

Research Article

Does Use of Different Platforms Influence the Relationship between Cocreation Value-in-Use and Participants' Cocreation Behaviors? An Application in Third-Party Managed Virtual Communities

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Despite an increasing amount of research on cocreation value, research on participants' value-in-use in third-party managed virtual communities remains limited. This study explores how participants perceive value-in-use through their participation in third-party managed virtual communities and the influence of the participants' value-in-use on three cocreation behaviors typical of these communities: information searching, feedback, and coinnovation activities. Participant value-in-use is a multidimensional construct consisting of five dimensions: informational value, entertainment value, social integrative value, personal integrative value, and community interactivity. We also consider whether use of different platforms (website, mobile app, or both) exerts a moderating effect on this cocreation process and identify significant differences in the relationships proposed based on the platform the participants use to access the virtual community. The research is contrasted empirically using the virtual community TripAdvisor. The PLS-SEM method is used to test the model proposed. In comparing the website and mobile app models, the results show significantly stronger effects on the relationships in the route “informational value-participants' value-in-use-information searching” for the website. Also, we find a stronger route for personal integrative value-participants' value-in-use-feedback among users of the mobile app than for website users. In the case of participants who use only one platform (website or mobile app) rather than both (website and mobile app), the weight of use of one technology rather than both is significantly greater in coinnovation. This study enriches previous studies that advance theories of cocreation value and provides companies with practical guidance to identify and encourage cocreation behaviors and enhance the perceived value-in-use of virtual community participants.

1. Introduction

The advent of Internet and increased accessibility of smartphone devices have enabled a new age of interaction and substantially influenced traditional lifestyles. Individuals' new forms of communication and consumption through Internet have dramatically changed companies' marketing practices, which face increasingly competitive global contexts with more sophisticated consumers and a growing need for greater efficiency and customer satisfaction—that is, more complex business environments. Internet users currently favor dynamic informative websites (social networking, virtual communities, etc.) to express their beliefs and comments on services or products, among other behaviors [1]. Multiple

traditional companies' websites lack such capabilities due to their static nature and deficiency in cocreating value with users who will be involved in long-term activities. Companies that can exploit information and communication technologies to encourage cocreation value-in-use will, however, ensure their survival and improve their firms' business results.

The theory and practice of contemporary marketing [2] are steeped in Service Dominant Logic (SDL) [3]. According to SDL, value cocreation is a crucial concept widely researched in offline environments. Despite consensus that virtual communities constitute ideal ecosystems for development of cocreation processes, their study is more recent and limited in the digital environment [4].

Claffey and Brady [5] identify three main types of virtual community—member-initiated, firm-hosted, and third-party managed. Member-initiated virtual communities are established by like-minded individuals and can be socially or professionally oriented. Examples include Android Free Software Communities. Firm-hosted virtual communities are created by firms to involve their customers in various cocreation activities, such as product design, product testing, product/service support, relationship building, understanding consumer value perceptions, and increased word-of-mouth communication. Third-party managed virtual communities are established by a third party to facilitate exchange of products, services, and information (e.g., eBay, TripAdvisor). Given the specific characteristics of different virtual communities, deeper analysis is needed of the cocreation models that occur in each type [5].

The definition of value cocreation as a complex process and its measurement through multidimensional scales have been researched for member-initiated and firm-hosted communities [6–15]. Compared to other types of virtual communities, however, study of value cocreation in third-party managed virtual communities is underdeveloped [16]. Studies of value cocreation in this type of community [16–19] have limited the cocreation process to proactive participation of users to exchange relevant information, knowledge, and experiences (i.e., generation and transmission of content).

Based on the tenets of SDL, this research views value cocreation in a third-party managed virtual community as the process of creating perceived value-in-use for the community through service exchanges within the ecosystem of all actors (consumers, potential consumers, various service firms housed on the platform, and managers of the website itself) [2]. From this perspective, it is unclear how users cocreate community value-in-use, how this value can be assessed, and how such value is reflected in their cocreation behaviors in the community.

Thanks to the proposal of an integrative model of value cocreation in third-party managed virtual communities, and more specifically in virtual communities of travelers, we can answer the following questions: What dimensions make up participants' cocreation value-in-use? What are the cocreation behaviors? What influence does participants' cocreation value-in-use exert on current cocreation behaviors? Do the relationships among participants' cocreation value-in-use and current cocreation behaviors remain for participants who use website and mobile app and those who use both platforms?

Answering the questions proposed has great importance for management. It will help managers of third-party managed virtual communities to identify and focus their marketing efforts on the dimensions that both increase the community's value through the value-in-use that its participants perceive and stimulate cocreation behaviors. The long-term survival and value of the virtual community, as well as the results for firms housed in the community, depend greatly on a satisfactory value cocreation process.

This study's first theoretical contribution is thus to develop an integrative framework of user cocreation value for third-party managed virtual communities. It makes this

contribution by identifying (1) the dimensions that constitute users' cocreation value-in-use in this context and (2) the relationship of users' cocreation value-in-use to value cocreation behaviors. Further, in a virtual context, we must remember that today's consumers are digital, hyperconnected, and accustomed to using multiple devices (smartphones, tablets, and desktop computers) [20]. Prior research shows that each type of platform has its own characteristics, which condition the participation of Internet users [16]. This study thus considers the possible moderating effect of the platform/s used in the relationship of the effect of participants' cocreation value-in-use on cocreation behaviors, distinguishing between participants who only use one platform to access the virtual community (whether website or mobile app) and those who use both website and mobile app to access the virtual community. The moderating effect considered enables analysis of the full process of user value cocreation in the third-party managed virtual community from a multiplatform perspective.

This study's empirical contribution extends the infrequent use of a multidimensional focus to measure both participants' cocreation value-in-use and cocreation behaviors related to virtual communities of travelers. This type of third-party virtual community is of great interest, as it has revolutionized the travel industry and the traveler's behavior [19]. For example, TripAdvisor, an important virtual community of travelers, accumulates 455 million users per month and over 600 million comments [21]. Nor has research analyzed how the type of platform used to access the virtual community of travelers influences the value cocreation process, even though real data show that 85% of travelers have consulted this type of community to plan their trip, 46% of whom use mobile apps at the destination [22]. Prior research on value cocreation in virtual communities of travelers has focused primarily on detecting its antecedents and results. Antecedents identified include characteristics of the environment—such as ease of use, perceived utility, quality of information, attractiveness of the medium [9, 11, 23], and individuals' motivations [9, 11, 12, 18, 24–28]. Consequences analyzed include the influence of participation in the community on brand equity and/or intention to use the products or services housed in the community [29, 30] and intention to use and recommend these to the community itself [16, 31].

2. Literature Review

2.1. Cocreation and Determination of Community Value-in-Use. The fundamental premises of SDL provide a suitable framework for how value is created. Within the framework of this new logic [2, 3], organizations do not create and deliver value to passive consumers. Rather, value is cocreated or “jointly created” by multiple actors—for example, stakeholders, firms, and customers—always including the beneficiary (premises 6 and 10, respectively) [2]. That is, value is created in a unique way and determined phenomenologically by the beneficiary. Along these lines, Prahalad and Ramaswamy [32] stress that cocreation provides value in itself, since it allows the actor to coconstruct personalized value to suit his/her context. A personalized cocreation experience reflects

how the individual chooses to interact with the experience environment that another actor (e.g., the firm) facilitates. Cocreation comes from the interaction of an individual located in specific time and space in the context of a concrete act. Organizations should always take into account the fact that the more they focus on the consumer's context and adjust to the individual's vital environment, the greater the value of cocreation is. According to Kohler et al. [25] and Füller [33], virtual communities represent ideal contexts for studying cocreation, since they constitute spaces in which dialogue is encouraged among actors who intervene in these communities and enables these actors to develop themselves fully, thus becoming direct participants in their own cocreation experiences.

In sum, SDL highlights that value is always cocreated among multiple actors and determined by the beneficiary through perceived value-in-use. **Value-in-use** is customers' experiential evaluation of a product or service proposition beyond its functional attributes and in accordance with their individual motivation, specialized competencies, actions, processes, and performance [34]. Following SDL, Tynan and McKechnie [35], and Zhang et al. [9], this study defines **community value cocreation** as the process of creating **perceived value-in-use** for an online community through network relationships and social interactions among all actors in the ecosystem [4]. The focus of this study is to present a metric that helps to assess the value-in-use of online community participants in the process of community value cocreation and to determine how this value influences cocreation behaviors.

2.2. Dimensions of Value-in-Use for Participants in Third-Party Managed Virtual Communities. Prior research suggests that cocreation value-in-use is a multidimensional concept [4, 34]. The subdimensions identified by the literature on cocreation are experience, personalization, and relationship [34]. These subdimensions are closely linked to users' willingness to cocreate community value-in-use. Online community participants' value-in-use refers to actors' motivations to participate actively in the process of community value cocreation [4]. To understand the motives of virtual community participants, we draw on the well-established uses and gratifications paradigm. Based on the theoretical framework of Dholakia et al. [27] and Nambisan and Baron [26], we propose five categories of value that motivate participation in virtual communities. These include informational value; community interactivity; and social, personal, and entertainment value. (1) Informational value is value the participant derives from acquiring and strengthening his/her understanding of the environment; (2) community interactivity refers to benefits derived from establishing and maintaining two-way communication with other actors in the virtual community; (3) social integrative value involves strengthening consumer's ties with relevant others; (4) personal integrative value involves strengthening the individual's credibility, status, and confidence; and (5) entertainment value is derived from the fun and relaxation involved in interacting with users.

The five categories of motivation mentioned above have been widely validated in prior studies of cocreation in virtual

communities, by being contrasted for participants in virtual brand communities [9, 10, 13, 36], and in online collaborative forums [8] and experiments [20]. Based on the review performed here, this study adopts the idea that cocreation value-in-use for third-party managed virtual communities is a multidimensional concept composed of the five motivational values presented above.

2.3. Cocreation Behaviors in Third-Party Managed Virtual Communities. In the online context, cocreation behaviors have been limited to individuals' participation in brand communities, digital platforms, and social networks and to generation and exchange of content [26]. Different studies synthesize the definitions and dimensions of cocreation identified in virtual environments [6, 7, 12, 18, 23, 37, 38].

On the one hand, we stress that different cocreation behaviors distinguish specific virtual environments. For example, video watching, video commenting, video producing, and video sharing are cocreation behaviors specific to video sharing communities (i.e., [23]). Creating groups and/or events, participating in them, sending and answering invitations to friends, and visiting other users' profiles are behaviors characteristic of social networks [37]. On the other hand, studies of virtual communities identify two cocreation behaviors (see [6, 7]): (1) use of the community through information searching and (2) participation in the community by generating and sharing content with other community members in order to take part in discussions, give feedback, advice on products and/or services, etc. Although some researchers do not consider consumption of content as cocreation behavior in virtual communities and limit cocreation to coproduction of content among actors (e.g., [18]), many studies of virtual environments support cocreation behavior as use of the virtual community to search for information [23]. Coinnovation is another cocreation behavior stressed by studies of cocreation in digital environments [38–40]. Coinnovation as a cocreation behavior is related to users' participation in the community by providing ideas for management of products/services housed on it (for example, proposing new modes of service, identifying new trends or new users, etc.), as well as for the community itself (its content, aesthetics, ease of use, etc.).

Along the lines of Vernet and Hamdi-Kidar [38], this study synthesizes the cocreation behaviors that occur in a third-party managed virtual community into three levels: (1) a low level of cocreation, determined by use of the community to search for information (for example, to plan a trip or make a reservation), (2) a moderate level of cocreation, defined through interaction with other users of the virtual community, creating content and generating feedback (e.g., giving an opinion about a specific hotel or restaurant), and finally (3) a high level of cocreation, in which participants carry out coinovation activities with both suppliers of the services housed in the virtual community (e.g., proposing new modes of service for a hotel or restaurant) and the platform itself (e.g., proposing a new forum, new interface to simplify the community's website or mobile app, etc.).

2.4. Proposal of a Theoretical Model of Cocreation in Third-Party Managed Virtual Communities. One very important part of value-in-use of third-party managed virtual communities derives from the information on the products/services about which comments are made (e.g., prices, characteristics of products/services, etc.). The information—if it is of good quality, that is, varied, up-to-date, precise, and reliable—enables participants to plan their experiences and find products/services better adapted to their interests and facilitates prepurchase decisions. When participants can undertake such actions, information searching behavior (lurking) very often occurs [8, 9, 11, 13, 20, 28, 33, 41]. Further, both the perception of entertainment and feeling part of the community encourage information searching [23, 42].

Likewise, when users of the third-party managed virtual community evaluate the information exchanged positively, they enjoy themselves and can establish relational ties thanks to community interactivity [43]. When they are recognized as experts for their knowledge of a specific service or brand [13, 20, 33], the feedback they generate will increase, in terms of recommending the product/service to other users as well as communicating failures of the product/service and providing ideas for its improvement [23, 26, 43].

Finally, it is important to note that third-party managed virtual communities are very good ecosystems for developing coinnovation activities [33], since these communities can point in two directions—toward products/services housed in the virtual community and toward management of the community itself. This study argues that perceived value-in-use for third-party managed virtual communities fosters coinnovation activities, since the users who collaborate on them (for example, by proposing new modes of service, identifying trends, or contributing ideas for improvement of the community's website) do so because they are motivated by their knowledge and the recognition gained by participating in this kind of activity (for example, the third-party managed virtual community TripAdvisor gives users who make comments a score based on their level of collaboration in the community). They also do so because they enjoy expressing their creativity while strengthening social ties and obtaining responses to their suggestions [8, 44, 45].

2.5. Moderating Effect of the Use of Various Platforms in the Cocreation Process. “Niche theory” is used to propose the moderating effect of the type of platform used in the relationships established between value-in-use perceived by the user of the third-party managed virtual community and cocreation behaviors. Niche theory was originally developed in animal communities, but Dimmick [46] pioneered its use from the multichannel marketing perspective to argue that consumers tend to make choices about their participation in the channels available (when and how they use the different channels, for how much time, etc.) according to the utility obtained from each channel. A new channel can thus prosper depending on the utility it brings consumers. When a new channel is developed, several things can occur: (1) the most common one is that the new channel coexists with the channels previously used, the channel that offers greater utility partially displacing the one with least utility.

Further, when two channels coexist, providing similar utilities, simultaneous use of both can create a reinforcement effect, improving favorable attitude toward and satisfaction with both channels. The new channel may also completely replace the previous one because the new channel clearly has better perceived value, although this is not common. Niche theory has been applied in prior research that explains the interrelations established between perceived value and consumers' behavior (i.e., search for information), considering the coexistence of interactive and traditional media [47] as well as the simultaneous use of mobile Internet, PC Internet, and traditional media [48].

Verleye [20] warns that, in contexts mediated by technology as is the case with virtual communities, the characteristics of the environment (i.e., technologization and connectivity) condition the value cocreation process. More specifically, for the use of social media when organizing and taking vacation trips, Parra-López et al. [49] find that certain factors, such as ease of use and flexibility and clarity of the platform used, determine community participants' value-in-use and type of participation. Thus, from a multiplatform perspective and the premise of niche theory, the cocreation process in a third-party managed virtual community can be expected to vary based on whether the user accesses the virtual community exclusively through a single platform (the community's website or mobile app) or uses both platforms to access the community.

For example, the mobile app involves greater time-space flexibility than the website on the desktop. Prior studies confirm that the mobile app enables the user to overcome constraints of space and time [48], increasing the intensity of the relationships established between community value-in-use and the most advanced cocreation behaviors (for example, feedback and coinnovation), since a tourist can currently access a community of travelers at any time, at any place, to rank and publish reviews, communicate with other members of the community, present his/her ideas or errors identified, etc. Since not enough theoretical evidence has been found to support the corresponding hypothesis, however, the following exploratory research question should be considered:

RQ: What is the moderating effect of the platform/s used (i.e., website, mobile app, or both platforms) on the relationships established between perceived cocreation value-in-use of the third-party managed virtual community and cocreation behaviors?

Figure 1 shows the theoretical model proposed.

3. Methodology

To tackle the research goals proposed, we perform an empirical study of a sample of 600 users of TripAdvisor in Spain who affirm that they share their service experiences through the platform. The information was obtained by telephone survey. The products and services housed on the platform (lodging, restaurants, etc.) encourage analysis of cocreation behaviors insofar as users show high involvement in and personalization of the service experience (for example, preparing the trip).

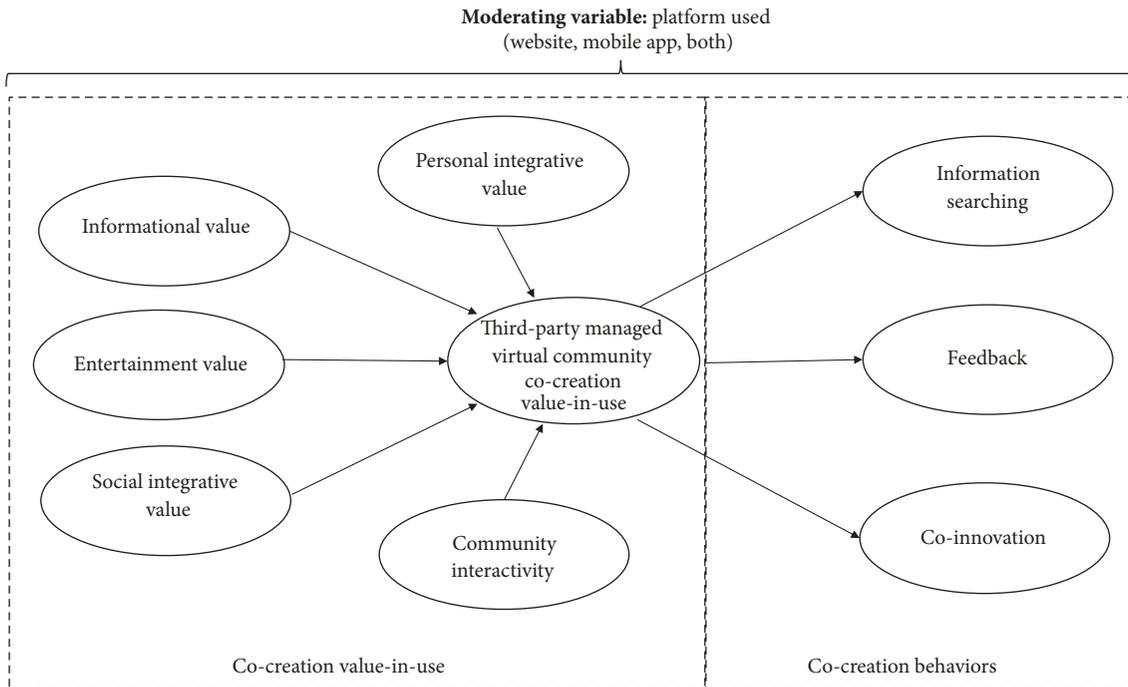


FIGURE 1: Theoretical research model.

As to the sample profile, 45.2% of the survey respondents comment 50% or more of the times they use the platform. The highest percentage of users (74.2% of the sample) uses the platform to comment on hotels, followed by 49.5% who use it to comment on their experiences at restaurants. Slightly over a third also use the platform to comment on flights and vacation rentals.

As to the gender of the participants, 49.7% of the survey respondents were men and 50.3% women. By age, respondents were distributed as follows: 17.7% were under 25 years of age, 29% aged 26-35, 37.2% aged 36-50, 12.2% aged 51-65, and 4% were over 65. By education level, 10.8% of the participants had completed primary school, 39.3% secondary school, and 49.5% university. By family income, 11.2% of the participants had an income of at least 1000 euros/month, 51.8% 1000-2000 euros, 29.7% 2001-3000 euros, and 6.8% over 3000 euros. The participants were primarily members of two- or three-member households (61.2%); 41% did not have children, 23.3% had one child, and 19.5% had two.

The items used to measure the concepts were obtained by adapting scales used previously in the academic literature. First, for perceived value-in-use, the dimensions of informational value and personal integrative value were measured by adapting the scale from Nambisan and Baron [26] and Kuo and Feng [10]. Entertainment value and social integrative value were measured by adapting the scale from Zhang et al. [9]. To measure community interactivity, the scale from Dholakia et al. [27] was adapted. Second, as to cocreation behavior, information searching was measured by adapting the items used in Yi and Gong [50]. For feedback, we adapted the items from Yi and Gong [50], Xu and Li [7], and Hu

et al. [23]. Coinnovation was measured by adapting the scale developed by Tonteri et al. [12].

All scales were measured using 11-point Likert scales from 0 (disagree completely) to 10 (agree completely) (Table 3). To measure the moderating variable in modeling cocreation, we used a single question asking individuals in the sample to indicate whether they participated in the virtual community of travelers using only the website, only the mobile app, or both platforms.

4. Results

Scholars suggest that PLS is frequently used in exploratory research, studies with small sample sizes, and nonnormal data [51]. Given the research aim and data characteristics, the partial least squares (PLS) path modeling is preferred to analyze the data. Regarding sample size issues, this study meets the rule of a minimum sample size, ten times the maximum number of paths in the outer model and inner model. SmartPLS3 was used to analyze the data. In order to estimate the precision of the PLS estimates, a technique of resampling (500 resamples) is used [51]. In this section, the results of the proposed modeling for the general sample and for the different platforms (i.e., website, mobile app, and both platforms) are presented. First, the results of reliability and validity for the sample are confirmed, and, second, the model in Figure 1 is estimated using structural equations, without including the moderating effect [52]. PLS path modeling allows for the conceptualization of a hierarchical component model. In this study, a second-order latent variable (third-party managed virtual community cocreation value-in-use) consists of five underlying first-order latent variables: (1)

TABLE 1: Description of variables according to platform used to access the online travel community.

Variable/Construct	Website + mobile app (n=242)	Website (n=277)	Mobile app (n=80)	F-Snedecor
Co-creation behaviors:				
Information searching	7.94 (1.39)	7.61 (1.56)	7.95 (1.33)	3.69**
Feedback	7.18 (1.41)	6.80 (1.82)	6.97 (1.73)	3.36**
Co-innovation	6.27 (1.65)	5.71 (2.08)	6.28 (2.20)	6.24***
Value-in-use:				
Informational value	7.22 (1.40)	6.96 (1.70)	7.50 (1.13)	4.52**
Community interactivity	6.32 (1.59)	5.98 (1.81)	6.66 (1.56)	5.95***
Entertainment value	6.57 (1.67)	6.21 (2.11)	6.70 (1.62)	3.33**
Social integrative value	5.18 (2.18)	4.89 (2.63)	5.59 (2.56)	2.73*
Personal integrative value	7.19 (1.35)	7.00 (1.57)	7.05 (1.46)	1.08 (n.s.)

*** $p < 0.01$; ** $p < 0.05$.

informational value; (2) community interactivity; (3) entertainment value; (4) social integrative value; and (5) personal integrative value.

Finally, the study considers the moderating effect and performs a multigroup structural analysis (website, mobile app, and both platforms). In order to identify a common model for the three analyzed platforms, the study compares pairs of parameters between structural models using a t-test based on the expression $t = (\beta_i - \beta_j) / \text{square root}(S_i^2 + S_j^2)$, in which β_i and β_j represent the coefficients to be contrasted and S_i and S_j their respective standard errors.

Recently, PLS-SEM application has expanded in marketing research [53]. This study adopts the classic form of divulgation of the measurement and structural results previously used in studies that incorporate this methodology (for example, [51, 54]). However, unlike the PLS-SEM application made by Molinillo et al. [51], which has a different aim, a central objective of this research is to develop the dimensions that constitute users' cocreation value-in-use. Thus, this research incorporates a hierarchical component model and more specifically a reflective-formative construct. The use of PLS is particularly interesting for this aim [55].

4.1. Measurement Model. First, as a preliminary analysis, we tested for common method bias using the post hoc Harman's single-factor test. All construct variables were included in an exploratory factor analysis, and the unrotated factor solution was examined. No single factor accounted for the majority of the variance in the variables [56].

Next, Table 1 presents the descriptive values of the model variables for the whole sample and the differences obtained among the three segments analyzed—use of the website only, the mobile app only, or both platforms.

The variance analysis performed shows statistically significant differences for all model variables except personal integrative value. In general, we observe higher values for value-in-use and cocreation behaviors among users of the mobile app and multiplatform users. Among the dimensions of value-in-use, informational value and personal integrative

value stand out, with values close to 7 in the different platform/s considered. Social integrative value, in contrast, shows the lowest values. Among cocreation behaviors, information searching stands out, with values close to 8, followed by feedback and coinovation. The mean values for the segments analyzed show the greatest differences for the variables of community interactivity and coinovation, which favor users of the mobile app and multiplatform users over website users.

To evaluate the measurement model (this analysis was replicated using AMOS 23; the model's fit was satisfactory ($\chi^2/\text{d.f.}=2.06$; CFI=0.97; NFI=0.95; IFI=0.97; GFI=0.93; AGFI=0.91; RMSEA=0.04); the scale's reliability and convergent and discriminant validity were also confirmed), it is necessary to confirm the quality of the measurement scales (convergent and discriminant validity). In all cases, the reliability statistics used, the Alpha Cronbach, and composite reliability exceed the minimum value of 0.70 recommended by literature. The variance extracted is greater than or equal to 0.5, and all of the items have good convergent validity, confirmed by the fact that all of the parameters are statistically significant (see Table 2).

Also, two methods are used to check the discriminant validity of PLS: (1) the Fornell-Larcker [57] criterion, which analyzes whether the correlations between the constructs are lower than each construct's square root of AVE and the (2) heterotrait-monotrait (HTMT [58]) ratio of correlations between two constructs, which should be below 0.9. The results in Table 3 indicate acceptable discriminant validity.

To measure the community participants' value-in-use, we verified that value-in-use is a formative multidimensional construct, as indicated by prior studies [4, 34]. First, we must rule out the presence of multicollinearity. As shown in Table 4, multicollinearity was assessed using variance inflation factors (VIF). All VIFs were below the cut-off value of 5 [53]. We also evaluated the validity of the dimensions of the participants' value-in-use through the path coefficients. As observed in Table 5, all coefficients were high and statistically significant, supporting the idea that value-in-use was defined correctly as a formative variable.

TABLE 2: Analysis of reliability and validity of the reflective measurement scales.

Variables	L_i	Reliability		Validity	
		Alpha Cronbach	Composite Reliability (CR)	Average Variance Extracted (AVE)	t-values
<i>Information Searching: When I visit TripAdvisor, before using a specific service:</i>					
(i) I search for information in the comments from other users of the service.	0.79	0.76	0.85	0.66	23.60
(ii) I take into account the comments of other users of the service.	0.82				29.66
(iii) I consult the opinion forum.	0.83				42.15
<i>Feedback: On TripAdvisor, when I have an opinion about a service I have used,</i>					
(i) If I liked it, I say positive things about it.	0.77	0.87	0.90	0.61	32.72
(ii) If I liked it, I recommend it.	0.73				23.60
(iii) If I liked it, I encourage other users to use it.	0.79				32.63
(iv) If I have a good idea about how to improve the service, I include it.	0.82				48.91
(v) When I have a problem with the service, I make it known.	0.80				41.09
(vi) When I have a problem with the service, I give ideas about how to solve it.	0.76				34.75
<i>Co-innovation</i>					
<i>I collaborate with TripAdvisor to improve:</i>					
(i) Its informative content.	0.86	0.92	0.94	0.72	60.02
(ii) Its aesthetics.	0.82				40.95
(iii) Its ease of use.	0.83				44.20
<i>With the service firms, I:</i>					
(i) Propose new modes of service.	0.89	0.90	0.90	0.90	64.85
(ii) Identify new trends.	0.92				69.42
(iii) Propose ideas to identify new users.	0.90				65.55
<i>Informational value: TripAdvisor enables me to know</i>					
(i) The services better.	0.82	0.81	0.89	0.72	32.53
(ii) The firms that provide the services.	0.88				66.13
(iii) The brands that the community evaluates as best.	0.85				38.12
<i>Community interactivity: In TripAdvisor</i>					
(i) Other users respond to my comments.	0.90	0.85	0.91	0.77	98.30
(ii) The companies about which I express opinions respond to my comments on services.	0.89				95.90
(iii) I generally receive responses to the comments I make.	0.84				34.91
<i>Entertainment value: participation in TripAdvisor:</i>					
(i) Entertains me.	0.89	0.87	0.92	0.80	66.04
(ii) Relaxes me.	0.87				68.34
(iii) Is fun.	0.91				117.38
<i>Social integrative value: TripAdvisor enables me to:</i>					
(i) Broaden my social network.	0.96	0.95	0.97	0.92	286.62
(ii) Increase my affinity with the community of users.	0.95				171.47
(iii) Have more social relationships.	0.96				217.22

TABLE 2: Continued.

Variables	L_i	Reliability		Validity	
		Alpha Cronbach	Composite Reliability (CR)	Average Variance Extracted (AVE)	t-values
<i>Personal integrative value: On TripAdvisor, I show my level of "expertise" in the use of:</i>					
(i) TripAdvisor and similar platforms.	0.86				32.23
(ii) The services that TripAdvisor provides.	0.93	0.88	0.93	0.81	100.61
(iii) Services about which I post comments.	0.90				78.66

TABLE 3: Fornell-Larcker criterion (HTMT ratio).

	Information searching	Feedback	Co-innovation	Informational value	Community interactivity	Entertainment value	Social integrative value	Personal integrative value
Information searching	0.81							
Feedback	0.43 (0.53)	0.78						
Co-innovation	0.34 (0.39)	0.55 (0.60)	0.85					
Informational value	0.50 (0.61)	0.48 (0.58)	0.45 (0.52)	0.85				
Community interactivity	0.33 (0.39)	0.57 (0.66)	0.61 (0.69)	0.44 (0.52)	0.87			
Entertainment value	0.34 (0.40)	0.52 (0.58)	0.59 (0.66)	0.39 (0.81)	0.54 (0.63)	0.89		
Social integrative value	0.29 (0.32)	0.45 (0.47)	0.65 (0.69)	0.39 (0.45)	0.59 (0.65)	0.67 (0.87)	0.96	
Personal integrative value	0.30 (0.35)	0.38 (0.43)	0.35 (0.39)	0.38 (0.44)	0.31 (0.34)	0.30 (0.68)	0.29 (0.31)	0.90

Note: the square roots of the AVE are in bold on the diagonal of the correlation matrix, and interconstruct correlations are shown off the diagonal.

In the following section, we confirm the predictive validity of community participants' value-in-use through its effect on information searching, feedback, and coinovation estimated through the relationship model.

4.2. Structural Model. The hypothesized model (this analysis of the full structural model was replicated using AMOS 23, initially without including the moderator effect; the models' fit was satisfactory ($\chi^2/d.f.=2.09$; CFI=0.97; NFI=0.95; IFI=0.97; GFI=0.93; AGFI=0.90; RMSEA=0.04)) fits the data well. First, R^2 values for information searching, feedback, and coinovation indicate adequate explanatory power (information searching: 0.22; feedback: 0.42; coinovation: 0.54). All values are above the limit of 0.1, accepted in academic literature [51, 59].

As denoted in Table 5, all paths are significant with at least 0.01 level. In addition, the Stone-Geisser test [60] was estimated (Q^2). The higher Q^2 is, the higher the predictive relevance of the tested model equation is [55]. This model shows medium and large impacts of community participants' value-in-use on information searching ($Q^2=0.15$), feedback ($Q^2=0.23$), and coinovation ($Q^2=0.40$). This result suggests that the community participants' value-in-use metric showed

good explanatory power, supporting its predictive validity, as indicated in the previous section.

4.3. Moderating Effect of Platforms. After evaluating the measurement model and structural model, we analyzed the moderating effects of the digital platforms as a form of participation in the virtual community of travelers (website, mobile app, and both platforms) using a multigroup PLS analysis. The results of each of the three models are shown in Figure 2.

The findings show that all dimensions considered contribute significantly to generating participants' value-in-use in the third-managed virtual community through the platform(s) used (website, mobile app, and both). In addition, community participants' value-in-use has a significant positive effect on information searching, feedback, and coinovation for any platform/s used. This finding suggests that the value-in-use scale has good explanatory power for the three cocreation behaviors considered and for any platform/s.

The significant differences between the parameters in the models are shown in bold in Figure 2 and Table 6. In Table 6, the p values of the differences between path coefficients lower than 0.05 or higher than 0.95 indicate differences

TABLE 4: Analysis of reliability and validity of the formative scale.

Higher-order factor model	Path coefficients	t-values	VIF
Informational Value→Value-in-use	0.23***	21.00	1.39
Community Interactivity→Value-in-use	0.28***	23.13	1.74
Entertainment Value→Value-in-use	0.29***	26.63	1.97
Social Integrative Value→Value-in-use	0.33***	29.02	2.11
Personal Integrative Value→Value-in-use	0.20***	10.88	1.22

*** $p < 0.01$.

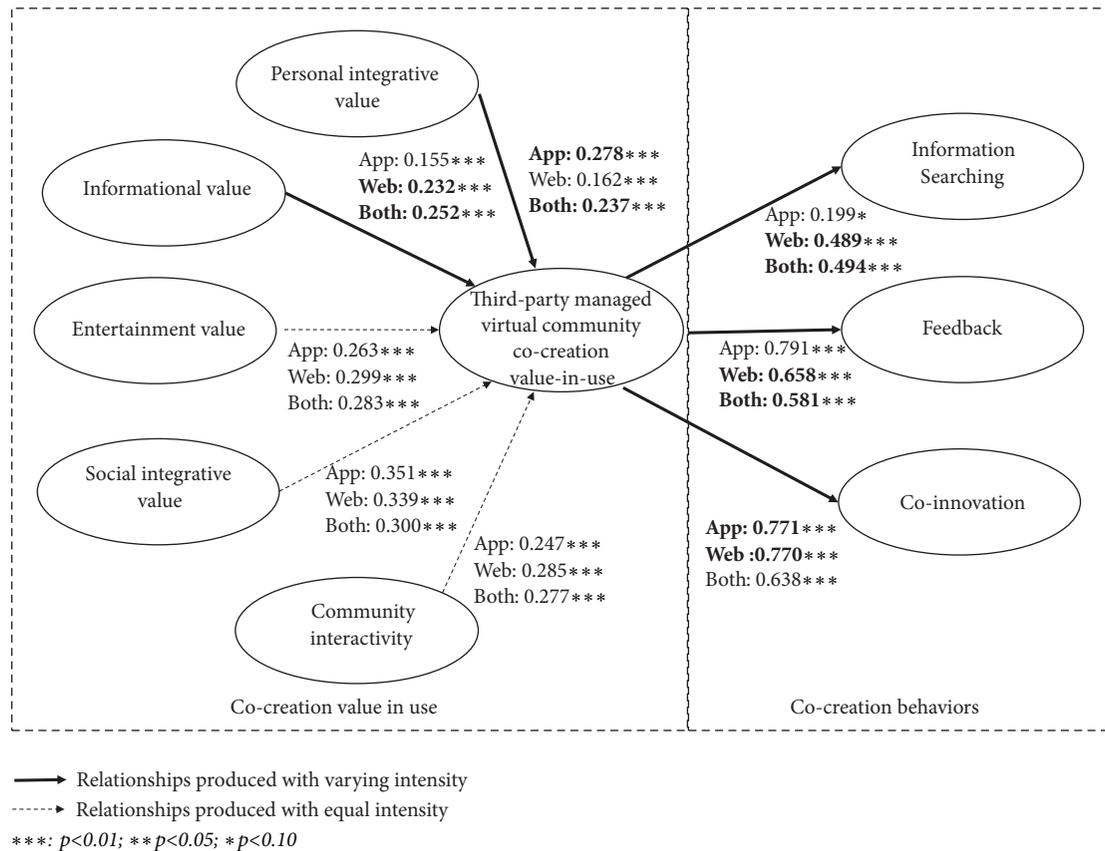


FIGURE 2: Relationship model.

TABLE 5: Results of relationship model.

Relationships	Path
Value-in-use→Information searching	0.46***
Value-in-use→Feedback	0.64***
Value-in-use→Co-innovation	0.73***

*** $p < 0.01$.

between specific path coefficients across two groups at a 5% significance level [61].

In comparing the website and mobile app models, we find significantly stronger effects on the relationships in the route “informational value-participants’ value-in-use-information searching” for the website. This result may be due to the fact that the variables that compose information

searching were measured during a period prior to enjoyment of the service experience, such that participants in the virtual community preferred the website to the mobile app for obtaining information, since the quality and quantity of information on the website are better than those on the app. For example, the website provides suggestions in each section (hotels, restaurants, etc.) and a ranking for each section (hotels, restaurants, etc.) for the current year and for different regions—information not available on the app. The design of information on the website was also more attractive, for example, in terms of image size. Thus, although the app has the characteristic of providing information accessible to the user at any time, at any place, its limitations in quantity and quality of information relative to the website led to better results for the website in the route informational value-participants’ value-in-use-information searching.

TABLE 6: Comparison of website model, mobile app model, and both-platforms model.

Relationships	Website vs mobile app.		Website vs both platforms		Mobile app. vs both platforms	
	Path coefficient difference	p-value	Path coefficient difference	p-value	Path coefficient difference	p-value
Value-in-use → Information searching	0.290	0.008	0.006	0.461	0.295	0.008
Value-in-use → Feedback	0.133	0.985	0.077	0.896	0.210	1.000
Value-in-use → Co-innovation	0.001	0.505	0.133	0.998	0.132	0.980
Informational Value → Value-in-use	0.077	0.007	0.020	0.189	0.097	0.003
Community Interactive Value → Value-in-use	0.038	0.116	0.008	0.620	0.031	0.180
Entertainment Value → Value-in-use	0.036	0.110	0.015	0.755	0.020	0.248
Social Integrative Value → Value-in-use	0.012	0.623	0.040	0.914	0.051	0.930
Personal Integrative Value → Value-in-use	0.116	0.998	0.075	0.024	0.041	0.886

Path coefficient differences appear in absolute values.

The weight of personal integrative value on value-in-use, in contrast, is greater in the model for the mobile app, surely because emergence and use of the mobile platform to access the virtual community are more recent, such that users who use it may feel a higher level of expertise in new technologies, etc. Likewise, the effect of participants' value-in-use on feedback (recommendations and complaints) is more intense in the case of the mobile app, due surely to the characteristics of this platform itself (accessible to the user at any time, at any place, by merely holding the mobile), encouraging generation and transmission of opinions at the very time of the service experience and immediately after. The results also show a stronger route for personal integrative value-participants' value-in-use-feedback among users of the mobile app than for website users. Mobile app users perceive greater value-in-use as a result of greater expertise and are also the users who cocreate the most through active feedback behavior that includes making recommendations and complaints. These users may think and feel that their recommendations and complaints are more useful for the decision-making of others than do users who obtain value-in-use through other elements.

On the other hand, if we compare the participants who use only one platform (website or mobile app) rather than both (website and mobile app), the weight of use of one technology rather than both is significantly greater in coinnoation. As mentioned above, coinnoation activities require a higher level of involvement from community participants, since contributing ideas about trends in service and users and collaborating to improve the virtual community itself (e.g., providing ideas that improve the usability and attractiveness of the website) require both an effort of reflection and creativity and deeper knowledge of the use platform. Perceived value-in-use strengthened by greater knowledge of a single platform of use increases coinnoation relative to participants who access the community through both platforms.

Finally, we would stress the high proportion of variance explained in the three models for all constructs used except that of information searching in the group that only uses the mobile app. For the group that uses both platforms, we obtain $R^2 = 0.24$ for information searching, $R^2 = 0.34$ for feedback, and $R^2 = 0.41$ for coinnoation. For the model of participants who use only the website, $R^2 = 0.22$ is explained for information searching, $R^2 = 0.42$ for feedback, and $R^2 = 0.54$ for coinnoation. Finally, in the model in which participation in the community occurs through the mobile app only, we obtain $R^2 = 0.04$ for information searching, $R^2 = 0.63$ for feedback, and $R^2 = 0.59$ for coinnoation.

5. Discussion

SDL [2, 3], cocreation literature [4, 34], and uses and gratifications theory provided the theoretical foundation for the conceptual model developed. As prior research has not assessed the conceptualization and dimensions of third-party managed virtual community participants' value-in-use, this study helps to close this knowledge gap by empirically exploring the dimensions of participants' value-in-use for the virtual communities mentioned above. We find

informational value, entertainment value, social integrative value, personal integrative value, and community interactivity to be determinants of virtual community participants' value-in-use.

Further, this study examines the process of cocreation in a virtual community of travelers through a holistic approach and by establishing and measuring the relationships in these communities between participants' value-in-use and cocreation behaviors. This analysis thus extends existing research, which has been limited to arguing the importance of value cocreation in the context of virtual communities. First, the proposed model identifies and integrates three cocreation behaviors that occur in a virtual community of travelers: information searching, feedback, and coinnoation. Identifying these three behaviors enriches knowledge of cocreation behavior in virtual communities of consumers and users, study of which has frequently been tackled from a one-dimensional perspective (i.e., intent to participate in this community). Further, these three behaviors are associated with three levels of cocreation (low, moderate, and high), based on the effort and involvement they require of participants. Dividing cocreation behaviors into levels facilitates study of this variable in the virtual community of travelers.

Further, the study defines coinnoation and how it functions in third-party managed virtual communities. Whereas previous studies show the importance of virtual communities as coinnoation platforms [39], this study demonstrates that coinnoation activities in virtual communities of travelers managed by third parties are expressed through (1) proposals for improvement addressed to the actors housed in the virtual community (proposal of new modes of service, identification of services that are a trend, characterization of new users, etc.), as well as (2) contribution of ideas that encourage ease of use, flexibility, and clarity addressed to the managers of the virtual community to make the virtual community more attractive. Coinnoation activities in both directions benefit relational and business results for all stakeholders involved.

In sum, since prior studies show that each type of virtual community has a different cocreation process, this study enables research to obtain results adapted to third-party managed virtual communities, particularly virtual communities of travelers, by identifying the variables that compose perceived value-in-use for the community's participants and quantifying the effect of this value on the specific cocreation behaviors of this type of community. The analysis stresses the three dimensions weighted relatively higher: social integrative values (0.33), entertainment value (0.29), and community interconnectivity (0.28).

The study contributes to the existing literature on cocreation value by responding to the suggestion by Verleye [20] to introduce as moderating variable the use of multiple platforms to access the virtual community. It examines whether the type of platform used to access the virtual community of travelers (website, mobile app, or both platforms) changes the intensity of the relationship established between the value-in-use perceived by the virtual community's participants and cocreation behaviors. To date, the moderating variables used in studies that relate motivation for participation in the virtual community to specific behavior have been aspects

related either to the type of virtual community [27] or to the community's participants, such as sex [48]. We should not neglect, however, that today's consumers are hyperconnected and can use multiple devices (smartphones, tablets, and PCs) to interact with the environment, conditioning the cocreation process. Our investigation makes an important theoretical contribution in corroborating that the use of different platforms to access the community of travelers has a moderating effect on the proposed model.

The results show that the weight of the dimensions considered in online traveler community participants' value-in-use varies depending on the type of platform access considered, as does the intensity of the effect of participants' value-in-use on cocreation behaviors. Statistically significant differences are obtained in 10 of the 24 relationships estimated, although in no case does the type of platform affect the comparatively greater importance of the dimensions social integrative value, entertainment value, and community interactivity in the composition of value-in-use. On the contrary, the contributions of informational value and personal integrative values to value-in-use differ significantly in the three groups compared according to platform used to access the community of travelers analyzed, as do all effects of value-in-use on cocreation behaviors.

In light of these results, it can be said that, for a specific level of value-in-use, using various platforms to access the virtual community (website and mobile app) does not generate greater synergy of cocreation behaviors relative to access through a single platform (only website or only mobile app). For a given level of value-in-use, using the mobile app only or the website only has a stronger positive influence on higher cocreation levels (coinnovation) than using both platforms. Virtual communities should thus be present through the different platforms, so that their users can employ different platforms based on their preferences, obtaining value-in-use and transforming this value-in-use into higher levels of cocreation, fundamentally into coinnovation activities. It is also worth noting that development of mobile apps is especially interesting to increase the positive influence of value-in-use on the moderate level of cocreation (feedback), due to these apps' great potential in terms of connectivity and ubiquity.

6. Conclusion

The results of this study contribute practical implications in two directions: managers of virtual communities of travelers and those in charge of the companies/brands about which the comments are made. It is very important that both groups understand the factors that contribute to both increasing perception of community users' value-in-use and detecting the levels of participation in the community relative to information searching, generation and transmission of feedback and intent to participate in coinnovation activities. Such understanding will enable managers to establish strategies and action plans that foster these behaviors.

Our research also provides a practical suggestion for firms that manage the virtual communities: exploit the advantages of technology to stimulate users' participation in

these communities. As the multigroup analysis shows, the mobile app increases the feedback derived from value-in-use relative to participants who only use the website. Mobile app use also encourages coinnovation activities relative to users who use both the website and the mobile app, since the mobile app facilitates connection to users at any time, at any place. This finding does not, however, reduce the importance of the cocreation behaviors of participants who use only the website. The website is the preferred platform for obtaining informational value and the platform that most fosters the search for information before carrying out the service experience. Participants who use only the website and who perceive positively the value that the virtual community brings them appear more inclined to participate in coinnovation activities than do users who use both platforms. Managers of the virtual community should thus encourage and homogenize the user's experience on both platforms for accessing the virtual community (website and mobile app), since both platforms encourage cocreation behaviors as long as users perceive value-in-use for the community. Both platforms should be attractive for users, since users can then choose one or the other to carry out their cocreation behaviors based on their experience, preferences, and circumstances.

We thus recommend establishing strategic plans based on knowledge of the cocreation behaviors of the different groups of participants, thereby providing users with the tools needed to guarantee continuity in the cocreation behaviors they perform, while also improving cocreation behaviors performed to a lesser extent. For example, for participants who use the mobile app only, managers should increase the influence of value-in-use on information searching by encouraging information searching through this platform during the planning phase of the service. The positive effect of value-in-use on feedback should be improved for participants who use the website only, and this should be done by maximizing the simplicity of the process by which participants write reviews through this platform and by stimulating participants also to use the mobile app (e.g., through promotions only available through that app), since this platform most encourages generation of feedback. Finally, for participants who access the community through both website and mobile app, managers should encourage the positive influence of perceived value-in-use on their coinnovation. For this group, an incentive program could be applied based on participation in coinnovation activities (e.g., prizes).

We can also identify areas for improvement in the variables that compose participants' value-in-use and concentrate resources on developing specific dimensions of this value—for example, improving the average values of social integrative value. To achieve this improvement, visibility of topical forums within the online travel community (e.g., trips with children, pets, etc.) could be increased, as well as forums not directly related to the topics but encouraging exchange of experiences (e.g., forums on gastronomy, leisure, etc.). Such action may be especially beneficial for increasing ties and affinity with other individuals in the group.

Finally, we recommend maximizing interactivity within the community and making participants feel heard, that is, responding to them and making them feel that they

play a very important role in the service firms housed on the virtual community, since these firms benefit most from the feedback and coinnovation that participants generate. Tourist firms that receive comments benefit directly from knowing the suggestions for improvement users propose. Management application of the valuable information that participants provide in codesign activities such as proposing new modes of service, trends, forms of improvement, etc. has direct repercussions for improving business results, as firms can better identify the motivations and behavior of current consumers and thus better satisfy the needs of the target market. Likewise, the managers of virtual communities of travelers benefit from users who propose improvements in informational content, website aesthetics, etc., since making these improvements in the virtual platform helps to improve users' perception of their ease of use and utility, with positive repercussions for attitude (e.g., trust) and loyalty to the virtual community of travelers.

We must note some limitations of this study, which can give rise to future lines of research. First, the cocreation behaviors were obtained through responses by survey respondents based on their perceptions. It is thus advisable to follow up by analyzing respondents' real behavior on the virtual community of travelers. Likewise, since the study was performed with a group of participants representative of the Spanish market, repetition of the study in other geographic contexts would give it greater external validity. In addition, there may be other cocreation behaviors not considered in this model, such as aid to other members of the community or participation in forums, which open a line to future studies. Further, antecedents researched in the cocreation literature could be incorporated to enrich the model proposed (e.g., perceived support given by organizations) by studying these antecedents' influence on value-in-use. Other different consequences of cocreation behaviors could also be incorporated, such as relational results for the firm that manages the virtual community of travelers or the firms housed on the platform (e.g., identification, customer capital, etc.). As the online travel literature indicates [16], it would also be interesting to study the moderating effect of specific variables, such as age, sex, income, education, or level of expertise, on the relationships between participants' value-in-use and cocreation behaviors, as well as to contrast whether the proposed modeling can be applied to other types of virtual communities.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

All authors declare no conflicts of interest.

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