RESEARCH ARTICLE

The Influence Mechanism of Social Interactions on Online Purchasing Intention of Mobile Social Users in a Low-Trust Business Environment

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ABSTRACT The success of a business or brand depends on how effectively mobile social interactions can be utilized to drive online consumption under the decentralized and low-trust virtual social space. This paper, constructing the influence mechanism of mobile social interactions on online purchasing intentions from the combination of information interactions and relationship interactions, performs analysis for exploratory factors, reliability and validity to test the formal scale and then examines the proposed hypotheses by structural equations. The empirical results show that four-factor variables of mobile social interactions, namely information value, the control of information dissemination, the strength of social relationships and the scope of social influence, have a direct positive effect on online purchasing intention with mobile social initial trust as a mediator. In addition, the product attributes and other external attributes play important moderating roles. These findings extend the research related to trust mechanisms in the new media environment and attempt to provide a theoretical basis and practical guidance for enterprises to better implement mobile social marketing strategies.

INDEX TERMS Mobile social interactions, mobile social initial trust, online purchasing intentions, influence mechanism, moderating roles.

I. INTRODUCTION

Mobile terminal devices such as smartphones, as a representative of the development of information and communication technology, have opened up a new paradigm of Internet use due to their high-speed data access, high-resolution touch screens and extremely strong convenience, allowing people to access the latest information and engage in social interactions across a wider range of scenarios and conditions [1]. Mobile social networks enable users to establish social relations and provide effective mobile computing environments for accessing, sharing and distributing information. Therefore, mobile social applications and services featured personalized, mobile

The associate editor coordinating the review of this manuscript and approving it for publication was Lei Shu.

and diversified have penetrated every aspect of human life [2], [3]. In 2020, China had 989 million netizens, 99% of which were mobile social users, and 782 million online shoppers, 99.8% of that were mobile shoppers [4]. A growing number of mobile users reflects the immense commercial potential of mobile terminals and the new consumption model has enhanced the prosperity of social commerce.

The mobile social networks promote real-time, multi-channel and personalized social interaction as well as cooperation between customers and customers, companies and customers to form a complex social network. It directly or indirectly affects other customers and prompts new changes in customer behavior patterns [5]. Mobile social interaction refers to the process of interactions among node users in the mobile social networks, including obtaining information,

communicating with each other, sharing experience and fun [6]. Besides inspiring, fueling and guiding social events, it enables accurate and efficient recommendations for social networking users, driving continuous innovations in corporate marketing models [7]. Generally, customers tend to trust user-generated content on social application platforms, especially brand recommendations and reviews from peers compared with enterprise-generated content via traditional media [8]. According to social commerce surveys, approximately 83% of online customers are willing to share purchasing information with friends, while 67% of those consider the views of others in the community when making purchase decisions [9]. Thus, users believe that friends' opinions are particularly reliable and friends' recommendations are the most preferred in social networks [10], [11]. These studies reveal that the success of companies or brands depends on how they effectively use mobile social networks to increase consumer engagement and turn them into brand advocates [12]. Thereby social networks have a positive impact on the revenue of the online market [13].

With the rapid development of mobile social networks and social interactions, the following questions need to be carefully considered to encourage innovation in corporate marketing models and realize the development and expansion of the commerce value for mobile social networks. What are the constituent factors of mobile social interactions? What factors can influence the formation of mobile social initial trust? What factors can influence the online purchasing intentions of mobile social users? To answer these questions, we start by examining the characteristics of mobile social interactions from the combination of relationship and information interaction. And then we study the regulation of mobile social interactions affecting online purchase intention in external contexts and consider the role of mobile social initial trust as a mediator. The significance of this study lies in improving the methodological system for the issue of online consumption behaviors, and laying the cornerstone for mastering the dynamic evolution mechanism of social relationships and the identification of trust relationships between mobile social users. And it provides important theoretical support for the effective development of social commerce. In addition, social interactions, a fundamental feature of social commerce are discussed to assist social commerce marketers to understand consumers' purchase motives and predict social user behaviors for making marketing strategies.

This study is organized as follows. The next section presents the literature review. And the hypotheses are proposed in Section III. Then the methodology and research results are described in Section IV and Section V, respectfully. Finally, Section VI concludes the summary and managerial implications.

II. LITERATURE REVIEW

The research on consumer behaviors has been a hot topic with the development of e-commerce [14], which focuses on the factors that affect online purchasing decisions including dimensions of intrinsic consumer, website, product, and marketing [15], [16]. Quantitative indicators for each dimension vary but mainly refer to the perception of value, online reviews and the internet word-of-mouth (IWOM) reflecting interactive behaviors [17], [18], [19], [20]. Purchasing decisions in the social commerce environment refer to the consumers' online purchasing intention [21]. Features that interactions, recommendations and feedbacks in social commerce environments help to alleviate information asymmetry and then improve user experience and satisfaction [22]. Many studies only consider the information interaction as the interaction factor that influences the purchasing decision. For example, academic research proceeding from Social Exchange Theory (SET), defines social interaction as the exchange of valuable resources [23] and supports the positive relationship between interaction and purchase intentions [24]. And other scholars, defining social interaction as one of the social capitals, find that social interactions have a positive impact on online information exchange and offline purchasing intentions [25]. However, mobile social interactions include not only information interaction behaviors but also relationship interaction ones (i.e., the views and emotions of social networking users towards the information publishers) [6]. It is evident that the relationship interactions have significant impacts on consumers' online purchasing decisions, and the credibility of information sources is a contributory factor in the online purchasing decision-making process [26]. And valuable information captures consumers' interests to motivate users' behaviors and significantly increase purchase intentions [27]. IWOM messages with an emotional appeal, particularly are more effective than those with rational appeal in social networks [28]. Thus, the relationship interaction is one of the key factors influencing the online purchasing intentions in a social commerce circumstance.

Notably, the importance of trust to various kinds of human behaviors has been widely recognized. Trust, the basis of social exchange relationships, strongly influences consumer satisfaction and loyalty, which is directly linked to purchase intentions by ensuring future customer retention, word-of-mouth referrals and long-term profitability [29], [30]. However, the current virtual social space is low-trust. On the one hand, the interference of massive information, stemming from fragmented short text data that are large in volume and noisy, causes conflicts between user needs and complex data resources [32]. On the other hand, various online dishonest events make customers face potential risks [33]. While the commercial value of mobile social networks has been demonstrated through social interactions, social commerce is constrained from further development in the virtual, low-trust social space. Thus, our review suggests that trust in online commerce environments reduces perceived risk, motivates purchasing intentions and builds consumer satisfaction and loyalty [33], [34]. It is believed that information sharing and trust are the mediating variables between social interactions

and purchase intentions [35]. Similarly, it is argued that the social presence of interactions has indirect effects on customers' purchasing intentions through trust acting as a mediating variable [36]. Moreover, the mediating effect of consumers' perceived trust can be verified from the three dimensions of platform availability, intrinsic consumer characteristics as well as behaviors and merchants' influence. Consumers are more likely to trust sellers with high intimacy and then have stronger purchasing intentions toward products and services provided [37]. Therefore, in a low-trust business environment, it is the key to online activities that integrate a large number of diverse subjects [38] to form effective interactions and promote trust formation [39], so that boosting purchase conversion rates on mobile social platforms and motivating the online platform users to shop [40]. However, the current literature fails to provide a comprehensive analysis of specific social interactive behaviors and characteristics.

Throughout the literature, many valuable findings have provided useful insights into how mobile social interactions affect online purchasing intentions, but there are still some deficiencies. Firstly, most studies on intentions have followed the traditional paradigm, ignoring the value of mobile social interactions. In addition, little literature dealing with social interactions mainly focuses on information interactions, ignoring the relationship that expresses users' views, moods, opinions and emotions towards the information publishers. Therefore, the studies of online purchase intentions with the combination of information and relationship interactions are rarely reported. Secondly, although the research context of mobile social trust has been discussed, its essence, basic composition and antecedents may vary in different transactional scenarios. In particular, the original connotation of trust is not applicable due to the uncertainty of system dependency from the complexity of online social interactions with a large number of potential friends.

Therefore, the marginal contributions of this paper are as follows. Firstly, combining the theory of social psychology with the analysis of network structure and mobile social interactive behaviors, the study establishes the conceptualization of mobile social interactions from the dimensions of relationship interactions and information interactions, breaking through the traditional limitation of analyzing mobile social interactive behaviors from a single dimension. Secondly, based on the trust theories, a mechanical model of mobile social interactions affecting online purchase intentions is constructed, with mobile social initial trust as the mediating variable. Then, the intermediary mechanism of mobile social initial trust in the process of mobile social interactions influencing online purchase intentions is revealed. Finally, the moderating effects of product attributes and other external attributes are explored, in an attempt to provide a basis to make precise marketing decisions for social commerce enterprises.

III. HYPOTHESIS DEVELOPMENT
A. MOBILE SOCIAL INTERACTIONS AND ONLINE PURCHASE INTENTIONS

Social interactions stem from the exchange of resources in society. Two different types of interactions exist within new media environments. One is information interactions for knowledge acquisition regarding product information, corporate information, brand information and market information to understand the product or market. The other is interpersonal interactions for emotional exchanges between people, such as gaining respect or concerns from members [41]. Thus, mobile social interactions include two dimensions, relationship interaction and information interaction.

Relationship interaction shapes and constructs identity and adjustment, which primarily encompasses two main factors: social relationship strength and social scope of influence [42]. The strength of social relationships, a collection of social activities such as likes, comments and retweets between users, reflects the importance that users attach to information. The purchase information of a node's online friends influences his purchase intentions, and those who are less connected are influenced less [43]; that is, the strength of social relationships affects mobile users' online purchasing intentions. The scope of social influence is a reflection of a user's influence, which is quantified by the number and characteristics of the user's friends. The more a mobile user is followed, which means that the more friends he has or the more followers he owns on social platforms, then the wider his scope of social influence is. The social scope of influence is also determined by the user's popularity or influence, as demonstrated by the fact that the opinions of authoritative online friends have a greater scope of influence and a positive impact on the online transaction market revenues [13]. Thus, the social scope of influence directly affects purchasing intentions. As a result, Hypothesis 1a and Hypothesis 1b are offered as follows,

H1a. The strength of social relationships will positively affect the online purchasing intentions of mobile social users.

H1b. The scope of social influence will positively affect the online purchasing intentions of mobile social users.

Information interaction refers to the exchange of information between users on social networking sites, consisting of two main factors: the information value and the control of information dissemination [44]. Information value embodies whether the information pushed to customers or potential customers is valuable. Specifically, valuable information expands the availability of product information, helps the company improve user stickiness and enhances potential consumers' willingness to purchase [27], [45], [46]. And the control of information dissemination refers to users' capabilities to control the process and the coverage of information dissemination. From the view of communication effects, the dissemination of information relies on interpersonal chains to spread with numerous intertwined chains and complex communication paths. This makes users more willing to

accept recommendations from individuals who have enormous influence in the diffusion process [47].

Therefore, Hypothesis 1c and Hypothesis 1d are offered as follows,

H1c. The value of information will positively affect the online purchasing intentions of mobile social users.

H1d. The control of information dissemination will positively affect the online purchasing intentions of mobile social users.

B. MOBILE SOCIAL INTERACTIONS AND MOBILE SOCIAL INITIAL TRUST

Drawing on Mayer's Trust Model, we defined mobile social initial trust as the trust between users who have no direct history of interactions in a mobile social network, including three dimensions: integrity, benevolence, and competence [48]. And based on Yin's Online Trust Model of the interlink of the antecedents of trust, online trust and the results generated by trust [49], we treat mobile social interactions as antecedents of trust (i.e., interactions influence the establishment and maintenance of trust).

On one side, relationship interactions influence the formation of mobile social initial trust, suggesting that online trust is closely related to the strength of social relationships between users [50]. It is easier for both parties to reach a consensus via smooth communications [51], so as to enhance mutual identification [8]. And the wider user's scope of social influence, the more likely he to create his celebrity endorsement effect, and to lead other mobile users to follow his opinions [52], then the higher the credibility of that user has in the social network [53]. Therefore, Hypothesis 2a and Hypothesis 2b are offered as follows,

H2a. The strength of social relationships will positively affect mobile social users' perception of the seller's trust.

H2b. The scope of social influence will positively affect mobile social users' perception of the seller's trust.

On the other side, information interactions affect the formation of initial trust in mobile social networks. The effectiveness of information interactions promotes the better operation of online communities [45]. However, the contents of information pushed to users do not directly generate profits but maintain the relationships by attracting the target users' attention with posting valuable or entertaining information [54]. Thus, valuable online information, a consultant worthy of consumer trust [55], can enhance companies' performance and stimulate beneficial interactions with consumers [56]. Meanwhile, in the process of information dissemination, if the information must pass through a certain node to be effectively disseminated, the node is considered to have a strong influence. Generally, the more information that passes through a node, the more influential the node is. Nodes are also more willing to accept recommendations from users with higher influence [47]. Thus, the following Hypothesis 2c and Hypothesis 2d are put forward,

H2c. The value of information will positively affect mobile social users' perception of the seller's trust.

H2d. Information dissemination control positively will affect mobile social users' perception of the seller's trust.

C. MEDIATING EFFECT OF MOBILE SOCIAL INITIAL TRUST

Research has provided evidence that the initial trust fosters consumers' choice to transact with the trusted merchants [57]. It is mainly manifested in the fact that consumers' trust directly determines purchasing intentions [58], which in turn affects actual purchasing behaviors [59]. Trust is divided into three forms in a mobile social network. Competence is the skill or aptitude that users possess to influence others. Benevolence is the expectation that others care for or uphold the fiduciary party, and integrity is the expectation that others act with honesty or an acceptable standard [48].

Considering Mayer's Trust Model, mobile social initial trust plays a mediating role in the relationship between social interactions and the online purchasing intentions of potential customers [35], [48]. The specific path is that relationship interactions and information interactions significantly drive the formation of initial mobile social trust, to enhance mobile social users' intentions to purchase online. So the study puts forward the following hypotheses,

H3a. The integrity of a mobile social node will have a directly positive effect on online purchasing intentions of other nodes.

H3b. The benevolence of a mobile social node will have a directly positive effect on online purchasing intentions of other nodes.

H3c. The competence of a mobile social node will have a directly positive effect on online purchasing intentions of other nodes.

H4. Mobile social initial trust plays a mediating role in the mechanism of mobile social interactions affecting online purchasing intentions.

D. MODERATING EFFECTS OF PRODUCT ATTRIBUTES AND OTHER EXTERNAL ATTRIBUTES

Another model, Davis's Technology Acceptance Model (TAM), is applied to explore the moderating effect of external attributes [60]. The theory explains the influence of external variables on behavioral motivation. In the mechanism of mobile social interactions affecting online purchasing intentions, the factors affecting the relationship should be taken into consideration, including product quality, product type, corporate reputation, and online risk [61]. Product attributes and other external attributes play moderating roles between mobile social interactions and online purchasing intentions.

Firstly, consumers' perception of the benefits originating from products or services affects their purchasing decisions significantly [62], and their perception of product quality bears the brunt. Therefore, when consumers perceive the product quality as high, they are likely to buy [63]. Accordingly, Hypothesis 5a is offered as,

H5a. Product quality will play a moderating role in the mechanism of mobile social interactions affecting online purchasing intentions.
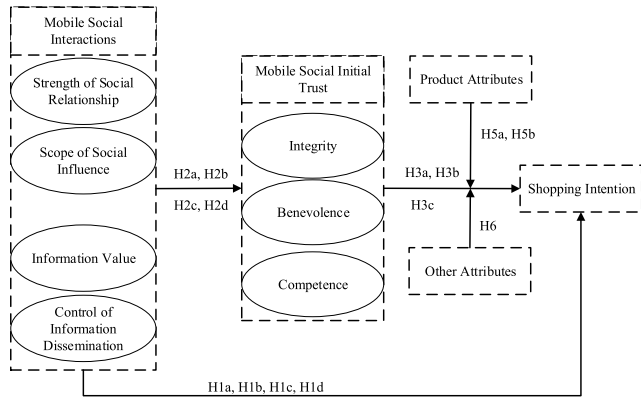
FIGURE 1. Theoretical model of influence mechanisms.

On the other hand, online products can generally be divided into two types: search products and experience products [64]. Customers can make appropriate judgments on the quality of search products before purchasing based on the descriptive information of the products, such as books and software. While the quality of experience products can only be judged after use, such as food and clothing [65]. Moreover, product type has a moderating effect between review content, reviewer's characteristics and review usefulness [66]. Therefore, mobile social interactions can be adjusted by the characteristics of diversified product types. Hypothesis 5b is offered as,

H5b. Product type will play a moderating role in the mechanism of mobile social interactions affecting online purchasing intentions.

Finally, the perception of quality affects the consumer's purchasing decision-making process from network login support, online transactions, and transaction payments to logistics services [67], [68]. In the study, other external attributes refer to the quality of pre-sale service, and that of in-sale service which reflects the logistics efficiency and transaction security. So Hypothesis 6 is offered as follows,

H6. Other external attributes will play a moderating role in the mechanism of mobile social interactions affecting online purchasing intentions.

The hypotheses regarding the theoretical relationship of this study are shown in Figure 1. The study tests the main effects of mobile social interactions on online purchasing intentions (H1a, H1b, H1c, H1d). It also evaluates the effect of mobile social interactions on mobile social initial trust (H2a, H2b, H2c, H2d), and the relationship between mobile social initial trust and online purchasing intentions (H3a, H3b, H3c). Furthermore, it inspects the mediating effect of mobile social initial trust (H4). Finally, it verifies the presence of a moderating effect of product attributes and other external attributes (H5a, H5b, H6).

IV. METHODOLOGY
A. MEASUREMENT
This paper develops a formal survey scale to carry out the study. Variables include mobile social interactions (strength

of social relationship (SSR), scope of social influence (SSI), information value (IV) and control of information dissemination (CID)), mobile social initial trust (integrity (Inte), benevolence (Ben), competence (Com), and the online purchase intentions (PIn)).

In terms of the questionnaire measurements, a five-point Likert scale is used, on a scale from 1 (completely disagree) to 5 (completely agree). The strength of social relationship (SSR) has 9 measurement items [43], [69], [70] and the scope of social influence (SSI) is measured by 5 items [71]. The information value (IV) and control of information dissemination (CID) are measured through 14 items (drop one invalid item) and 2 items, respectively [72], [73], [74]. Then, mobile social initial trust is measured by 6 items [48]. Finally, 6 items are used to measure purchase intentions (PIn) [49]. See Table 1 (Measurement items) for details.

B. DATA COLLECTION
The questionnaire has been reviewed by 8 researchers in the field of e-commerce previously, and then 50 mobile social users with rich online shopping experience are selected for pre-survey. According to the pre-survey results, the items are revised to form a final survey scale. The final version involves a comprehensive range of social platforms, including instant messaging (WeChat, Tencent QQ), social media (Sina Weibo, Tencent Weibo), content community (Douban, Bilibili, YouTube, Tik Tok), BBS (Baidu Post Bar, Zhihu, Hupu) and e-business (Meilishuo, Little Red Book, Dianping) and other social networking platforms. The formal scale also covers a wide range of topics, ranging from food and tourism, beauty accessories, clothing, shoes and hats, digital technology, fitness, health care and childcare, to real estate decoration. Because the formal scale[1] contains 91 questions, the formal scale sets not only single choices and multiple choices but also matrix single choices and matrix slide bars to avoid monotony and boredom.

Prior to the formal survey, the respondents are identified according to the following principles first, ① the respondents are mobile social users; ② the respondents have some experience in online shopping; ③ the sample is representative and avoids homogeneity. Therefore, the respondents include the main user group of mobile social networks; that is, mobile users aged between 18 and 50 with the online shopping experience, involving university students and respondents who are already in the workforce. Meanwhile, as the research subjects are mobile users, the data is collected via the internet. The online questionnaire has been generated and published through Sojump, a professional survey website, and a total of 749 responses are collected. Then, the valid questionnaires are screened according to the following principles: ① Those that take less than 180 seconds to answer are deleted; ② Those from non-mobile social users are deleted; ③ Those filled out incompletely are deleted; ④ Those with the same answer for

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[1]A formal questionnaire is not available for space constraints. Authors can provide it if required.

TABLE 1. Measurement items.

Variable	Item	Standard factor loading	Reference
Strength of social relationship (SSR)	Sim1: Users sharing a large number of common friends with me.	0.663	Shen et al. (2014) [69]
	Sim2: Users having a similar background with me (such as interests, hobbies, majors, academic qualifications).	0.667	
	Sim3: Users joining a large number of same public homepages with me.	0.720	
	Int1: Users whose messages posted have been retweeted many times by friends	0.795	Iyengar et al. (2009) [43]
	Int2: Users whose information published has been repeatedly commented by friends.	0.780	
	Int3: Users whose messages have been repeatedly praised by friends.	0.780	
Scope of social influence (SSI)	Pro1: Users with a large amount of expertise in a particular product or field. (e.g. brand, price, performance)	0.673	Voyer (2000) [70]
	Pro2: Users who can provide me with professional advice.	0.697	
	Pro3: Users with the extensive shopping experience and use experience in a field.	0.682	
	Pup1: Users with lots of friends.	0.661	He and Xie (2013) [71]
	Pup2: Users with lots of fans.	0.669	
	PP1: Users with dominant and great impact in a certain field.	0.811	
	PP2: Users with dominant and influential information responders in a field.	0.863	
	PP3: Users with dominant and influential information retweets in the field.	0.856	
Information value (IV)	IC1: Usefulness of information text.	0.693	Gorla et al. (2010) [72]
	IC2: Integrity of information text.	0.698	
	IC3: Conciseness of information text.	0.718	
	IC4: Authenticity of information text.	0.731	
	IC5: Accuracy of information text.	0.658	
	IF1: Information content is easy to understand.	0.730	Wang et al. (2019) [45]
	IF2: Information is in the form of text.	0.653	
	IF3: Information is in the form of picture.	0.729	
	IF4: Information is in the form of voice.*	⸺	
	IF5: Information is in the form of video.	0.653	
	IF6: Information is in the form of live streaming.	0.700	
	IF7: Information is presented in various forms (such as text, pictures, voice, video, live streaming).	0.732	
	IF8: Information is attractive in visual form (such as labels, fonts, colours).	0.732	

TABLE 1. (Continued.) Measurement items.

Variable	Item	Standard factor loading	Reference
Control of information dissemination (CID)	IT1: Value of factual information (a brief introduction to product models and functions).	0.705	Zheng et al. (2013) [73]
	IT2: Value of experience-sharing information (product use experience, feelings and related information).	0.703	
	Qo11: The amount of information released per unit time.	0.881	Dolev et al. (2010) [74]
	Qol2: The amount of information forwarded per unit time.	0.877	
Integrity (Inte)	Inte1: I trust that the node user will keep promise.	0.881	Mayer et al. (1995) [48]
	Inte2: I feel that the node user is trustworthy.	0.933	
Benevolence (Ben)	Ben1: I believe the users of the node are usually kind.	0.821	
	Ben2: I trust that the node user will not disclose my personal information to others.	0.731	
Competence (Com)	Com1: I believe the node user can provide me with the goods and services I expect.	0.873	
	Com2: I am confident that the users of this node are capable of solving the problems encountered during the recommendation process.	0.908	
Purchase intention (PIn)	WTB1: I think the purchase information provided by these users affected my purchase plan.	0.712	Yin et al. (2009) [49]
	WTB2: I consider buying products or services recommended by these users.	0.836	
	WTB3: I am likely to buy products or services recommended by these users.	0.870	
	WTB4: I strongly desire to buy the products or services recommended by these users.	0.798	
	WTRE: If there is any need in the future, I will also buy the products or services recommended by these users.	0.834	
	WTR: I will recommend the products or services recommended by these users to my friends and colleagues.	0.847	

*Item dropped from final analysis.

most or all options are deleted. Valid questionnaires are 682,[2] excluding 67 invalid responses (sample validity of 91.05%). Descriptive statistical analysis is performed on the valid

[2]The sample size for structural equation models is consistent with Westland's recommendations for the number of latent variables and observed variables [75]. Conditional on 42 observed variables and 8 latent variables and assuming the most stringent or conservative parameter values (anticipated effect size of 0.2 and desired statistical level of 0.8), the results is that recommended and minimum sample size for detecting effects is 444, and the minimum sample size for model structure is 116 through Daniel Soper's A-priori Sample Size Calculator for Structural Equation Models (http://www.danielsoper.com/statcalc3/calc.aspx?id=89). Thus, the size exceeds these minimum values and meets the structural equation model's requirements for sample size requirements.

Characteristic	Category	Frequency (%)
Gender	Male	263 (38.56%)
	Female	419 (61.44%)
Age	18-25 years	145 (21.26%)
	26-30 years	153 (22.43%)
	31-40 years	251 (36.80%)
	41-50 years	133 (19.50%)
Monthly income (RMB)	≤2000	129 (18.91%)
	2000-5000	273 (40.03%)
	5000-10000	204 (29.91%)
	10000-20000	65 (9.53%)
	>20000	11 (1.61%)
Education	High school or below	104 (15.25%)
	Junior college	140 (20.53%)
	Undergraduate	399 (58.50%)
Time spent using mobile social networks	Half of one year or below	8 (1.17%)
	Half of one year to 1 year	15 (2.20%)
	1-3 years	68 (9.97%)
	3-5 years	95 (13.93%)
	5 years or above	496 (72.73%)
Time spent using mobile social networks per day	Half of an hour or below	38 (5.57%)
	Half of an hour-1 hour	91 (13.34%)
	1-2 hours	149 (21.85%)
	3 hours or above	115 (16.86%)

questionnaires. Table 2 shows the demographic information of the samples, and 263 (38.56%) are male and 419 (61.44%) are female. The slightly higher percentage of females which is in line with the research objectives is acceptable [19]. Although the gender distribution has a slightly higher proportion of females than males, our analysis concentrates on the shopping intention of the products including clothing and food. In addition, one-way ANOVA is conducted to examine the impact of different groups, and the results show that the differences between gender groups are small and comparable. The age distribution is mainly between 18 and 50 years old, and 64% are highly educated (bachelor degree or above). After careful selection, a total of 682 valid questionnaires are obtained, with a sample effective rate of 91.05%. More than 95 per cent of the respondents have been using mobile social networks for more than 1 year, and 81.1% of them access mobile social networks for more than 1 hour daily.

V. ANALYSIS AND RESULTS

Structural equation model (SEM) is a multivariate statistical analysis method used to test hypotheses on the relationship between observed and potential variables, and between latent and latent variables [76]. We examine the reliability and validity of the scale by first testing the measurement model. And then the model hypotheses are tested based on the two-step test of SEM, which is a Covariance-Based approach (CB-SEM) [77]. The path analysis with SPSS/AMOS is chosen as the statistical analysis tool to handle structural equation models. Compared to other statistical methods, AMOS software is widely used for model validation in various fields due to its easy operation, visualization and powerful functionality [78]. In addition, the AMOS approach can be applied not only for modelling but also for predicting the values of the variables in the observed model. It is suitable for model studies with large samples of data (200+) [79]. Finally, considering the complexity of the model, AMOS structural equation modelling is more suitable for testing the model in our study.

A. EXPLORATORY FACTOR ANALYSIS

Based on the CB-SEM recommended by Anderson and Gerbing [77], the reliability and validity of the scale are tested, and the structural model is established to test the hypotheses.

Exploratory factor analysis on the mobile social interaction scale is conducted firstly to obtain the potential dimensions of mobile social interaction measurement. The applicability test of factor analysis on 682 valid questionnaires shows the results of KMO (Kaiser-Meyer-Olkin) and Bartlett sphere test, that is KMO=0.963, sig.=0.000, indicating that the sample data is suitable for factor analysis. Then the maximum variance method is utilized to perform orthogonal rotation and principal component analysis. The factors are determined based on the extraction principle that the characteristic root is greater than 1. One item with a factor load less than 0.5 is eliminated, and one index with a factor load greater than 0.5 on both common factors is filtered. The scale structure has changed after excluding invalid items, and KMO and Bartlett's sphere test must be performed again. The reported results are KMO=0.961, sig.=0.000. Then the principal component factor analysis is performed to extract 4 common factors. The results are shown in Table 3. The cumulative variance explanation rate is 69.95% (more than 65%), evidencing that extracted factors can cover the information of the original indicators and that the designed dimensions of mobile social interactions are reasonable. Four factors are the strength of social relationship (SSR), the scope of social influence (SSI), the value of information (IV) and the control of information dissemination (CID). The principal component analysis is performed on all measurement items of the scale, as shown in Table 4. And the first principal component obtained without rotation is 72.225%, enunciating that the first principal component explains most of the variables.

B. RELIABILITY AND VALIDITY ANALYSIS

We check the quality of all the constructs used in the measurement model in terms of reliability and validity to investigate the study hypotheses in the model. Therefore, following the study of Ghahtarani *et al.* [35], we use confirmatory factor analysis and examine the composite reliability (C.R) and average variance extracted (AVE) to test the validity and reliability of the constructs.

Firstly, we use SPSS software to test the sample data, and the results are shown in Table 5. The Cronbach's α value of every latent variable is between 0.744 and 0.93 (exceeds the standard level of 0.7) and every combined reliability value is greater than 0.7 that reaches the ideal level [80]. This indicates that the items of the survey scale have an acceptable level of reliability and can reliably measure the latent variables. Besides, the results of the

TABLE 3. Exploratory factor analysis results of mobile social interactions.

Variable	Item	Ingredient				Cronbach's α	
		1	2	3	4		
	Sim1	0.643					
	Sim2	0.648				0.789	
	Sim3	0.737					
	Int1	0.712					
Strength of social relationship (SSR)	Int2	0.754				0.871	0.905
	Int3	0.703					
	Pro1	0.542					
	Pro2	0.589				0.813	
	Pro3	0.630					
	Pup1		0.669			0.770	
	Pup2		0.543				
Scope of social influence (SSI)	PP1		0.741				0.877
	PP2		0.654			0.898	
	PP3		0.773				
	IC1			0.702			
	IC2			0.689			
	IC3			0.766		0.875	
	IC4			0.781			
	IC5			0.765			
	IF1			0.727			
	IF2			0.537			
Information value (IV)	IF3			0.522			0.931
	IF4			0.709		0.882	
	IF5			0.659			
	IF6			0.686			
	IF7			0.570			
	IF8			0.544			
	IT1			0.609		0.826	
	IT2			0.575			
Control of information dissemination (CID)	Qol1				0.675	0.872	0.872
	Qol2				0.679		
Cumulative variance explained (%)		16.897	33.510	50.036	69.950		

aggregated validity test are shown in Table 5. The factor loading value of every indicator is above the minimum level of 0.65, passing the significance level of 0.001, thus suggesting that the model is reliable [81]. Moreover, the value of Cronbach's α of the latent variable is higher than 0.90, which further confirms the overall reliability of the scale.

After determining the reliability, we examine the internal consistency and convergent validity of the indicators, and discriminant validity. As reported in Table 6, the AVE of latent variables above 0.5 is cut off, indicating that the scale has high convergent validity. In the test of discriminant validity, the results demonstrate that the AVE square roots (diagonal values) of all latent variables are greater than the correlation

**TABLE 4.** Exploratory factor analysis results of online purchasing intention.

Variable	Item	Ingredient	Cronbach's α
PIn	WTB1	0.771	0.921
	WTB2	0.865	
	WTB3	0.887	
	WTB4	0.836	
	WTRE	0.863	
	WTR	0.871	
Cumulative variance explained (%)		72.225	

coefficient between the latent variables, which meets the requirements of discriminant validity.

Finally, since respondents to the survey are collected using a single-temporal questionnaire in the same measurement setting, the results are, therefore, susceptible to common method bias (CMB) influence, which leads to a high correlation between variables [82]. Thus, before further data analysis, it is essential to test whether the questionnaire data is affected by CMB. The study employs Harman's single factor test. Specifically, exploratory factor analysis is used to extract the factors using a principal components approach. And the results show that the first factor explains 40.2% of the variance without reaching 50% [82], hence no common method bias.

C. STRUCTURAL EQUATION MODELLING AND HYPOTHESIS TESTING

The structural equation model is used to verify the related assumptions. The results show that the $\chi 2$ of the model is 1784.259, the degree of freedom, 932, $\chi 2/df$, 1.914, and other fitting indicators are at acceptable levels (GFI=0.684, CFI=0.944, IFI=0.945, RMSEA=0.074), indicating that the data fit well with the structural model. As shown in Figure 2, a user's strength of social relationships (SSR) positively affects the mobile social initial trust significantly through integrity, benevolence and competence (β are 0.284, 0.313, 0.254, and t values are 7.030, 8.014, 8.014), which supports H2a. Then, the scope of social influence (SSI) affects the mobile social initial trust through integrity (β = 0.091, t=2.183), while SSI does not significantly affect a node's benevolence and competence. And information value (IV) positively affects the mobile social initial trust through a node's integrity, benevolence, and competence significantly (β are 0.290, 0.201, 0.236, t values are 6.598, 6.598, 5.898), so H2c is verified. Moreover, H3a, H3b, and H3c regarding the impact of the control of information dissemination (CID) are supported as well. As predicted, CID significantly affects the mobile social initial trust through a node's benevolence (β = 0.094, t=2.183). Besides, it is worth noting that three dimensions of mobile social initial trust; that is, integrity, benevolence, and competence positively affect online purchasing intentions of users significantly (β are 0.158, 0.255, 0.219, and t values are 6.029, 6.839, 7.135). In addition, the
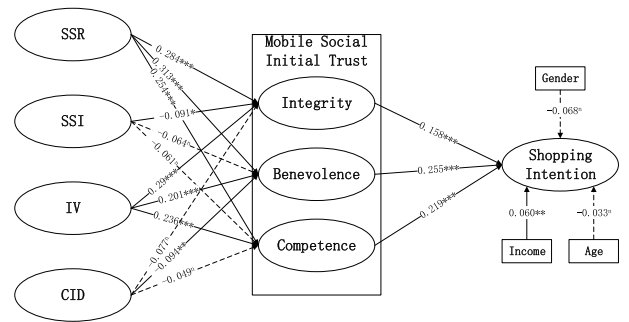
Note: N = not significant; p< .05; ** p < .01; *** p < .001

FIGURE 2. Analysis results of the research model.
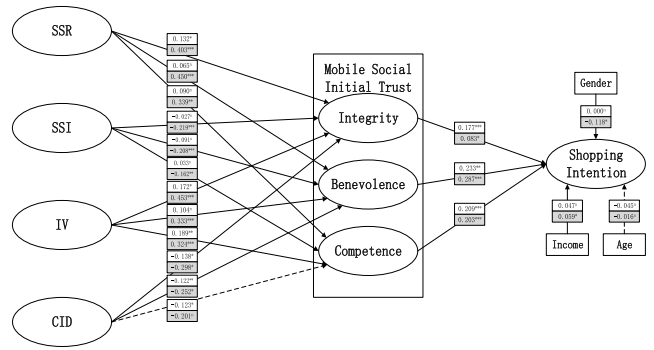
Note: N = not significant; p< .05; ** p < .01; *** p < .001

FIGURE 3. The moderating effect of product quality.

coefficient of determination R^2 of online purchasing intention is 0.539, showing that the variables are well explanatory.

D. TEST OF THE MEDIATING EFFECT

As shown in Table 7, SSR, SSI, IV, and CID of a node all have significant effects on online purchasing intentions of other nodes (0.090**, 0.079*, 0.099**, 0.099***), which means that four factors have direct positive impacts on online purchasing intentions; that is, H1a, H1b, H1c, and H1d are supported. Furthermore, when verifying the mediating effect, the results of SSR, IV, and CID on online purchasing intention are not significant, indicating that mobile social initial trust plays a completely mediating role between three elements and online purchasing intention. Meanwhile, the impact of SSI on online shopping intention is weakened (from 0.079* → 0.067*), which proves that initial trust plays a partially mediating role between SSI and online shopping intentions. In summary, H4a and H4b are supported.

E. TEST OF THE MODERATING EFFECT

First of all, we examine the moderating effect of product quality. Product quality is ranked as high or low, so 682 questionnaires are divided into two groups with the median referred to Tellis and Johnson [62]. The results of the structural equation models show that the path from the mobile social initial trust to the online shopping intention is significantly

TABLE 5. Confirmatory factor analysis results.

Variable	# of items	Standard factor loading					Average variance extracted (AVE)	Combination reliability (CR)	Cronbach's α
SSR	9	Sim1(0.663) Int1(0.795) Pro1(0.673)	Sim2(0.667) Int2(0.780) Pro2(0.697)	Sim3(0.720) Int3(0.780) Pro3(0.682)			0.517	0.906	0.905
SSI	5	Pup1(0.661) PP1(0.811)	Pup2(0.669) PP2(0.863)	PP3(0.856)			0.604	0.883	0.877
IV	14	IC1(0.693) IF1(0.730) IF7(0.732) IT1(0.705)	IC2(0.698) IF2(0.653) IF8(0.732) IT2(0.703)	IC3(0.718) IF3(0.729)	IC4(0.731) IF5(0.653)	IC5(0.658) IF6(0.700)	0.501	0.932	0.931
CID	2	QoI1(0.881)	QoI2(0.877)				0.773	0.812	0.872
Inte	2	Inte1(0.881)	Inte2(0.933)				0.823	0.903	0.902
Ben	2	Ben1(0.821)	Ben2(0.731)				0.604	0.753	0.744
Com	2	Com1(0.873)	Com2(0.908)				0.793	0.885	0.844
PIn	6	WTB1(0.712) WTRE(0.834)	WTB2(0.836) WTR(0.847)	WTB3(0.870)	WTB4(0.798)		0.669	0.923	0.921

TABLE 6. The square roots of AVE and the coefficient matrix of related variables.

	1 SSR	2 SSI	3 IV	4 CID	5 PIn	6 Inte	7 Ben	8 Com
1	0.719							
2	0.705	0.777						
3	0.689	0.696	0.707					
4	0.670	0.662	0.614	0.879				
5	0.333	0.335	0.330	0.344	0.818			
6	0.318	0.291	0.325	0.324	0.598	0.907		
7	0.370	0.334	0.320	0.353	0.691	0.693	0.777	
8	0.323	0.300	0.321	0.319	0.617	0.774	0.760	0.891

The value on the diagonal is the square root of AVE.

Note: N = not significant; p< .05; ** p < .01; *** p < .001

FIGURE 4. The moderating effect of product type.

Note: N = not significant; p< .05; ** p < .01; *** p < .001
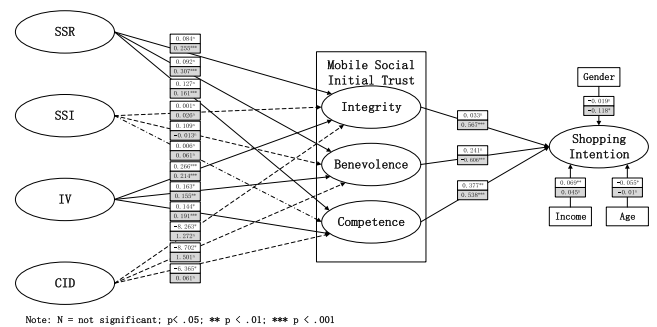
FIGURE 5. The moderating effect of other external attributes.

different as shown in Figure 3. Then the multi-group analysis is used to further test the path coefficients of each group. The results suggest that when the product quality is high, a node's benevolence and competence have a stronger impact on online purchasing intention of other nodes (β is 0.287 and 0.403 respectively, t values are 5.908 and 4.910). In contrast, when the product quality is low, a node's integrity has a significantly stronger effect on online shopping intention ($\beta = 0.177$, t=4.371), and H5a is supported.

Secondly, the moderating effect of product type is tested. Products can be divided into search products and experiential products according to Moon et al. [64]. The search products in our sample refer to books, computer hardware, software, audio-visual products, and experience ones include food and clothing. The results suggest that the path from initial trust to purchasing intention is significantly different as shown in Figure 4. The multi-group analysis is used to further test the path coefficients, indicating that when the product belongs to the search type, the integrity of a node has a stronger influence on the intentions of other nodes ($\beta = 0.163$, t=5.788); When the product is experiential, a node's ability has a stronger effect on shopping intentions ($\beta = 0.245$, t=7.234).
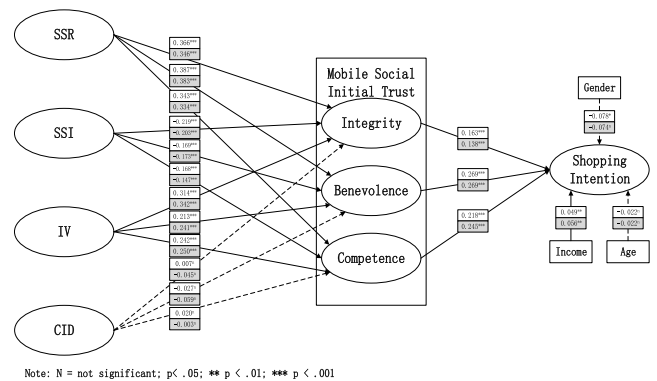
The results clarify that there is no difference in other paths between the two groups. Therefore, H5b is supported.

Thirdly, the moderating effects of other external attributes are tested. External attributes can be poor or good, so 682 questionnaires are divided into two groups with the median [67]. The results show that the path from mobile

TABLE 7. The mediation test of mobile social initial Trust.

	Independent variable	SSR		SSI		IV		CID	
	Mediator variable	Cof	t value	Cof	t value	Cof	t value	Cof	t value
Step 1	Independent variable ———>Dependent variable	0.090 **	2.645	0.079 *	2.160	0.099 **	2.761	0.099 ***	3.388
Step 2	Independent variable ———>Mediating variable — Inte	0.245 ***	6.141	0.123 **	2.929	0.113 **	2.780	0.171 ***	5.349
	Ben	0.273 ***	7.138	0.099 **	2.648	0.024 *	2.182	0.160 ***	5.454
	Com	0.215 ***	5.955	0.082 *	2.210	0.097 **	2.662	0.134 ***	4.689
	Mediating variable ———>Dependent variable — Inte	0.155 ***	4.793						
	Ben	0.295 ***	5.992						
	Com	0.241 ***	6.292						
Step 3	Independent variable, mediating variable ———>Dependent variable	-0.031	-0.922	0.067 *	2.486	0.037	1.211	0.037	1.419

Cof represents coefficient; ***, **, and * represent a significance level of 1%, 5%, and 10%, respectively.

social initial trust to purchasing intentions is significantly different as shown in Figure 5. When other external attributes are better, a node's integrity, benevolence and competence have a stronger influence on online shopping intentions of other nodes (β are 0.567, 0.606, 0.538, and t values are 3.445, 2.287, 3.648 respectively), and H6 is supported.

VI. CONCLUSION AND DISCUSSION

This paper uses mobile social initial trust as a mediator to construct the mechanism of mobile social interactions on online purchasing intention and perform SEM to verify. We hope to provide a decision-making basis for mobile social marketing. Thus, the conclusions and management implications are summarized as follows.

A. SUMMARY

Firstly, the study reveals the mechanism of mobile social interactions on online shopping intentions of mobile social users. In the initial contact stage, the four latent variables of mobile social interactions including the strength of social relationships, the scope of social influence, the information value and the control of information dissemination, not only have a significantly positive impact on online shopping intention but also exert an influence through the intermediary effect of initial trust. This discovery is consistent with the findings of several studies (e.g., Ghahtarani et al. [35], Lu et al. [36], which report that the social interactions drive consumers' shopping intention. Specifically, initial trust plays a fully mediating role in the influence path of the strength of social relationships, the information value, and the control of information dissemination, while partially playing the mediating role between the scope of social influence and intention. This proves that a node that gains high credibility promotes sales more effectively in the process of mobile social interactions.

Secondly, the study confirms that mobile social initial trust stimulates online shopping intentions. However, the mobile social interactions that are pre-factors of the initial trust have different affecting degrees. To be specific, the overall effect of the strength of social relationships is the strongest, followed by the information interaction. The strength of social relationship and the information value positively affect initial trust through a node's integrity, benevolence and competence. The scope of social influence significantly affects the initial trust through a node's integrity, and the control of information dissemination significantly affects it through benevolence. Thus, the strength of social relationships mainly presents the benevolent feature of a node, and the information value principally reflects integrity characteristics. The control of information dissemination mainly shows the aspect of competence, and the scope of social influence exhibits the characteristics of integrity.

Thirdly, the quality, type and other external attributes of products have significant moderating effects in the process of mobile social interactions affecting online shopping intentions, which supports the research of Rust and Zahorik [61]. When most products sold in the market are high quality, a node's benevolence and competence have a stronger effect on intention. On the contrary, when those are low quality, a node's integrity exhibits significant effects. The reason is probably that the high-quality product provided by a seller can reflect his concern, benevolence to customers and his ability to provide excellent products, which in turn affects consumers' intentions to buy. However, consumers concern about the integrity of a seller than products under the circumstance of more low-quality products. Thus consumers

are more willing to purchase products from sellers with high integrity and honesty.

In terms of product types, the integrity of a seller has a stronger effect on online shopping intentions of the search products, while the influence of a seller's ability is stronger for the experiential ones. The reason is probably that the search products (such as books) have strong product similarities, so consumers focus on the integrity of a seller; that is, whether the sellers can honestly describe and sell products. For experience products (like apparel), users concentrate on whether a seller's ability to provide products can meet individual needs.

When other external attributes are good, a seller's integrity, benevolence and competence have stronger influences on intentions. Because external attributes (such as service quality, logistics speed and transaction security) are basic requirements for online sales. If other external attributes are good, mobile users will be willing to believe that a seller is honest, caring about consumers and capable of providing related products or services, and therefore they are willing to purchase products or services from the seller.

B. MANAGERIAL IMPLICATIONS

When marketer makes mobile social interaction strategies, it is worth noting that the strategies not only refer to controlling the amount of information posted, producing accurate and exquisite information and choosing appropriate forms of information but the quality of the relationship interactions. For example, marketing activities can be carried out on platforms where more mobile social users match the products according to factors such as interest, hobby or occupation. A marketer also needs to increase interactions with existing users to gain more attention, reviews, likes and word of mouth, which may encourage other mobile social users to actively seek information about the products or businesses through the platform.

Establishing user trust through mobile social interactions can help marketers to guide online consumption. Marketers demonstrate their honesty, benevolence and capabilities to provide high-quality products or services through information interactions and relationship interactions. Only in this way can they effectively earn the trust of mobile social users and motivate them to purchase. Product price, brand awareness, product type, and other external manifestations of product quality also influence the effect of mobile social interactions, such as receiving information and purchasing products. Companies should choose appropriate interactive methods based on the specific characteristics of products. For example, enhancing the sense of experience for mobile users is the key to the marketing of experiential products, while the function description and information dissemination are important for search products. In addition, other external attributes, such as service quality, transaction security, and logistics quality, are essential factors when interacting with mobile social users.

There are still extensive directions that can be considered in the future. For example, we measure the online purchasing intention rather than the actual online shopping behavior. Due to the complexity of consumer behaviors, behavioral intention is not a complete substitute for actual behavior. A more accurate, specific and in-depth study of online shopping behavior may be possible if information technology is used to capture data or to obtain recorded data from social platform operators to distil indicators of actual behavior. In addition, the empirical research focuses on domestic mobile social contexts, while the social culture and industry context abroad may be completely different. Therefore, the research may be more interesting if subsequent studies consider cultural differences and collect behavioral data from foreign mobile social platforms to meet the new demands for multiple data sources and research methods to explore online consumer behaviors in the marketing field.

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