A Variation of the DeLone and McLean Model for Collaborative Commerce Services: A Structural Equation Model

C. Christopher Lee
Central Connecticut State University, christopher.lee@ccsu.edu

Pankaj Nagpal
Stonehill College

Hyoun Sook Lim
Central Connecticut State University

Laura Dutil
Central Connecticut State University

Rebecca Lee
Central Connecticut State University

See next page for additional authors

Follow this and additional works at: https://scholarworks.lib.csusb.edu/jitim

Part of the E-Commerce Commons, Management Information Systems Commons, and the Social Media Commons

A Variation of the DeLone and McLean Model for Collaborative Commerce Services: A Structural Equation Model

Authors

C. Christopher Lee, Pankaj Nagpal, Hyoun Sook Lim, Laura Dutil, Rebecca Lee, and Youngseon Kim

A Variation of the DeLone and McLean Model for Collaborative Commerce Services: A Structural Equation Model

C. Christopher Lee (*Central Connecticut State University*)
Pankaj Nagpal *(Stonehill College)*
Hyoun Sook Lim *(Central Connecticut State University)*
Laura Dutil *(Central Connecticut State University)*
Rebecca Lee *(Central Connecticut State University)*
Youngseon Kim *(Central Connecticut State University)*

ABSTRACT

This study intends to provide theory-driven empirical findings of the factors affecting users' loyalty to a collaborative commerce platform provider and further suggests that the platform loyalty lead to future extended use of collaborative commerce services. DeLone and McLean model serves as a basic framework for this study. Our variation of the model tested the impact of perceived value, relationship quality, and service quality on platform loyalty, which would influence future extended use of collaboration commerce services. Our results confirm that perceived value and platform quality were the best predictors for platform loyalty, which in turn, had a positive influence on future extended use intention.

INTRODUCTION

Over the recent twenty years, technology has transformed not only the way people interact but also the way businesses are run. Especially the digital revolution has brought up new business models such as e-commerce, social commerce, and collaborative commerce, as the newest model. Collaborative commerce engages in business platforms where consumers participate in activities of acquiring and distributing products and services without actual ownership (Belk, 2014; Lamberton & Rose, 2012). No wonder that information technology on the internet has allowed people to share more than ever and prompted the growth of collaborative consumption industry (Belk, 2014; Bokyeong & Cho, 2016). The concept of collaborative commerce centers on consumers as the user and the provider. For example, some consumers participated in what is commonly referred to as the "sharing economy" or "collaborative consumption" as users, while others did as providers (Goldelnik, 2017). This relatively young business entity has not only disrupted business strategies of many firms (Cusumano, 2014), but also invited lots of investments from businesses because collaborative commerce has emerged as a profitable venture with millions of users (Botsman & Rogers, 2010).

Despite the exponential growth of collaborative commerce, there is limited empirical research focused on collaborative commerce, especially in terms of what motivates people to use collaborative commerce and to keep loyal to it (Hamari, Sjoklink, & Ukkonen, 2016; Bokyeong & Cho, 2016). Former research found that people are motivated to engage in collaborative consumption by factors such as sustainability (social and environmental impact), enjoyment of the collaborative commerce activity and economic gains (Hamari et al., 2016). What are the factors to influence users' intention to use and recommend to others? Studies are abundant to examine the research topics in the broad context. Perceived value is one of the factors to affect a consumer's intention to use a product/service in e-commerce (Zhuang et. al., 2010; Bokyeong & Cho, 2016; Möhlmann, 2015; Buda & Lehota, 2017; Zhu, Fung So & Hudson, 2016; Lin et al., 2017; Paundra et al., 2017; Gan & Wang, 2017; Hamari & Ukkonen, 2016). Service delivery mechanisms online are found to influence technology acceptance and platform loyalty (Bhattacherjee, 2001; John, 2013; Ahn et al., 2007; Möhlmann, 2015; Zhu et. al., 2016; Liang et. al., 2012). However, former research does not appear to encompass these factors to test their overall association with the consumption of collaborative commerce. That is, we do not clearly know these key variables will also drive platform loyalty and collaborative commerce use intention. Predictors of collaborative consumption platform loyal are not well designated (Mohlmann, 2015).

Therefore, the present study aims at identifying the critical drivers that impact collaborative commerce platform loyalty by examining the key factors in one model and further suggests that the collaborative commerce platform loyalty lead to

.

the user's increased use of collaborative commerce services as a whole in future. Specifically, we examine two research questions: (1)

What are the major factors to explain the consumer's loyalty to a collaborative commerce platform provider? (2) Will the platform loyalty influence the user's extended use of collaborative commerce services? To answer these questions, we proposed a theoretical model that combines perceived value, relationship quality, and platform quality as factors to influence collaborative commerce platform loyalty. DeLone and McLean model (2003) serves as a framework for this study. We expanded the model. To test the model, we conducted a survey and performed a structural equation model. The current research will increase our understanding of collaborative commerce in the user's perspective and suggest platform providers of collaborative commerce ways to better serve their current and prospective users. This paper is structured as follows. The next section briefly presents the theoretical background and framework for our hypotheses. The subsequent section outlines our research methods, followed by the results. Then, this paper concludes with a discussion on implications and future research directions.

## THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

Since inception of collaborative commerce, many researchers have examined user characteristics and factors leading to the use of collaborative commerce (Tussyadiah, 2015; Hamari et al., 2016). Millennials are known as major users of sharing economy and collaborative commerce, while Lee (2010) discovered that demographic factors such as gender, age, education, and income levels have little to no influence on a customer's perceptions of technology benefit or on e-commerce adoption. Perceived value of collaborative commerce, users' overall evaluation of service providers, and the quality of the service providers' delivery mechanism (so called platform) are rather, most commonly confirmed factors to influence consumers' engagement with collaborative commerce (Shen, Li, Sun, Chen, & Wang, 2019; Falco & Kleinhans, 2018; Cheng, Fu, Sun, Bilgihan, & Okumus, 2019). Thus, we included these variables in our modified Delone and McLean Model to explore our research questions.

.

DeLone and McLean (D&M hereafter) Model

The D&M model shows that platform quality leads to use intention and loyalty which entail user satisfaction or continued use (Figure 1).

The antecedents of platform quality are information quality, service quality and system quality (DeLone & McLean, 2003).

Figure 1. DeLone and McLean Model on Platform Quality
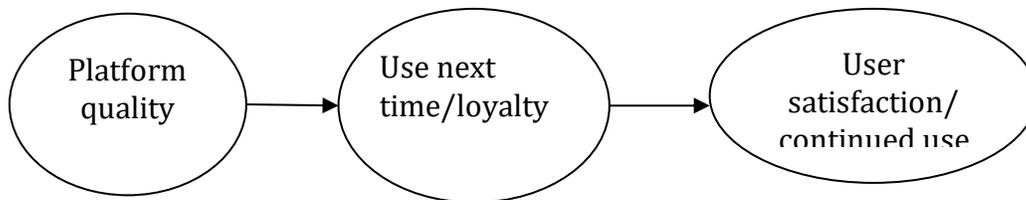
We use a variation of the classic D&M model where platform quality was a sole predictor of use next time and/or loyalty by including perceived value and relationship quality as antecedents of platform loyalty (Figure 2). We test perceived value and relationship quality as additional antecedents of platform loyalty leading to the intention of extended use of collaborative commerce offerings.

As DeLone and McLean discussed in their original paper, there are several business and educational contexts that are relevant to the model.

Figure 2. The Hypothesized Model

.
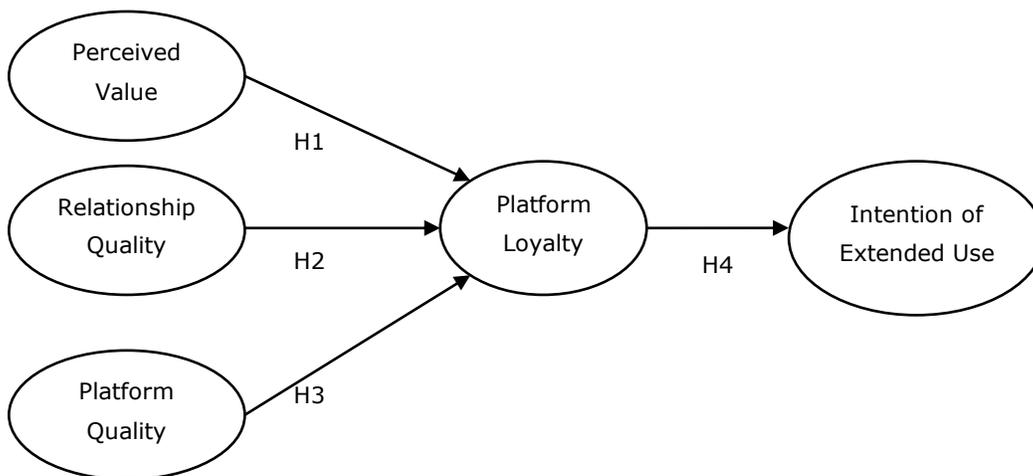
ANTECEDENTS OF PLATFORM LOYALTY

Perceived Value

Perceived value is defined as the overall assessment of purchase based on consumers' perception of what is received and what is given (Heinonen, 2004).
It is positively related to customer satisfaction and purchase intentions
(Gan & Wang, 2017). Perceived value consisted of two major components: transaction utility and acquisition utility (Thaler, 1985). The transaction utility deals with the difference between consumers' expected price of an item and the actual purchase price, while acquisition utility refers to the difference between what consumers pays and what they receive (Grewal, Monroe, & Krishnan, 1998; Thaler, 1985). The first is linked to the economic value of purchase and the latter linked to psychological value to influence consumers' emotion (Gallarza & Saura, 2006; Hamari and Ukkonen, 2016). Both components of perceived value influence positively consumers' buying intention (Zhuang et al., 2010)
Research shows that consumers tend to maximize utility out of their purchases regardless of product type (Mohlmann, 2015). Considering that cost benefits affect a propensity to participate in sharing economy (Lamberton & Rose, 2012), perceived value should be a key factor leading to engagement with collaborative commerce consumption. In fact, Bokyeong & Cho (2016) found that customers' perceived value as well as justice dimensions are positively related with customer intention, satisfaction, and consumer loyalty of collaborative commerce.
Justice dimensions were comprised of procedural (getting what they expected to get), interactional (the treatment during purchase) and distributive (monetary) justice. The results indicated that all dimensions of justice significantly affect a consumer's satisfaction level and loyalty and procedural justice and distributive justice were significant dimensions that affected a customer's intention. Findings also showed that perceived values significantly affected a consumer's intention to use, and experience was the most significant factor leading to customer loyalty (Bokyeong & Cho, 2016). Besides, psychological values (emotional enjoyment and social identification) were important when it comes to intention to use a ridesharing application (Zhu et al., 2016). Therefore, we hypothesize that perceived value will have a positive effect on loyalty to a collaborative commerce provider platform.

Hypothesis 1: *Perceived value is positively related with platform loyalty.*

.

Relationship Quality

We define relationship quality, a concept originated from relationship marketing (Liang, Ho, Li, & Turban, 2012) as the consumer's total evaluation of collaborative commerce provider (Crosby, Evans, & Cowles, 1990). Relationship quality includes the consumer's belief or attitude toward the commerce provider (Liang et al, 2012). It influences the consumer's continued use of services (Gustafsson, Johnson, & Roos, 2005; Palmatier, Dant, Grewal, & Evans, 2006). The customer's emotional tie with a service provider can be formed from the service offering of quality and tends to increase the customer's likelihood to continue using the same service provider (Crosby et al., 1990). Relationship quality is a multidimensional construct with three major components: trust, commitment, and satisfaction (Garbarino & Johnson, 1999; Palmatier et al., 2006). These three components to represent relationship quality play a role in various consumption context, individually or all together, either in social commerce or building consumer-to-consumer website stickiness (Chen, Zhang, & Xu, 2009; Liang et al., 2012; Teo, Srivastava, & Jiang, 2009). For example, Liang, Ho, Li, & Turban (2012) found that relationship quality had a strong effect on intention to repeatedly use the web site. Möhlmann (2015) highlighted trust, a relationship quality component, as one of ten determinants for satisfaction with a sharing option and recurring use of the sharing option. Therefore, it is legitimate to posit that relationship quality will play a role in forming platform loyalty.

Hypothesis 2: *Relationship quality is positively related with platform loyalty.*

Platform Quality

We adopt this antecedent directly from the D&M model. Platform quality discusses the degree to which a collaborative commerce platform, a web site where collaborative commerce transactions occur facilitates user-friendly commerce engagement. We included information quality, service quality, and system quality of collaborative commerce platform as three components of the platform quality. This is in line with another relevant research (e.g., Ahn et al., 2007). Many studies show that Web quality has a positive association with users' acceptance of Web service (Chung & Tan, 2004; Shih, 2004). Ahn, Ryu, and Han (2007) proposed that Web quality play an important role in use of online retailing. Customers tend to return when they have a good experience which is crucial for customer retention (Chung & Tan, 2004). Website quality is found to enhance customer experience online and reinforce customers' behavioral loyalty to use the online retailers continuously (Ahn, et al., 2007). When it comes to collaborative commerce, it is a business model in which consumers use online tools to collaborate on owning, renting, sharing, and trading good and services. The technology-driven platform

.

quality is a key to users' engagements in collaborative commerce with ease and fluent communication with the service providers, thereby, it will heighten a likelihood of continued support of the collaborative commerce platform (John, 2013).

Thus, we expect that platform quality will have a positive impact on platform loyalty.

Hypothesis 3: *Platform quality is positively related with platform loyalty*

FUTURE EXTENDED USE OF COLLABORATIVE COMMERCE SERVICES FUTURE

Platform loyalty means loyalty to a collaborative commerce platform provider (Chen et al., 2009). The user with platform loyalty tend to be open to other collaborative commerce services and extend their collaborative commerce trials to other services because they have devloped favorable attitudes towards a specific collaborative commerce platform through their actual experience. In fact consumers became more open to the sharing economy in general after trying it (Zhu et al., 2016). If the user becomes loyal to their used collaborative commerce platform provider, it is very likely that they will intend to use more collaborative commerce services in future (Gan & Wang, 2017). Users of collaborative commerce are those who are willing to try novelties, are applications-savvy and do not hesitate to engage in online transactions (Buda & Lehota, 2017) thereby it is very likely that they will continue to support and utilize other collaborative commerce platforms once they are satisfied with their collaborative commerce experience and become loyal to their used platform. Hence, we propose that loyalty to a collaborative commerce platform will have a positive impact on likelihood to extended use of overall collaborative commerce services in the future.

Hypothesis 4: *Platform loyalty is positively related with the intention of extended use of overall collaborative commerce services in the future.*

METHOD

A survey was conducted to measure the constructs in the research model and test four hypotheses. The survey was conducted via two data collection methods, online questionnaire and paper questionnaire. The paper version was completed in person at a regional public university in the east coast. The respondents were undergraduate and graduate students. The online survey was emailed and shared in

social media websites. We had a total of 313 responses returned. Data from 18 respondents were eliminated because they had multiple missing items, which left us a dataset with 295 respondents in total.

Variables

A summary of all variables is shown in Table 1. Each of measurement items are displayed in Appendix. All questionnaire items were measured on a seven-point Likert-scale from 1 (strongly disagree) to 7 (strongly agree).
Perceived value includes two dimensions: economic value and psychological value. Economic value was measured by items that assess the perception of cost and time savings. Psychological Value was measured by items that assess the perception(s) of emotional interaction, trendy affinity, sustainability and community belonging. Relationship quality, modeled after Liang's study, includes three dimensions: trust, commitment, and satisfaction (Liang et al., 2012). Trust is a user's belief that the collaborative platform is honest and benevolent; commitment is the degree to which a user is willing to maintain the relationship with the collaborative commerce platform (Ert, Fleischer & Magen, 2016; Liang et al., 2012). Trust and commitment were measured by items adapted from Chen et al. (2009); Liang et al. (2012); Bokyeong & Cho, 2016; and Mohlmann (2015). Satisfaction is the degree to which a user is pleased with the overall experiences of using the collaborative commerce platform. The measurement items were adapted from Liang et al. (2012) and Mohlmann (2015). Platform quality includes three dimensions – service quality, systems quality and information quality. Service quality measures the degree to which a user evaluates supports and services delivered by the service provider via the Web site. The items for service quality were adapted from Ahn et al. (2007). System quality assesses a user's perception of the degree to which a collaborative commerce platform possesses desired functional capabilities such as availability, reliability, and response time. Measurement items for system quality were adapted from Ahn et al. (2007) and Mohlmann (2015). Service quality assesses the degree to which a user's overall evaluation of the services delivered by a collaborative commerce platform, including tangible support, reliability, responsiveness, assurance, and empathy, as perceived by the user. Measurement items for service quality were adapted from Ahn et al. (2007). Information quality refers to providing messages, in the form of recommendations, advice, or knowledge, which could be helpful for solving problems (Liang et al., 2012). Measurement items for information quality were also adapted from Ahn et al. (2007).The dependent variables are the user's loyalty to a collaborative commerce platform provider and the extended user intention of overall collaborative commerce services in future. The collaborative commerce platform loyalty measures the degree to which a user is willing to continue using the same collaborative commerce platform for a similar type of business.
Two measurement items were adapted from Chen et al. (2009) and Mohlmann (2015). The future extended use intention of overall collaboration commerce

.

services assesses the degree to which a user is likely to extend their collaborative commerce use to other collaborative commerce services in future. Measurement items were adapted from Hamari et al. (2016).

Table 1. Variable Description

Variable	Description
Perceived Value	The overall assessment the usefulness based on consumer perceptions of what is received and what is given ■ Economic Value - linked to perceived price (cost savings, utility/justice) ■ Psychological Value - influences the consumer's emotion (environmental impact, community belonging)
Relationship Quality	A user's total evaluation of a service provider ■ Trust - the belief that the service provider is honest and benevolent ■ Satisfaction - an emotional state that is evoked by the overall evaluation of interactive experiences with the service provider ■ Commitment - a psychological state that occurs when an ongoing relationship with a service provider is so important that maximum efforts are guaranteed in order to maintain it
Platform Quality	A user's total evaluation of a service provider's delivery mechanism ■ System Quality - the degree to which a Web site possesses desired capabilities such as availability, reliability, and response time. ■ Service Quality - the degree to which a user evaluates supports and services delivered by the service provider via the Web site. ■ Information Quality - the degree to which the content of the Web site is timely, accurate, and complete.
Platform Loyalty	A user's loyalty to a collaborative commerce platform provider (behavioral loyalty and a willingness to recommend it to others)
Intention of Extended Use	A user's intention to extend their use of collaborative commerce to other collaborative commerce services in the future

.

Analytical Model

Structural equation modeling (SEM) with AMOS version 25.0 was used to examine the hypothesized model, and parameters were estimated using maximum likelihood method (Byrne, 2001). The advantage of SEM over conventional multiple regression analyses is that it explicitly accounts for measurement error, which provides more accurate estimates of relations among the constructs (Kline, 2016), and minimizes the residual variances of the endogenous constructs (Hair, Ringle, & Sarstedt, 2011). Specifically, covariance-based SEM was used in this study. According to Hair and colleagues (2011), appropriate type of SEM should be chosen depending on the research objective. While partial least squares SEM is appropriate for explanatory research where theory is less developed, covariance-based SEM is more appropriate when theory is well developed, and the goals are further testing and confirmation. Because the main goal of our study is theory testing using DeLone and McLean model, covariance-based SEM was chosen for the analysis.

Following Anderson and Gerbing's (1988) two-step analytic strategy to test the hypothesize model, we first modeled the measurement models using confirmatory factor analysis (CFA), and then tested structural model to estimate path coefficients and the fit of the hypothesized model to the data. To evaluate the model fit, we used chi-square (χ^2) values, the Normed Fit Index (NFI; Bentler & Bonett, 1980), the comparative fit index (CFI; Bentler, 1990), and the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993) as fit indices. Values for NFI and CFI above or equal to above .90 are considered indicators of good fit (Medsker, Williams, & Holahan, 1994). For RMSEA, values less than or equal to .08 indicate good fit and values less than .10 indicate acceptable fit (Browne & Cudeck, 1993; Kline, 2016).

RESULTS

Descriptive Statistics

Descriptive statistics of the sample data are shown in Table 2. Out of the 295 survey responses, 208 participants were between the ages of 17 and 25 (70.5%), 65 participants were between 26 and 36 years old (2.2%) which means that 72.7% of the participants were millennials. In the current study, millennials are dominant so that we decided to only include them in our analysis (final n = 273). Thus, the data from anyone aged 37 or the above were excluded.

.

Considering generation Y is the most technically literate and technologically savvy so that they are more open to adopt a new technology and accept e-commerce (Chuah, Marimuthu, & Ramayah, 2014), analyzing the data only from this specific group of respondents was legitimate.

Table 2. Demographics of Respondents

	n	%
Age		
17 – 25	208	70.5
26 – 36	65	2.2
37 – 52	14	4.7
53+	7	2.4
Prefer not to respond	1	0.3
Gender		
Male	151	51.2
Female	140	47.5
Prefer not to respond	4	1.4

Cronbach's alpha was used to assess internal consistency reliability (Ahn et al., 2007). For variables to be reliable, Cronbach's Alpha value should be above .70. As shown in Table 3, all alpha values ranged from .889 (perceived value) to .949 (platform quality), were therefore deemed adequate

Table 3. Reliability of Constructs

Construct & Items	Cronbach's α
Perceived Value (X_1)	.884
Relationship Quality (X_2)	.903
Platform Quality (X_3)	.948
Collaborative Commerce Platform Loyalty (Y_1)	.936
Intention of Extended Use (Y_2)	.878

Pearson's correlation coefficients (r), shown in Table 4, were reviewed to measure the association strength between these variables.
The results of this analysis show a positive correlation for all variables, indicating

.

that the variables increase together; for example, when perceived value is higher, then usage intention is also higher.

Platform quality (X_3) showed the highest association to both platform loyalty (Y_1) and intention of future extended use (Y_2); with perceived value (X_1) and relationship quality (X_2) also showing a significantly high association to both dependent variables.

Table 4. Pearson Correlation Analysis

	(1)	(2)	(3)	(4)	(5)
(1) Perceived value	1	.767**	.746**	.756**	.729**
(2) Relationship Quality		1	.834**	.779**	.747**
(3) Platform Quality			1	.824**	.796**
(4) Platform Loyalty				1	.890**
(5) Intention of Extended Use					1

$**p < .01$

Measurement Model

Confirmatory factor analysis validated the measurement model that contained five constructs measured by 12 observed variables. All items showed factor loadings that ranged from .76 to .94, and all factor loadings were significant at the .01 level. The hypothesized five-factor model provided fair fit to the data (χ^2 = 154.20, df = 44, p < .01; NFI = .95, CFI = .97, RMSEA = .10), where all items loaded on their intended constructs. Next, we tested a four-factor model by merging relationship quality and platform quality (χ^2 = 158.45, df = 45, p < .01; NFI = .95, CFI = .96, RMSEA = .10), and a three-factor model with all three independent variables combined into one (χ^2 = 181.13, df = 47, p < .01; NFI = .94, CFI = .96, RMSEA = .10). We then tested a two-factor model by further merging two dependent variables, platform loyalty and future use intention (χ^2 = 231.10, df = 48, p < .01; NFI = .93, CFI = .94, RMSEA = .12), and a one-factor model (χ^2 = 232.25, df = 51, p < .01; NFI = .93, CFI = .94, RMSEA = .12). The hypothesized five-factor model provided a significantly better fit than various alternative models (four-factor, $\Delta\chi^2$ = 4.25, Δdf = 1, p < .05; three-factor, $\Delta\chi^2$ = 26.93, Δdf = 3, p < .01; two-factor, $\Delta\chi^2$ = 76.90, Δdf = 4, p < .01; one-factor, $\Delta\chi^2$ = 78.06, Δdf = 7, p < .01).
Based on these findings, despite high correlations among some variables, these five

.

variables can be considered as separate constructs for the structural model analysis.

Structural Model

The results of the structural model suggested that the hypothesized model fit the data well (χ^2 = 156.80, df = 47, p < .01; NFI = .95, CFI = .97, RMSEA = .09). As shown in Figure 3, both perceived value and platform quality were positively related to platform loyalty (β = .48, p < .05, for perceived value; β = .56, p < .01, for platform quality), whereas relationship quality was not significantly related to platform loyalty (β = .24, *n.s.*). Platform loyalty was positively related to future extended use intention (β = .88, p < .01). Among the four proposed hypotheses, three hypotheses were supported (H1, H3, and H4; solid lines) and one hypothesis was not supported (H2; dotted lines).

Sample Size and Power

There are several ways of calculation of sample size. Essentially, there should be enough power to test the effects. Given the results, we conclude that the sample size was adequate to test the effects.

Figure 3. Results of Hypothesized Model[a]

.
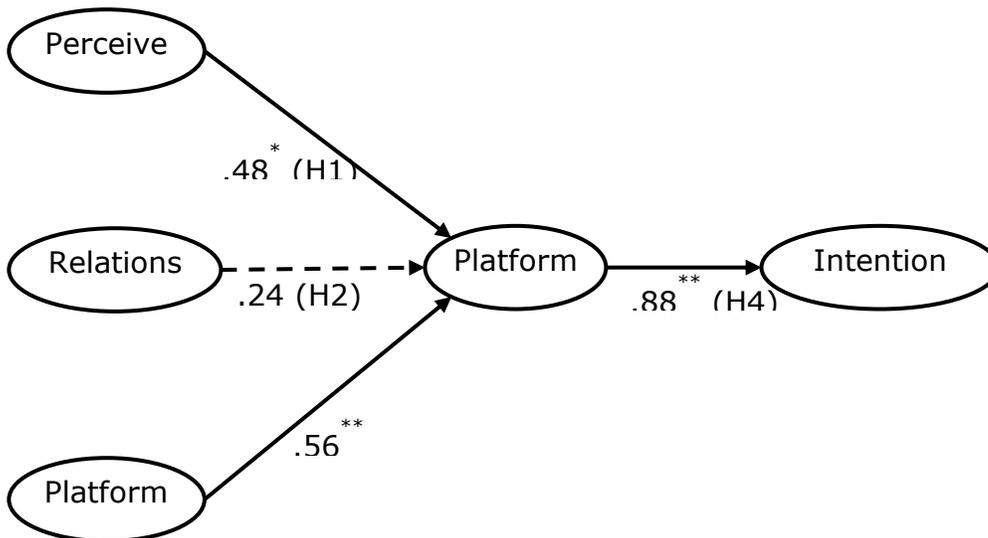
Note: Solid lines represent statistically significant paths. Dotted lines represent nonsignificant paths.

[a] *N = 270.* [*] *p < .05;* [**] *p < .01.*

Although the results indicated that the overall model based on the hypotheses fits the data relatively well, they do not rule out the possibility that other models may provide an equally good or better fit to the observed data (MacCallum, Wegener, Uchino, & Fabrigar, 1993). We first assessed the fit of the hypothesized model, and then compared the fit with the alternative model: a parsimonious model by omitting the nonsignificant path between the relationship quality and platform loyalty. To determine an improvement in fit of our hypothesized model compared to the alternative model, $\Delta\chi^2$ difference tests were used (Bentler & Bonett, 1980; Medsker, Williams, & Holahan, 1994). A significant difference in $\Delta\chi^2$ values between the hypothesized model and the alternative, more parsimonious model, means that the alternative model has a better model fit, and vice versa. The result showed that the alternative model did not provide a significant better model fit than the hypothesized model ($\Delta\chi^2 = .99$, $\Delta df = 1$, *n.s.*), indicating the superiority of the hypothesized model to the alternative model. Table 5 presents a summary of the fit indices for both hypothesized and alternative models that were tested.

Table 5. Summary of Model Fit Indices

Model	χ^2	df	NFI	CFI	RMSEA
Measurement model	154.20	44	.95	.97	.10
Hypothesized model	156.80	47	.95	.97	.09
Alternative model: Remove the path from Relationship Quality to Platform Loyalty	157.79	48	.95	.97	.09

Note: N = 270. NFI = normed fit index; CFI = comparative fit index; RMSEA = root mean squared error of approximation

.

Previous research has shown that perceived value is highly associated with a user's loyalty to a platform provider (Bhattacherjee, 2001; Chuah et. al., 2014; Mohlmann, 2015). Studies have also shown relationship quality to have an impact on platform loyalty (Bokyeong & Cho, 2016; Chen et. al., 2009; Gan & Wang, 2017). Additionally, extant literature showed platform quality to be a significant factor in determining a user's platform loyalty (Ahn et. al., 2007; Liang et. al., 2012; Mohlmann, 2015).

We included all these variables as predictors of platform loyalty in our model. Our initial correlation analyses showed they are positively associated with platform loyalty, which are in line with former research. However, our final hypotheses tests confirmed perceived value and platform quality are the major predictors of platform, as opposed to relationship quality. Finally, we confirmed that a user's loyalty to one collaborative commerce provider's platform would lead to their future extended use of overall collaborative commerce services. This finding is very interesting in that one platform loyalty based on satisfying experiences driven by perceived value of transactions and platform quality can shed a positive influence on increasing the user's overall collaborative commerce consumption in future beyond their currently used platform.

This research extends our knowledge of collaborative commerce.

It not only corroborates the major factors for platform loyalty but also delivers evidence that putting efforts to build a platform loyalty can yield expansion of collaborative commerce industry.

CONCLUSION

Overall this research demonstrated that perceived value and platform quality are significant factors for collaborative commerce platform loyalty which in turn has a positive influence on extended use of collaborative commerce. We extended the DeLone & McLean model by adding relationship quality and perceived value. Perceived value and platform quality were significant as predictors of platform loyalty, while relationship quality was not. This research has managerial implications that solidifying the user's platform loyalty is also critical for entire collaborative commerce industry. Therefore, managers should continue investing resources into creating, maintaining and enhancing the user's positive platform experience. Economic value and psychological value of using collaborative commerce play key roles in instilling platform loyalty and use intention. Accordingly, managers should place more emphasis on improving the aspects of the value proposition to improve their competitive advantage (Gustafsson, Johnson, & Roos, 2005), as well as influence customers' perception of community belonging and environmentally friendliness. When it comes to platform loyalty, managers

.

need a strategy on how to create and maintain relationship quality (trust, commitment and satisfaction) between the company and its customer. Retention programs and efforts should focus on improving satisfaction. These are the implications for practice.

There are some suggestions for future research. Although our framework offers promise, our theoretical model could be strengthened by focusing on a specific collaborative service, such as car-sharing or room-sharing, to determine if variables are consistent across the industry. Additionally, future studies could extend target population to the other age groups because the current study only includes responses from millennials. This will help generalize the research findings to broader consumer groups. Further, while this study aimed to provide an overall framework for platform loyalty and extended collaborative commerce use intention, future studies may want to focus solely on one of the latent variables to better understand which endogenous variables matter most to better pinpoint areas for improvement.

REFERENCES

Ahn, T., Ryu, S., & Han, I. (2007). The impact of Web quality and playfulness on user acceptance of online retailing. *Information & Management, 44*, 263-275.

Anderson, J., & Gerbing, D. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin, 103,* 411-423.

Belk. R. (2014). You are what you can access: sharing and collaborative consumption online. *Journal of Business Research, 67*, 1595-1600.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.

Bhattacherjee, A. (2001). Understanding information systems continuance: an expectation confirmation model. *MIS Quarterly, 25*, 351-370.

Bokyeong, K., & Cho, Y. (2016). Investigating the impact of justice dimension and perceived value on customer satisfaction for sharing economy of accommodation. *Journal of Business and Economics Research, 14*, 153-170.

Botsman, R., & Rogers, R. (2010). *What's mine is yours: The rise of collaborative consumption*. New York: Harper Collins.

Buda, G., & Lehota, D. (2017). Attitudes and Motivations of Consumers in Sharing Economy. *Management, Enterprise and Benchmarking in the 21st Century*, 22-30.

Byrne, B. M. (2001). *Multivariate applications book series. Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Chen, J., Zhang, C., & Xu, Y. (2009). The role of mutual trust in building members' loyalty to a C2C platform provider. *International Journal of Electronic Commerce, 44*, 147-171.

Chuah, H. W., Marimuthu, M., & Ramayah, T. (2014). The Effect of Perceived Value on the Loyalty of Generation Y Mobile Internet Subscribers: A Proposed Conceptual Framework. *Procedia-Social and Behavioral Sciences, 130*, 532-541.

Chung, J. & Tan, F. B. (2004). Antecedents of playfulness: an exploratory study on user acceptance of general information-searching websites, *Information & Management, 41*, 869-881.

Crosby, L. A, Evans, K.R., & Cowles, D. (1990) Relationship quality in services selling: An interpersonal influence perspective. *Journal of Marketing, 54*, 68-81.

Cusumano, M. (2014). How traditional firms must compete in the sharing economy. *Communications of the ACM, 58*, 32-34.

Delone, W. H. & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems, 19*, 9-30.

Ert, E., Fleischer, A., & Magen, N. (2016). Trust and reputation in the sharing economy: The role of personal. *Tourism Management, 55*, 62-73.

Garbarino, E., & Johnson, M.S. (1999) The different roles of satisfaction, trust, and commitment in customer relationships. *Journal of Marketing, 63*, 70-87.

Gallarza, M. G., & Saura, I. G. (2006) Value Dimensions, Perceived Value, Satisfaction and Loyalty: An Investigation of University Students' Travel Behaviour. *Tourism Management, 27,* 437-452.

.

Gan, C., & Wang, W. (2017). The influence of perceived value on purchase intention in Social Commerce Context. *Internet Research, 27*, 772-785.

Godelnik, R. (2017). Millennials and the sharing economy: Lessons from a 'buy nothing new, share everything month' project. *Environmental Innovation and Societal Transitions, 23*, 40-52.

Grewal, D., Monroe, K. B., & Krishnan, R. (1998). The Effects of Price Comparison Advertising on Buyers' Perceptions of Acquisition Value and Transaction Value. *Journal of Marketing, 62*, 46-59.

Gustafsson, A., Johnson, M. D., & Roos, I. (2005). The Effects of Customer Satisfaction, Relationship Commitment Dimensions and Triggers on Customer Retention. *Journal of Marketing, 69*, 210-218.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice, 19*, 139-152.

Hamari, J., Sjoklint, M., & Ukkonen, A. (2015). The Sharing Economy: Why People Participate in Collaborative Consumption. *Journal of the Association for Information Science and Technology, 67*, 2047-2059.

Heinonen, K. (2004). Reconceptualizing customer perceived value: the value of time and place. *Managing Service Quality: An International Journal*, *14*, 205-215.

Hutcheson, G., & Sofroniou, N. (1999). *The Multivariate Social Scientist*. Sage Publications.

John, N. A. (2013). Sharing, collaborative consumption and Web 2.0. *Media@ LSE Electronic Working Paper*, *26*, 1-19.

Lamberton, C. P., & Rose, R. L. (2012). When is Ours Better than Mine? A Framework for Understanding and Altering Participation in Commercial Sharing Systems. *Journal of Marketing, 76*, 109-125.

Lee, J.-W. (2010). The roles of demographics on the perceptions of electronic commerce adoption. *Academy of Marketing Studies Journal, 14*, 71-89.

Leech, N., Barrett, K., & Morgan, G. (2014). *IBM SPSS for Intermediate Statistics: Use and Interpretation (Fifth ed.)*. Routledge.

.

Liang, T.-P., Ho, Y.-T., Li, Y.-W., & Turban, E. (2012). What drives social commerce: the role of social support and relationship quality. *International Journal of Electronic Commerce, 16*, 69-90.

Lin, H.-Y., Wang, M.-H., & Wu, M.-J. (2017). A study of Airbnb Use Behavior in the Sharing Economy. *International Journal of Organizational Innovation, 10*, 38-47.

MacCallum, R. C., Wegener, D. T., Uchino, B. N., & Fabrigar, L. R. (1993). The problem of equivalent models in applications of covariance structure analysis. *Psychological Bulletin, 114*, 185-199.

Medsker, G. J., Williams, L. J., & Holahan, P. J. (1994). A review of current practices for evaluating causal models in organizational behavior and human resources management research. *Journal of Management, 20*, 439-464.

Mohlmann, M. (2015). Collaborative consumption: determinants of satisfaction and the likelihood of using a sharing economy option again. *Journal of Consumer Behaviour, 14*, 193-207.

Palmatier, R. W., Dant, R. P., Grewal, D., & Evans, K. R. (2006). Factors influencing the effectiveness of relationship marketing: A meta-analysis. *Journal of Marketing, 70*, 136-153.

Paundra, J., Rook, L., Dalen, J., & Ketter, W. (2017). Preferences for car sharing services: Effects of instrumental attributes and psychological ownership. *Journal of Environmental Psychology, 53*, 121-130.

Shen, X., Li, Y., Sun, Y., Chen, Z., & Wang, F. (2019). Understanding the role of technology attractiveness in promoting social commerce engagement: Moderating effect of personal interest. *Information & Management, 56*, 294-305.

Shih, H. (2004). An empirical study on predicting user acceptance of eshopping on the Web, *Information & Management 41*, 351-368.

Teo, T. S., Srivastava, S. C., & Jiang, L. (2009). Trust and electronic government success: An empirical study. *Journal of Management Information Systems, 25*, 99-132.

.

Thaler, R. (1985). Mental Accounting and Consumer Choice. *Marketing Science, 4*, 199-214.

Tussyadiah, I. (2015). An exploratory on drivers and deterrents of collaborative consumption in travel. In Tussyadiah, I. & Inversini, A. (Eds.), *Information & Communication Technologies in Tourism 2015*. Switzerland: Springer International Publishing.

Zhu, G., So, K. K. F., & Hudson, S. (2017). Inside the sharing economy: understanding consumer motivations behind the adoption of mobile applications. *International Journal of Contemporary Hospitality Management*, *29*, 2218-2239.

Zhuang, W., Cumiskey, K. J., Xiao, Q., & Alford, B. L. (2010). The Impact of Perceived Value on Behavior Intention: An Empirical Study. *Journal of Global Business Management, 6*, 1-7.

.

APPENDIX

Survey Items & References

Construct	Items		References
Perceived Value	PV-EV1	I believe a CCS offer substitutes quite well for owning a similar product.	Mohlmann (2015)
	PV-EV2	I think the prices from the CCS are fair/reasonable compared to alternatives. (i.e. hotels, taxis)	Bokyeong & Cho (2016)
	PV-EV3	My participation in collaborative consumption benefits me financially.	Hamari et al. (2016)
	PV-EV4	I think that I can save my time by using the CCS compared to other services (i.e. taxis, hotels).	Bokyeong & Cho (2016)
	PV-PV1	Using this CCS is enjoyable and fun for me to complete my task.	Hamari et al., 2016; Ahn et al., 2007
	PV-PV2	By using the collaborative commerce services, I am being environmentally responsible.	Bokyeong & Cho (2016)
	PV-PV3	The use of CCS allows me to be part of a group of likeminded people.	Mohlmann (2015)
	PV-PV4	Participating in CCS makes me feel like I'm up with the latest trends.	Mohlmann (2015)
Relationship Quality	RQ-T1	I think this CCS is credible and dependable.	Bokyeong & Cho (2016)
	RQ-T2	I trust that the CCS provider provides enough safeguards to protect me from liability for damage I am not responsible for.	Mohlmann (2015)
	RQ-T3	I think I wouldn't worry about private information exposure in using a CCS.	Bokyeong & Cho (2016)
	RQ-S1	I am satisfied with using the CCS.	Liang et al. (2012)
	RQ-S2	My last experience with the CCS fulfilled my expectations.	Mohlmann (2015)
	RQ-C1	Based on my past experience with this platform, I think this CCS cares about its customers.	Chen (2009)
	RQ-C2	I care about the long-term success of the CCS.	Liang et al. (2012)
Platform Quality	PQ-SYS1	I believe the CCS platform was easy to navigate.	Ahn et al. (2007)

.