Influencing Factors of Online Public Opinion Dissemination in Universities from a Motivational Perspective: A Case Study of Shandong Province (Postprint)

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Abstract

[Purpose/Significance] This study investigates the factors influencing the dissemination of online public opinion in universities, which is of great significance for maintaining normal order in universities and social stability. [Method/Process] Based on Motivation Theory and the Theory of Planned Behavior, and taking the university student population in Shandong Province as the research subject, this study employs Structural Equation Modeling (SEM) and fuzzy-set Qualitative Comparative Analysis (fsQCA). Through SEM, it tests 12 hypotheses related to 6 influencing variables affecting university students' online public opinion dissemination; through fsQCA, it explores the antecedent configurations that trigger students' dissemination intention and behavior. [Results/Conclusion] The findings indicate that while individual variables may have insignificant effects, the effects of complex combinations of multiple variables cannot be overlooked. Social motivation is a core condition for university students' dissemination intention. Dissemination intention, information literacy, and trust are core conditions for university students' dissemination behavior, with all three exerting significant positive effects on such behavior. Social participation awareness has a mediating effect between social motivation and dissemination intention.

Full Text

Research on Influencing Factors of Network Public Opinion Dissemination in Universities from a Motivational Perspective: Taking Universities in Shandong Province as an Example

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Abstract:
[Purpose/Significance] This study investigates the influencing factors of network public opinion dissemination in universities, which is of great significance for maintaining normal university order and social stability. [Method/Process] Based on motivation theory and the theory of planned behavior, and taking university students in Shandong Province as the research object, this study employs structural equation modeling (SEM) and fuzzy-set qualitative comparative analysis (fsQCA). Through SEM, it tests 12 hypotheses related to six influencing variables that affect university students' network public opinion dissemination. Through fsQCA, it explores the antecedent configurations that trigger students' dissemination willingness and behavior. [Result/Conclusion] The study finds that while the effect of individual variables may not be significant, the cumulative impact resulting from complex combinations of multiple variables cannot be underestimated. Social motivation is the core condition influencing students' dissemination willingness. Dissemination willingness, information literacy, and trust are core conditions for students' dissemination behavior, each exerting a significant positive impact on students' dissemination behavior. Social participation awareness has a mediating effect between social motivation and dissemination willingness.

Keywords: Network public opinion; Social motivation; Structural equation model (SEM); Fuzzy-set qualitative comparative analysis (fsQCA)

1.1 Motivation Theory

Psychologists define motivation as the internal psychological needs and driving forces that influence the initiation, direction, intensity, and persistence of individual behavior [11]. Motivation is considered a crucial factor affecting human behavior, as it can prompt individuals to act and is closely related to their needs, interests, and goals. Motivation theories typically explore why individuals engage in certain activities, how they sustain action to achieve goals, and explain the nature of behavior and the mechanisms underlying motivation generation [13]. Since motivation is a complex psychological process with diverse research directions, Raacke [14] categorized motivation into personal motivation and social motivation in the context of social media usage. Social motivation

posits that social factors such as social progress, social recognition, and sense of belonging influence and drive individual achievement behaviors [14], while also serving as an important factor affecting individual intentions [15] and promoting willingness and behavior in disseminating network public opinion.

1.2 Theory of Planned Behavior

The Theory of Planned Behavior is a social psychology theory [12] used to explain individual behavioral decisions and actual behaviors, and has been widely applied to explain user behavior [16]. For example, TPB has been used to predict academic information sharing intentions [17], forecast network community user participation behavior in public health emergencies [18], integrate and predict rumor-combating behavior in society [19], and predict middle school students' continuous usage intention of AI learning platforms [20]. When university students encounter network public opinion on campus, they consider their behavioral control and behavioral intentions, which collectively influence their participation level and behavioral choices in network public opinion. University network public opinion dissemination is closely related to the Theory of Planned Behavior, and this study investigates university students' network public opinion dissemination willingness and behavior based on this theory.

1.3 Research Status on University Network Public Opinion Dissemination

The popularity of the Internet has made information dissemination faster and more extensive, and network public opinion has become an important topic of concern. Scholars both domestically and internationally have conducted related research on university network public opinion [21-22]. The university student group is the primary audience for university network public opinion dissemination [23]. In infectious disease models, opinion leaders, netizens, universities, and events are important factors affecting university network public opinion dissemination [24]. As universities are important venues for leading diverse social ideologies, with large numbers of faculty and students and high media attention, once emergencies occur, the speed and influence of network public opinion dissemination will far exceed imagination [25]. Once university network public opinion forms, it can trigger public distrust and negative evaluations of universities, damaging their reputation and image, and even affecting long-term social stability [26]. Currently, there are few foreign studies on influencing factors of university network public opinion dissemination, while domestic scholars have conducted a series of studies.

Domestic research on university network public opinion dissemination mainly involves two aspects: First, research on dissemination paths and evolution. Such studies focus on the mechanisms and patterns of university network public opinion dissemination, exploring its dissemination channels, influencing factors, and evolutionary paths, and attempting to reveal underlying social, psychological, and cognitive reasons. Wei Yuhang et al. [7] constructed a dissemination influ-

encing factor model through grounded theory and illustrated the model through case studies across time dimensions. Wang Zhe et al. [27] discussed the evolutionary mechanisms and dissemination characteristics of university network public opinion at different stages from a crisis communication perspective. Shao Zeqian [28] explored influencing factors of university student public opinion dissemination from a psychological distance perspective, obtaining important influencing factors through stepwise regression analysis. Second, research on monitoring and early warning. Xing Yunfei et al. [29] constructed a network monitoring model through analytic hierarchy process and fuzzy comprehensive evaluation to classify public opinion levels. Liu Jianxin et al. [9] analyzed network measurement indicators and different objects through social network analysis using the "A City Bus Drowning Incident" as an example. Xu et al. [30] proposed a multi-level dynamic monitoring model based on analysis of the current situation of university network public opinion to promote professionalism in university network public opinion management. In summary, domestic research on university network public opinion dissemination mainly focuses on dissemination paths/evolution and monitoring/early warning, with few studies exploring influencing factors from a motivational perspective or considering the impact of information literacy. To better investigate the effects of multiple variables such as social motivation and information literacy on university network public opinion dissemination and address issues of fuzziness or uncertainty in research, this study employs a cross-method approach combining SEM and fsQCA.

2 Research Hypotheses

Social motivation, trust, dissemination willingness, information literacy, social participation awareness, and dissemination behavior constitute a comprehensive analytical framework. Since dissemination behavior is an endogenous variable that does not affect other variables, this study constructs a research model of influencing factors for university students' network public opinion dissemination from the following five variables.

2.1 Social Motivation

Social motivation refers to the internal driving force that propels people to participate in social activities or achieve certain social goals, influencing behavior in various ways [15]. Hilvert-Bruce et al. [31] consider social motivation as the basic force driving social action. Ryan et al. [32] view social motivation as the internal driving force promoting social activities. From a psychological perspective, we define social motivation as individuals' psychological tendency to engage in certain activities to satisfy their social needs. Social participation awareness refers to individuals' consciousness of having obligations and responsibilities to participate in various aspects of society and contribute to social development and progress [33]. Social motivation is directly related to social participation awareness and is the core element driving it [34]. To satisfy their social needs, university students' social participation awareness is inevitably influenced under

the drive of social motivation. Chen Jun et al. [35] explored the impact of different motivations on word-of-mouth dissemination willingness and found that social motivation significantly affects users' dissemination willingness. However, the impact of network public opinion dissemination is larger and broader than word-of-mouth dissemination, making it worthwhile to explore the impact of social motivation on users' dissemination willingness in this new context. People often associate others' behavioral motivations with their trustworthiness. When others' behaviors are motivated by social responsibility or cooperative willingness, people are more inclined to believe in these motivations, thereby increasing trust [36]. Based on this, the following hypotheses are proposed:

H1: Social motivation has a significant positive impact on social participation awareness.
H2: Social motivation has a significant positive impact on dissemination willingness.
H3: Social motivation has a significant positive impact on trust.

2.2 Trust

When people trust individuals or organizations, they are more likely to disseminate information from those sources because they believe the information is true, reliable, and valuable. Trust affects users' behavioral intentions to use social media [37]. When people have high trust in Weibo users, they are usually more willing to forward information posted by those they follow [38] because they believe these users will post valuable information that may be helpful to their social circles. Based on this, the following hypotheses are proposed:

H4: Trust has a significant positive impact on dissemination willingness.
H5: Trust has a significant positive impact on dissemination behavior.
H6: Trust has a mediating effect between social motivation and dissemination willingness.

2.3 Dissemination Willingness

The Theory of Planned Behavior posits that behavioral intention influences behavior and represents an individual's internal motivation to adopt a specific action [16]. Many studies have proven that behavioral intention is a direct factor affecting behavior [39-40]. In this study, users' behavioral intention is equivalent to the willingness to disseminate network public opinion, and dissemination willingness may be a direct factor influencing dissemination behavior. Based on this, the following hypothesis is proposed:

H7: Dissemination willingness has a significant positive impact on dissemination behavior.

2.4 Information Literacy

Information literacy was first proposed by American librarian Zurkowski [41], referring to an individual's ability to acquire, evaluate, use, and transmit information. Individuals with high information literacy possess strong information acquisition, evaluation, integration, and sharing capabilities [42], which can enhance their ability to obtain, understand, evaluate, and disseminate information, thereby affecting their dissemination willingness. Li Baomin et al. [43] believe that information literacy plays an important role in promoting social participation awareness. Based on this, the following hypotheses are proposed:

H8: Information literacy has a significant positive impact on dissemination willingness.
H9: Information literacy has a significant positive impact on social participation awareness.
H10: Information literacy has a significant positive impact on dissemination behavior.

2.5 Social Participation Awareness

Social participation awareness refers to individuals' consciousness of having obligations and responsibilities to participate in various aspects of society and contribute to social development and progress [33]. Al-Oraiqat et al. [44] explored the impact of social participation awareness on individual opinion dissemination on social media and found that social participation awareness can promote individual opinion dissemination. Individuals with high social participation awareness typically actively engage in social affairs, express their views and attitudes, and have stronger dissemination willingness. Based on this, the following hypotheses are proposed:

H11: Social participation awareness has a significant positive impact on dissemination willingness.
H12: Social participation awareness has a mediating effect between social motivation and dissemination willingness.

Based on the above analysis, this study constructs a research model of influencing factors for university students' network public opinion dissemination, as shown in Figure 1 [Figure 1: see original paper].

Table 1 Variables and Measurement Items

Variable	Measurement Items	Source
Social Participation Awareness (CSP)	I have forwarded/shared/commented on public opinion information on social media. I actively follow information related to university public opinion.	Wu Xiaoli [45]

Variable	Measurement Items	Source
	I frequently forward and share university public opinion information on social websites.	
	I often participate in social activities.	
	I believe social activities enrich my life.	
	I actively share my experiences in social activities.	
	I have a positive attitude toward social participation.	Zhao Jinlou et al. [46]
Dissemination Willingness (DW)	If I find a discussion area similar to campus emergency public opinion, I will forward the information.	
	I will forward campus emergency public opinion to my family and friends.	
	If I find a discussion area similar to campus emergency public opinion, I will share my views.	Lee et al. [47]
	I will continue to share information on social media.	
Social Motivation (SM)	I feel happy when sharing public opinion information.	Hernandez et al. [48]; Hilvert-Bruce et al. [31]
	I share public opinion information with other users mainly to let friends and followers understand my views.	Xiong et al. [49]
	I share public opinion information with other users mainly to enhance their feelings toward me.	
	I share public opinion information with other users mainly to gain their support.	
Trust (TR)	I believe websites protect personal privacy security.	
	I believe disseminating Weibo information will not lead to personal information leakage.	
	I believe websites can filter harmful information in a timely manner.	
	I believe content on websites is authentic.	

Variable	Measurement Items	Source
Information Literacy (IL)	I can distinguish the authenticity and reliability of public opinion information.	Liang Xingkun et al. [50]; Wu Xiaowei et al. [51]
	I can effectively screen useful information and quickly find what I need.	
	I am confident that the information I provide is clear and reliable.	
	When encountering conflicting viewpoints, I can comprehensively collect information and make my own judgment.	

3 Questionnaire Design

As a major education province in China, Shandong has numerous universities and university students, with relatively high risks of university network public opinion incidents. This study targets regular undergraduate university students in Shandong Province, using a questionnaire survey for data collection and empirical research. The questionnaire was primarily based on mature scales from domestic and international research, with appropriate modifications according to network public opinion contexts. A seven-point Likert scale was used to record respondents' attitudes toward questionnaire items (1 = strongly disagree, 7 = strongly agree). The questionnaire was designed according to uniform standards and distributed online through Wenjuanxing to university students in Shandong universities that have experienced many network public opinion incidents.

To ensure questionnaire quality, small-scale testing and evaluation were conducted before formal distribution to identify potential problems and make improvements. A total of 102 pre-test questionnaires were collected, and some respondents were interviewed. The overall Cronbach's α coefficient of the pre-test questionnaire was 0.762. Through exploratory factor analysis, items consistent with the initial construct dimensions were retained, while inconsistent items were deleted. Based on respondent feedback, unclear items were modified or deleted, including 1 item for social participation awareness, 1 for dissemination willingness, 1 for social motivation, 1 for trust, and 3 for information literacy.

A total of 460 formal questionnaires were distributed. After excluding incomplete and inconsistent responses, 380 valid questionnaires were collected, with an effective rate of 82.6%. Descriptive statistics are shown in Table 2 . Among respondents, 42.4% were male and 57.6% were female. Undergraduates accounted for 85% and graduate students for 15%. Liberal arts majors comprised 50.5%, science majors 28.2%, engineering majors 16.6%, and arts and sports majors

4.7%. Regarding daily internet usage time, 8.7% spent 1-2 hours, 21.6% spent 2-4 hours, 28.2% spent 4-6 hours, and 41.5% spent more than 6 hours. Regarding frequency of following network public opinion, 22.9% followed daily, 42.1% frequently, 27.6% occasionally, and 7.4% rarely, indicating that most university students pay considerable attention to network public opinion.

Table 2 Descriptive Statistics of Valid Samples

Characteristic	Category	Count	Percentage (%)
Gender	Male	161	42.4
	Female	219	57.6
Education Level	Undergraduate	323	85.0
	Graduate	57	15.0
Major	Liberal Arts	192	50.5
	Science	107	28.2
	Engineering	63	16.6
	Arts and Sports	18	4.7
Daily Internet Usage	1-2 hours	33	8.7
	2-4 hours	82	21.6
	4-6 hours	107	28.2
	6+ hours	158	41.5
Public Opinion Following Frequency	Daily	87	22.9
	Frequently	160	42.1
	Occasionally	105	27.6
	Rarely	28	7.4

4.1 Normal Distribution Test

Normal distribution tests were conducted to evaluate the distribution of research data, obtaining information about shape, central tendency, and dispersion. Test results showed that the absolute values of skewness for all measurement items were less than 2 and the absolute values of kurtosis were less than 7, indicating that the research data followed a normal distribution and could be analyzed using Maximum Likelihood Estimation (MLE).

4.2 Common Method Bias Test

To control and avoid common method bias caused by identical data collection methods and homogeneous respondents, and to improve data credibility and validity, Harman's single-factor method was used to test for common method bias [53]. Principal component analysis was conducted using SPSS 26.0, as shown in Table 3 . Six principal components were extracted, explaining 74.804% of total variance. The first principal component explained 17.892% of total variance, far below the 40% threshold, indicating that no single component explained most of the variance and that common method bias was not a problem in this study.

Table 3 Principal Component Analysis

Component	Initial Eigenvalue	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings
1	...	...	...
2	...	...	...
3	...	...	...
4	...	...	...
5	...	...	...
6	...	...	...

4.3 Measurement Model Analysis

Structural equation modeling is a comprehensive statistical analysis method for exploring relationships and influence mechanisms among multiple variables. It is an extension of traditional linear modeling techniques [54], aiming to understand relationships between various measurement criteria and latent variables, also known as latent variable analysis and covariance structure analysis. Since all variables in this research model are latent variables measured through items as observed variables, SEM is appropriate for this study.

4.3.1 Reliability and Validity Test This study used Cronbach's α coefficient and Composite Reliability (CR) to measure internal consistency. SPSS 26.0 was used to analyze reliability and validity of dissemination behavior, social participation awareness, dissemination willingness, social motivation, trust, and information literacy. All latent variables had CR values greater than 0.70, and all variables had Cronbach's α coefficients greater than 0.80, indicating good reliability and internal consistency of the questionnaire.

Validity refers to the degree to which a measurement accurately captures the intended construct. Validity was assessed from three aspects: construct validity, convergent validity, and discriminant validity. KMO and Bartlett's sphericity tests were conducted, yielding a KMO value of 0.95, exceeding the reference value of 0.80, indicating suitability for factor analysis. Exploratory factor analysis was used to test construct validity, as shown in Table 4 . All observed variables had factor loadings greater than 0.60, indicating good construct validity [55]. All Average Variance Extracted (AVE) values exceeded 0.50, indicating good convergent validity [56]. The square root of each variable's AVE was greater than its correlation coefficients with other variables, demonstrating good discriminant validity, as shown in Table 5 . In summary, the scales used in this study demonstrate good validity [57].

Table 4 Confirmatory Factor Analysis Results

Latent Variable	Cronbach's α	CR	AVE
Social Participation Awareness	...	...	...
Dissemination Willingness	...	...	...
Social Motivation	...	...	...
Trust	...	...	...
Information Literacy	...	...	...
Dissemination Behavior	...	...	...

Table 5 Discriminant Validity Test Results

	Social Participation Awareness	Dissemination Willingness	Social Motivation	Trust	Information Literacy	Dissemination Behavior
Social Participation Awareness	0.78					
Dissemination Willingness	...					
Social Motivation	...	...				
Trust	...	...	...			
Information Literacy	...	...	...	...		
Dissemination Behavior	...	...	...	...		...

4.4.1 Model Fit Test

To verify the match between the theoretical model and research data, model fit was examined. Results are shown in Table 6 . Due to the large sample size in

this study, the ideal value for CMIN/DF was expanded, with the criterion set at less than 3. All model fit indices reached acceptable values, indicating good structural model fit and ability to explain data variation.

Table 6 Model Fit Test Results

Fit Index	Criterion	Result
CMIN/DF	<3	...
RMSEA	<0.08	...
Absolute Fit Indices	>0.9 (ideal); >0.8 (acceptable)	...
Incremental Fit Indices	>0.9 (ideal); >0.8 (acceptable)	...
Parsimonious Fit Indices	>0.9 (ideal); >0.8 (acceptable)	...

Path analysis was conducted using AMOS 26.0, with results shown in Figure 2 [Figure 2: see original paper]. Among the 10 hypotheses proposed in the research model, all were supported except H4 and H8. Social motivation (β=0.369, p<0.001) and information literacy (β=0.290, p<0.001) had significant positive effects on social participation awareness, supporting H1 and H9. Social motivation (β=0.564, p<0.001) had a significant positive effect on trust, supporting H3. Trust (β=0.278, p<0.001), dissemination willingness (β=0.477, p<0.001), and information literacy (β=0.307, p<0.001) had significant positive effects on dissemination behavior, supporting H5, H7, and H10. Social motivation (β=0.613, p<0.001) and social participation awareness (β=0.306, p<0.001) had significant positive effects on dissemination willingness, supporting H2 and H11. Trust (β=0.030, p=0.604) and information literacy (β=0.011, p=0.798) had no significant effects on dissemination willingness, so H4 and H8 were not supported.

Figure 2 [Figure 2: see original paper] Path Analysis Results

Note: ** indicates extremely significant level (P<0.001); ** indicates highly significant level (P<0.01); * indicates significant level (P<0.05); NS indicates not significant (P>0.05).*

4.4.2 Mediation Effect Test

Following Edwards' recommendations [58], this study used bootstrap analysis in AMOS 26.0 software for mediation effect testing, with 5,000 resamples, bias-corrected confidence intervals, and percentile confidence intervals set at 95% confidence level. VB programming language was used to write code for calculating mediation effects [52].

Table 7 Mediation Effect Test Results

Path	Bias-corrected 95% CI	Percentile 95% CI
	Lower	Upper

Path	Bias-corrected 95% CI	Percentile 95% CI
SM→CSP→DW	0.068	0.183
SM→TR→DW	-0.025	0.127

As shown in Table 7: (1) In the SM→CSP→DW path, the indirect effect did not include zero in either confidence interval, indicating that the indirect effect exists. Social participation awareness has a mediating effect between social motivation and dissemination willingness, supporting H12. (2) In the SM→TR→DW path, both confidence intervals included zero, indicating that the indirect effect does not exist. Trust does not have a mediating effect between social motivation and dissemination willingness, so H6 is not supported.

Table 8 Hypothesis Test Results

Hypothesis	Result
H1: Social motivation has a significant positive impact on social participation awareness.	Supported
H2: Social motivation has a significant positive impact on dissemination willingness.	Supported
H3: Social motivation has a significant positive impact on trust.	Supported
H4: Trust has a significant positive impact on dissemination willingness.	Not supported
H5: Trust has a significant positive impact on dissemination behavior.	Supported
H6: Trust has a mediating effect between social motivation and dissemination willingness.	Not supported
H7: Dissemination willingness has a significant positive impact on dissemination behavior.	Supported
H8: Information literacy has a significant positive impact on dissemination willingness.	Not supported
H9: Information literacy has a significant positive impact on social participation awareness.	Supported
H10: Information literacy has a significant positive impact on dissemination behavior.	Supported
H11: Social participation awareness has a significant positive impact on dissemination willingness.	Supported

Hypothesis	Result
H12: Social participation awareness has a mediating effect between social motivation and dissemination willingness.	Supported

5.1 Variable Calibration

Using fsQCA 3.0 software, variables were calibrated to make results interpretable. Mean values of latent variables were taken and calibrated according to the 5%, 95%, and crossover point 50% standards [59]. After calibration, necessity of antecedent conditions was tested. The consistency levels of individual antecedent conditions did not exceed 0.9. With dissemination willingness and dissemination behavior as outcome variables, the consistency levels of individual antecedent conditions were all below 0.9, indicating no necessary conditions. This study conducted configurational analysis combining multiple antecedent conditions.

5.2 fsQCA Results Analysis

Using fsQCA software, the consistency threshold was set at 0.8, case threshold at 2, and cases with PRI consistency below 0.7 were coded as 0 to construct a truth table for configurational analysis of antecedent variables. Results are shown in Tables 9 and 10. Following Ragin [59], core condition presence is indicated by a large solid circle ( ), peripheral condition presence by a small solid circle (•), core condition absence by a large crossed circle ( ), and peripheral condition absence by a small crossed circle ( ). Blank indicates the condition is irrelevant. The QCA truth table analysis identified two antecedent configurations for university students' dissemination willingness and four configurations for dissemination behavior.

5.2.1 Configurational Analysis with University Students' Dissemination Willingness as Outcome Variable The configurational analysis model for university students' dissemination willingness had an overall consistency of 0.883. Configurations S1 and S2 both had consistency greater than 0.9, with an overall coverage of 0.737, indicating good model explanatory power. The two configurations are:

(1) S1: This configuration consists of (CSP*SM), covering 66.1% of cases. Social participation awareness and social motivation are core conditions for university students' dissemination willingness, consistent with hypotheses H2 and H11 from the SEM analysis. When university students have high social participation awareness and high social motivation, they are more willing to express personal opinions on social media. Previous research has proven that individual social participation awareness can promote opinion dissemination [44], and

university students' dissemination willingness depends not only on social participation awareness but also on individual social motivation [60].

(2) S2: This configuration consists of (SM*TR*IL), covering 61.7% of cases. Social motivation, trust, and information literacy are core conditions for university students' dissemination willingness. Social motivation is consistent with hypothesis H2 from SEM, but trust and information literacy are inconsistent with hypotheses H4 and H8. Some studies have proven that trust positively affects public opinion dissemination willingness [61], and information literacy level also positively affects information sharing willingness [42].

Both configurations include social motivation as a core condition, and SEM analysis also found that social motivation has a strong effect on university students' dissemination willingness, indicating that social motivation is the core condition for university students' dissemination willingness.

Table 9 Antecedent Configurations for University Students' Dissemination Willingness

Configuration	CSP	SM	TR	IL	Raw Coverage	Unique Covera
S1					0.661	0.120
S2					0.617	0.076
Overall consistency: 0.883; Overall coverage: 0.737						

5.2.2 Configurational Analysis with University Students' Dissemination Behavior as Outcome Variable The configurational analysis model for university students' dissemination behavior had an overall consistency of 0.752. Configurations S1, S2, S3, and S4 all had consistency greater than 0.9, with an overall coverage of 0.910, indicating excellent model explanatory power. The four configurations are:

(1) S1: This configuration consists of (CSP*DW*SM), covering 60.0% of cases. Social participation awareness, dissemination willingness, and social motivation are core conditions for university students' dissemination behavior. S1 shows that regardless of how trust and information literacy affect dissemination behavior, as long as university students have high social participation awareness, dissemination willingness, and social motivation, their dissemination behavior will be more active. This configuration further proves the mediating effect of social participation awareness between social motivation and dissemination willingness, consistent with hypothesis H12 from SEM. Previous research has proven that behavioral intention is a direct factor affecting behavior [39], and university students' dissemination willingness significantly affects their dissemination behavior [62]. In social management practice, social motivation stimulates individual knowledge sharing behavior [63].

(2) S2: This configuration consists of (DW*SM*TR), covering 65.8% of cases. S2 indicates that dissemination willingness, social motivation, and trust are

core conditions for university students' dissemination behavior. When university students have high dissemination willingness, high social motivation, and high trust, they will show active dissemination behavior regardless of social participation awareness and information literacy levels. Trust is a core condition for university students' dissemination behavior, consistent with hypothesis H5 from SEM. Trust affects users' dissemination behavior in social media [64], and Weibo users with high trust are usually more willing to forward information posted by those they follow [38].

(3) S3: This configuration consists of (CSP*DW*TR*IL), covering 54.2% of cases. S3 indicates that dissemination willingness, trust, and information literacy are core conditions for university students' dissemination behavior, with social participation awareness as a peripheral condition and social motivation becoming irrelevant. Information literacy as a core condition is consistent with hypothesis H10 from SEM. Research shows that when individuals have proactive traits and information objects can be guaranteed, information literacy is a key factor triggering semi-public encountered information sharing behavior [65].

(4) S4: This configuration consists of (CSP*SM*TR*IL), covering 54.6% of cases. S4 indicates that social participation awareness, social motivation, trust, and information literacy are core conditions for university students' dissemination behavior, with dissemination willingness becoming irrelevant. As long as university students have these four core conditions, dissemination behavior will be triggered.

Furthermore, the coverage rates of S1 and S2 are both higher than those of S3 and S4. Therefore, this study considers dissemination willingness and social motivation, the core conditions shared by S1 and S2, as important factors affecting university students' dissemination behavior that deserve focused attention.

Table 10 Antecedent Configurations for University Students' Dissemination Behavior

Configuration	CSP	DW	SM	TR	IL	Raw Coverage	Unique
S1						0.600	0.045
S2						0.658	0.103
S3						0.542	0.087
S4						0.546	0.091
Overall consistency: 0.752; Overall coverage: 0.910							

This study targeted regular undergraduate university students in Shandong Province, investigating influencing factors of university students' network public opinion dissemination based on motivation theory and the theory of planned behavior. SEM was used to test related hypotheses, and fsQCA was employed to explore antecedent configurations triggering dissemination willingness and behavior, analyzing the interaction and synergistic effects among influencing

variables from a deeper level. Through SEM, fsQCA, and comparison of both results, the following findings emerge: (1) Individual variables may not have significant effects, but the utility of complex combinations of multiple variables cannot be ignored. (2) In SEM, dissemination willingness, information literacy, and trust all have significant positive effects on university students' dissemination behavior. In fsQCA, when dissemination behavior is the outcome variable, dissemination willingness and trust appear most frequently as core conditions across configurations. (3) SEM mediation effect analysis proved the mediating effect of social participation awareness between social motivation and dissemination willingness, but trust does not have a mediating effect between social motivation and dissemination willingness, which aligns with fsQCA results where social motivation is the core condition for university students' dissemination willingness.

This study has some limitations, such as not introducing moderating variables like respondents' gender or information source preferences, and the sample being limited to university students, which may involve age and education level restrictions. With the development of big data technology, future research can expand the selection range of research objects, increase sample size, and comprehensively consider differences among groups with different ages, occupations, and genders.

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Note: Figure translations are in progress. See original paper for figures.