

Article

Sub-Network Structure and Information Diffusion Behaviors in a Sustainable Fashion Sharing Economy Platform

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Abstract: It is important to understand the creative processes of social value networks in terms of the interdependent connections between fashion sharing economy businesses and consumers. In particular, when the similarity in the values of each member is shared in the sub-network, the closeness of the relationships can be further strengthened. In such value chains, the overall process is important because the content, which is originally provided through the distribution process, is reinterpreted from the consumer's point of view and it is reproduced as new creative output with high added value. In this study, the characteristics of sub-network structure, the characteristics of social relations, and network externality are proposed and analyzed as influential variables of information diffusion behaviors that explain the diffusion of shared information in fashion sharing economy platforms. We examined the shared information diffusion performance of the sharing economy platform as a multidimensional influential factor including the network characteristics, and proposed a structural model that integrated network research and mobile information diffusion research. We surveyed 400 people with experience of fashion information activity on sharing economy platforms. Frequency, validity, reliability, measurement model and path analyses were conducted using SPSS and AMOS statistical packages. The results showed that trust value, profit/risk sharing, interdependence, and cultural/social similarity of the sub-network structure characteristics affected social relations, while trust value and cultural/social similarity also influenced relational embeddedness. Social relations and relational embeddedness, in turn, affected perceived complementarity and social interaction, both of which affected fashion information diffusion behaviors. Finally, social pressure, social ties, and social unity affected trust values. The results of this study can be applied not only to social connections among the members of the sub-network of a fashion sharing economy platform, but also as an effective means to explain the maintenance and reinforcement of mutual relations, thereby advancing the current academic research and practical applications.

Keywords: sustainable fashion sharing economy platform; sub-network structure characteristics; social relationship characteristics; network externality; information diffusion behaviors

1. Introduction

A sharing economy is an economic model in which a platform operator mediates online service consumption transactions that do not involve changes in ownership. It not only creates new markets, but also changes the way in which businesses operate in the marketplace [1]. The sharing economy is

comprised of social economy, social value, and collaborative consumption. It is also characterized by the collective intellectual, an integral feature of the Internet; voluntary participation and knowledge sharing; a digital community, wherein communities are formed virtually; and social capital, which is the social capacity to solve common problems through trust and cooperation. The sharing economy is a consumer-driven, win–win digital economy paradigm [2–4]. It has created many social networks and relationships through its use of resources and the social benefits that arise from inter-individual cooperation [5]. The development of information and communication technologies (ICT), social sharing and exchange, and cooperative consumption have facilitated the production and sustainability of this network, and have led to the development of a sharing economy model [4].

In an economic relationship characterized by a diffusion network, individuals or groups are able to minimize the uncertainty of value by creating new synergic and collaborative relationships with common core-values that strengthen the network among its members [6]. This is highlighted in the content and structure of the social relationships between these actors. In the relational dimension, this relationship further promotes quality (interaction), leading to mutually beneficial activities that arise from the sharing of collective values, norms, beliefs, and attitudes in the cognitive dimension [7].

Under the framework of a sharing economy, members seek to solve social problems through the virtual cycle of resources and the pursuit of value reproduction. Also, they pursue spontaneous and reasonable alternative consumption by sharing their resources with others. Related research should consider the characteristics of the we-rationality of the sharing economy in terms of the spirituality of unity or a sense of belonging to the network of relations. Additionally, it is important to understand that the movement toward collaborative consumption, as opposed to ownership, corresponds to increasing its value as an alternative means of consumption [8]. In particular, the sharing economy is a form of ‘network commons’ that relies more on social capital, such as social trust, than on invisible markets, and collaborative consumption can be regarded by its members as an indication of sustainable behavior due to the nature of the sharing economy [4].

Thus, the network of a sharing economy platform refers to the social connection of the sharing economy, which is created voluntarily based on preference. Its members actively communicate information about a shared product category or an activity, as well as new information. Here, a strong connection among users, who are connected through the network’s structural characteristics, has an influence on the spread of shared information. Social relationships on sharing economy platforms are becoming increasingly horizontal, primarily because of the multi-communication features of interactive network information in mobile social networking services [9]. This new type of collaborative consumption based on the sharing economy is contributing to greater economic efficiency owing to the Internet and mobile computing technologies. These social characteristics are important in the social environment of human interactions and their influence [10]; notably, social connectivity in the sharing economy also enhances trust and commitment in a relationship.

To examine the effects of relationship characteristics within a sharing economy platform, access to various types of information is required, including network configuration, network range, network size, frequency of contact between people, member characteristics, network history, and available resources in the network [11]. Since social cohesion leads to behavioral intentions toward cohesion [12], studying network characteristics by considering social connectivity can help us understand the causes of information diffusion in a successful sharing economy platform.

Song and Hwang [13] discussed the relationship between network members and the structural characteristics of a network. They proposed that members of a sub-network that are linked via strong ties within a sharing economy platform will show characteristics that are different from other sub-network members. Han et al. [14] suggested that both individual and sub-network characteristics are important in understanding the phenomenon of information diffusion. When similarities are shared among members of a sub-network, interpersonal relationships are strengthened, and this creates a network with higher trust compared to other types of networks, that is, members can exchange richer and more meaningful information through solidarity [15]. Furthermore, individuals who exert similar

opinions or express empathy with others over purchased products or issues form a sort of network, and are constantly influenced by those who belong to this network [9].

In a sharing economy platform that uses a wired or mobile Internet connection, network formation expands more easily with the follow-up extension method. The follow-up extension method involves a user of a social network service (SNS) following others for communication and information sharing, thereby expanding the scope of their network relationships. In particular, the sharing economy includes elements that allow for self-expression and the spread of information to a greater degree compared to personal websites. These elements include SNS linkage [16] and the ability to maintain connections with existing, cohesive social capital through communication [17].

In particular, in recent sharing economy platforms, network externality can be seen as an effect that brings more value to customers by increasing the number of auxiliary products or services, for example, photo and video sharing and chatting in connection with SNS [18]. If the characteristics of network externality are applied to a fashion sharing economy platform, users feel more utility as the size of the platform network increases, and this can be further enhanced through active participation, such as knowledge sharing [19].

In this regard, complementary services become the basis for consumers to use services in the sharing economy platform to engage in more sharing activities, and thus, more interactive opportunities [18]. Above all, social interaction in this platform is relational social capital; it is necessary for the formation of social similarity, shared values, and cooperative/personal relationships. It has been shown to improve other related values such as altruism and fairness [20], which strengthen the network externality of the sharing economy platform, which in turn, is causally related to performance [21].

In conclusion, we propose and analyze sub-network structure characteristics, social relationship characteristics, and network externality as influential variables on information diffusion behaviors, to explain the diffusion of shared information in a sharing economy platform. We propose a structural model that integrates the study on networks and mobile-based information diffusion by examining the performance of shared information diffusion in a sharing economy platform as a multi-dimensional influencing factor that consists of specific network characteristics. This study not only examines the social connections among the members of the reference group in a sustainable fashion sharing economy platform, but also enables theoretical extension and assessment by examining how the research results effectively explain the sustainable maintenance, enhancement, and expansion of social relationships.

2. Theoretical Background

2.1. The Rise of the Sharing Economy

Owyang et al. [5] have suggested that the collaborative economy is a global trend that brings changes to society, business, and public sectors. The collaborative economy is also regarded as a sharing economy or collaborative consumption, whereby customers actively use social technologies to share goods and services in addition to sharing their opinions and experiences through mutual communication and interactions in the business environment [5]. The sharing economy (collaborative economy) model has received a lot of attention in many developed countries, especially in the European Union. This new economic model emphasizes active collaboration between consumers and producers.

This collaboration is enabled by the use of technology, and the mutual relationship between the entities involved requires each party to contribute to the relationship, either with knowledge, money, services or other input. Since the sharing economy is supported by the development of web services, it has been argued that the sharing economy is part of the digital economy, and it is growing rapidly with global expansion [22]. Collaborative consumption is defined as “the use of online marketplaces and social networking technologies to facilitate mutual sharing of resources in terms of space, money, goods, skills and services between individuals, who maybe both producers and consumers”. Furthermore, the sharing activities of individuals, businesses, and government agencies are efficiently supported by Internet-related technology in the sharing economy, bringing a radical change in consumer purchasing

and consumption behaviors [23]. Barnes and Mattsson [23] also argued that collaborative consumption is an essential part of a “sharing economy”, which means access-based consumption of products or services that can be used online and offline.

2.2. The Sharing Economy Platform in Fashion

Fashion has been evolving to reflect the growth potential of the sharing economy platform. In particular, the sharing economy is creating changes in fashion consumption and satisfying needs through the accumulation of user experience and related systems. Thus, it promotes long-tail demand [24]. This platform is a new sustainable business model arising from ICT, and it has become increasingly important to address its function in and effect on fashion.

A “sustainable fashion sharing economy platform” implies that people make effective decisions about the use and consumption of goods and services based on their preferences. Thus, people will perhaps buy less and value experience rather than ownership through sharing and borrowing. This can help save related resources (i.e., raw materials, components, capital, energy, etc.) and minimize waste in manufacturing the goods and offering services in the fashion related business environment. In a rapidly changing digital economy, people value interactive experiences and prefer the goods and services of innovative companies with entrepreneur business models, such as sharing economy platform, thus supporting their continuous business growth and success as a sustainable business.

Early fashion sharing economy platforms focused on their cost effectiveness rather than on the purchase of expensive clothes in the form of fashion goods rental services. Now, with “sharing” as the central focus, the new trend involves moving from a rental to a sharing concept. Sharing economy services (e.g., Rentez-Vous: a fashion rental marketplace for clothes and accessories, which was founded in 2012 and is based in London, United Kingdom, and The Ms. Collection: a personalized clothing rental service provider which was found in 2013, etc.) that offer fashion goods with no immediate need are similar to the Airbnb (sharing service company for lodging and accommodation) of fashion. Kiple is a company that provides a children’s clothing exchange and sharing service in Korea, and Open Closet is a service that provides formal clothing options to social seniors and jobseekers in Korea. In handmade cooperatives in Seoul’s Eunpyeong area, small-scale businessmen and consumers share information while SK Planet, which was established as a technology platform development company as a subsidiary of SK Telecom (a South Korean wireless telecommunications operator), cooperates with famous domestic brands and new designers to provide customers with clothes on demand. SK Planet’s “Project N” offers free services that can be used to exchange new clothes at any time.

Despite these existing services, the domestic fashion sharing economy platform finds it difficult to promote the sharing economy model in Korean fashion compared to countries that have successfully expanded their global business through such models. Studies on sharing economy have not sufficiently considered the quantitative and qualitative effects that characterize the domestic markets [8].

Therefore, it is important to develop a fashion-oriented business model that is suitable for domestic fashion consumers and the current market environment, especially when the domestic sharing economy market is in its growth stage. The fashion sharing economy platform assumes that efforts are made to engage and act collaboratively to solve problems in a sustainable manner, while value relationships are shared between companies and consumers to create positive social change.

There is an increasing need to understand the creative and innovative processes of social value networks in relation to the interdependent links between fashion-based businesses and consumers. When the value similarity of each member is shared in a sub-network, the closeness of the mutual relationship is strengthened. This value chain has been evaluated as a process in which outcomes produced through distribution processes are reinterpreted from the consumer’s point of view and reproduced in new creative outputs with high added value [25].

This study of the network of a fashion sharing economy platform can be seen as a new opportunity to uniquely connect consumers and enable the marketing of related companies. Through the vision and

pursuit of cooperative relationships that enhance mutual growth and competitiveness for consumers, it will be possible to attain sustainable consumption for businesses.

2.3. Sub-Network Structure Characteristics

A sub-network is a network created by a group of members clustered by similarity. In network-based theory, this is often regarded as a community structure [26] that is built by the characteristics of each community, which, in turn, is a sub-group with close mutual interests. These communities are identified by unique characteristics that differentiate them from nearby groups, a high degree of familiarity and interaction among individuals, and the totality of emotions and attitudes that bring individuals together. The sub-network structure is a specific community within a network; it is characterized by the commonality of the community and the relationship among the factors of similarity, consciousness of kind, etc.

Watts [27] used the path length and clustering coefficient to examine the relationship characteristics of nodes in a network. The closer the relationship among nodes in a sub-network, the higher their mutual influence, meaning that it has a significant effect on the information diffusion in the sub-network [28]. Further, when certain information is provided to nodes in a sub-network, the information spreads faster via neighbors who are closely bounded to the node. Subsequently, Han and Oak [29] also argued that strongly connected members belonging to a sub-network show characteristics different from those of other sub-network members. Moreover, Newman [30] indicated that each node exhibits a wide array of characteristics based on the characteristics of each node in the network and the type of link it has with other members. These characteristics can be clustered based on similarity; if the similarity of each member is shared in the online community sub-network, the closeness of relationships among the members can be strengthened.

Prior studies have paid close attention to the unique characteristics of independent nodes affecting the diffusion of information in technological and online networks. Han et al. [14] conceptually suggested that both individual and sub-network characteristics should be considered in terms of network-based information diffusion. Further, Heo et al. [31] noted that interactions among users are central to service quality, leading to continual use of SNSs by customers, which, in turn, requires building and sustaining relationships. Suh [32] suggested that the degree of familiarity commonly shared by members in a community site takes a leading role in enhancing user engagement and forming a community. Moody and White [33] differentiated the types of group relationships based on the emotional experiences of individuals in combination with issues related to the group's cohesion, solidarity, and commitment. The structure of the network affects the emotional attachment to the network [34]. In addition, Han and Kim [35] categorized the structural characteristics of networks that explain the flow of information in the community as connectivity, activity, and dominance.

2.4. Social Relationship Characteristics

A "social network" refers to a network in which members of a society are connected, and the actions of members interact with the utility, consciousness, and behavior of other members of the same network [36].

The social network used in the sharing economy platform is based on a network of people formed by a series of relationships. It is a society that highlights the effects of human behavior and social structure in terms of the relational concept of humans based on network theory. A network is created by members who belong to the social environment of the self at a particular moment [37]. Because acceptance of information in the network occurs by modifying one's behavior based on the preferences of other neighbors in mutual relationships [38], changes in the behaviors of neighbors above a critical level have a positive impact on the actor when he or she displays the same behavior. Similarly, the relationship in the social network indicates the similarity in member preferences, and the acceptance of the individual in the social network is affected by the acceptance of other people who are in close connection with him or her. The members in a social network who cooperate with each other engage

in mutual solidarity, which in turn reinforces across-group solidarity [39]. These social behaviors play a significant role when they are structurally embodied in social networks, and they emphasize the relational embeddedness that is created through social ties [40].

Jang and Kim [41] characterized a social capital network formed in a cyber-community by reciprocal factors such as bond, responsibility, closeness, and sustainability. Furthermore, individuals investing in social networks develop expectations about norms for trust and (mutual) reciprocity, which is essential for successful participation in collective activities [42]. Previous studies have examined the elements of community in terms of shared interests, experiences or needs, and supportive social relationships. Individuals develop an important resource—a sense of belonging—and want to share their awareness through online communities. They especially share feelings of identity and belonging by sharing social norms, values, and interests; this sense of belonging affects their attitudes and behavior [43]. The social and technical familiarity, and (mutual) reciprocity of SNSs have elevated the interaction of service users, and the number of causal links that people can develop and sustain has increased, enabling broad social connections [44].

2.5. Network Externality

Network externality can be understood based on social capital theory. If social capital is seen as “accumulated resources arising from relationships among individuals,” it is manifest in one-person media as network externality. Many studies have considered network externality as an important factor that directly affects the end-user of information technology [45,46]. Above all, an online network environment, such as a social network, enables users to express themselves, connect to the network, and develop and maintain relationships with others [47].

We focus on the interaction of users and mutual trading in a sharing economy platform, where user participation is the key to success as a media [48]. In previous studies, network externality consists of direct network externality and indirect network externality. The former increases the value and utility of the network depending on the number of users participating in the same network, which is the total number of users in the network and the number of network peers [49]. In the latter, the value and utility of the network increases when complementary goods or services, such as supplementary content and/or supplementary services, are provided. It also includes mutual complementarity and compatibility [18].

Since individuals can share information with colleagues through the basic infrastructure of SNS such as Twitter, Facebook, and KakaoTalk, in the sharing economy platform, social networks are used as separate systems. They also have the unique ability to share the platform at the same time; these are referred to as cross-platform features of social media. However, economies of scale that are characteristic of network externality cannot maximize the utility unless social relations are finally established. Social interaction is important for forming social similarity, shared values, and cooperative/personal interaction as relational social capital [50]. It also enhances other related values such as altruism and fairness [20]. Even within sharing economy platforms, these social interactions provide opportunities to make acquaintances, and thus generate positive emotions. This positive network externality is also called a network effect, and previous research has shown that network externality is directly and indirectly influential on behavioral intention in terms of online identity, perceived benefits (usefulness, enjoyment), intention to participate, usefulness, and commitment [18,51,52].

2.6. Information Diffusion Behaviors

Studies have identified the information diffusion that occurs in online/mobile networks and its causes. Cha et al. [53] suggested that social cascades exist in an online network service, which is a key determinant in information diffusion in social networks. Sasrty et al. [54] identified the social contagion phenomenon in which user-generated content spreads on the social network. Because information transmission occurs due to certainty [55], Christakis and Fowler [56] argued that the social cascade

phenomena can be described by the concepts of contagion and connection, the two most important ideas in explaining social networks. Algesheimer et al. [9] found that individuals in relationships formed based on preferences like brand communities, often share information about brands they like or product categories and exchange ideas about new products. The strong connection among these individuals connected through a community affects the spread of information. As information becomes more widespread, online consumers act as producers of information; thus, they actively communicate their experiences and search for information [57].

Recent studies have focused on how the characteristics of individual nodes belonging to a network affect the diffusion of information [58]. In particular, scholars have examined how user adaptation to content provided by companies through SNSs has a significant effect on word-of-mouth. Goldenberg et al. [58] indicated that the hub of a network has a great influence on the acceptance of information at nodes connected to it—more innovator hubs affect the spread of information in more follower hubs. Similarly, Hirshleifer and Teoh [59] found that the diffusion of information in a network occurs as cluster behavior by imitating the behavior of the leading node in the reception of information by other nodes. They also argued that the influence of the seed node and the followers who try to imitate it have a significant effect on the behavior of information acceptance.

3. Materials and Methods

3.1. Conceptual Model and Hypotheses

We intend to expand and refine the variables that can be applied to the sharing economy platform in terms of diffusion of shared information. It is vital to understand the influence of users on the increasing social interaction of sharing economy platform users based on their preferences with respect to the structural characteristics of the sub-networks, which affect other members' information, social network characteristics, and network externality.

First, the structural characteristics of the sub-network are recognized as different based on the nodes that constitute the sub-networks and the characteristics of the links created between them. Thus, Watts [27] examined path length as the total of the closest links formed between nodes in the network, and Albert and Barabasi [28] stated that the shorter these links, the tighter the relationship is. In this way, the stronger the relationship between the nodes in the sub-network, the higher their mutual influence. This significantly influences the diffusion of information in the sub-network. Because this sub-network structure includes characteristics such as perceived consciousness, consciousness of kind, and persistent sharing attitudes and moral responsibility [60], interaction between network members is based on trust. Furthermore, because of the "tendency to trust each other" among individuals with high levels of social similarity, more frequent interactions between them will occur and trust will eventually grow more rapidly [61].

Previous research has considered the possibility of relationships among members of a particular individual's network of social relationship in terms of the degree of association with other members in the network. This refers to the bond density, which indicates the strength of the connection and the connection density [62]; centrality, which indicates the location of a member compared to other members in the network; centralization, which refers to the degree to which the overall network is centered around a particular member [63]; and the homogeneity of similarities among network members from the positional view of the relationship [37]. The strong, linked structure formed through this relationship serves as the path for information in the sharing economy platform.

Santor et al. [64] found that the influence of purchase behavior on the behaviors of a close neighbor is highly influenced by the social relations of the neighboring individuals, and the diffusion of these social relationships is associated with chilling effects that are spread over a longer period [65]. In a network relationship, emotional attachment is a form of attachment based on a relationship that connects emotional ties to the objects (such as a brand, a person, a place, or a subject) related to a group of individuals [66]. The stronger the bond intensity, the more likely it will induce behavioral

and emotional commitment [12]. Members develop social relationships through the reference group, and then compare and imitate the behavior patterns of social influencers and friendly neighbors in the same reference group as them. In this way, members develop a sense of social unity and match their behaviors with the behaviors of the reference group [67]. The behavior of sharing members' knowledge is affected by (mutual) reciprocity, trust, and social cohesion [68]. Note that persistent cohesion is the tendency to maintain and expand relationships in the future and for a long time [69].

Moreover, users in a sharing economy platform want to increase their network connections or strengthen their ties in the network environment by involving their school friends and co-workers. Thus, continued use of a network may be a part of expanding social capital, according to Boyd and Ellison [39].

Among the characteristics of a sharing economy platform, communication through relationship systems (e.g., a social network linkage, which can create relationships among close friends and accumulate them in the system) exists in terms of sharing the relational network that is formed. Here, users engage in sharing, recommending, and distributing activities within the system using content such as dialogue forms (email, notes, chat, instant messaging, etc.), photos, and videos [70]. In this regard, network externality brings more value to customers by increasing the number of auxiliary products or services [18].

In previous research, the number of members and colleagues were expected to increase the utility of users when they joined the network [71]. They may also increase the desire for identity, to help others, or to work better with others [45]. Wasko and Faraj [50] argued that this aspect can be important because it forms the social capital of the structural dimension.

Complementary services related to network externality form the basis for more activities by users on social networks [50]. This increased social interaction improves social similarity, shared values, and the preferences required for the formation of cooperative/personal interactions [20]. In other words, these factors will strengthen the network externality of the sharing economy platform.

Rather than making personal decisions based on self-obtained information, an individual considers other members to be key initiators of information, and thus follows their decisions. This leads to a continuous diffusion of information [72]. In this respect, the social information contagion is a series of actions in which one individual changes another by exerting influence, and together, they enable structural transformation through a continuous process that goes on to affect other individuals [73]. Therefore, social information contagion enables social connections with individuals who are close to users within the reference group of the sharing economy platform (in this study). Furthermore, it can serve as a constructive means to develop and strengthen this relationship. Based on this understanding, Figure 1 presents our conceptual model, followed by our hypotheses.

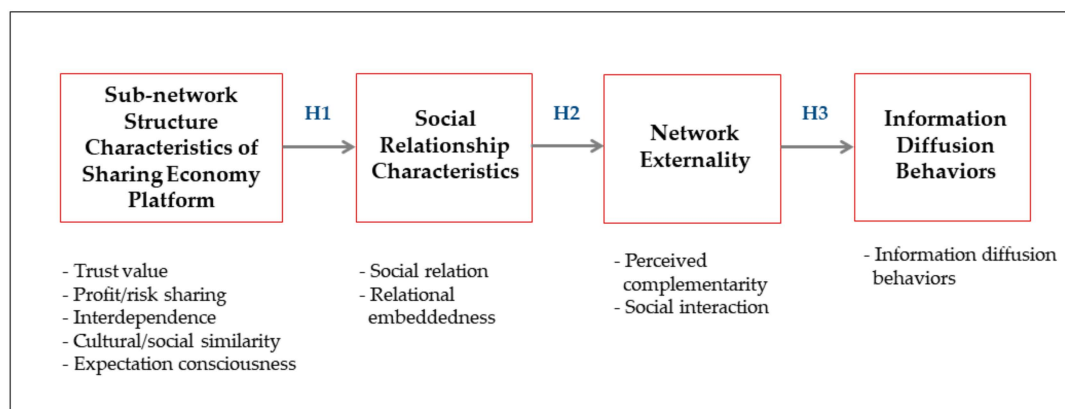


Figure 1. Conceptual model.

Hypothesis 1 (H1). *The sub-network structure characteristics of the sharing economy platform will positively (+) influence social relationship characteristics.*

Hypothesis 2 (H2). *The social relationship characteristics of the sharing economy platform will positively (+) influence network externality.*

Hypothesis 3 (H3). *The network externality of the sharing economy platform will positively (+) influence information diffusion behaviors.*

3.2. Measurement Development

The measurement tools developed for this study consist of items related to sub-network structure characteristics, social relationship characteristics, network externality, and information diffusion behaviors, as well as the demographic characteristics of the fashion sharing economy platform.

First, the factors related to the sub-network structure characteristics of this platform were measured by 15 items based on research by Albert and Barabasi [28], Han and Kim [35], Han and Oak [29], Heo et al. [31], Newman and Girvan [26], Moody and White [33], Park and Maclnnis [66], Song and Hwang [13], and Watts [27]. The items were developed based on the degree of sharing of personal understanding and interests among members of a sub-network, similarity in choice/selection between the influencer and the members in the sub-network, interdependence among members in the mobile SNS sub-network, implicit behaviors and expectation consciousness among members in the sub-network, and building equivalence belief value among members in the sub-network of the platform.

The social relationship characteristics were measured by six items based on research by Boyd and Ellison [39], Goldenberg et al. [65], Hoyer and Maclnnis [37], Landry et al. [40], Steinfield et al. [44], and Zaho and Rosson [36]. The items were developed based on the degree of sense of belonging, feelings of connection, relationship values and the importance of social relationships with members, consciousness of kind, and formation of intimate relationships with the social reference group of the platform.

The features of network externality were measured by six items based on research by Kim and Rhee [21], Buchan et al. [20], Chiu et al. [49], Lin and Lu [18], Fiedler and Sarstedt [45], Kane et al. [47], Kauffman and Wang [71], Yang and Mai [46], and Wasko and Faraj [50]. The items were developed based on the degree of social sharing function and tool utilization, mutual ties to participate, maintenance of social relationships, and strengthening of social relationships in the platform.

Fashion information diffusion behaviors were measured by three items based on research by Algesheimer et al. [9], Boyd and Ellison [39], Cha et al. [53], Christakis and Fowler [56], Goldenberg et al. [58], Lawler [12], and Sasrty et al. [54]. The items were developed based on the degree of shared behavior intention about fashion related information, and the recommendations and diffusion of fashion information through word of mouth or other SNS.

3.3. Data Collection and Analysis

The present study collected data through a survey questionnaire using a 5-point Likert scale. A cross-sectional survey was conducted based on the questionnaire. The stratified random sampling method was used to select the people participating in the survey. Our research method was as follows. First, we developed measurement items for the research tasks using derived data, sub-network structures, social network theory, and information diffusion frameworks based on a literature review and interviews with experts in the relevant companies using the Delphi technique. This is often considered a structured communication technique or method, but, is also known as a systematic, interactive predicting method which depends on a group of experts for their "opinion".

Second, to grasp the characteristics of the sub-network structure and social relationships that influence the diffusion of fashion information, this study conducted a critical incident technique (CIT) analysis to extract concrete information on the companies that provide sharing economy platform services in fashion through open-ended questions about the diffusion of fashion information in a social network from a business perspective.

Third, to collect accurate and reliable data on the diffusion of information, we conducted an accurate assessment of the measurement items, and analyzed information diffusion phenomena in the platform by focusing on fashion information diffusion research. We selected individuals with experience of using sharing economy fashion services in the last six months for related information activities (personal information disclosure, comments from members, scraps, etc.) as the unit of analysis. This is based on research by Cha et al. [53]—that is, if there is even one neighbor who scrapped the content owned by a member first among the neighbors who connected with the member under investigation in a social network, the authors referred to the situation above as acceptance by social contagion and argued that it should be included in the social contagion phenomenon.

We conducted two surveys. First, the preliminary survey was conducted from April 1, 2018 to April 15, 2018 on 50 people to establish the primary categories of the sub-network structure and social relationship characteristics. The preliminary study revised the error part by identifying the primary structural relationships among related variables of the network externality and the information diffusion behaviors in the fashion information diffusion environment.

The main survey was conducted online from May 1 to May 30, 2018 in consultation with the representatives of the service providers of the platform. Survey data were collected from 420 people; the responses of 400 people without the missing values were used to analyze the data.

Fourth, the frequency analysis of the general characteristics of the sample, analysis of the internal consistency of reliability, and the validity analysis were performed using the statistical package of SPSS Ver. 20.0. In order to perform measurement model analysis and path analysis, AMOS Ver. 20.0 statistical package is used as well. The statistical analyses were conducted based on the following procedures. (1) Before evaluating the measurement model, Cronbach's α coefficient, which is a method used to verify the internal consistency of each research construct, was calculated and presented. (2) In this study, we used structural equation modeling (SEM) to understand the effects of latent variables. SEM can simultaneously estimate multiple and mutual dependencies, and moreover, the general regression coefficient is likely to be biased, whereas the SEM finds regression coefficients between latent variables. Thus, it is possible to more accurately estimate the relationship between latent variables except error terms [74]. The path analysis in this study was conducted according to the following two steps proposed by Anderson and Gerbing [75]. In the first step, the model was evaluated using exploratory factor analysis and confirmatory factor analysis. In order to verify the discriminant validity, a correlation analysis was performed on the entire research concept. In the second stage, path analysis was performed based on the evaluation results of the measurement model. Based on the above structural analysis results, the research hypotheses were verified by taking into account differences in sub-network structure characteristics, social relations characteristics, network externality, and information diffusion behaviors in the fashion sharing economy platform.

4. Results

4.1. Demographic Profile of Research Sample

The demographic profile of the people in the research sample were as follows:

Gender was represented by even proportions: 50.0% (200 people) male and 50.0% (200 people) female. Regarding age, 45.8% (183 people) were in their 20s, 24.0% (96 people) were in their 30s, 15.5% (62 people) were in their 40s, and 14.8% (59 people) were in their 50s. Regarding residential housing area, 35.8% (143 people) lived in Seoul, 18.8% (75 people) lived in the Kyunggi province, which is a metropolitan area near Seoul, and 45.4% (182 people) lived in the remaining areas. Marital status

showed that 56.6% (226 people) were not married and 43.5% (174 people) were married. For the highest degree of education, most of the respondents were in college or college graduates (70.8%; 283 people), followed by community college students or graduates (10.8%; 43 people), graduate students or higher (10.5%; 42 people), and high school graduates or lower (8.0%; 32 people). In terms of employment, most were office workers (40.3%; 161 people), followed by students (23.5%; 94 people), technicians (9.8%; 39 people), stay-at-home mothers (6.8%; 27 people), managers (6.3%; 25 people), sales and service workers (5.3%; 21 people), professionals (5.0%; 20 people), skilled workers (1.8%; 7 people), and unemployed (1.5%; 6 people). Regarding estimated average monthly household income in USD, 40.0% (160 people) earned \$2,788.10 - less than \$4,646.84, 24.0% (96 people) earned \$4,646.84 - less than \$6,505.58, 19.3% (77 people) earned \$929.37 - less than \$2,788.10, 11.3% (45 people) earned \$6,505.58 - less than \$8,364.31, 3.0% (12 people) earned \$8,364.31 or higher, and 2.5% (10 people) earned under \$929.37.

4.2. Reliability and Validity Analysis

We calculated the Cronbach's α coefficient and examined its reliability before assessing the measurement model. First, we performed a factor analysis of 15 items explaining the characteristics of the sub-network structure of the sharing economy platform using the Varimax method rotation. Five factors—"trust value" (three items), "profit/risk sharing" (three items), "interdependence" (three items), "cultural/social similarity" (three items), and "expectation consciousness" (three items)—with Eigenvalues above 1.000 were extracted (Table 1). The total variance elucidated by these five factors was 66.832%, and the Cronbach's α coefficients were 0.702 or higher, showing high reliability of the items.

Table 1. Analysis of reliability and validity for sub-network structure characteristics.

Variables	Items	Component	Eigenvalues	Variance	Cronbach's α
Trust value	• Degree of trust value	0.886	2.236	14.908	0.787
	• Degree of value of behavior and objectives	0.871			
	• Degree of honesty and belief	0.760			
Profit/risk sharing	• Degree of personal activity sharing	0.847	2.026	13.506	0.709
	• Degree of concern sharing	0.816			
	• Degree of interest sharing	0.709			
Interdependence	• Degree of friendship (making)	0.844	1.966	13.105	0.729
	• Degree of acceptance on other's views	0.785			
	• Degree of participation in replying	0.781			
Cultural/social similarity	• Degree of similarity in preference	0.833	1.928	12.852	0.709
	• Degree of similarity in interests	0.772			
	• Degree of liking (similarity) about original information	0.772			
Expectation consciousness	• Degree of social-oriented value with importance	0.814	1.869	12.462	0.702
	• Degree of self-realization value with importance	0.778			
	• Degree of conducts and expectations of social-oriented value	0.773			

Six more items explaining social relationship characteristics were similarly analyzed. We extracted two factors—"social relationship" (three items) and "relational embeddedness" (three items)—with

Eigenvalues above 1.000 (Table 2). The total variance elucidated by these two factors was 79.021%, and the Cronbach's α coefficients were 0.846 or higher, showing high reliability of the items.

Table 2. Analysis of reliability and validity for social relationship characteristics.

Variables	Items	Component	Eigenvalues	Variance	Cronbach's α
Social relation	• Degree of belonging				
	• Degree of connection and participation	0.912	2.436	40.593	0.882
	• Degree of stability in participation	0.907			
	0.879				
Relational embeddedness	• Degree of importance about social relationship	0.885	2.306	38.428	0.846
	• Degree of consciousness of kind	0.880			
	• Degree of comfort feeling	0.861			

Furthermore, six items describing network externality yielded factors of “perceived complementarity (three items)” and “social interaction (three items)” with Eigenvalues above 1.000 (Table 3). The total variance elucidated by these two factors was 73.998%, and the Cronbach's α coefficients were above 0.788, showing high reliability of the items.

Table 3. Analysis of reliability and validity for network externality.

Variables	Items	Component	Eigenvalues	Variance	Cronbach's α
Perceived complementarity	• Degree of externally linked social sharing function				
	• Degree of using tools related to external information diffusion	0.875	2.332	38.871	0.833
	• Degree of effort to form external relations	0.870			
	0.855				
Social interaction	• Degree of mutual bonding to external participation				
	• Degree of effort to maintaining external relationship participation	0.876	2.108	35.127	0.788
	• Degree of assistance in strengthening external relationship	0.876			
	0.779				

The results of verifying the single dimensionality of the research variables related to fashion information diffusion behaviors is shown in Table 4. Factor analysis using Varimax rotation for three items describing information diffusion behaviors yielded one factor of “information diffusion behaviors (three items)” with Eigenvalues above 1.000. The total variance elucidated by this factor was 66.739%, and the values of factor loading of a single factor were all above 0.769. The Cronbach's α coefficients was above 0.748, showing high reliability of the items.

Table 4. Analysis of reliability and validity for single factors.

Variables	Items	Component	Eigenvalues	Variance	Cronbach's α
Information diffusion behaviors	• Degree of shared behavior intention about fashion information	0.842	2.002	66.739	0.748
	• Degree of recommending the obtained fashion information	0.838			
	• Degree of delivering the obtained fashion information	0.769			

4.3. Confirmatory Factor Analysis

Table 5 provides the assessment of confirmatory factor analysis. The validity of the construct was verified based on the measurements of unstandardized coefficient, standardized coefficient, standard error (SE), critical ratio (CR), construct reliability, and average variance extraction (AVE), as well as the values of the standardized coefficients, which were all 0.6 or higher. Since the AVE was 0.5 or higher, convergent validity was verified. In addition, the internal consistency was verified because the construct reliability was 0.7 or higher.

Table 5. Assessment of confirmatory factor analysis.

Measurement Items	Unstandardized Coefficient	Standardized Coefficient	SE	CR	Construct Reliability	AVE
Sub-network Structure Characteristics						
Trust value 1	1.000	0.816	-	-	0.818	0.731
Trust value 2	0.977	0.764	0.037	7.446		
Trust value 3	0.758	0.671	0.053	5.386		
Profit/risk sharing 1	1.000	0.702	-	-	0.753	0.679
Profit/risk sharing 2	0.984	0.670	0.035	6.829		
Profit/risk sharing 3	0.786	0.616	0.042	6.832		
Interdependence 1	1.000	0.717	-	-	0.790	0.686
Interdependence 2	0.953	0.692	0.047	7.970		
Interdependence 3	0.807	0.690	0.039	7.990		
Cultural/social similarity 1	1.000	0.691	-	-	0.731	0.827
Cultural/social similarity 2	0.866	0.679	0.045	8.602		
Cultural/social similarity 3	0.827	0.635	0.042	8.131		
Expectation consciousness 1	1.000	0.768	-	-	0.717	0.719
Expectation consciousness 2	0.799	0.693	0.033	9.293		
Expectation consciousness 3	0.682	0.620	0.040	9.244		
Social Relationship Characteristics						
Social relation 1	1.000	0.844	-	-	0.932	0.700
Social relation 2	0.947	0.819	0.045	7.021		
Social relation 3	0.923	0.768	0.047	8.422		
Relational embeddedness 1	1.000	0.787	-	-	0.907	0.669
Relational embeddedness 2	0.992	0.765	0.053	9.015		
Relational embeddedness 3	0.932	0.759	0.068	9.226		
Network Externality						
Perceived complementarity 1	1.000	0.802	-	-	0.861	0.758
Perceived complementarity 2	0.913	0.754	0.061	7.998		
Perceived complementarity 3	0.821	0.700	0.060	8.773		
Social interaction 1	1.000	0.821	-	-	0.854	0.755
Social interaction 2	0.975	0.807	0.040	8.226		
Social interaction 3	0.631	0.657	0.047	9.113		
Information Diffusion Behaviors						
Information diffusion behaviors 1	1.000	0.807	-	-	0.792	0.613
Information diffusion behaviors 2	0.959	0.798	0.044	9.340		
Information diffusion behaviors 3	0.913	0.785	0.049	8.079		

4.4. Correlation Analysis

We examined whether the value of 1.000 is included in the estimates of the correlation coefficients among the research constructs in order to verify the discriminant validity. Thus, most of the correlation coefficients were analyzed to be less than 1.000 at a statistically significant level ($p < 0.05$, $p < 0.01$,

$p < 0.001$). Since the null hypothesis that the correlation coefficients of the research constructs are the same ($\varphi = 1.0$) is rejected, the discriminant validity was verified (Table 6).

Table 6. Assessment of the discriminant validity.

Variables	1	2	3	4	5	6	7	8	9	10
1. Trust value	1.000									
2. Profit/risk sharing	0.493 **	1.000								
3. Interdependence	0.555 **	0.493 **	1.000							
4. Cultural/social similarity	0.481 **	0.499 **	0.531 **	1.000						
5. Expectation consciousness	0.413 **	0.515 **	0.462 **	0.518 **	1.000					
6. Social relation	0.578 **	0.460 **	0.485 **	0.507 **	0.355 **	1.000				
7. Relational embeddedness	0.498 **	0.421 **	0.427 **	0.556 **	0.355 **	0.603 **	1.000			
8. Perceived complementarity	0.598 **	0.446 **	0.469 **	0.563 **	0.365 **	0.700 **	0.739 **	1.000		
9. Social interaction	0.475 **	0.408 **	0.402 **	0.509 **	0.321 **	0.554 **	0.655 **	0.690 **	1.000	
10. Information diffusion behaviors	0.496 **	0.404 **	0.361 **	0.504 **	0.334 **	0.540 **	0.557 **	0.576 **	0.556 **	1.000

Note: Pearson Cross-Correlation, ** $p < 0.01$.

4.5. Research Hypothesis Testing

The goodness of fit and the parameters of the path analysis were estimated by the maximum likelihood method. First, the goodness of fit indices of the path analysis for the fully integrated model were $\chi^2 = 449.770$ ($df = 6, p = 0.003$), $GFI = 0.925$, $RMR = 0.093$, $NFI = 0.932$, $CFI = 0.957$, and $RMSEA = 0.039$. Thus, the relationship among the research constructs in the proposed model was comprehensively explained at a satisfactory level (Table 7).

Table 7. Assessment of the estimation of the model fit.

Concept	Goodness of Fit Indices								
	χ^2	df	p-Value	GFI	AGFI	RMR	NFI	CFI	RMSEA
Study model	449.770	6	0.003	0.940	0.925	0.093	0.932	0.957	0.039

Figure 2 and Table 8 exhibit the results of the hypothesis testing for information diffusion behaviors in the fashion sharing economy platform.

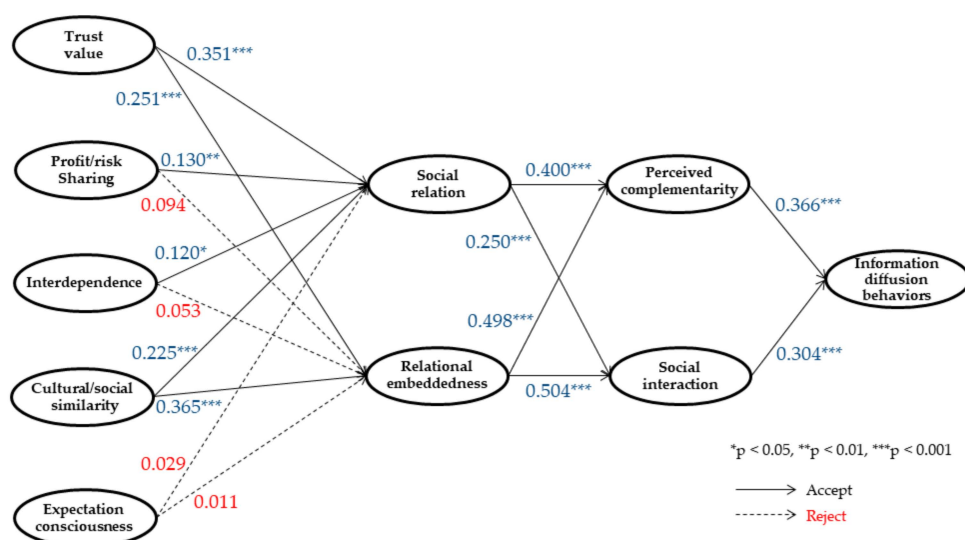


Figure 2. Verification of research model.

Table 8. Assessment of hypothesis testing.

H		Path		Coefficient	SE	CR	p-Value	Result
H1-1	Trust value	→	Social relation	0.351	0.049	7.132	0.000	Accept
H1-2	Profit/risk sharing	→	Social relation	0.130	0.050	2.619	0.009	Accept
H1-3	Interdependence	→	Social relation	0.120	0.051	2.354	0.019	Accept
H1-4	Cultural/social similarity	→	Social relation	0.225	0.050	4.487	0.000	Accept
H1-5	Expectation consciousness	→	Social relation	0.029	0.048	0.594	0.553	Reject
H1-6	Trust value	→	Relational embeddedness	0.251	0.051	4.937	0.000	Accept
H1-7	Profit/risk sharing	→	Relational embeddedness	0.094	0.051	1.842	0.066	Reject
H1-8	Interdependence	→	Relational embeddedness	0.053	0.052	1.005	0.316	Reject
H1-9	Cultural/social similarity	→	Relational embeddedness	0.365	0.052	7.048	0.000	Accept
H1-10	Expectation consciousness	→	Relational embeddedness	0.011	0.050	0.213	0.831	Reject
H2-1	Social relation	→	Perceived complementarity	0.400	0.037	10.726	0.000	Accept
H2-2	Relational embeddedness	→	Perceived complementarity	0.498	0.037	13.346	0.000	Accept
H2-3	Social relation	→	Social interaction	0.250	0.046	5.453	0.000	Accept
H2-4	Relational embeddedness	→	Social interaction	0.504	0.046	10.995	0.000	Accept
H3-1	Perceived complementarity	→	Information diffusion behaviors	0.366	0.055	6.707	0.000	Accept
H3-2	Social interaction	→	Information diffusion behaviors	0.304	0.055	5.563	0.000	Accept

The key results of this research are as follows. First, the relationship between the sub-network structure and the social relationship characteristics of the fashion sharing economy platform showed that trust value ($\beta = 0.351$, $CR = 7.132$, $p = 0.000$), profit/risk sharing ($\beta = 0.130$, $CR = 2.619$, $p = 0.009$), interdependence ($\beta = 0.120$, $CR = 2.354$, $p = 0.019$), and cultural/social similarity ($\beta = 0.225$, $CR = 4.487$, $p = 0.000$) had a significant effect on social relations. However, expectation consciousness ($\beta = 0.029$, $CR = 0.594$, $p = 0.553$) did not have a significant effect on social relations. In addition, trust value ($\beta = 0.251$, $CR = 4.937$, $p = 0.000$) and cultural/social similarity ($\beta = 0.365$, $CR = 7.048$, $p = 0.000$) had a significant effect on relational embeddedness, but profit/risk sharing ($\beta = 0.094$, $CR = 1.842$, $p = 0.066$), interdependence ($\beta = 0.053$, $CR = 1.005$, $p = 0.316$), and expectation consciousness ($\beta = 0.011$, $CR = 0.213$, $p = 0.831$) did not have a significant effect on relational embeddedness.

Second, the analysis of the relationship between the social relationship characteristics of the platform and the network externality shows that social relations ($\beta = 0.400$, $CR = 10.726$, $p = 0.000$) and relational embeddedness ($\beta = 0.498$, $CR = 13.346$, $p = 0.000$) had a significant effect on perceived complementarity. In addition, social relations ($\beta = 0.250$, $CR = 5.453$, $p = 0.000$) and relational embeddedness ($\beta = 0.504$, $CR = 10.995$, $p = 0.000$) had a significant effect on social interaction.

Third, the correlation between the network externality and the information diffusion behavior of the platform showed that perceived complementarity ($\beta = 0.366$, $CR = 6.707$, $p = 0.000$) and social interaction ($\beta = 0.304$, $CR = 5.563$, $p = 0.000$) had a significant effect on information diffusion behaviors.

5. Discussion

Our results can be summarized as follows. First, the structural characteristics of the sub-networks affecting the characteristics of the social relationship can be interpreted along the lines of research indicating that members of sub-networks, and connected through strong ties, demonstrate

characteristics different from those of the other sub-networks [29]. Further, the social cohesiveness of members, connection density, and centrality and concentration affect the homogeneity of network members [63], and the characteristics of each member who participates in the network can be clustered according to similarity [30].

Second, the finding that sub-network structure characteristics affect relational embeddedness also supports prior research [66]. In the online community sub-network, when the similarity of each member is shared, the closeness of the relationship is strengthened [76]; furthermore, the trust value of the relationship in the network is connected to the emotional tie of the consumer group.

Third, the effects of social relations and relativity on perceived complementarity can be interpreted in line with previous research that indicates that the behavior of a specific member affects other participants' behaviors in a social network [72]. Behavioral intentions lead to cohesion when they are socially related [12], and community members are persistently influenced by opinion- and empathy sharing related to purchased products or issues [9]. Furthermore, knowledge-sharing behavior is affected by trust, social ties, and (mutual) reciprocity [68]. Notably, Lee and Chung [77] claimed that it is difficult to maximize the utility of economies of scale—which are characterized by network externality—unless social relations are established.

Fourth, the effects of social relations and relational embeddedness on social interaction can be interpreted in line with research indicating that social interaction is a social capital of a relational dimension that is crucial for social similarity, shared value, and cooperative/personal interaction [50]. Possibly, social interaction in SNS will increase user interaction and the individual's social connection can be broadened [44]. Furthermore, participants' behaviors in a certain network reflect the interactions with the utility, consciousness, and behavior of other participants in the same network [78], and social behaviors play a significant role when structured in a social network [40].

Finally, the effects of perceived complementarity and social interaction on information diffusion behaviors can be interpreted in line with research that indicates that information may spread more rapidly through neighbors closely linked to the node when such information is available to nodes in a sub-network [28]. The characteristics of the social network that relate to the neighbors with whom consumers are connecting influence the diffusion process [58]. Further, complementary services incentivize users to engage in more activities by sharing media [50], and social interaction enhances other relevant values such as altruism and fairness, and provides opportunities to make friends [20].

6. Conclusions

In this study, we took a structural effect approach in examining the sub-network structure characteristics, social relation characteristics, network externality and information diffusion behaviors of a sharing economy platform through a social network perspective. Based on this research, we propose the influential factors for establishing a successful fashion information diffusion behavior strategy on a sharing economy platform. The existing studies on the sharing economy network services have only identified the mass media influences. However, this study proposes the following academic and marketing implications with respect to social network perspective and fashion information diffusion, which are formed in sharing economy platform services, by identifying the key relational characteristics and variables in the social network and verifying the influential relationships between the variables.

First, the theoretical implications of this study are as follows. This study focused on creative convergence to attain synergy between scholarly work and the specific goals of this research project, that is, the case of the sharing economy platform in the fashion field, in which objective research has not been done previously. In particular, through in-depth interviews with fashion-related economy platform experts and experienced consumers, we developed concrete theoretical measures for variables by establishing a collaboration system with experts in related industries. By examining and confirming the validity and suitability of these evaluation factors, the academic utilization of the scale will be enhanced.

Second, the results of this study suggest the direction of research approached from the viewpoint of consumer behavior and the social network for fashion sharing economy platforms. This study also suggests a framework of research that is related to the role of shared information dissemination through these influential relationships, and this can be developed as a more informative model of information diffusion when integrated with existing sharing economy business and network studies.

Third, this study divides the variables to be applied to the fashion sharing economy platform in terms of diffusion of shared information. Especially, as the social interaction of fashion consumers based on preference increases, this study suggests a research approach from the viewpoint of the sub-network structure and social psychology in the social network. These influential relationships also have academic significance in that they present an integrated structural model that incorporates network externality and information dissemination behaviors.

Fourth, the social contagion phenomenon of information applied in this study can be viewed as a series of behaviors enabling the structural transformation in which one person is changed due to another person's influence and the transformed person affects another person through a continuous process. Therefore, this study is expected to be helpful for expanding current theory and for evaluation as it not only enables social connection among the members of the sub-network of the sharing economy platform, but also explains the maintenance and strengthening of these relationships.

Next, we present the managerial implications of our study as follows. First, to elevate social relationships in terms of a sense of belonging, connection and participation, and security of participation in a sustainable fashion sharing economy platform, it is necessary to increase trust among members of the SNS community, the value of the actions and goals of the members, and honesty and trust among the members. It is also necessary to increase profit/risk sharing to promote personal activities and sharing of private concerns in the community. It is also necessary to increase interdependence so that individuals can interact through efforts to develop friendly relations in the community and positive acceptance of others' views.

Second, to increase relational competitiveness in terms of the importance of social relationships in the sharing economy platform, as well as the degree of comfort about the consciousness and relationships, it is essential to increase the sharing of trust information among members of the SNS community, the value of the actions and goals, and the value of mutual trust and honesty of the members. In addition, cultural/social similarity should be enhanced through positive exposure to information about similar tastes and interests among members, with recommendations about information related to them.

Third, to enhance perceived mutual complementarity of the external social sharing function, information transfer effort, tool utilization in the sharing economy platform, and mutual ties to external participation, it is necessary to increase the sense of belonging to the sharing community, expand the connection and participation in social relations, and enhance social relationships. This would also increase security in participation. Further, the importance of social relationships in the SNS and the relationships with other members should be highlighted to encourage consciousness and comfort.

Fourth, to increase information diffusion behaviors in fashion information sharing, it is practical to use the information sharing environment, social sharing function, and external relations. Furthermore, the perceived mutual complementarity should be improved as it leads to relationship formation. Finally, mutual ties to, participation in, and maintenance of external relations, and social interaction that can help to strengthen these relationships should be enhanced.

However, it is necessary to systematically understand the research factors and relationships that are not examined in this study. Other variables that behave as antecedent and mediating factors must be explored; these include users' psychological characteristics in the social relationship between fashion sharing economy platform services and users. Furthermore, we must verify the differentiated impacts of other valid sharing economy platforms. Thus, comparative studies should be conducted that consider the characteristics of fashion sharing economy categories.

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