

## Article

# The Influence of Multi-Variation In-Trust Web Feature Behavior Performance on the Information Dissemination Mechanism in Virtual Community

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**Citation:** Zhao, T.; Lin, J.; Zhang, Z. The Influence of Multi-Variation In-Trust Web Feature Behavior Performance on the Information Dissemination Mechanism in Virtual Community. *Sustainability* **2022**, *14*, 6122. <https://doi.org/10.3390/su14106122>

Academic Editors: Rosabel Roig-Vila, Jordi M. Antolí-Martínez, Antonio Cortijo, Vicent Martines, Santiago Mengual Andrés, Elena Sánchez-López, Fabrizio Manuel Sirignano and Alexander López Padrón

Received: 17 February 2022

Accepted: 10 May 2022

Published: 18 May 2022

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**Abstract:** With the flourishing development of the virtual community (VC), trust not only provides a guarantee and foundation for the VC operation, but is critical in activating individual trust-related behavior in a virtual setting. However, based on a review of prior literature on trust and the VC, those studies failed to pay enough attention to trust's multidimensional nature. Specifically, the relation among multidimensional components (conditions) in the research trust model is usually less discussed. This research focuses on a set of multidimensional conditions (components) that could activate trust in the context of the VC. The research framework also focuses on the factors of the virtual community scene and individual online behavior (based on intrinsic trustworthiness properties). Based on the classic trust framework, the operation and maintaining mechanism of the VC is analyzed, as well as the relationship between the trustworthy qualities of online users and their online behavior, which helps survey scale design, and then the multidimensions of trust's construct of the VC is successfully isolated. The concept of Multi-Variation In-Trust Web Feature Behavior Performance as the set of multidimensional conditions supporting trust is proposed in the paper, and the relation among four dimensional components (conditions) is verified. Finally, the connection and operation mechanism between the four dimensional conditions (components) of trust and information dissemination in the VC are explored.

**Keywords:** virtual community; information dissemination; trust; multidimensional conditions; multi-variation in-trust web feature behavior performance

## 1. Introduction

With the rapid development of 4G/5G network communication technology and the rapid popularization of smart terminals such as mobile phones, the transmission cost of information all over the world has been sharply reduced and is even close to zero [1]. With the help of intelligent terminals, people connect through online social media; exchange and share views, comments, and user experience; and gradually converge into a new group. Rheingold [2] called it “virtual community,” that is, people who share common interests and goals gradually form a social aggregate of the interpersonal network by using the Internet as a means of communication. The aggregate is willing to share each other's knowledge and information in space and can convey common trust and experience [3]. China's virtual community is booming as a country with an Internet penetration rate of 70.4% and 989 million Internet users [4]. After the outbreak of COVID-19, China's exposure reduction measures further motivated a large number of offline social activities to move online, which greatly stimulated the more frequent use of online media. Internet media profoundly changed knowledge generation and dissemination, and increased the enjoyment of life for a vast number of residents. In view of this, the research on the virtual

community has become a hot study in academic circles [5–11] and an important issue related to the public's vital interests.

Sorting out the relevant literature, the research on the virtual community can be roughly divided into three categories. First, the research on social networks and behavior on networks. Yang Shanlin et al. [12] regard social networks as specific information technology, and used models and theories to study the impact of motivation factors and network environment on online behaviors, or regard social networks as a platform for providing services and applications, and used statistics and econometrics to study the characteristics and laws of users when using social networks. Wu et al. [13] discussed modeling and measuring for social influence analysis with respect to user behaviors, interaction information, and so on, and introduced the context of discovering opinion leaders and social influence spreading. Victor et al. [14] advocated for the use of a trust model in which trust scores are (trust.distrust) couples, and fuzzy relations are preminent tools for modeling trust networks. Du et al. [15] studied the clustering of individual opinions and the handling of trust relationships, and proposed the trust-similarity analysis (TSA)-based clustering method, which considers the attributes of opinion similarity and the trust relationship. Li et al. [16], based on the panel data of the largest micro-blogging platform in China, explored the relationship among the post content, micro-blogger source, and user's online interaction behaviors. Jeon et al. [17] explored the relationship between individual features and manual judgment (Q & A) quality in Web services, and pointed out that the most important features (which affect Q & A quality) are related to the respondents themselves. The research on the Amazon website shows that it is not directly relevant to the consumer comments and the sales, but the number of comments is positively correlated with the sales [18–21], which means the expected results are correlated with the number of comments. Second, works on the user have focused on personality and user behavior on the Internet. Paioannou et al. [22] conducted an online survey of the SNS platform to examine the influence of privacy concerns, self-esteem, and the chosen SNS platform on the shaping of the digital identity. Amichai-Hamburger and Vinitzky [23] pointed out a strong connection between user personality and Facebook behavior. Kelly et al. [24] researched the association between personality as an individual difference factor and usage habits on Facebook. Marwick [25] explored the problem of users' self-presentation of identity based on the service structure and concept of social networking sites. Yang et al. [26] explored associations between online self-presentation and identity development in the young population (the college transition). Gosling et al. [27] pointed out that offline-online social contact and offline personality are consistent. Web users can effectively use the observable personal data of the Internet to form an accurate impression of general personality characteristics. Similarly, Leimeister et al. [28] used the breast cancer online community as background. The indicators that disclosed the patterns of past performance or sharing high-quality content were seen as perceived competence, and the performance of revealing personal data to other members was seen as perceived goodwill. Thirdly, works have focused on the information dissemination channels and web-users' information-sharing motivation in the virtual community. Berger and Jonah [29] pointed out that information can have amplifying effect in the network during the dissemination process, but the scale of the network may not promote the sharing of information. Zhang et al.'s [30] research on social media verified that the reliability of information sources and the trust of information recipients have a positive impact on information transmission. Boyle et al.'s [31] research showed how knowledge and network members promote knowledge flow, and verified that trust, altruism, reciprocity, social capital, social interaction relation, and so on also have an impact on knowledge sharing [32]. Based on the knowledge-sharing theory, Wang et al. [33] took multiple virtual communities' user data as samples, studied the impact of the virtual community reward mechanism on (explicit and implicit) knowledge sharing and its internal motivation, and developed the corresponding research framework. In the study by Wu et al. [34], a twofold personalized feedback mechanism for social network consensus is proposed. Personalized recommendation advice is generated based on the

principle of a recommendation being more acceptable the higher the level of trust is from which it is derived, and a balance between group consensus and individual personality can be achieved through the mechanism. Scholars Guha et al. [35], Walter et al. [36], and Wang and Wu [37] proposed their own trust-transferring model of social networks based on different trust-transferring strategies.

However, Hiltz and Wellman [38] argued that in the social network, the premise of interaction and communication among members is trust, and information can be exchanged and knowledge can be shared successfully in the community only when trust is a bridge. To Moorman et al. [39] and Rousseau et al. [40], trust is critical in facilitating exchange relationships when the setting is a lack of offline social norms and hardly any personal privacy clues. Ridings et al. [41] argued that trust provides sufficient guarantees that others will behave as they are expected to. Hsu et al. [42] posited that the interpersonal trust as well as system trust are critical in shaping individual behaviors in virtual settings. Riegelsberger et al. [43] presented a framework that shifts the perspective towards factors that support trustworthy behavior. We identified contextual properties (motivation based on temporal, social, and institutional embeddedness) and the actor's intrinsic properties (ability and motivation based on internalized norms and benevolence) that form the basis of trustworthy behavior.

Therefore, with the support of information technology, the virtual community (VC) provides a digital space for communication among persons. In the social organization constructed through the network, individuals' behavior performance, intrinsic personality, communication mode, group consensus, and action motivation all show similar characteristics to and considerable consistency with offline society. Trust is important for both interpersonal communication and information transmission of the VC.

However, few studies have shifted the perspective towards multidimensional conditions of the nature of trust and individual online behavior (based on intrinsic trustworthiness intrinsic) in the context of the VC. Moreover, fewer studies have tried to verify whether there is a positive relation among every multidimensional conditions (components) of trust. However, there is a relation among every multidimensional component of trust [44,45]. In a sense, they complement one another, comprising an unassailable foundation for trusting intentions and trust-related behaviors.

Drawing from above, this paper plans to do the following: (1) Based on a multidimensional research model of trust and literature of the virtual community (VC), a set of multi-dimensional components that can activate trust in the context of the VC will be explored, and the relation among every multidimensional component will be analyzed. (2) The operation and implementation mechanism of the VC is analyzed, and a set of multi-dimensional components supporting trust will be proposed. Moreover, with perspective and opinion about individual (based on intrinsic trustworthiness properties) online behavior collected from a survey of experts and users, the dimensions of the construct of trust in the VC will be successfully isolated, which will help survey scale design. (3) Drawing from the factors of the virtual community scene and individual online behavior (based on intrinsic trustworthiness properties), the relations among every multidimensional component supporting trust will be verified. Then, the relations between the set of multidimensional components supporting trust, interpersonal trust, and information dissemination of the VC will be explored. Finally, the acting mechanism of influence that the set of multidimensional components supporting trust works with for information dissemination in the VC will be discussed.

## 2. Literature Review

Trust theory was first widely used in sociology and psychology. This paper is based on this theory. Starting from classic trust theory and learning from the research on the network trust model, this paper finally constructs a conceptual model of the trust relationship.

### 2.1. Classic Trust Theory

Luhmann [46] believed that trust is a bridge for people to communicate successfully, reducing the interaction cost. In a broad sense, trust is the belief that other people will react in predictable ways. In 1991, Butler [47] pointed out that trust has been found to be multidimensional as a construct as well as being activated and sustained by a multidimensional set of conditions. Leimeister et al. [28] argued that trust is a multidimensional construct, and that trust is applicable to individual group bilateral relations and vertical binary relations. The equivalence of trust leads to the reciprocity of trust conditions as well. To Mayer et al. [44], trust is applicable to a relationship with another identifiable party who is perceived to act and react with volition toward the trustor. Then, the way factors such as ability, benevolence, and integrity contribute to trust building is focused on. Morgan and Hunt [48] argued that trust is associated with qualities such as consistency, competence, honesty, and benevolence. Jarvenpaa et al. [49] concluded that the exercises of two weeks of trust building did have a significant effect on the team members' perceptions of the other members' ability, integrity, and benevolence.

To sum up, the classic trust studies all agree that trust is supported by multidimensional components (conditions), and the academic research on trust basically supports that although the belief is intertwined, trust is mainly composed of three dimensions: ability, benevolence (kindness), and integrity.

### 2.2. Trust in the Network

The interpersonal trust mechanism promotes cooperation, interaction, and knowledge exchange in the organization [7,41,50–53]. As the existing rules cannot provide sufficient online guarantee, online trust can play a key role in the virtual team, as well as the process of e-commerce and network transactions [54–58]. Trust under the context of the virtual community (VC) seems to be different from trust under the context of the offline social environment. Under the context of the virtual community, three-dimensional components (conditions) of classic trust—ability, benevolence, and integrity—are not only relevant, but particularly prominent in every dimension [28,44,47,59,60].

Firstly, in addition to the three multidimensional components of classic trust (ability, benevolence, and integrity), “predictability” is added to multidimensional components of trust under the setting of the VC as a new dimensional component. After sorting out 65 studies on trust from multiple disciplines, Harrison et al. [45] found that the four dimensional components on ability, benevolence, integrity, and predictability cover 91.8% of the characteristics of the definition of trust; meanwhile, drawing from the perspective of trust and cognition, online behaviors bound up with online trust are naturally formed from the interpersonal trust structure, beliefs, and intentions affecting each other, all of which act on behaviors linked to trust: information sharing, purchasing behavior, and cooperation. In 1996, Misztal [61] pointed out that one of the basic functions of trust in daily life is to make social life predictable.

Secondly, Ridings et al.'s [41] research on the online trust model showed that “integrity” and “benevolence” as two independent dimensional components supporting trust are unified under the context of the VC. So, multidimensional components supporting the online trust model are adjusted to ability and integrity/benevolence. Leimeister et al. [28] showed that in online health-care communities, perceived goodwill and competence support the process of creating and sustaining trust between members as well as between members and the operators of the VC and contribute to the successful implementation and maintenance of the community.

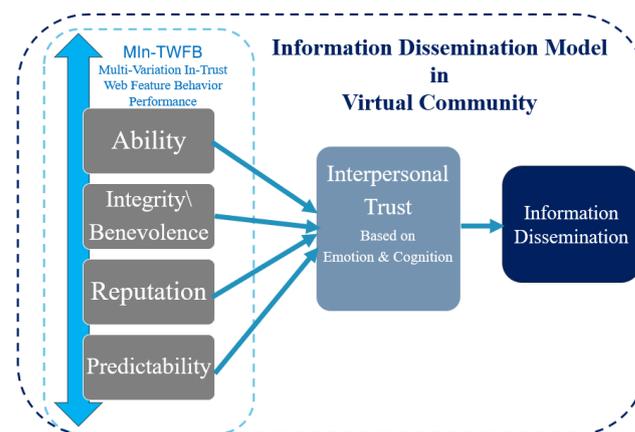
In addition, the virtual community usually builds up incentive mechanisms and distinctive identification methods to identify members' contributions to the community with a cumulative point grade or diamonds with which to highlight personal social status in the VC. In Luhmann [46] (Chapter 4, Trust: Complexity Simplification), a symbolic hint is regarded as a simplified identification framework through which trust is delivered. Establishing one's own reputation always indicates that the person has been recognized

or respected by peers [62]. Trust will only occur in a social context; the social side of interpersonal communications is likely impacted by the social presence of the medium [63]. Gefen and Straub's [64] research suggests that social presence is not only an enabler of other trust-building components, but also builds trust in its own right. This incentive mechanism and distinctive identification of the virtual community can convey more information and is capable of reducing the equivocality and ambiguity in information exchanges; in such a way the website can enhance its social presence. Meanwhile, research has suggested that the greater the social presence is, the more trust-building that can be developed among the parties [64]. Therefore, the incentive mechanism of the VC is drawn as the "reputation" dimensional component into the set of multidimensional components supporting the online trust model.

### 2.3. The Research Framework Model

The paper devoted a large amount effort and careful work to the social and setting characteristics of the virtual community (VC), online behavior data collection of the users (based on intrinsic trustworthiness properties) from the survey, as well as relationship between the trustworthy qualities of online users and their online behaviors. Drawing from above studies of multidimensional conditions activating trust and the online trust model, such as Butler [47], Harrison et al. [45], and Ridings et al. [41], a model of four dimensional components supporting online trust is successfully proposed that has combined factors of the virtual community scene and users' online behaviors (based on intrinsic trustworthiness properties). The four dimensional component model contains the following dimensional conditions: ability, integrity/benevolence, reputation, and predictability.

Then, in this paper, the above four dimensional model of trust-supporting components is named Multi-Variation In-Trust Web Feature Behavior Performance (abbreviation: MIn-TWFB). Part of MIn-TWFB, interpersonal trust and information dissemination of the VC, is integrated as organic into the information dissemination model in the VC, as shown in Figure 1. The relation and action mechanism between the performance part of MIn-TWFB, interpersonal trust, and information dissemination of the VC will be explored. As shown in Figure 1, the relations among every component of MIn-TWFB will be discussed as well.

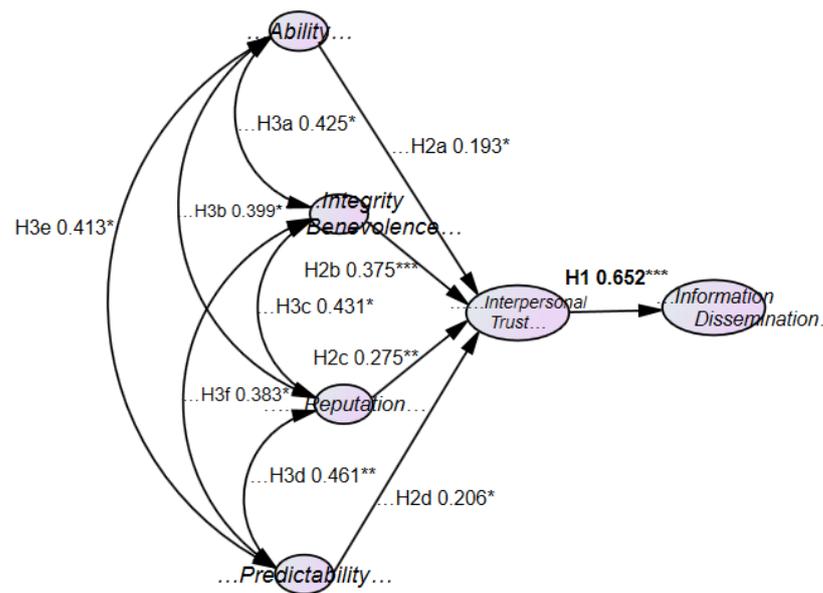


**Figure 1.** The framework mode of information dissemination in the virtual community.

## 3. Research Model and Hypothesis

### 3.1. Research Model

In Section 2.3, a model of trust-supporting components of online trust was proposed that contains four dimensional conditions: ability, integrity/benevolence, reputation, and predictability. This four dimensional component model was named MIn-TWFB (Multi-Variation In-Trust Web Feature Behavior Performance). The research model of information dissemination including MIn-TWFB is shown in Figure 2, and relations and roads between the latent variables are clearly shown in the research model.



**Figure 2.** Results of the research model tests. Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

### 3.2. Hypothesis Development

#### 3.2.1. The Link between Interpersonal Trust and Information-Dissemination Behaviors in the Virtual Community

David and Andrew [65] found that interpersonal trust is a common phenomenon in organizational life, which is expressed by cognitive-based trust (CBT) and affective-based trust (ABT). McAllister [66] believes that interpersonal trust is the degree to which a person has confidence in another person's words, deeds, and decisions, and that people act according to these words, deeds, and decisions. Users' trust level in information sources will have a great impact on the information itself and the strategy of a supporting decision [67], with a recommendation being more acceptable the higher the level of trust from which it is derived [34], and drawing from the research achievements in the computer field, trust-transferring strategies and properties have been verified [35–37]. Through empirical research, Harrison et al. [45] found that trust is a significant predicting factor of information-sharing among virtual community members, and that obtaining information from trusted information sources can reduce the cost of information search. When disseminating information, it can reduce the psychological or spiritual cost of bearing the dissemination of stigmatized information [68]. Thus, the hypothesis is as follows:

**Hypothesis 1 (H1).** *The participants' interpersonal trust in the virtual community is positively related to their inclinations of information-dissemination behaviors.*

#### 3.2.2. MIn-TWFB and Interpersonal Trust in the Virtual Community

In Qin and De-Juan-Vigaray's [69] research of social commerce, all the trust-building antecedents had significant positive impact upon trust, and interpersonal trust when individuals communicate was key among the parties.

##### (1) Ability component of MIn-TWFB and interpersonal trust in the virtual community.

Harrison et al. [40] believe that ability means believing others possess the capability or power to do what needs to be done for themselves. Information seekers rely more on information sources with high-level professional knowledge [70], and the information recommended by people with relevant experience is more persuasive [71]. Thus, the hypothesis is as follows:

**Hypothesis 2a (H2a).** *The ability component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.*

- (2) Integrity/benevolence component of MIn-TWFB and interpersonal trust in the virtual community

Harrison et al. [45] found that when the trustor knows little about the trustee, honesty and kindness mean that the trustee will be beneficial to the trustor, which also means a kind of concern for others' welfare [47]. Thus, the hypothesis is as follows:

**Hypothesis 2b (H2b).** *The integrity/benevolence component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.*

- (3) Reputation component of MIn-TWFB and interpersonal trust in the virtual community.

Blau [72], who studies social exchange theory, pointed out that all people have what others want, which could be economic resources (such as assets and services), social resources (such as friendship and reputation), or both. There is usually a sort of familiarity or direct reciprocity in the network environment, which means that the opportunity to improve reputation is an important motivation to provide advice to others [73]. Another study showed that individuals also approve of gaining status by response (to others) [74]. Thus, the hypothesis is as follows:

**Hypothesis 2c (H2c).** *The reputation component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.*

- (4) The predictability component of MIn-TWFB and interpersonal trust in the virtual community.

Harrison et al. [45] believe that predictability refers to trustworthy people being consistent and willing to show (predictability), willing (benevolence), and able (ability) to serve the interests of others completely and honestly (integrity). Ref. [75] believes that they care about each other's interests and believes that the person will consider the impact of the action on the other before taking action. Thus, the hypothesis is as follows:

**Hypothesis 2d (H2d).** *The predictability component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.*

### 3.2.3. Trust-Supporting Components of MIn-TWFB in the Virtual Community

By studying earlier measures and findings of trust in the virtual community (VC) [44,49,59,60], a correlation between each trust-supporting component can be found. Wasko et al. [10] found that individuals with rich knowledge are more inclined to share information and make generous contributions to others. Other research shows that information seekers rely more on information sources with highly professional knowledge, and the information recommended by people who have relevant experience is more persuasive [70,71]. Furthermore, according to the incentive mechanism formulated by the virtual community, valuable contributions, especially when sharing professional knowledge, can improve the reputation of users among their peers [76]. Ridings' [41] work showed that the feedback of the online community is related to the enhancement of cooperation intention. If members show respect for the principle of organizational public welfare, the interests of the community could be increased for all. Mutual benefit and win-win will not only help to build up trust relations, but also obtain the recognition and incentive of the community. As a valuable social asset, reputation needs a lot of resources and long-term maintenance. A good reputation means the patience of opportunism in the past [77]. Therefore, in the virtual community, the reputation enjoyed by users is helpful to conveying their past experiences to others. According to the definition of predictability by [45] and Bandura's [78] expectation of results (believing that action will bring positive and valuable results), it could be explained why people are willing to spend time and energy on voluntary activities. Thus, the hypothesis is as follows:

**Hypothesis 3a (H3a).** *The ability component of MIn-TWFB is positively related to the integrity/benevolence component of MIn-TWFB in the virtual community.*

**Hypothesis 3b (H3b).** *The ability component of MIn-TWFB is positively related to the reputation-component of MIn-TWFB in the virtual community.*

**Hypothesis 3c (H3c).** *The integrity/benevolence component of MIn-TWFB is positively related to the reputation-component of MIn-TWFB in the virtual community.*

**Hypothesis 3d (H3d).** *The reputation component of MIn-TWFB is positively related to the predictability component of MIn-TWFB in the virtual community.*

**Hypothesis 3e (H3e).** *The predictability component of MIn-TWFB is positively related to the ability-component of MIn-TWFB in the virtual community.*

**Hypothesis 3f (H3f).** *The predictability component of MIn-TWFB is positively related to the integrity/benevolence component of MIn-TWFB in the virtual community.*

## 4. Research Methods

### 4.1. Survey Design

For all items of the questionnaire survey, a five-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5) was employed. Table A1 in Appendix A shows the final measurement items. In order to ensure the measurement tools’ content reliability and validity, each construct’s items in the conceptual model referred to or directly adopt the mature measurement scales in the existing literature, such as studies on trust, e-commerce business, online word-of-mouth information dissemination, and knowledge sharing in the online community. the process of the survey design was as follows:

- (1) When the questionnaire survey was designed for MIn-TWFB, the trust-supporting components of MIn-TWFB referred to items from those relevant studies, each part composed of four to five items. The intertextual description of the measurement items that came from the reference materials for the same latent variable was shortened. Then, each measurement item was modified or amalgamated to meet our work according to the virtual community (VC) situation and Chinese culture characteristics. In such a way, the accuracy and adaptability of the items’ content expression were improved.
- (2) Experts and scholars in management, information, and other fields were invited to review the preliminarily designed questionnaire.
- (3) Since young people are the main character group of the network, undergraduate and graduate students from a university were invited to conduct a small-scale pre-test survey on the questionnaire.
- (4) Combined with the suggestions from a group of experts and pre-test feedback results from respondents, the original questionnaire was amended again. Then, the formal questionnaire was finally formed after repeated refinement, which included six latent variables and 25 observation variables. Table A1 in Appendix A shows the final measurement items and literature sources of each variable.

### 4.2. Sample

The survey object of the formal questionnaire was virtual community users. By December 2020, the proportion of Internet users using mobile Internet had reached 99.7% [4]. As Internet users have shifted to using smartphones instead of laptop and desktop computers, the questionnaire link was mainly distributed to virtual communities that investigation team members and their friends had joined in WeChat, and the professional questionnaire website supplemented the survey. Respondents were informed of the survey’s purpose and the concepts of virtual community and network trust features were explained before they started the formal questionnaire. To encourage the respondents to participate in the

survey actively, a certain number of gift coupons were sent after the questionnaire was completed. Meanwhile, those respondents were informed that they had a choice to share the survey link with friends who were other community users. During the survey process, the smartphone users and virtual communities were selected at random to help avoid sample selection bias. Each user's ID could be applied to the survey only once via the application of information technology, so the ineffective submissions were prevented from affecting the data reliability. In addition to recording the answers, the time spent filling in the questionnaire was also traced. The survey lasted for about three weeks. A total of 171 questionnaires were collected in this survey, and 132 questionnaires were finally determined to be accepted after excluding the invalid ones due to short time or missing items. The rate of effectiveness of the questionnaire reached 77.2%. The demographics of the survey respondents were as follows:

- (1) Respondent composition: The proportion of males and females was 59.1% and 40.9%, respectively.
- (2) Age composition: There were 68.1% of respondents aged 18–39, 22.7% aged 40–49, 4.5% aged 50–59, and 4.5% aged 60 and over. The age range of 18–49 years old accounted for 90.8% in total.
- (3) Education composition: High school (including technical secondary school) and university education (including junior college) accounted for 55.50% in total, and a master's degree or above accounted for 42.3%. Over 97.8% of respondents had obtained a bachelor's degree (including education experience equivalent to bachelor's) or above.
- (4) Registration time composition: This comprised the length of time respondents' had been registered in various online communities, with 13.6% for less than half a year, 12.1% for 0.5–2 years, 19.7% for 2–5 years, and 54.5% for more than 5 years. A total of 74.2% of the respondents had used the virtual community for more than 2 years.
- (5) Honorary qualifications composition: This comprised the respondents' qualifications in various online communities, with senior or honorary members accounting for 9.1% and ordinary members accounting for 90.9%.
- (6) Usage composition: This comprised the respondents' visiting frequency to various online communities, with 31.8% visiting less than or equal to 6 times/week, 15.2% 7–10 times/week, and 53.0% over 10 times/week. Furthermore, 36.4% visited less than 30 min/time, 34.8% visited 30–60 min/time, and 28.8% visited more than 60 min/time. A total of 68.2% of the respondents visited the virtual community 7 times/week at least, and 63.6% of the respondents spent at least 30 min at a time in the virtual community.

To sum up, the vast majority of the respondents were young and middle-aged adults with high education and knowledge levels. Most of them were older members of the virtual community with rich experiences. As they usually maintained a stable and continuous daily average online community visit frequency and daily average community participation time, the online community membership and virtual community life composed a part of their daily lives. Most respondents were familiar with network applications and were capable of filling in the scale according to their own judgment, ensuring survey quality. The demographics of the survey respondents were in line with the actual situation. On the whole, the samples were representative and effective.

## 5. Data Analysis and Results

Stevens pointed out that exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) are usually used as analysis methods in practical research [79]. EFA could be used for both explanations of the new scale and revision of the old scale. Referring to the study method recommended by Yang et al. [80], first, EFA was adopted to analyze the MIn-TWFB performance part with SPSS, through which the newly developed scale was under testing and revision. In addition, EFA could help multiple scale items be condensed into a few common factors, so all the information of the data should have been represented as much as possible [81]. Finally, for the measurement model of information dissemination

in the virtual community, EFA was adopted to verify the scale’s reliability and CFA was adopted to verify the scale’s convergent and discriminant validity. Then, the structural equation model (SEM) was used to verify and analyze the hypothetical path and the fitting degree of the sample data, and then the SEM was evaluated [82]. According to the standard empirical process for conceptual model verification, in this paper, IBM SPSS statistics 26 software was used to carry out demographics of the survey, CITC purification method, and EFA, and then Amos24 0 software was used to carry out CFA on the sample data.

5.1. Assessment of the Measurement Model

- (1) Applicability test of MIn-TWFB (Multi-Variation In-Trust Web Feature Behavior Performance). The four dimensional components of MIn-TWFB were valued based on principal component analysis (PCA) to reduce the dimension of the data set for the applicability test. The result of the KMO value was 0.809 and the  $\chi^2$  statistical value of the Bartlett sphericity test was sig 0.000, indicating that it completely met the feasibility standard of operating PCA.
- (2) PCA of MIn-TWFB. The four principal components could be extracted from data in the online community through PCA. The results are shown in Tables 1 and 2. Table 1 shows that there were four factor values of features greater than 1, and the cumulative variance contribution rate of the four reached 84.60%, which indicates that almost the original survey data could be perfectly reflected [80]. The number of factors was four more than two, in which the first factor’s variance interpretation rate was 49.11% (<50%) [83,84] and its variance interpretation rate after rotation was 25.51%. This means that the common method bias was not obvious and was acceptable. After rotation with the maximum variance method, the loading of each observed variable on its factor was more than 0.6 (>0.6). As shown in Table 3, the factor structure was relatively clear, which indicates that the convergence validity of the same dimension was acceptable, and the differential validity of the scale was also acceptable.

Table 1. Explained total variance.

Factor	Initial Eigenvalue			Extracting the Sum of Load Squares			Rotating the Sum of Load Squares		
	Total	Percentage Variance	Accumulation%	Total	Percentage Variance	Accumulation%	Total	Percentage Variance	Accumulation%
1	8.348	49.108	49.108	8.348	49.108	49.108	4.336	25.509	25.509
2	2.615	15.383	64.491	2.615	15.383	64.491	3.504	20.613	46.121
3	1.969	11.580	76.071	1.969	11.580	76.071	3.370	19.822	65.943
4	1.450	8.527	84.598	1.450	8.527	84.598	3.171	18.655	84.598

Table 2. Rotating component matrix.

Item	Common Factor Variance (Common Degree)			Common Factor Variance (Common Degree)			Common Factor Variance (Common Degree)			Common Factor Variance (Common Degree)		
	Factor 1	Item	Factor 2	Item	Factor 3	Item	Factor 4	Item	Factor 1	Item	Factor 2	Item
A1	0.899	R1	0.899	R1	0.858	BI1	0.752	P1	0.872	R2	0.868	R2
A2	0.786	R2	0.822	R2	0.775	BI2	0.854	P2	0.718	R3	0.775	R3
A3	0.827	R3	0.827	R3	0.769	BI3	0.781	P3	0.801	R4	0.769	R4
A4	0.900	R4	0.854	R4	0.867	BI4	0.923	P4	0.866			
A5	0.883								0.852			

**Table 3.** Reliability and validity analysis.

Dimension	Item	Standard Loading	AVE	C.R.	CITC
Ability Cronbach's $\alpha = 0.942$	A1	0.941	0.758	0.940	0.886
	A2	0.740			0.761
	A3	0.893			0.837
	A4	0.901			0.877
	A5	0.864			0.870
Integrity/benevolence Cronbach's $\alpha = 0.916$	BI1	0.872	0.747	0.922	0.827
	BI2	0.783			0.733
	BI3	0.857			0.802
	BI4	0.938			0.889
Reputation Cronbach's $\alpha = 0.924$	R1	0.918	0.749	0.922	0.868
	R2	0.819			0.788
	R3	0.818			0.772
	R4	0.901			0.866
Predictability Cronbach's $\alpha = 0.906$	P1	0.971	0.713	0.907	0.731
	P2	0.733			0.846
	P3	0.914			0.707
	P4	0.731			0.900
Interpersonal trust Cronbach's $\alpha = 0.947$	T1	0.731	0.528	0.816	0.909
	T2	0.764			0.861
	T3	0.792			0.849
	T4	0.606			0.876
Information dissemination Cronbach's $\alpha = 0.876$	ID1	0.873	0.830	0.951	0.763
	ID2	0.917			0.721
	ID3	0.926			0.712
	ID4	0.928			0.749

- (3) The common degree (common factor variance) of MIn-TWFB. Commonality show the proportion of each item's variation that can be explained by common factors, so more commonality usually means not only more common characteristics that can be measured with common factors, but also more influence [85]. All commonality (common factor variance) in Table 2 was more than 0.5, and the smallest item of factor 4 was 0.710, which means that the remaining three common factors contributed 71.0% of the P1 variance. All measure items contained in each of these four factors were the originally preset measurement ones, so each dimensional latent variable could be respectively represented by deigned measure items as expected. Then, the designed survey scales of the four dimensional MIn-TWFB were feasible and applicable, describing users' online community trust behavior reasonably well.
- (4) Common method bias test and reliability test of the information dissemination model of the virtual community (VC). This survey process adopted an online questionnaire to collect data, which may have caused common method bias in the research results. The criterion that the correlation coefficient between latent variables not exceed 0.9 indicates that the common method bias was not obvious and acceptable [86]. In Table 4, the correlation coefficient between latent variables ranged from 0.279 to 0.623, far from 0.9, indicating that the quality of the measured data was good. Cronbach's coefficient (Cronbach's  $\alpha$ ) is usually used to assess each dimension or the facet of scale reliability in the factor analysis process. The Cronbach's  $\alpha$  threshold of 0.7 was adopted as the reliability standard [87] and the corrected item total correlation (CITC) was not less than 0.5. The composite reliability (CR) reference threshold was more than 0.6 in the work of Hair et al. [88] and Fornell and Larck [89], and the average variance extracted (AVE) reference threshold was more than 0.5 [80]. The standard loading of each factor, Cronbach's  $\alpha$ , CR, and AVE are shown in Tables 3 and 4. Among them, the six dimensions of the model were ability, integrity/benevolence,

reputation, predictability, interpersonal trust and information dissemination. The Cronbach's  $\alpha$  of the six dimensions ranged from 0.876 to 0.947, all of which are more than 0.7. The composite reliability (CR) ranged from 0.816 to 0.951, all of which are more than 0.6, and each CITC value was more than 0.7 as well. The results show that all variables were measured well, the measurement model of this study is reliable, and the questionnaire data had certainly stability and consistency.

**Table 4.** Discriminant validity test.

	Ability	Integrity/ Benevolence	Reputation	Predictability	Interpersonal Trust	Information Dissemination
Ability	<b>0.871</b>					
Integrity/benevolence	0.442 **	<b>0.864</b>				
Reputation	0.383 **	0.442 **	<b>0.865</b>			
Predictability	0.431 **	0.416 **	0.457 **	<b>0.844</b>		
Interpersonal trust	0.552 **	0.616 **	0.623 **	0.558 **	<b>0.727</b>	
Information dissemination	0.400 **	0.345 **	0.279 *	0.321 **	0.542 **	<b>0.911</b>

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ ; values in bold type along the diagonal indicate the square root of AVE.

- (5) Validity test of the information dissemination model of the VC. Convergent validity was confirmed by examining both the indicator loadings and AVE. The standardized factor loading of each indicator ranged from 0.606 to 0.971, as shown in Tables 3 and 4. All of them were more than 0.50. Furthermore, the AVE ranged from 0.528 to 0.830, both more than 0.50. Such results show that latent variables had good convergence validity. The test results of discriminant validity are shown in Table 4; every square root of AVE exceeded the off-diagonal correlations between the constructs, which demonstrates that the scale had good discriminant validity [82], and the correlation coefficient between latent variables had a significant correlation ( $p < 0.01$  or  $p < 0.05$ ), which provides preliminary support for the theoretical model and relevant assumptions of this study.

### 5.2. Assessment of the Structural Model

The structural model was estimated for fit and verified assumptions with AMOS v24.0 (AMOSv24.0 is a standalone product within IBM SPSS Statistics package). The model fit indices' actual and recommended values are listed in Table 5. According to the recommended threshold from Congjie and Qiaoling's [82] research, the model's fit indices were better than the recommended thresholds, demonstrating a good fit between the model and data. The adjusted goodness-of-fit index (AGFI) was 0.816 less than 0.9, the reason for which may have been the small number of samples [90]. According to the path analysis of the model, the relationship between latent variables, standardized path coefficient, and significance level is shown in Figure 2. First, the four dimensional components of MIn-TWFB performance—ability, integrity/benevolence, reputation, and predictability—had a significant positive effect on interpersonal trust. Secondly, interpersonal trust from the virtual community also had a significant positive impact on information dissemination ( $\beta = 0.652$ ,  $p < 0.001$ ). Third, there was a significant positive correlation between the four dimensions of users' ability, integrity/benevolence, reputation, and predictability, as shown in Figure 2. The hypothesis test results of this survey are shown in Table 6 below, which are all supported.

**Table 5.** Measures of the model fit.

Fit Index	$\chi^2$	df	$\chi^2/df$	GFI	AGFI	RMSEA	NNFI	CFI
Recommended range	N/A	N/A	$\leq 5$	$\geq 0.8$	$\geq 0.8$	$\leq 0.08$	$\geq 0.9$	$\geq 0.9$
Model value	259.811	246	1.056	0.883	0.816	0.037	0.983	0.986

**Table 6.** The hypothesis test results.

	Hypothesis	Result
The link between interpersonal trust and information dissemination behaviors in the virtual community		
H1	The participants' interpersonal trust in the virtual community is positively related to their inclinations toward information dissemination behaviors.	Supported
MIn-TWFB and interpersonal trust in the virtual community		
H2a	The ability component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.	Supported
H2b	The integrity/benevolence component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.	Supported
H2c	The reputation component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.	Supported
H2d	The predictability component of MIn-TWFB is positively related to the participants' interpersonal trust in the virtual community.	Supported
Trust-supporting components of MIn-TWFB in the virtual community		
H3a	The ability component of MIn-TWFB is positively related to the integrity/benevolence component of MIn-TWFB in the virtual community.	Supported
H3b	The ability component of MIn-TWFB is positively related to the reputation component of MIn-TWFB in the virtual community.	Supported
H3c	The integrity/benevolence component of MIn-TWFB is positively related to the reputation component of MIn-TWFB in the virtual community.	Supported
H3d	The reputation component of MIn-TWFB is positively related to the predictability component of MIn-TWFB in the virtual community.	Supported
H3e	The predictability component of MIn-TWFB is positively related to the ability component of MIn-TWFB in the virtual community.	Supported
H3f	The predictability component of MIn-TWFB is positively related to the integrity/benevolence component of MIn-TWFB in the virtual community.	Supported

## 6. Conclusions

### 6.1. Discussion of Results

In this section, some interesting findings from this survey are shared as follows:

- (1) Online trust in ability, integrity/benevolence, reputation, and predictability all supported a significant positive effect on interpersonal trust in the virtual community (VC). Each one of the trust-supporting components of MIn-TWFB had a significant positive impact on network interpersonal trust, among which the integrity/benevolence component implemented the most significant positive effect on interpersonal trust ( $\beta = 0.375, p < 0.001$ ), and the reputation component of MIn-TWFB supported the second most significant positive effect on participants' interpersonal trust in the VC ( $\beta = 0.275, p < 0.01$ ). Thus, the interpersonal communication and interaction of the VC can be regarded as an expansion of real life. The reputation mechanism of the community management plays an important role for the creation and maintenance of websites. The building of a reputation reward system could help guide the partici-

pants according to intersubjectively comprehensible rules to support trust within the VC, and positive feedback to user contributions is also helpful in strengthening trust concerning the quality of the content. According to the building and implementation mechanism of the virtual community, proposing “reputation” as one trust-supporting component of MIn-TWFB is helpful and necessary. The reputation component of MIn-TWFB could compensate for a certain lack of primary information and refer to personal outstanding contributions as well as past behaviors of users within the virtual community. Moreover, honorary recognition in the virtual community also means an expectation about the user’s behavior. However, the ability component of MIn-TWFB supported a significant positive effect on participants’ interpersonal trust in the VC ( $\beta = 0.193, p < 0.05$ ) compared to the integrity/benevolence component ( $\beta = 0.375, p < 0.001$ ). The above result is consistent with the previous research by Leimeister et al. [28] in the fact that benevolence was more important for the members than the professional knowledge and expertise of their communication partners, which might explain why the members could have a high level of benevolence and at the same time show a lower level of competence to the others. According to the data of the structural equation model (Figure 2), the theoretical constructs of MIn-TWFB were supported by showing that the trust-supporting design components had positive effects on the interpersonal trust within the VC. All of the trust-supporting components of MIn-TWFB, such as ability, integrity/benevolence, reputation, and predictability, were not only positively related to interpersonal trust, but were in line with the interpersonal trust mechanism and social relationship networks of offline society as well.

- (2) The relation among every four dimensional component of MIn-TWFB was positive. The significant positive correlation between the reputation component and the predictability component of MIn-TWFB was the most obvious ( $\beta = 0.461, p < 0.01$ ), which means that the incentive effect of the community reputation reward mechanism is remarkable. The significant correlation between the integrity/benevolence component and the reputation component of MIn-TWFB was on the second level ( $\beta = 0.431, p < 0.05$ ), which means that the online community aligned its moral and ethical values with the offline community. Thus, this verifies the virtual community’s social organization property, and that the interaction of the VC is also a real interpersonal social experience with the network as the intermediary. Finally, this research successfully verified that every relation among the four dimensional components of MIn-TWFB was positively connected; each one of the four dimensional components could complement and interweave one another—in a sense, they all belong to an integrated belief.
- (3) Users’ online behavior (based on intrinsic trustworthiness properties) could be perceived and affect interpersonal trust. The path coefficients from the ability component, integrity/benevolence component, reputation component, and predictability component to interpersonal trust were 0.193, 0.375, 0.275, and 0.206, respectively, as shown in Figure 2, which verifies that these four latent variables had a positive and significant effect on the network interpersonal trust. So, people’s online behavior of trust in the VC could be perceived and judged by others. Among them, the integrity/benevolence component had the most positive influence on interpersonal trust ( $\beta = 0.375$ ), which could significantly improve others’ trust in one, and the reputation component ( $\beta = 0.275$ ) followed just behind. Despite the complexity of the virtual community environment and the concealment of information, users can still form an impression of whether other community members are trustworthy by observing others’ honest and friendly online behavior, reputation, and status in the VC. Obviously, this impression was also affected by expectation of others ( $\beta = 0.206$ ).
- (4) MIn-TWFB applies influence on network information dissemination through the interpersonal trust in the virtual community. The research found that interpersonal trust and the mechanism of interpersonal trust on behavioral intention also exists in virtual

communities, which also generally exist in traditional communities. The working mechanism of MIn-TWFB's significant impact on network information dissemination (interpersonal trust to information dissemination,  $\beta = 0.652$ ,  $p < 0.001$ ) is the interpersonal trust of the VC. Due to the virtual community informatization characteristics and users' behavior trajectory digitalization characteristics, individuals' online behaviors in the VC could be observed, obtained, calculated, and analyzed. Based on the context above, MIn-TWFB was constructed. Then, we explored how users (based on intrinsic trustworthiness properties) are perceived and recognized through a series of trust-related behaviors in the VC. The relation between MIn-TWFB and the interpersonal trust of the VC was studied, which had an impact on information dissemination in the network. This work helps people understand the value of online behaviors; the information of online behaviors has the same social and organizational significance as real behavior in a traditional community.

## 6.2. Contributions and Implications

### 6.2.1. Theoretical Contributions

We note that online and offline behaviors are related. Online status is not only related to users' personal identity and personality differences, but also has a strong impact on a person's behavior [23,24,26,91]. With this as a cue to begin a survey, the users' behavior performance in virtual communities with trust characteristics was explored. The research found that even strangers can understand each other through the information traces and behavior tracks on the network media and form their perception of the characteristics of others when the medium during the interaction process is the virtual network. Then, interpersonal interaction in a virtual community will be influenced. Based on the online representativeness of virtual community data information [91], the impact of a virtual community using behavior and information traces [27] on interpersonal trust and information dissemination in the community was explored. Firstly, based on the construction mechanism of the virtual community and the characteristics of the user's community identity, the reputation dimension was proposed in the study. Then, based on the work of Harrison et al. [45] and observable historical information's impact on others' social memory and evaluation in a virtual community, the predictability dimension was proposed as well. Thus, three-dimensional components of classic trust (ability, benevolence, and integrity) were successfully expanded into a four dimensional trust-supporting components model, which is named the Multi-Variation In-Trust Web Feature Behavior Performance (abbreviation: MIn-TWFB). MIn-TWFB contains four dimensional components: ability, integrity/benevolence, reputation, and predictability, which, as presented in the paper, are supported in the virtual environment. Secondly, the trust-related behaviors in ability, integrity/benevolence, reputation, and predictability [52,53] were verified to be significant in the virtual community environment and positively related to each other. Users' online behaviors in ability, integrity/benevolence, reputation, and predictability could be sensed and recognized by others, and all of the characteristics had a significant positive effect on interpersonal trust in the community. Third, the research shows that interpersonal trust in the network significantly impacted information communication behavior. It inferred that network users are not fickle, and that the network is a sticky space and a powerful tool to strengthen interpersonal relationships [92]. With the help of the network, trustworthy online behavior can not only transfer trust to others, but also have a positive impact on network interpersonal trust, and finally effectively affect information communication behavior. The mechanism of MIn-TWFB to information dissemination was explored, as well as the influence implementation path between MIn-TWFB and the information dissemination.

### 6.2.2. Managerial Implications

According to the 48th report [93] issued by the China Internet Network Information Center, as of June 2021, the total number of domain names in China was 31.36 million, and the average time spent online per person per week was 26.9 h. The number of online office,

online education, and online medical users were 380 million, 325 million, and 239 million, respectively, accounting for 37.7%, 32.1%, and 23.7% of the utilization rate of Internet users, respectively. TikTok, live broadcast, and chess and card entertainment have also been transformed online by relying on the powerful Internet. Network media, such as the micro-blog WeChat, Jowl, Xiao Hong, Google, and Zhihu, have been developing vigorously. As people integrate the traditional network and the virtual network, the cyberspace is more closely related to real life. The integration of “online” and “offline” society will form a composite social network environment. In view of this, the suggestions for reference are as follows.

Managers should pay attention to the relationship between ordinary individuals and network information dissemination. The essence of online community is formed by interpersonal interaction [46]. The network gives individuals equal status. Users on social media are not only consumers of content, but producers of information, and they bear the function of the information dissemination node as well. With the help of information technology, the public possesses the ability and power to “create” and “spread” information at the same time. Managers need to realize that online celebrities with tens of millions of fans will have considerable traffic and voice power over a period of time, but that online celebrities Big V (Big V refers to users who have obtained personal authentication on popular social platform and always have many fans, their platform nickname attaching with the capital English letter “V”) may lose the attention of fans and even be despised by the public for various reasons. Therefore, it is very important to try to identify the user groups with trustworthy behavior features of the virtual community, as this part of the online group is the main force of network information dissemination and stable dissemination node.

Besides, managers should guide the active environment of the network community. The virtual community brings huge benefits, but also a lot of risks due to the lack of traditional constraints. E-commerce lacks transaction process supervision, and the large amount of advertising and naval bombing can very easily cause information overload. If the network community wants to operate for a long time, it needs to strengthen security technologies, prevent loopholes in time, improve the computer network security management system, and truly provide a safe, reliable, and efficient network environment for all community users. In addition, community managers should strive to create a good community atmosphere and build reward and punishment mechanisms, regularly organize community activities, and promote communication and interaction among community users, which will be conducive to the accumulation of network resources and the improvement of the network relationship quality.

### *6.3. Limitations and Future Research Directions*

Like many other empirical studies, this research also has some limitations. First, the survey objective mainly came from WeChat and friends recommended through WeChat, and the professional questionnaire website supplemented the survey. Therefore, the recognition method of trustworthy behaviors may be different depending on the reference group, and users of the different online communities may give varying degrees of attention to different online behaviors of online trust. For products dealing with complex and professional knowledge, people tend to accept the recommendation of experts [71], such as for cars and mobile phones. If an online platform is a microblog, the positive response of bloggers or network platforms plays a positive role in the diffusion of information or influence [94–96]. Second, referring to different types of online communities, the measurement items of the questionnaire may not fully reflect the background or characteristics of the present virtual community. To accurately evaluate the survey objective and obtain positive questionnaire feedback, future research should add corresponding measurement items or conduct a one-to-one survey for different types of online communities. Third, this research’s work helps to identify the user groups who could be relied on in a virtual community and regarded as reliable and stable information dissemination nodes, always playing the role of

communication switch. However, on the other side, opinion leaders, Internet celebrities, and leading users in the network usually have an extraordinary influence on information dissemination and discourse power as well. In the future, with MIn-TWFB as reference, we plan to compare and analyze the feature behavior of opinion leaders, Internet celebrities, and leading users in the network. According to the four dimensional features of ability, integrity/benevolence, reputation, and predictability, the network behavior of opinion leaders, network celebrities, leading users, and other users will be analyzed and then compared with MIn-TWFB, proposed in this research. That will be a very interesting and worthy study in the future.

**Author Contributions:** Conceptualization, T.Z.; methodology, T.Z.; software, T.Z.; formal analysis, T.Z.; investigation, T.Z.; writing—original draft preparation, T.Z.; writing—review and editing, T.Z., J.L. and Z.Z.; supervision, J.L. and Z.Z.; funding acquisition, J.L. All authors have read and agreed to the published version of the manuscript.

**Funding:** This work was funded by the National Natural Science Foundation of China (No. 71672128) and the National Key Research and Development Program of China (2018YFC0830400).

**Institutional Review Board Statement:** Ethical approval was received from the Ethics Commission founded in the Institutional Review Board (or Ethics Committee) of the Dept. of Scientific Research Management (27 December 2021, 2021/NO.3), which is ruled by the code of ethics of the Academic Committee of Tongji University.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding author. The data are not publicly available due to personal privacy and non-open access of the research program.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

**Table A1.** Questionnaire.

Construct	Item	Source
Ability	A1. The more user posts are authenticated as the essence, the better the performance.	[5,41,97]
	A2. The more users knows about the topics concerning the community, the better the performance.	
	A3. Users are able to demonstrate their ability to analyze and answer questions related to the theme of the forum.	
	A4. User are able to publish news or content in a narrative form understandable to others in the virtual community.	
	A5. User are able to share complete and comprehensive content in the virtual community.	
Integrity/benevolence	BI1. After coming to this virtual community, users show the behavior of sharing what they know about a topic with others.	[41,76,98]
	BI2. In the interaction process of the virtual community, users show their efforts to treat other participants fairly.	
	BI3. Users are very loyal to the virtual community, showing that they can selflessly contribute their strength to the community construction.	
	BI4. Users show behavior of good interaction with other members of the community.	
Reputation	R1. Some feedback or rewards are gained by participating in community activities, which can represent users' reputation and status in the virtual community.	[5,99]
	R2. Users show influence over others through their own ideas and opinions.	
	R3. Users try to show their behavior in the community that they expect to become the focus of.	
Predictability	R4. Users' behavior shows that they are proud to be members of the virtual community.	
	P1. Users usually show efforts to share information in the virtual community.	

Table A1. Cont.

Construct	Item	Source	
Interpersonal trust	P2. Users usually show efforts to invest a lot of time and energy to participate in the construction of the virtual community.	[5,99,100]	
	P3. Users usually show efforts to actively reply to the posts of those seeking help in the virtual community.		
	P4. The content shared by users could be always expected to enrich information and accumulate knowledge in virtual communities.	[51,66]	
	T1. Given a featured user's past excellent performance in the community, I have no reason to doubt his/her ability and information reserve.		
	T2. I can trust the featured user to share content in the community without causing me more confusion.		
	T3. In the interaction with the featured user, I think we all benefit a lot.		
	Information dissemination	T4. My interaction with the featured user in the virtual community has brought emotional investment and enhanced emotional connection.	[41,101]
		ID1. The featured users share their skills and knowledge with others in the virtual community.	
ID2. In this virtual community, the featured user's posts always receive active community response.			
ID3. When I need advice to solve a problem, I may ask the featured user for help.			
	ID4. I possibly look forward to the information shared by featured users to my friends.		

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