and the number of original comments have the greatest weights among the tertiary indexes, which are all above 0.09. The international dissemination effect scores of the sample rural revitalization literary works range from 1.57

to 3.96, with most of the works scoring between 1.5 and 3.5, accounting for 94.66% of the total, and the overall international dissemination effect of rural revitalization literary works is average. The graphic type of content presentation, the cultural type of content theme classification, and the neutral attitude of content emotional tendency have the greatest degree of influence on the international communication effect of rural revitalization literature, with feature importance values of 0.089, 0.080, and 0.079, respectively. It is suggested to enhance the high-quality communication effect of rural revitalization literature from three dimensions of diversification of communication subjects, civilianization of communication contents and innovation of communication methods, through interactions between subjects to enhance the infectious power, inter-construction of texts to enhance the cross-cultural communication power, and inter-media fusion to highlight the multi-modal expression power.

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