

Article

Building Sustainable Virtual Communities of Practice: A Study of the Antecedents of Intention to Continue Participating

Baltasar González-Anta ^{1,*} , Isabel Pérez de la Fuente ² , Ana Zornoza ¹  and Virginia Orengo ¹ 

¹ Research Institute of Human Resources Psychology, Organizational Development, and Quality of Working Life (IDOCAL), University of Valencia, 46010 València, Spain; ana.zornoza@uv.es (A.Z.); virginia.orengo@uv.es (V.O.)

² Department of Social Psychology, Faculty of Psychology, University of the Basque Country, 20018 Donostia-San Sebastián, Spain; isabel.perezdelafuente@gmail.com

* Correspondence: juan.b.gonzalez@uv.es

Abstract: Virtual communities are essential in contemporary social and organizational domains. Their sustainability is largely propelled by members' contributions, and yet the mechanisms for achieving significant participation remain ambiguous. Grounded in the Technology Acceptance Model, our primary objective is to identify the factors that may predict the intention to participate in a virtual community of practice; secondly, we aim to detect the most influential predictor(s) and the best model. In this paper, we conduct a cross-sectional study with a sample of 114 virtual community participants. Our multiple and weighted regression analyses reveal that technological, personal, and motivational factors sway participation intentions. Nevertheless, a combination of specific factors, interactivity, self-efficacy, and identification, are the most closely related to participation intention. This research offers valuable insights for organizations and community promoters, enhancing member retention and interaction stimulation and thereby constructing sustainable virtual environments through effective community design and management.

Keywords: virtual community of practice; virtual community development; technological factors; personal factors; motivational factors; participation intention; online communities



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1. Introduction

Virtual communities (VCs) have revolutionized human relations through platforms like Twitter, LinkedIn, Reddit, or Instagram, with an ever-increasing use that has reached around 75% in developed countries [1]. VCs have transitioned our interactions into the digital sphere, becoming an essential component of our everyday routines, particularly with the widespread adoption of the internet and mobile devices and a growing emphasis after the COVID-19 pandemic [2–4]. They have also made their way into the job market, impacting organizational structures and the way people work and connect within organizations [4,5]. Moreover, amidst the challenges posed by the pandemic, virtual communities have emerged as indispensable and highly valuable platforms for facilitating and enhancing professional development opportunities [4,6]. The rise of the knowledge economy, driven by globalization and unprecedented challenges, has further necessitated virtual tools that enable communication, access to information, and adaptation to the needs of well-informed clients and other stakeholders [3,7].

This article focuses on Virtual Communities of Practice (VCoPs). VCoPs are collectives of professionals who gather on virtual platforms to exchange experiences, ideas, and solutions to work-related problems, ultimately enhancing their competencies [8–10]. VCoPs foster coordination, innovation, and knowledge exchange within organizations and among professionals [11]. They are based on face-to-face organizational communities of practice that have emerged as informal structures for sharing knowledge efficiently, circumventing the complexities of formal organizational hierarchies [12]. By breaking down geographical

and time barriers, VCoPs serve as a tool for exchanging knowledge within multinational companies with diverse branches in different locations [13]. Therefore, VCoPs can play a pivotal role in revitalizing the lost office culture within an online setting, while also addressing some of the challenges introduced by new modes of work [14], such as virtual teamwork [15] or telework [14,16]. In VCoPs, participants will benefit from interactions with colleagues by acquiring unique knowledge, having the opportunity to socialize, and developing new skills [17].

However, despite their popularity, VCoPs face limitations in terms of their effectiveness, due to inactive participation from some members or poor quality interactions, which undermines their sustainability [18] and leads matrix organizations to experience great financial losses [19]. VCoPs rely on technological systems that optimize communication among members, making the success of the community contingent on members' continued adoption and utilization of these systems [20,21]. Moreover, although personal interests drive member engagement, members also share a common purpose linked to broader organizational goals that require widespread and active participation.

In order to address this need, the current literature explores the factors that contribute to the success and longevity of VCoPs [22,23]. To do so, different theoretical approaches have been considered (e.g., Theory of Planned Behavior; UTAUT ([24,25])). In this study, we build on the Technology Acceptance Model (TAM) [26] to delve into a set of technological (navigation and interactivity), personal (self-efficacy and perceived individual benefits), and motivational (reciprocity and identification) factors that we hypothesize are related to participation intention in VCoPs. Moreover, we test the relative importance of each set of factors in participation intention. We aim to contribute to and broaden the corpus of recent research that has attempted to further understand the underpinnings, challenges, and inefficacies related to VCoP participation [4,6,27]. In the following sections, we briefly review each set of factors and further describe the hypothesized relationships. Then, we test the proposed hypotheses in a VCoP with participants from different NGOs using regression analysis. We finally discuss the results from the perspective of the TAM theory and prior research.

1.1. Sustainable VCoPs: A Complex Recipe

Creating a virtual platform in an organization is an easy task; some resources and basic technological interventions can easily prepare the groundwork. However, digitalizing organizational goals, relationships, and dynamics is a complex goal. For example, Ford and P&G ran into problems when pushing a digital transformation without proper management and awareness of the intertwined relationships between technology, people, and business nuances [28]. Therefore, if we want to obtain real benefits from the VCoP, we need a community that stands the test of time, nourishes its members and the broader context, and is not only effective but also leads to the wellbeing of different stakeholders. In sum, creating a sustainable VCoP requires more effort because there is little consensus about the best way to design and implement VCoPs in different fields [4].

The sustainability of VCs has been operationalized using different criteria, for example, through objective and subjective indicators such as the number of interactions or knowledge sharing. In this study, given the need for active members who participate in the VCoP frequently and effectively, sustainability is measured through intention to continue participating or participation intention. The term intention refers to the predisposition to perform a particular behavior [29]. This behavioral orientation estimates the probability that a given VCoP member will continue to interact with the community. TAM already highlights usage intention as a key predictor of actual use, and the current literature has continued to support the possibility of studying intention as a determinant of technology adoption and community participation [30,31]. Participation intention has been previously used as an indicator of the maintenance and success of VCs [32,33]. This follows along the lines of the growing literature that highlights that organizational—or, in this case, community—sustainability is related to members' long-term orientation and participation,

which are closely linked to their wellbeing in the group, their engagement and involvement, and their compliance beyond formal standards [34,35].

Particularly, VCoPs depend on the voluntary contributions of their members in order to be useful and thrive, given that members create content, resolve other members' doubts, and indicate which topics should be addressed by the community [9,27,36]. Consequently, each individual decides whether or not to continue to be a member of the community and participate through his/her personal contributions. In summary, it is essential to study the factors that predict participation intention due to its critical role in VCoPs' sustainability. In this vein, the TAM is an information systems theory that helps us to understand and evaluate behavioral intention to participate in a virtual community and propose the nomological network of the factors under study [19]. As Luo and colleagues (2019) stated, when "studying continuance intention, it is inevitable to consider the Technology Acceptance Model" [37] (p. 120). Therefore, this theory can help to develop effective and sustainable online communities. TAM includes a set of core factors (technological characteristics and perceived value for the user) and peripheral factors related to personal characteristics and motivations that vary as the model evolves [38]. Among the different conceptualizations of the model, relational factors such as subjective norms or social influence are also considered, for example, in TAM Model 3 [19,25]. This recent approach describes potential determinants of the behavioral intention to contribute [31]. Based on TAM [19,26], we posit that participation intention is a complex function of personal characteristics, motivations, and social influences, as well as system characteristics.

These broad factors need to be specified as variables. However, several particular variables have been related to participation intention in VCs. Various studies within the literature have also explored this in different communities, such as virtual learning communities, communities of interest, or virtual brand communities, among others [2,39,40]. In this vein, initial research on participation in VCs highlighted technological resources and "online friendship" as the main variables [41,42]. Later, individual determinants and social identities were analyzed, also mentioning the relevance of technological and motivational factors such as system quality and trust [41]. Previous research also considered information quality and accuracy [43]. Similarly, Zhang and colleagues (2017) found that the quality of the information and interactions affected the usefulness, which, in turn, determined users' participation intention [44]. In communities of interest, system quality factors and personal factors such as perceived individual benefits are components that increase participants' intention to continue [33].

The prior literature presented here tends to coalesce into sets of factors that could positively affect participation intention in VCoPs. The design of a technology system—technical or technological factors—may be a necessary condition for usability and ease-of-use and, thus, the development of the community based on participation. Once technological factors are met, psychological factors—both personal and motivational factors—are related to VCs' flourishing and success. Although previous studies have highlighted the importance of contextual factors [27], and TAM reformulations have suggested them [19], in this study, their influence is considered to be indirect and diffuse because there is no full shared context (a depiction of the broad conceptual rationale explained can be seen in Figure 1).

Therefore, we attend to technological, motivational, and personal factors as the core elements to analyze for understanding participation. They are relevant factors to take into consideration in increasing the continuance intention of the members. However, previous research has addressed specific isolated factors (e.g., [33,45]), and there have been a variety of factors studied and methods used, but the possible symbiotic effect that may exist has not been analyzed [2,27]. Thus, there is still a research gap in the area of the joint effect of different sets of factors and, more importantly, their relative relevance in fostering participation intention in a VC in a professional context, a VCoP.

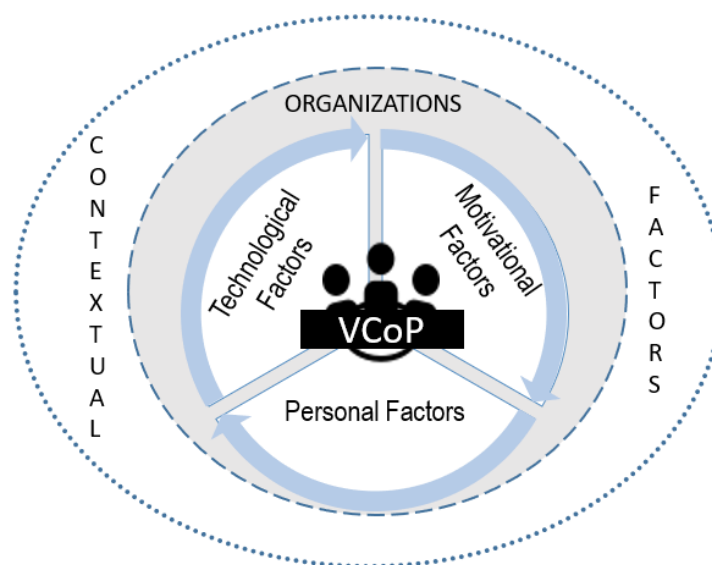


Figure 1. Conceptual rationale.

1.2. Technological Factors

Several studies have investigated how technology—the quality of the system—influences different results, such as perceived individual benefits, satisfaction, and participation intention in VCs [33,46], due to the infrastructural role played by technology in community development [4]. Based on TAM, the perceived ease-of-use of the VCoP (i.e., ability to effortlessly navigate, use the platform tools, and interact with other members) will lead to an increased willingness to take part in the community. Supporting this, Zheng and colleagues (2013) argued that technological factors are directly related to participation intention in VCs [33]. As Jones, Ravid, and Rafaeli (2004) mentioned, system quality factors such as navigation are important for facilitating users' search process and reducing processing costs [47]. Recent case studies in educational settings also highlight the challenges that technological factors can produce in online settings [48,49]. In sum, an effective technical infrastructure promotes user participation and is a key element of the information exchange process in VCs [50].

Considering the context of this study, it is important to note that VCoPs are, overall, virtual spaces for working collaboratively. In them, information is shared and learned from others, and there is a need for reciprocity and debate. To do so, a prerequisite is that the technology has to work properly and fluently, providing resources for interaction and communication (e.g., direct inboxes, chatrooms, document sharing tools). These technological resources affect the way users evaluate their interactions with the information technology of the system [51]. In the end, a positive perception of the technological factors will facilitate members' usage and maintain their continuance intention in VCoPs [46]. Throughout this study, technological factors are composed of navigation and interactivity.

Navigation is defined as the extent to which a user easily goes back and forth within the VC [33]. It implies that understanding the common functions and general characteristics of a technological tool is easy (user interface and experience). Proper navigation makes it possible to find information easily and take advantage of other resources, facilitating the willingness to continue to participate in the community [52].

Interactivity is understood as the ability of the technology to facilitate the establishment of more personal relationships among members [33]. In VCoPs, members are expected to exchange knowledge and engage in shared conversation. Therefore, interactivity is relevant because it is the element that manages the storage, control, processing, and transmission of information among users. Moreover, interactivity involves the interpersonal communication process by providing members with tools for online dialogue with each other [33,53]. In sum, interactivity is a key factor that promotes easy, enjoyable, and appreciated participation and satisfaction among users [33,52].

Therefore, based on previous results and the relevance of technological factors in promoting and encouraging VC members' participation, we expect that the perception of technological factors (navigation and interactivity) will play a relevant role in VCoP members' intention to continue.

To this end, we posit:

Hypothesis 1. *The set of technological factors (navigation and interactivity) will have a positive relationship with the intention to continue.*

1.3. Personal Factors

People's intention to participate in VCoPs also involves different soft individual variables, usually called personal factors [27]. We focus on self-efficacy and individual benefits as personal factors. Personal factors have been suggested as an important avenue for future research on online knowledge sharing [30], and, particularly, technology self-efficacy and potential individual benefits (i.e., usefulness) are key components of the TAM model that can influence community participation [19].

First, self-efficacy is defined as the perceived probability of reaching a goal. It is a self-evaluation based on the perception of one's own skills in order to share knowledge and, consequently, cooperate and achieve greater goals [54,55]. Prior research has mainly analyzed self-efficacy in face-to-face environments [56], and it has also been considered a key factor in online communities [57,58]. Thus, participants who perceive themselves to have a high probability of accomplishing their goals will cooperate more in VCoPs. Similarly, these participants will feel that their competences match the demands of the task and perceive themselves as having the skills to carry out community tasks. Therefore, they are also more likely to actively engage in community activities to achieve their goals [2]. Van Acker and colleagues (2014) also reported that self-efficacy is positively related to the intention to share in electronic systems [54]. In sum, users with high self-efficacy seem to be more motivated towards the community and more likely to collaborate [55,59].

In addition, participation in VCoPs is driven by a set of benefits or advantages that individuals obtain, e.g., learning, showing off, feeling part of something, or developing specific competences. There are different types of benefits, however; individual benefits play a key role in continuance intentions in VCs [29]. Perceived individual benefits are defined as the extent to which a member perceives personal gains for participating in a VC based on his/her experiences [10,33]. In other words, a member who obtains something s/he needs is more likely to continue to participate [33]. Prior studies within the literature have identified the importance of outcome expectations and benefits from the community as key drivers of participation [27]. In this context, participants' intention to contribute increases if their needs are met and there are opportunities and resources in the community [2]. Likewise, considering the information system post-adoption research (e.g., [60]), personal factors—such as perceived individual benefits and self-efficacy—will profoundly determine continuance intention. Lin and colleagues (2009) [46] reported that self-efficacy and perceived individual benefits are positively linked to knowledge-sharing behavior, and that the latter is linked to community loyalty, which could increase participation intention in a VC. Considering the aforementioned rationale and research, we expect that personal factors (self-efficacy and perceived individual benefits) may be components related to the intention to continue in VCoPs.

Therefore, we hypothesize that:

Hypothesis 2. *The set of personal factors (self-efficacy and perceived individual benefits) will have a positive relationship with the intention to continue.*

1.4. Motivational Factors

Technological and personal factors are important in predicting the continuance intention in a VC, but motivational factors are also involved in this process [33]. Motivational factors in this study are reciprocity and identification. Based on the Social Exchange Theory [61] and TAM Model 2 and Model 3 [19,62], reciprocity and social influence (identification) will have a direct impact on participants' eagerness to become involved in the VCoP.

Reciprocity, closely linked to the expected benefits and returns, is defined as peoples' main beliefs that current participation (for example, in knowledge sharing or social interaction) in a VC leads to the future participation of other members [63]. Reciprocity is, therefore, understood as a social norm that involves members' helping process, with the knowledge exchange being mutual, perceived, and fair, based on the mutual exchange among team members [61]. The existence of reciprocity, in turn, will foster interest in the VCoP and its members [64]. Empirical results have linked reciprocity to participation in different forms. For example, Wasko and Faraj (2000) found that members who shared knowledge in VCs believed in reciprocity [65]. Zheng et al. (2013) [33] proposed that motivational factors such as reciprocity might be involved in the intention to continue to participate. Norms of reciprocity have also been related to information-sharing behavior [66] and the development of VCs [67].

Another key motivational factor in fostering the intention to continue is identification with the community [57,68]. Identification is defined as individual recognition and feelings of belonging to a particular VC. Social identification, understood as considering oneself as part of the virtual community, is a core variable in virtual communities [69] that helps to cultivate participants' engagement and behavioral intentions [68]. In this regard, multiple prior studies also found that identification is positively related to knowledge sharing [70,71]. Additionally, prior research reported that identification has a positive effect on the quality and quantity of the knowledge contributed and permanence in VCs [29,71]. Thus, previous studies within the literature have shown the importance of fulfilling this social need as a means of nurturing members' participation [57]. We argue that reciprocity and identification are motivational factors that will affect the intention to continue in VCoPs.

Therefore, we expect that:

Hypothesis 3. *The set of motivational factors (reciprocity and identification) will have a positive relationship with the intention to continue.*

Finally, throughout the Introduction, we have built on theory and research to propose the relationship between these three sets of factors (technological, personal, and motivational) and participation intention in VCoPs. In other words, as Lin and Lee (2006) proposed, technology is the structure that provides information and a basis for social exchange in a virtual environment, but technological factors cannot work on their own and do not ensure the success of VCs [72]. They also pointed out that other kinds of factors, such as reciprocal and individual benefits, knowledge self-efficacy, and enjoyment in helping others, are related to knowledge-sharing behavior. Therefore, it is necessary to understand members' interests, motivations, and preferences in order to boost the use of a virtual system [73] and promote contents within the VCoP that facilitate users' participation [74].

Moreover, based on the literature, it is clear that each set of factors influences participation intention in its own way, and all three sets of factors should be important in fostering participation in VCoPs in the long term. Despite this, as mentioned above, a myriad of studies have analyzed individual specific factors, but as far as we know, no study has empirically investigated which dimension is the most important, which set of factors best predict intention to continue, or any synergistic effects that may occur. Consequently, exploratory research is required to examine this potential difference among factors or

groups of factors because this field of inquiry is in the early stages [75]. Therefore, we propose an exploratory research question:

ERQ1. Is there a weight difference in the types of factors that predict intention to continue in VCoPs?

The resulting research model is presented in Figure 2, which summarizes the relationship paths we seek to test.

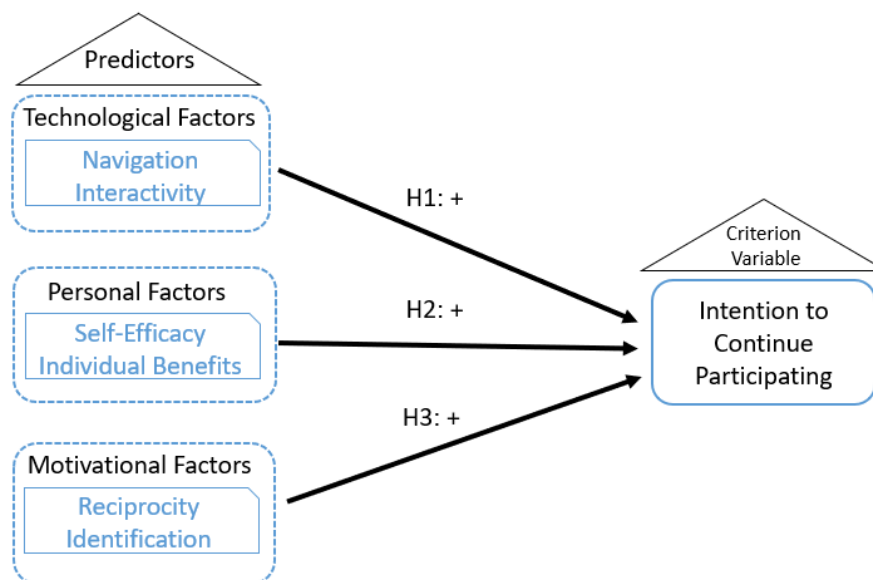


Figure 2. Research model.

2. Materials and Methods

2.1. Sample and Procedure

Data were collected from 114 healthcare professionals from a Spanish NGO confederacy. This confederacy is a network of organizations that ensures compliance with the rights of people with intellectual and developmental disabilities in Spain. Their work focuses on improving the quality of life and social inclusion of their patients. To do so, they participate in an internal VCoP that gathers workers from different specific NGOs throughout Spain. Their participation was voluntary and linked to a research project that aimed to explore the impact of VC use on NGO workers.

Participants in the VCoP could create folders for document storage and sharing and manage a calendar, publish news, and initiate discussion threads. Furthermore, the platform enabled them to build a comprehensive profile, including a picture and personal and professional information. They were invited to participate and completed a confidential online survey posted on the online platform for two weeks. Fourteen responses were eliminated from the final analyses due to incorrect or incomplete answers.

Table 1 presents the demographic profile of the final respondents as well as the reasons for participating in the VC. As the table shows, the participants are mainly women (71.9%), young and middle aged (46.3% range from 21 to 40 years old), and have medium and mainly higher education (74.6% had at least a bachelor's degree). The reasons for their participation are varied and represent the many possibilities VCoPs can offer.

Table 1. Demographic profile (total respondents = 114).

Measures	Items	Frequency	Percentage
Gender	Male	32	28.1
	Female	82	71.9
Age	21–30 years	7	6.1
	31–40 years	47	41.2
	41/50	39	34.2
	more than 50 years	21	18.4
Education level	High school	2	1.8
	Vocational training	27	23.7
	Bachelor	84	73.7
	PhD	1	0.9
Reason for participating in the VC	Upload required documents	24	21.1
	Interact with other users	21	18.4
	Create relationships with other users	7	6.1
	Look for solutions for workplace issues	34	29.8
	Missing	28	24.6

2.2. Measures

Technological factors. The set of technological factors is composed of two variables, navigation and interactivity. Five of the survey items measured navigation. An example is “XXX provides tools for me to easily locate information (e.g., table of contents, use of categories, and index)”. Interactivity was evaluated with three items (e.g., “XXX allows me to interact with other users through various methods (e.g., discussion board, email, blog)”) developed by Zheng et al. (2013) [33]. Both measures used a 6-point Likert-scale ranging from one (“Strongly disagree”) to six (“Strongly agree”). Cronbach’s alphas were 0.94 for navigation and 0.88 for interactivity.

Personal factors in VCs. The set of personal factors is composed of two variables, perceived individual benefit and self-efficacy. Perceived individual benefit was measured using three items from a scale of perceived relative advantage. A sample item is “Sharing knowledge with members in this virtual community will increase my problem-solving capability”. Self-efficacy was measured with three items. A sample item is “I have confidence in my ability to provide knowledge that other members in this virtual community consider valuable”. Both measures derive from Lin et al. (2009) and present a 6-point Likert-scale ranging from one (“Strongly disagree”) to six (“Strongly agree”) [46]. Cronbach’s alphas were 0.93 for self-efficacy and 0.92 for individual benefits.

Motivational factors in VCs. The set of motivational factors is composed of two variables, reciprocity and identification. Reciprocity was measured using three items from Lin et al. (2009) [46]. The items were measured on a 6-point Likert-scale ranging from one (“Strongly disagree”) to six (“Strongly agree”). An example of these items is “I know that other members will help me, and so it’s obligatory and fair to help other members in this virtual community”. Identification was evaluated with three items by Chang and Chuang (2011) [70]. A sample item is “I have a feeling of togetherness or closeness in this virtual community”. Both scales were measured on a 6-point Likert-scale ranging from one (“Strongly disagree”) to six (“Strongly agree”). Reciprocity had a Cronbach’s alpha of 0.84, whereas Cronbach’s alpha for identification was 0.92.

Intention to continue. Intention to continue participating was measured using six items from the Zhao et al. (2013) scale [29]. An example of these items is “I intend to continue browsing information in XXX”. The items were measured on a 6-point Likert-scale ranging from one (“Strongly disagree”) to six (“Strongly agree”). Cronbach’s alpha was 0.94.

2.3. Analyses

In order to test Hypothesis 1 (navigation and interactivity will have a positive relationship with the intention to continue), Hypothesis 2 (self-efficacy and perceived individual benefits) will have a positive relationship with the intention to continue), and Hypothesis 3 (reciprocity and identification will have a positive relationship with the intention to continue), a multiple linear regression analysis was conducted. Moreover, to answer our exploratory research question (is there a weight difference in the types of factors that predict intention to continue in VCoPs?), we conducted a stepwise regression analysis to evaluate which set of predictor variables was more relevant in the intention to continue.

Analyses were conducted with SPSS statistics. First, we ran a preliminary analysis to check the validity of our scales. Then, we checked descriptive statistics and correlations. In addition, we also checked for assumptions of regression normality, linearity, multicollinearity, and homoscedasticity.

To examine the study hypotheses and exploratory research question, four models were proposed. First, three individual multiple linear regression analyses were performed for each group of factors; because of their different natures, there was one for technological factors, one for personal factors, and one for motivational factors. After these three individual models, a joint model of the six variables was carried out through stepwise regression analysis with forward selection in order to find out which variables had greater predictive values in the intention to continue.

3. Results

Table 2 presents descriptive statistics with the means and SDs, along with correlations between the studied variables. As Table 2 shows, the correlations among navigation, interactivity, self-efficacy, individual benefits, reciprocity, identification, and intention to continue were positive and statistically significant, except for the correlation between reciprocity and interactivity. Cronbach's alpha coefficients were also above the 0.7 threshold.

Table 2. Descriptive statistics and Pearson's correlations.

	M	SD	1	2	3	4	5	6	7
1. Navigation	3.82	1.01	[0.91]						
2. Interactivity	4.16	1.03	0.65 **	[0.88]					
3. Self-efficacy	4.54	0.92	0.38 **	0.21 *	[0.93]				
4. Individual benefits	4.73	0.84	0.31 **	0.33 **	0.3 **	[0.92]			
5. Reciprocity	4.81	0.86	0.31 **	0.13	0.38 **	0.42 **	[0.84]		
6. Identification	4.32	1.16	0.36 **	0.3 **	0.43 **	0.45 **	0.55 **	[0.92]	
7. Intention to continue	4.97	0.9	0.30 **	0.35 **	0.38 **	0.35 **	0.37 **	0.41 **	[0.94]

* $p < 0.05$, ** $p < 0.01$. Cronbach's alpha coefficients for each measure appear between brackets.

The results of the multiple regression analysis are summarized in Table 3. Technological factors accounted for 13 percent of the variance explained by the model ($R^2 = 0.13$, $F_{2,111} = 8.55$, $p < 0.001$). The results for personal factors revealed that 20 percent of the variance was explained by the model ($R^2 = 0.20$, $F_{2,111} = 14.14$, $p < 0.001$). The motivational factor results showed that 20 percent of the variance was explained by the model ($R^2 = 0.20$, $F_{2,111} = 14.03$, $p < 0.001$).

Regarding Hypothesis 1, the regression analyses showed that navigation was not significant ($\beta = 0.13$, $p = 0.27$), but interactivity had a significant effect on the intention to continue ($\beta = 0.27$, $p = 0.02$). Thus, there was a positive relationship between technological factors and the criterion variable. Based on these results, H1 was partially supported.

The results for Hypothesis 2 show that both variables—self-efficacy ($\beta = 0.30$, $p < 0.001$) and individual benefits ($\beta = 0.26$, $p = 0.004$)—were significantly related to the intention to continue.

Table 3. Multiple linear regressions per set of factors predicting intention to continue.

	B	SE	β	R^2	F
Technological factors model				0.13	8.55 ***
Navigation	0.12	0.10	0.13		
Interactivity	0.23	0.10	0.27 *		
Personal factors model				0.20	14.14 ***
Self-efficacy	0.29	0.09	0.30 ***		
Individual benefit	0.28	0.10	0.26 **		
Motivational factors model				0.20	14.03 ***
Reciprocity	0.22	0.11	0.21 *		
Identification	0.23	0.08	0.30 **		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

We also found support for Hypothesis 3. Both reciprocity ($\beta = 0.21$, $p = 0.043$) and identification ($\beta = 0.30$, $p = 0.004$) were significantly related to the intention to continue.

Moreover, to test the exploratory research question, we carried out a stepwise regression analysis. The results (Table 4) show that, of the six predictor variables, only three variables were left in the final regression model (identification, interactivity, and self-efficacy). As the table shows, Model 3 yields identification, interactivity, and self-efficacy, which explain 27 percent of the variance. In addition, according to these results, the adjusted R^2 is higher in Model 3 than in Models 2 and 1.

Table 4. Collective effect and stepwise regression analysis predicting intention to continue (3 models).

		B	SE	β	R^2	ΔR^2	F
Model 1.					0.17 ***	0.17	23.20 ***
	Identification	0.32	0.07	0.41 ***			
Model 2.					0.23 **	0.06	16.52 ***
	Identification	0.26	0.07	0.34 ***			
	Interactivity	0.22	0.08	0.25 **			
Model 3.					0.27 *	0.04	13.44 ***
	Identification	0.20	0.07	0.25 **			
	Interactivity	0.20	0.08	0.23 **			
	Self-efficacy	0.21	0.09	0.22 *			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

To sum up, the best model to explain the intention to continue includes three variables that belong to the three groups of factors, identification ($\beta = 0.25$) from motivational factors, interactivity ($\beta = 0.23$) from technological factors, and self-efficacy ($\beta = 0.22$) from personal factors.

4. Discussion

The aim of the present article was to contribute to discovering the role of different factors that influence the sustainability of VCoPs. Using the Technology Acceptance Model as the theoretical basis for our research, we examined general factors and specific variables that shape participation intention in VCoPs.

Several findings and significant contributions are derived from this research. First, regarding the technology that acts as a platform for the VCoP, the results revealed that technological factors have a positive effect on the intention to continue in a VC. When a user perceives that there is easy information identification and sharing among members, s/he will be more likely to continue to contribute to the VC. Our technological factor results

support Markus' (2005) findings [50]. The technical infrastructure, in the specific area of interactivity and technological mechanisms, promotes members' participation. This finding is of primary relevance because technology directly shapes users' experience, and ease-of-use based on proper platform interaction may have a great influence on continued participation. Reliable and user-friendly infrastructure facilitates seamless interaction and access to community resources and knowledge, thus encouraging active and meaningful participation.

However, only interactivity had a significant effect on the intention to continue. Interactivity plays a central role because it makes users' participation and the exchange among members easy and enjoyable [53]. In contrast, it is possible that proper navigation is considered a minimum standard nowadays and does not directly influence participation intention. These results do not agree with Zheng et al. (2013), whose results highlight navigation as the main variable in VC sustainability [33]. Despite this, these differences could be due to the type of VC analyzed. Whereas our study examined a VCoP, with workers evaluating their own community, their study was conducted in a community of interest, namely a travel forum [36]. Considering the sample characteristics, it is possible that workers prioritize interaction with their colleagues in order to reach the organization's goals, whereas users of a community of interest consider usability to be an important predictor, given that they will feel less attached to the VC. Our results confirm Tseng's (2015) findings, which showed that the interactivity function was related to the intention to continue participating in a virtual system [52]. In sum, the design of the technology and its functions are important factors in users' continuance intention, especially the possibility of properly interacting with other members. These results align with recent studies within the literature highlighting the importance of technical factors in community development [6,27].

Moreover, the hypothesized positive effect of personal factors—self-efficacy and individual benefits—on continuance intention in VCoPs is supported. This finding is in line with most of the empirical studies developed in this area (e.g., [31,33,57]). Feeling able to use the technology successfully to achieve goals and obtain individual rewards leads to overall personal improvement from participating in the VCoP, thus encouraging members' continued participation in the community and potentially increasing their wellbeing due to personal fulfilment, both from perceived competence and objective gains.

In addition, the study also confirms that motivational factors are important in predicting participation intention in VCoPs. The results of this study suggest that a mutual, perceived, and fair exchange and identification among members will favor continued participation in the VC. As proposed by TAM, identification and reciprocity—through social influence—are key influence mechanisms in the adoption of an information system [19]. This finding is consistent with Chan and Li's (2010) argument that the reciprocity factor contributes to the development of VCs [67], and with Zhao and colleagues (2013)'s argument that identification greatly fosters the continuance intention in VC members [21]. Self-efficacy and social identification with the group are crucial for members of VCoPs because the positive relationship established, the collective identity, and the sense of achievement group members experience can make participation an enjoyable activity that motivates them rather than a duty.

Addressing a variety of perspectives regarding the predictive elements of participation in VCs [76], this article also tries to disentangle which set of factors better predict the intention to continue in VCoPs. Our exploratory analysis of the weight of each factor revealed that the model that best predicts the intention to continue is composed of identification, interactivity, and self-efficacy. Prior research has examined individual factors or bundles of factors with the same characteristics [33], but our results suggest that in order to foster continued participation in VCoPs, a synergistic combination of factors of different natures is necessary.

In sum, users of online virtual communities need to be able to connect, collaborate, and socialize properly, namely by means of proper interactivity. They need to perceive competence in their use of the community in a way that allows them to accomplish goals,

namely self-efficacy. Finally, they need to create something beyond their work ties, and they need to truly become and feel part of the community, that is, build social identification. Our findings highlight the importance of personal identity and social links in the virtual community as drivers of community success.

4.1. Theoretical Contributions

This study contributes to the literature by integrating past studies [21,33] focused on only one group of factors that influence the intention to continue to participate in VCs. We also address the call to integrate and further develop the predicting factors of participation in VCoPs [6,27]. Hence, this study goes further by empirically exploring different groups of factors in the same study and sample. The studied relationships provide a more fine-grained view of the TAM Model 3 theoretical framework [19]. TAM has been considered a very useful model from an organizational and community development point of view because it addresses the components that may drive actual members' use of a technology from a broad perspective. Despite this, the existing literature has hardly applied this theory in the context of organizational virtual communities, and the results have sometimes been contradictory [20]. Our results support the broad formulation of TAM [19,77], providing more evidence about the relevance of perceived ease-of-use (interactivity in the online community), self-efficacy, and usefulness of the community.

Moreover, we focus on a VCoP, a VC used in the job context to enhance communication and knowledge transfer among professionals in a company or profession [4]. This study context (participation in VCoPs) has been largely neglected compared to other contexts such as communities of interest, virtual brand communities, or social networking sites (e.g., [2,78]). Our findings show which factors are essential in a model that predicts participation intention in VCoPs, highlighting that there are differences, and that not only one element, but rather a combination of them, will truly help to develop VCoPs.

Despite this, the results also highlight identification—a motivational factor—as the most relevant element in fostering participation in VCoPs. In summary, this article theoretically contributes to the overall understanding of users' intention to continue in VCoPs. We propose a model based on interactivity, self-efficacy, and identification as the three main factors that could influence participation, although individual benefits and reciprocity also show significant results and, thus, should be considered.

4.2. Practical Implications

This study offers practical implications for VC design, maintenance, and management in several different areas such as educational settings, business development, or governmental participative activities. First, community moderators and company managers who try to build up a VC need to attend to the software's functions and characteristics, especially by providing tools for information exchange among members, i.e., "friends" lists, private in-boxes, etc., in order to foster users' interaction. These technological features will offer the basis for further psychosocial development. This finding is of primary relevance in public entities that experienced struggles related to technology when suddenly faced with digitalization during the COVID-19 pandemic, for example, in the Italian education system [48,79]. Similarly, the case study conducted by Kamal et al. (2020) emphasized that, in virtual work settings, inadequate technological infrastructure poses a risk to outcomes, whereas factors such as interactivity and self-efficacy can mitigate the adverse effects of technical challenges [49].

Based on our findings, once the technology has been established and accepted by the user, the emphasis should be on personal and motivational factors. In this regard, organizational and industrial psychologists in companies will play an important role in working to maintain participation intention in VCs. Psychologists need to work as community coordinators so that, first, important goals are addressed and members feel confident about participating, and second, the community extends beyond the formal structure of the company. In other words, it is important for people who first attend the

community to perceive high self-efficacy and identify with the community in order to ensure the sustainability of the VCoP. Community managers should, therefore, periodically check that interactions flow adequately and in a positive way, and that people can accomplish their personal goals without huge investments in terms of time or effort.

The outcomes of our research are essential in the post-pandemic context with the prevalence of virtual teamwork and new forms of work, such as platform work [15,80]. For example, collaborative platform work and the gig economy in general are highly dependent on virtual communities and online settings that may hamper psychosocial processes that spontaneously occur in face-to-face job contexts. Therefore, sustainable and effective VCoPs and other collaborative environments can be an organizational tool for emulating classical office environments, helping organizations in the long term. Consequently, the aim of these suggestions is to make it possible to design an intranet with specific characteristics that can guarantee the sustainability of the VCoP in the long term. Moreover, by fostering VCoPs, we aim to improve the return on investment of companies that innovate by implementing VCs. Companies that create a VCoP that functions well will obtain greater learning and professional development among their workers that will positively affect their day-to-day jobs. They will increase their wellbeing and engagement, not only with the community, but also with the organization and the broader context. At the same time, companies will reduce costs—e.g., coordination meetings, traveling costs—and obtain the benefit of knowledge value created by workers from different locations with different cultures and backgrounds. Workers from different regions and time zones will maintain their participation in the community and share, work, learn, socialize, and discuss different relevant topics for their jobs, ultimately benefiting the organization and the community's sustainability through this spillover effect.

4.3. Limitations and Future Research

As in any empirical research, this study has some limitations that should be noted. The sample size was adequate because it was representative and close in number to the population (i.e., the total users of the VCoP). Despite this, the results are only generalizable to this particular type of VC, and future studies need to address whether the factors studied are able to predict participation in other types of VCs, comparing communities such as learning communities or virtual brand communities [2,36]. In addition, our sample was composed of members who work in non-profit organizations. Therefore, replicating this study in traditional business companies will offer a better idea about how users' intention to continue operates in VCoPs.

We considered intention to continue participating as our dependent variable, which is a well-established approach in the IS adoption literature (e.g., [60]). However, as we mentioned in the Introduction, other variables have also been studied as proxies for sustainability [34,35]. In relation to this, we present a correlational design, asking about users' intentions, and we do not evaluate the relational components that may be affecting their intentions, such as the role of team managers or the subsequent social links that may arise [6,27]. Future longitudinal studies could replicate this research, add interpersonal factors as predictors, and track users' behaviors over time, thus measuring maintained participation in a VC. This may also help to consider contextual factors whose influence on the studied variables is complex, given that the organizational context of each participant was different. Future studies should analyze a VCoP operating in a single organization, which will make it possible to study variables such as the organizational culture and leadership structure.

Lastly, future research could explore the studied factors to find out how VCoP users interpret identification, interactivity, and self-efficacy in terms of behaviors. Therefore, we suggest carrying out qualitative studies in order to better understand and explore the factors that contribute to VCs' sustainability.

5. Conclusions

There is a growing need to properly understand the sustainability of VCoPs. VCoPs have become a key tool in organizations, and their use is increasing around the world [4,27], but their utility and spread does not go hand-in-hand with their sustainability, in some cases backfiring in the companies that promote them. Further research needs to continue to disentangle the elements that can best assist in the process of maintaining and developing VCs in organizations and in for-profit companies, considering other sustainability variables. All in all, this study provides a broad view of the main factors that can influence members' participation intention as an indicator of the sustainability of the community. Based on the TAM theory, we addressed the technological, personal, and motivational factors that have been individually considered, and we integrated them in a multifaceted model fueled mainly by identification, interactivity, and self-efficacy.

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