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Article

Social Commerce and Customer-To-Customer Value Co-Creation Impact Sustainable Customer Relationships

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Abstract: The advent of social commerce (SC) has transformed the landscape of online consumer behavior, emphasizing the significance of customer-to-customer relations in shaping sustainable relationships with customers. This research investigated the intricate relationships between social commerce dimensions, particularly suggestions and recommendations, forums and communities, and ratings and reviews, and their influence on customer-to-customer value co-creation (C2CVCC) and sustainable customer relationships (SCRs). A questionnaire was designed and administered to 635 respondents. We examined the psychometric properties of the measurements and subsequently applied Partial Least Squares as a Structural Equation Modeling method (PLS-SEM) for hypothesis testing. The findings reveal that the dimensions of SC significantly impact C2CVCC, with ratings and reviews playing a pivotal role. Furthermore, C2CVCC emerges as a substantial mediator in the path between SC and SCRs. The empirical analysis showcases strong support for the proposed model, with robust path coefficients (β) and p-values confirming direct and indirect effects. These findings offer valuable insights for businesses seeking to leverage SC and customer interactions to enhance SCRs in the digital era. Understanding the dynamics of C2CVCC within the context of SC has become essential for marketers and businesses aiming to thrive in today's competitive online marketplace.

Keywords: social commerce; ratings and reviews; customer-to-customer; value co-creation; forums and communities; sustainable customer relationship; suggestions and recommendations

1. Introduction

The rise of e-commerce has brought about profound transformations in both business operations and consumer shopping habits [1]. The continuous growth and evolution of the e-commerce sector have significantly influenced shifts in consumer behavior [2]. These changes in consumer shopping patterns, particularly those facilitated through various e-commerce methods using social media platforms, are collectively referred to as "social commerce" [3]. Social media platforms like Facebook, Twitter, Instagram, and others have harnessed the power of social networking to give rise to SC, not only reshaping the traditional business-to-consumer (B2C) transactional model but also fostering interactions among consumers themselves, commonly referred to as consumer-to-consumer (C2C) transactions [4]. In this digital era, consumers have evolved from mere buyers into active contributors to value creation [5]. They engage in collaborative processes that extend beyond conventional purchasing, involving the co-creation of products, services, and overall experiences. The advent of SC, which seamlessly integrates social media with e-commerce, has taken this transformation to new heights [6]. SC empowers consumers to engage with one another, share their experiences, and exert influence over purchasing decisions. This dynamic fusion of technology and social interaction has given birth to a vibrant ecosystem where C2C interactions hold a central role in shaping the behaviors and choices of consumers in the marketplace [7]. SC differs significantly from traditional electronic

commerce models, where consumers typically interact with online shopping websites individually. In contrast, SC places a strong emphasis on the active participation of online communities, fostering robust interactions among users and the sharing of existing content and information. This collaborative environment is anticipated to strengthen the bonds between sellers and customer communities [8,9]. The concepts of SC are distinct and more straightforward when compared to content marketing activities. Content marketing often involves direct occurrences, such as conferences, where personal interactions with clients occur, or digital events like webinars and digital content generated by companies on their websites [10]. Furthermore, the evolution of digital marketing methods has brought about a closer connection between SCRs and engagement with social media platforms [4].

Within this context, understanding the intricate relationships between SC, C2CVCC, and SCRs has become increasingly vital. SCRs are a key metric in assessing customer behavior and predicting future buying practices [6]. An SCR signifies a customer's inclination to revisit and make repeated purchases from a specific brand or platform. Unraveling the factors that underlie SCRs is essential for businesses aiming to foster enduring customer relationships and achieve sustainable growth [11]. In this dynamic digital landscape, where consumers are not passive recipients but active contributors to value creation, exploring the dynamics between SC and C2CVCC can offer critical insights into the drivers of SCRs [12]. However, the relationship between SC and its impacts on C2C value co-creation and SCRs is not well understood in the literature. This research aimed to fill this gap by exploring how different dimensions of SC can impact C2C value co-creation and affect SCRs. By examining how consumers engage with one another and with brands within the realm of SC, we sought to illuminate the mechanisms of value co-creation and their profound impacts on customers' intentions and SCRs. Furthermore, this study aimed to provide actionable insights for businesses and marketers seeking to leverage the potential of SC and C2CVCC as strategic tools for enhancing customer loyalty and augmenting brand performance.

In the subsequent sections, we review the literature on SC, C2CVCC, and SCRs, emphasizing the gaps in our understanding of the interplay between these concepts. We also outline our research methodology, including our data collection and analysis procedures, and discuss the potential implications of our findings. Ultimately, this research was carried out to contribute to the expanding body of knowledge in the domain of digital marketing and consumer behavior, offering a comprehensive exploration of how SC and C2CVCC influence consumers' intentions and SCRs in the ever-evolving digital marketplace.

2. The Related Literature

2.1. SC and C2CVCC

SC has gained significant prominence across various social media networks. Customers who embrace Web 2.0 applications for daily purchasing and selling dynamically participate in marketing and commercial activities related to diverse brands, services, and products [4]. The heightened interactivity within these platforms empowers customers to not only engage with businesses but also contribute their own content and share their experiences with a vast community of fellow users [13]. In practice, two primary forms of SC applications exist. The first type consists of interactive websites that incorporate Web 2.0 features, exemplified by platforms such as Noon, eBay, Alibaba, and Amazon. These websites permit users to participate through ratings, rankings, and online reviews. However, in contrast to social media boards, the level of communication among customers on these websites remains relatively limited, as they do not facilitate personal communication among customers or the ability to tag customers [14].

The second category of SC unfolds within the realm of social media platforms, offering customers more extensive chances for personal and social interactions with fellow users. This environment also facilitates the sharing of their content and experiences, enabling active participation in the processes of value co-creation. Curty and Zhang [15] claimed that the true essence of SC emerges through applications integrated into social network sites (SNSs). Furthermore, Stephen and

Toubia [16] conceptualized SC as “forms of Internet-based social media that allow people to actively engage in marketing and selling products within online marketplaces and communities”. Additionally, Hajli [17] proposed a multidimensional framework for SC consisting of three key dimensions: (a) online ratings and reviews, which involve the practice of assessing products or services using a rating scale, often accompanied by written feedback; (b) suggestions and recommendations, which encompass situations where individuals receive information about products or services from trusted sources such as friends, family, or other reliable contacts; and (c) forums and online communities, where online platforms serve as spaces where individuals can engage in discussions about various topics, including products, services, and other subjects, fostering a sense of community and interaction among users.

Equally significantly, the concept of co-creating value suggests that ultimate value emerges at the crossroads of the offering, the customer, and several other value creation collaborators [18]. Within the framework of service-dominant logic (SDL) in marketing, organizations are considered the primary orchestrators and converters of highly specialized skills into services tailored to meet consumer preferences [19]. SDL regards customers as active “co-producers” or “co-creators” of value [20] and as integral components inherently linked to value networks [21]. Theoretically, this concept implies the convergence of two primary resource categories: operant resources (i.e., physical elements such as raw resources or tangible products) and operand materials (i.e., efforts, information, and relational assets like skills, knowledge, cultural nuances, and relationships). These resources are combined by individual consumers and facilitated by firms within the value creation process. Subsequently, Vargo and Lusch [20] expanded upon the foundational premise of SDL, originally encapsulated in the statement “the customer is always a co-creator of value”, to better encapsulate the collaborative nature of value co-creation. The revised proposition asserts that “value is co-created by multiple actors, always including the beneficiary” (p. 8). Within the value constellation, any entity can assume the role of resource integrator. Consumers, as integral participants in the value co-creation process, contribute their experiences and are frequently engaged by companies pursuing proactive competitive positions [22]. Indeed, customer engagements with firms and fellow customers, facilitated by technology such as SNSs, represent operant resources that collaboratively generate value.

In addition to their interactions with firms, customers amalgamate a spectrum of resources, encompassing physical, social, and cultural elements, during their engagements with one another. This proposition aligns with SDL fundamental principle that all economic and social players function as resource-based integrators [20]. This perspective finds resonance in social construction theory, which posits that customers exist in a more 'intersubjective' rather than 'objective' context [23]. They play a pivotal role in shaping and fortifying value, collaboratively participating in common activities with firms [24]. Consequently, customers leverage resources as they engage with one another, which is exemplified by activities such as suggestions and recommendations, online ratings and reviews, and engagement in forums and online communities. They co-create and exchange value throughout the advancement of relationships through these interactions, and they utilize value through consumption. C2CVCC processes are observable not only in face-to-face settings but also on online platforms. Face-to-face C2CVCC encompasses traditional service encounters characterized by the physical existence of other customers, as exemplified in settings like zoos and river and rafting trips [25]. The advent of social media and smartphones has reshaped C2C interactions, transforming them into virtual value systems [26].

SNSs (i.e., Instagram, Twitter, Facebook, and LinkedIn) serve as platforms for value co-creation, where various actors, including individual users and companies, engage with one another and actively participate in the process of value co-creation. Within these dynamic environments, the presence of a solitary user does not inherently contribute value to either the service provider or that particular user. Instead, the generation of value hinges upon the collective presence of other users and the interactions that unfold between them [8]. Across SNSs and mobile applications, customer interactions, such as suggestions and recommendations, online ratings and reviews, and engagement in forums and online communities, constitute the fundamental mechanisms driving value co-

creation. While a firm assumes a central role during the initial stages of designing and marketing a value network, this primary role gradually shifts toward customers as more individuals become active users within the network [27]. Based on the preceding discussion, we can formulate the following hypotheses:

Hypothesis 1 (H1): Suggestions and recommendations (as a dimension of SC) have a significant relationship with C2CVCC.

Hypothesis 2 (H2): Forums and communities (as a dimension of SC) have a significant relationship with C2CVCC.

Hypothesis 3 (H3): Ratings and reviews (as a dimension of SC) have a significant relationship with C2CVCC.

2.2. SC Influences SCRs

Purchase intention denotes the likelihood of consumers making a purchase or endorsing specific services to their friends or family [28]. Conversely, an SCR represents a variable that gauges the extent of a customer's inclination to engage in subsequent commercial interactions with the same online seller [29]. In essence, the objective of SCRs is to cultivate enduring intentions. This involves indicating a consumer's intent to undertake specific actions, such as utilizing a social networking site platform to re-engage with and revisit preferred online vendors in the future [30]. An SCR indicates a consumer's willingness and inclination to make repeat purchases from a particular brand or platform. It is a fundamental indicator of customer loyalty and is crucial for business sustainability. Understanding the dimensions that impact SCRs is essential for businesses seeking to maintain and grow their customer base [31].

Platforms for SC provide an environment where consumers can access user-generated content, such as reviews of products and ratings, which serve as social proof. Positive reviews and endorsements from peers enhance trust in a product or brand and positively affect SCRs [29]. Additionally, consumers actively engage in generating content such as reviews, ratings, and product recommendations. This user-generated content serves as authentic marketing collateral and aids in building trust and credibility. Consumers are more likely to have SCRs when they trust peer-generated content [17]. Moreover, SC platforms enable real-time interactions and discussions among consumers. Engaging with peers in product-related discussions enhances the overall shopping experience. Consumers who feel connected to a community or social network are more likely to return for future purchases [8]. Furthermore, SC platforms often employ recommendation algorithms that personalize product suggestions based on user behavior and preferences. These recommendations increase the likelihood of SCRs by offering consumers products that align with their interests [32]. Based on the previous discussion, we can formulate the following hypotheses:

Hypothesis 4 (H4): Suggestions and recommendations (as a dimension of SC) have a significant relationship with SCRs.

Hypothesis 5 (H5): Forums and communities (as a dimension of SC) have a significant relationship with SCRs.

Hypothesis 6 (H6): Ratings and reviews (as a dimension of SC) have a significant relationship with SCRs.

2.3. C2CVCC and SCRs

One critical aspect of consumer behavior is SCRs, which play a pivotal role in sustaining business success. One key mechanism through which C2C value co-creation influences SCRs is by enhancing the perceived value of products or services. As consumers engage in discussions, share experiences, and provide recommendations within online communities, they build trust in fellow community members and the products being discussed [33]. This trust can lead to increases in SCRs, as consumers are more likely to revisit brands and products they trust. Furthermore, online communities formed around shared interests or brands often result in strong community

identification among members. Consumers who identify strongly with a particular community may exhibit stronger SCRs toward products associated with that community [34]. In the conceptual model formulated by Payne et al. [35], three distinct categories of processes are delineated within the value co-creation context. These include the customer value creation system, supplier value creation system, and encounter system. Within the framework proposed by Payne et al. [35], it is posited that the customer learning process, situated within the realm of customer value creation processes, plays a pivotal role. This process aids customers in acquiring a deeper comprehension of a firm's offerings, ultimately fostering engagement with the products or services provided by the firm. Such heightened engagement, in turn, exerts an influence on both purchases and SCRs. Thus, we can introduce the following hypothesis based on these premises:

Hypothesis 7 (H7): C2CVCC has a significant positive relationship with SCRs.

2.4. *The Mediating Role of C2CVCC*

In the digital age, SC has emerged as a transformative force in the world of online retail, revolutionizing the way consumers shop and interact with brands. Unlike traditional e-commerce, SC seamlessly merges the power of social media with e-commerce platforms, creating a dynamic and interactive space where consumers can do much more than simply browse and purchase products. They can engage in meaningful interactions, share their experiences, seek peer recommendations, and actively participate in discussions related to products and services [5]. One key aspect that has garnered significant attention in this rapidly evolving landscape is the mediating role of C2CVCC. C2CVCC refers to the collaborative and interactive process where consumers actively contribute to the value generated during consumption experiences. This phenomenon is particularly pronounced in SC environments, where consumers become more than just shoppers; they become active participants in shaping their own and others' purchasing decisions. C2C value co-creation fundamentally transforms the shopping journey in SC. Consumers who engage in this co-creative process experience a deeper level of engagement with the products and brands they encounter. They actively participate in discussions, share their opinions, and seek out peer recommendations. This heightened level of involvement enhances the overall shopping experience, making it more informative, engaging, and enjoyable. As a result, engaged consumers are not only more likely to make an initial purchase but are also more inclined to consider SCRs with the same platform or brand [29]. Furthermore, C2C interactions within SC platforms go beyond the transactional aspects of shopping. They create a sense of community and belonging among consumers. This community-building aspect is driven by shared interests, experiences, and mutual trust among participants. Consumers who feel connected to a community or social network within a specific platform are more likely to develop a sense of loyalty and attachment to both the platform itself and the brands present on it. This loyalty is a powerful driver of SCRs. Loyal customers, who have established a sense of trust and attachment to a social commerce platform or brand, are more inclined to have SCRs with products or services. They not only become repeat customers but also advocates who actively promote the platform or brand to their peers, further fueling the cycle of engagement and SCRs. Hence, we can propose the following hypotheses, as illustrated in Figure 1:

Hypothesis 8 (H8): C2CVCC mediates the path from suggestions and recommendations to SCRs.

Hypothesis 9 (H9): C2CVCC mediates the path from forums and communities to SCRs.

Hypothesis 10 (H10): C2CVCC mediates the path from ratings and reviews to SCRs.

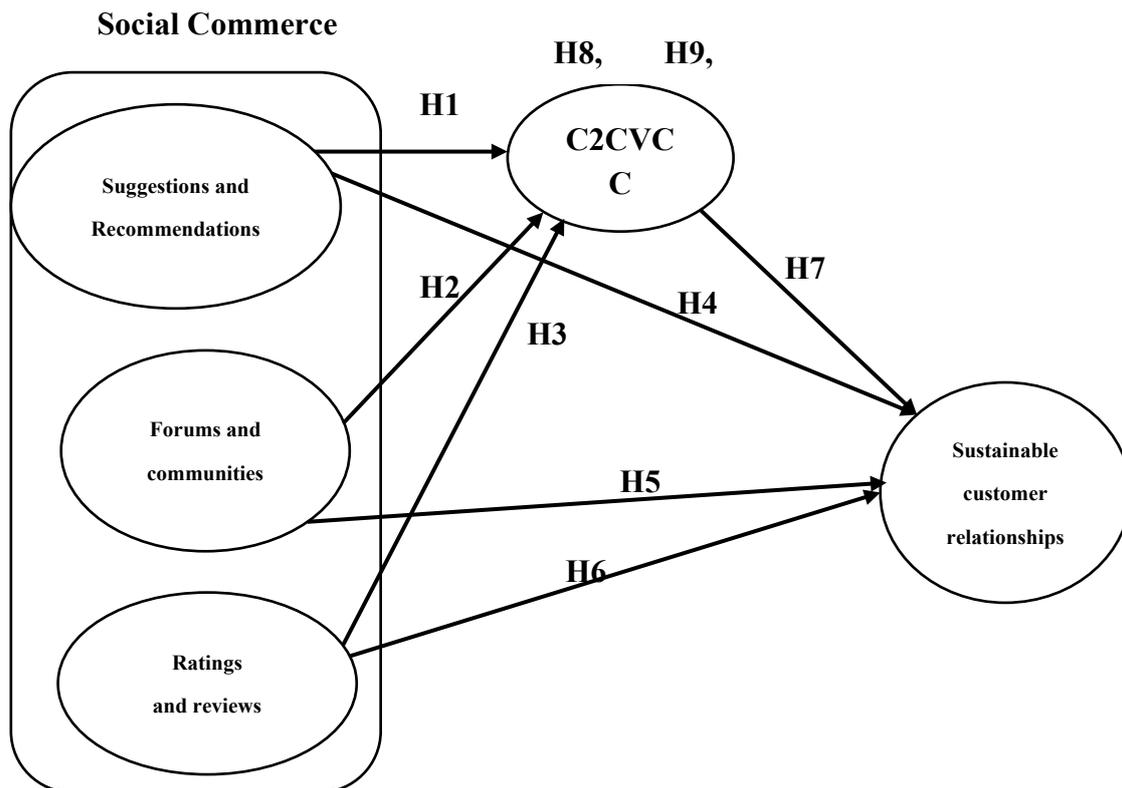


Figure 1. The study framework.

3. Methods

The objective of our research was to examine the impacts of various dimensions of SC (specifically suggestions and recommendations, forums and communities, and ratings and reviews) on sustaining customer relationships. This influence was examined within the context of the mediating role of C2CVCC. To achieve this, a conceptual model was constructed, drawing upon previous empirical research, and the validity of this model was assessed using empirical data obtained through a questionnaire. In pursuit of this research objective, a comprehensive questionnaire was meticulously developed and subjected to validation through a series of statistical techniques, including an assessment of common method bias (CMB) and the application of PLS-SEM. The subsequent sections provide a detailed account of the empirical research process.

3.1. Measurement Development

We developed a questionnaire grounded in the previous literature, drawing upon sources such as Han and Windsor [36]; Elshaer et al. [2]; Chou and Hsu [37]; Zadeh, Zolfagharian, and Hofacker [38]; Zhang, Guo, Hu, and Liu [8]; and Jahn and Kunz [39]. This questionnaire was then refined through collaboration with a panel of experts in this field. The questionnaire comprised 28 questions organized into two primary sections. The initial section was designed to collect socio-demographic data from the study participants, including information such as gender, age, and level of education. The second section encompassed 25 statements aimed at measuring the key study variables, namely, the three dimensions of SC, SCR, and C2CVCC. Each variable was assessed using a five-point Likert scale, spanning from one ("strongly disagree") to five ("strongly agree"). To gauge SCR, we adapted three items from the work of Chou and Hsu [37]. C2CVCC was measured using a 7-item scale that was suggested by Zadeh et al. [38] and was tested and validated by several studies [8,39]. SC was operationalized using three distinct but related dimensions (suggestions and recommendations, forums and communities, and ratings and reviews). Each dimension had 4 reflective variables, as suggested by Han and Windsor [36] and validated by Elshaer et al. [2].

3.2. Study Participants and Data Collection Procedures

Before commencing the data collection process, a statistical power examination was conducted to determine the sample size necessary to effectively measure the effect. This power analysis was conducted employing the G*power analysis program with settings recommended in [40]. As outlined in Table 1 below, for a PLS-SEM featuring seven paths pointing to endogenous latent constructs, at least 204 responses are required to predict a low R² (R²=0.10) at a level of significance equal to 5% while maintaining a statistical power of 95%.

Table 1. Adequacy of sample size.

F value	Size of Effect		Adequate sample size
	Lowest R ²	Sig. ratio (5%)	
F (5,169) = 2.260	0.10	0.95	204
F (5, 78) = 2.33	0.25	0.95	86
F (5, 38) = 2.46	0.50	0.95	46
F (5, 27) = 2.57	0.75	0.95	35

Source: authors.

Consequently, we opted for a more extensive sample size for our study. As a result, data were gathered from a total of 700 respondents in Kingdom of Saudi Arabia (KSA) via SNSs such as WhatsApp, Facebook, and Twitter, utilizing Google Forms as the data collection platform. The rationale behind selecting this larger sample size stemmed from our desire to mitigate potential challenges that could arise during the data collection process, which might include a low response rate, disengaged participants, or missing data.

At the onset of the survey, the participants were provided with a briefing regarding this study's nature and objectives and were informed of their right to discontinue their participation at any point. Over a three-month period spanning May, June, and July 2023, 650 questionnaires were consequently completed. Regrettably, 50 remained incomplete. To ensure the quality of the data, we applied a monitoring process to identify non-engaged replies and outliers, following the method suggested by Churchill [41]. This method involved assessing and documenting the value of the standard deviation (S.D) for each respondent. Instances where the standard deviation was low or zero indicated that the respondent had consistently presented the same pattern (e.g., consistently selecting "strongly agree" (1) or "strongly disagree" (5)) throughout the survey. Such patterns signaled that the participants may not have been actively engaged when completing the questionnaire. Consequently, 15 responses exhibiting a standard deviation of less than one ($S.D \leq 1$) were excluded from the analysis. Following this data refinement process, the total number of usable responses amounted to 635, resulting in an impressive response rate of 90%.

4. Data Analysis and PLS-SEM Outcomes

The empirical data analysis encompassed two distinct stages. The first stage was dedicated to examining the psychometric properties of the research measurements. This involved the assessment of factors such as CMB, measurement reliability, and validity. To achieve this, various statistical techniques were employed, including Exploratory Factor Analysis (EFA), Cronbach's alpha (α), and composite reliability (CR). The second stage of the analysis focused on evaluating the research model and hypotheses utilizing the PLS-SEM approach. The subsequent sections provide an in-depth account of the data analysis process.

5. Outer Model Evaluation

5.1. Dealing with CMB

CMB suggests that the methods employed for collecting the required data could theatrically inflate the variance observed between the model dimensions [42]. To assess whether CMB posed a

concern, we conducted Harman's single-factor test, following the guidance in [43]. This examination involves performing EFA on all research dimensions while constraining all items to load onto a single common factor without rotation. According to Harman [44], if the variance explained by this single common factor method is less than 50%, it indicates that CMB is not a significant issue within the tested dataset. The results of our analysis revealed that the common factor accounted for only 35% of the total variance among the model dimensions. Accordingly, it is unlikely that CMB significantly influences the current dataset.

5.1.1. Tests of Internal Consistency

As per the guidelines provided in [40], internal consistency assesses the extent to which the items employed for data collection effectively measure the intended construct. In this study, we employed three commonly used measures to determine internal consistency, namely CR, Cronbach's alpha (α), and Average Variance Extracted (AVE). As depicted in Table 4, the estimated values of both α and CR surpassed the minimum threshold widely accepted in social business research (> 0.7) [45]. Additionally, AVE values were computed and compared to the recommended minimum threshold of 0.50, as advised in [40]. Notably, the AVE values for all research dimensions surpassed this specified cutoff value, as outlined in Table 4.

Table 4. Results of outer loadings and psychometric properties.

Dimensions	Items	Estimates	M	SD	AVE	α	CR
Customer-to-customer value co-creation					0.912	0.984	0.984
	C2CVCC1	0.982	3.894	0.974			
	C2CVCC2	0.953	3.849	1.002			
	C2CVCC3	0.953	3.849	1.002			
	C2CVCC4	0.965	3.852	0.996			
	C2CVCC5	0.972	3.857	0.978			
	C2CVCC6	0.934	3.806	1.051			
	C2CVCC7	0.925	3.798	1.055			
Forums and communities					0.651	0.820	0.828
	For_Com1	0.745	3.699	1.095			
	For_Com2	0.853	3.814	0.995			
	For_Com3	0.754	4.024	0.902			
	For_Com4	0.868	3.978	0.942			
Ratings and reviews					0.634	0.806	0.815
	Rat_Rev1	0.734	3.698	1.100			
	Rat_Rev2	0.860	3.813	0.995			
	Rat_Rev3	0.737	4.011	0.926			
	Rat_Rev4	0.846	3.957	0.961			
Suggestions and recommendations					0.898	0.962	0.962
	Rec_Sug1	0.956	4.132	0.874			
	Rec_Sug2	0.929	4.079	0.949			
	Rec_Sug3	0.932	4.052	0.991			
	Rec_Sug4	0.973	4.068	0.954			
Sustainable customer relationships					0.921	0.957	0.958
	SCR_1	0.973	3.890	1.072			
	SCR_2	0.957	3.830	1.122			
	SCR_3	0.950	3.795	1.154			

Source: authors. C2CVCC1- C2CVCC7: items that measure customer to customer value co-creation; For_Com1- For_Com4: items that measure forums and communities; Rat_Rev1- Rat_Rev4: items that measure ratings and reviews; Rec_Sug1- Rec_Sug4: items that measure suggestions and recommendations; SCR_1- SCR_3: items that measure sustainable customer relationships.

5.1.2. Measurement Validity

Before subjecting the proposed model and hypotheses to testing, an assessment of discriminant and convergent validity was conducted. This evaluation utilized techniques such as the “Heterotrait–Monotrait Ratio of the Correlations” (HTMT) to examine whether the constructs in our model are distinct from each other, additionally we employed cross-loading, and the “Fornell–Larcker criterion” metrics to make sure that the things we are measuring in our study are really different from each other and that the questions or items we are using to measure them are closely tied to what they are supposed to measure, but not getting mixed up with other things we are measuring. For the convergent validity assessment, the factor loadings of the items were initially assessed and scrutinized to determine if they adequately loaded onto their respective dimensions. As illustrated in Table 5, the calculated loadings of all the items fell within the range of 0.734 to 0.982, surpassing the proposed threshold score of 0.50, as advocated in [40]. The discriminant validity was assessed by applying two main criteria: (1) the Fornell–Larcker criterion and (2) the HTMT ratio. The former criterion expects that the coefficient of correlation between operationalized dimensions will be lower than the square root of AVE, while the latter demands that the correlation coefficient between the dimensions is lower than the recommended level of 0.85 [40]. Table 6 shows the assessment of the two criteria. For the Fornell–Larcker criterion, the table shows that the values of all square roots of the AVEs (bold diagonal) were higher than the correlation coefficients between the model dimensions. Likewise, the table also indicates that all HTMT scores were lower than the suggested level. Accordingly, convergent and discriminant validity were assumed, and the study data were appropriate for evaluating the structural model.

Table 5. Cross-loading results.

Items/dimensions	C2CVCC	For_Com	Rat_Rev	Rec_Sug	Reprch_Int
C2CVCC_1	0.982	0.639	0.639	0.408	0.720
C2CVCC_2	0.953	0.607	0.616	0.424	0.706
C2CVCC_3	0.953	0.604	0.618	0.421	0.704
C2CVCC_4	0.965	0.600	0.627	0.459	0.716
C2CVCC_5	0.972	0.604	0.629	0.417	0.716
C2CVCC_6	0.934	0.592	0.592	0.421	0.695
C2CVCC_7	0.925	0.588	0.587	0.420	0.680
For_Com_1	0.490	0.745	0.719	0.348	0.535
For_Com_2	0.589	0.853	0.812	0.420	0.528
For_Com_3	0.441	0.754	0.700	0.360	0.419
For_Com_4	0.509	0.868	0.823	0.342	0.536
Rat_Rev_1	0.496	0.702	0.734	0.396	0.559
Rat_Rev_2	0.600	0.823	0.860	0.450	0.568
Rat_Rev_3	0.444	0.691	0.737	0.348	0.431
Rat_Rev_4	0.496	0.797	0.846	0.330	0.534
Rec_Sug_1	0.434	0.469	0.484	0.956	0.469
Rec_Sug_2	0.439	0.426	0.443	0.929	0.469
Rec_Sug_3	0.401	0.428	0.462	0.932	0.476
Rec_Sug_4	0.410	0.405	0.438	0.973	0.475
SCR_1	0.737	0.648	0.670	0.462	0.973
SCR_2	0.678	0.593	0.632	0.446	0.957
SCR_3	0.710	0.570	0.602	0.528	0.950

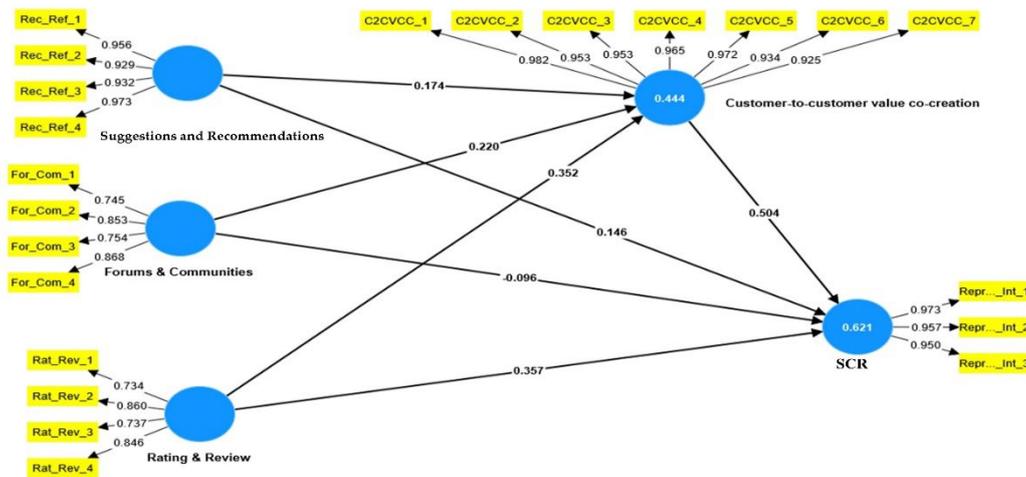
Table 6. Fornell and Larker results and HTMT output for validity test.

	Fornell and Larker results				HTMT output					
	C2CVCC	For_Com.	Rat_Rev.	Rec_Sug.	SCR	C2CVCC	For_Com.	Rat_Rev.	Rec_Sug.	SCR
C2CVCC	0.955									
For_Com	0.634	0.807				0.702				
Rat_Rev.	0.645	0.750	0.796			0.719	1.166			
Rec_Sug.	0.444	0.456	0.482	0.948		0.457	0.513	0.544		
SCR	0.738	0.629	0.662	0.498	0.960	0.760	0.707	0.749	0.519	

Note: bold scores are AVE square roots.

5.2. Structural Model Assessment and Hypothesis Analysis

The ultimate phase of the analysis entailed the assessment of this study's structural model, employing the PLS-SEM approach. In line with the proposed hypotheses, the proposed inner and outer models were subjected to smart PLS v4, and the bootstrapping resampling method was executed, encompassing 5000 iterations. For all hypotheses, the evaluation was conducted through the examination of path coefficients (β) and associated p-values, with significance levels set at or below 0.05 ($P \leq 0.05$). As illustrated in Figure 2 and detailed in Table 8, concerning direct influence, the results indicate that suggestions and recommendations (as a dimension of SC) had a significant direct positive influence on SCR ($\beta = 0.174$, $p < 0.000$) and C2CVCC ($\beta = 0.146$, $p < 0.000$), which supported the first (H1) and fourth hypotheses (H4). The PLS-SEM results also indicated a significant positive influence of forums and communities (as a dimension of SC) on C2CVCC ($\beta = 0.220$, $p < 0.000$), supporting the second hypothesis (H2).



C2CVCC1- C2CVCC7: items that measure customer to customer value co-creation; For_Com1- For_Com4: items that measure forums and communities; Rat_Rev1- Rat_Rev4: items that measure ratings and reviews; Rec_Sug1- Rec_Sug4: items that measure suggestions and recommendations; SCR_1- SCR_3: items that measure sustainable customer relationships

Figure 2. The tested PLS-SEM model.

However, forums and communities failed to positively and significantly predict SCR ($\beta = -0.096$, $p = 0.167$), which did not support the fifth hypothesis (H5). Additionally, ratings and reviews (as a dimension of SC) were found to have significant positive impacts on C2CVCC ($\beta = 0.352$, $p < 0.000$) and SCR ($\beta = 0.357$, $p < 0.000$), which supported the third and sixth hypotheses (H3 and H6). Furthermore, C2CVCC was found to have a highly significant positive influence on SCR ($\beta = 0.504$, $p < 0.000$), which supported hypothesis seven (H7). Regarding the indirect effect of C2CVCC, the results show that C2CVV had a full mediation role that affected the impact of forums and communities on SCR ($\beta =$

0.111, $p < 0.000$), supporting hypothesis nine (H9). The direct path was found to be non-significant, as reported for hypothesis 5. The results of the PLS-SEM support partial mediation roles played by C2CVCC in the impact of suggestions and recommendations on SCRs ($\beta = 0.088$, $p < 0.000$) and in the impact of ratings and reviews on SCR ($\beta = 0.177$, $p < 0.000$), supporting hypotheses eight and ten (H8 and H10).

The overall model analysis shows that the proposed model explains 44% of the variance in C2CVCC and 62% of the variance in SCRs. To evaluate the model fit, we considered two critical indices: the Standardized Root-Mean-Square Residual (SRMR) and the Normed Fit Index (NFI). A well-fitting model typically exhibits an SRMR value below 0.08, while the NFI is expected to surpass 0.9 to indicate a good model fit (Bentler, 1985; Hu and Bentler, 1998). In our analysis, the NFI registered at 0.972 and the SRMR value was 0.073, both of which met the satisfactory model fit criteria. Additionally, to validate the proposed model, we calculated Stone–Geisser test criterion (Q2) values for the dependent variables, namely C2CVCC (Q2=0.439) and SCRs (Q2=0.474). Importantly, these Q2 values were found to be greater than zero (Q2>0), substantiating the predictive validity of the model, as per the guidelines outlined by Hair et al. [40].

Table 8. Results of hypothesis testing.

Research hypotheses	Beta (β)	t-value	F2	P-value	Decision
Suggestions and Recommendations -> C2CVCC	0.174	5.756	0.042	0.000	Accept (H1)
Forums and Communities -> C2CVCC	0.220	3.404	0.009	0.001	Accept (H2)
Ratings and Reviews -> C2CVCC	0.352	5.289	0.021	0.000	Accept (H3)
Suggestions and Recommendations -> SCRs	0.146	4.508	0.041	0.000	Accept (H4)
Forums and Communities -> SCRs	-0.096	1.381	0.002	0.167	Reject (H5)
Ratings and Reviews -> SCRs	0.357	4.928	0.031	0.000	Accept (H6)
C2CVCC -> SCRs	0.504	13.481	0.373	0.000	Accept (H7)
Specific indirect paths					
Suggestions and Recommendations -> C2CVCC -> SCRs	0.088	5.688	---	0.000	Accept (H8)
Forums and Communities -> C2CVCC -> SCRs	0.111	3.245	---	0.001	Accept (H9)
Ratings and Reviews -> C2CVCC -> SCRs	0.177	4.809	---	0.000	Accept (H10)

6. Discussion and Implications

The findings of this research highlight the direct influence of suggestions and recommendations, as a dimension of SC, on both C2CVCC and SCRs. These results are consistent with those of Varadarajan [46] and Friedrich [47]. They indicate that businesses should recognize the significance of fostering and facilitating C2C interactions within their SC strategies. By actively encouraging suggestion and recommendation mechanisms and creating a supportive online community, organizations can enhance customer loyalty and drive SCRs. Additionally, the findings of this research underscore the direct influence of forums and communities, as a dimension of SC, on C2CVCC. This finding is consistent with findings by Tajvidi [48]. These platforms play a pivotal role in enhancing customer engagement, knowledge sharing, and collaborative value creation. By actively nurturing forums and communities, organizations can empower consumers to co-create value, which ultimately strengthens customer loyalty and contributes to sustained success in the digital marketplace. However, the findings of this research illuminate the direct negative influence of forums and communities, as a dimension of SC, on SCRs. While these platforms offer valuable opportunities for information exchange and peer interaction, they also present challenges related to misinformation, biased reviews, and negative sentiment. Businesses and marketers should recognize these complexities and proactively address them to mitigate their adverse effects on SCRs.

Interestingly, the findings of this research illuminate the highly positive direct influence of ratings and reviews, as a dimension of SC, on C2CVCC. These findings are consistent with [30]. These mechanisms serve as catalysts for trust-building, knowledge sharing, and collaborative value creation among consumers [49]. Businesses and marketers should recognize the significance of

fostering ratings and reviews within their SC strategies, as they contribute to enhanced consumer engagement and the enrichment of the overall purchasing experience. Similarly, the findings of this research highlight the direct positive influence of ratings and reviews, as a dimension of SC, on SCRs, which is consistent with [49]. These mechanisms serve as potent trust-building tools, shaping consumer perceptions and driving their willingness to be sustained. Businesses and marketers should recognize the pivotal role of ratings and reviews in enhancing SCRs and invest in strategies that encourage authentic user-generated content. C2CVCC positively impacted SCRs, which was consistent with [38,50,51]. Businesses and marketers should recognize the pivotal role of C2CVCC in driving SCRs and invest in strategies that encourage collaborative value creation.

Furthermore, the findings of this research demonstrate the mediating role of C2CVCC in the relationship between SC and SCRs. C2CVCC practices serve as a bridge between consumer engagement within SC platforms and the likelihood to be retained as a customer. Businesses and marketers should recognize the pivotal role of C2CVCC in enhancing trust, engagement, and customer loyalty, ultimately contributing to sustained success in the SC realm.

The theoretical implications of this study underscore the evolving dynamics of consumer behavior within the context of SC and C2CVCC. By considering the mediating role of C2CVCC in the relationships between SC and SCRs, this research enriches our understanding of the multifaceted nature of online consumer interactions and provides a foundation for future explorations in the field of digital marketing and e-commerce. These implications emphasize the need for a more holistic approach to understanding and harnessing the power of suggestions and recommendations, forums and communities, ratings and reviews, and collaborative value creation within the evolving landscape of SC. Researchers and practitioners alike can draw on these theoretical insights to inform their strategies, ultimately contributing to the long-term success of businesses in the digital marketplace.

Practically, the implications derived from the relationships between SC, SCRs, and the mediating role of C2CVCC highlight actionable steps that businesses and platform administrators can take to leverage C2CVCC effectively. By fostering collaborative communities, emphasizing trust, personalizing interactions, and continuously improving strategies, organizations can enhance customer loyalty, drive repeat purchases, and thrive in the ever-evolving landscape of online commerce. These practical recommendations provide a roadmap for businesses to harness the power of C2CVCC and achieve sustainable success in the digital marketplace. To enhance SCRs, online businesses should actively foster collaborative spaces where consumers can engage, share experiences, and co-create value. Encouraging knowledge sharing and rewarding active participants can promote the growth of these communities. Additionally, user-generated content, such as product reviews and recommendations, plays a significant role in shaping consumer decisions in online business. Businesses should actively encourage consumers to create and share such content. Highlighting positive experiences and showcasing user-generated content can influence other SCRs. Furthermore, personalized interactions and recommendations within SC platforms can enhance customer engagement. Online businesses should leverage data analytics to tailor recommendations and content to individual preferences, thus increasing the likelihood of sustainability. Dynamic and interactive features can further engage consumers.

7. Limitations and Further research Opportunities

This study focused on online consumers in the KSA and may not fully represent the diverse consumer base engaging in SC. Future research should consider broader demographic and cultural variations to assess the generalizability of these findings. This research adopted a cross-sectional design, limiting our ability to establish causality. Future longitudinal studies could explore how the relationships between SC, C2CVCC, and SCRs evolve over time. This study relied on self-reported data, which may introduce response bias. Combining self-reported data with behavioral data or employing observational methods could provide a more comprehensive understanding of consumer behavior. While this study focused on C2CVCC as a mediating variable, other factors may also play mediating roles in the relationship between SC and SCRs. Future research should explore additional

mediators and their combined effects. These findings are context-specific and may vary across industries, products, and platforms. Further research should examine the nuances of these relationships in different contexts to gain a more comprehensive understanding.

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