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RESEARCH PAPER

Collaborative consumption continuance: a mixed-methods analysis of the service quality-loyalty relationship in ride-sharing services

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Abstract

Extant studies in collaborative consumption have theorized service quality as the distinctive perception of customers. Improved service quality can enable customers to positively influence their perception of the service and lead to continued usage in the future. In this context, our study acknowledges that service quality in collaborative consumption deserves further research. We propose that service quality in collaborative consumption can manifest across different touchpoints. We employ the SERVQUAL framework and Expectation Confirmation Theory as theoretical lenses to explore the service quality-loyalty relationship of app-based ride-sharing services. We apply mixed methods in the form of (i) semi-structured interviews, (ii) text mining and topic-modelling of app reviews, and (iii) Partial-least Squares modelling of responses collected from ride-sharing passengers. The main findings from our study are as follows. First, service quality is manifested across three touchpoints: *platform*, *vendor*, and *co-sharer*. Second, customer satisfaction of collaborative consumption is positively influenced by *platform reliability*, *platform responsiveness*, *vendor competence*, *vendor empathy*, and *co-sharer's empathy*. Third, *platform assurance* has the least impact on *customer satisfaction*. Fourth, *customer satisfaction* positively influences the continuance of collaborative consumption in ride-sharing services. Findings from our study contribute to the theory, practice, and future research on collaborative consumption.

Keywords Collaborative consumption · Service quality · Loyalty · Satisfaction · Continuance

JEL classification C20 · C83 · L81

Introduction and motivation

Collaborative consumption (CC), also known as the sharing economy (SE), is a recent phenomenon in consumer behaviour. It is facilitated by the extensive use of electronic platforms to match buyers and sellers among a community of users to enable sharing goods and services (Belk, 2014; Filser et al., 2020; Schlagwein et al., 2020). Airbnb and Vrbo (home sharing), Grab, Didi, Ola, and Uber (ride-sharing) are the most used CC platforms (Lim et al., 2021; Paundra et al., 2020). According to Bardhi and Eckhardt (2012), CC is an access-based consumption where "consumers want access to goods and prefer to pay for the experience of temporarily accessing them, instead of buying and owning things." Such unprecedented changes in consumption behaviour motivate the pursuit of re-defining service quality (SQ).[1]

Though SQ is an established concept in services marketing, its continued investigation in new service settings, particularly in the SE, holds the potential to reveal new insights on both the (re) conceptualization and (re) contextualization of SQ as an emerging field in SE literature (Akhmedova et al., 2021). This contention is supported by the trajectory of service quality in marketing (Akhmedova et al., 2021;

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[1] Deloitte Report on "The rise of the sharing economy - Impact on the transportation space": https://www2.deloitte.com/us/en/pages/consumer-business/articles/the-rise-of-the-sharing-economy-impact-on-the-transportation-space.html

Marimon et al., 2019). For example, the electronic service quality (E-S-QUAL) framework by Parasuraman et al. (2005) extended the conceptualization and contextualization of the original service quality (SERVQUAL) framework by Parasuraman et al. (1988).

In this study, we propose that current service delivery in the CC context can be extended through conceptualization and contextualization of SQ. In particular, the electronic platforms required to deliver these shared CC services result in the segregation of standard SQ dimensions (Akhmedova et al., 2021). These dimensions account for the different service touchpoints that consumers encounter in CC (Lim et al., 2021) and affect their service evaluations and future continuance behaviour (Li et al., 2021). For example, the electronic platforms (Alt, 2020b), vendors in the SE (Lim et al., 2021) moderate the SQ. This new form of consumer behaviour influences the design of future marketing strategies and understanding consumer satisfaction and the continuance of CC services (Lim, 2020). In this regard, (re) conceptualization and (re) contextualization of SQ is vital as it enables us to differentiate the source and impact of SQ in CC. These gaps motivate us to propose the following research questions (RQs):

RQ1. How do consumers perceive and evaluate the service quality of collaborative consumption?
RQ2. How does service quality influence customer satisfaction of collaborative consumption?

Besides, the context of examining SQ in developing economies also deserves further attention (Maalouf et al., 2020). Here, CC is an alternative in providing access to products and services that many people otherwise might not afford and consume through direct ownership (Alt et al., 2019; Lim, 2020). Further, CC can contribute to the sustainability agenda (Boar et al., 2020), such as economic well-being, minimizing carbon footprint, environmental degradation, and social security (Amat-Lefort et al., 2020; Alt, 2020a), leading to overall reduced transaction costs (Alt, 2017; Xu, 2020). However, to the best of our knowledge, there has been no concerted effort to explore and compare SQ in electronic settings with multiple service touchpoints and its impact on the continuity of CC in transportation sectors. Moreover, none of the current studies has taken a service quality-loyalty lens to enrich the understanding of *service quality-satisfaction* and *satisfaction-continuance relationships* in CC practices acquainted with multiple service touchpoints. Our claim was validated through a keyword search of "service quality", "satisfaction", "continuance", "collaborative consumption", "service touchpoint", and "sharing economy" on Google Scholar, the world's largest academic search engine, which yielded no results at the time of writing. This gap motivates us to propose the following research question (RQ):

RQ3. How does customer satisfaction influence collaborative consumption continuance?

To address these research questions, we collected and examined responses from passengers who had recent experience using app-based ride-sharing services in India. Our unit of analysis encapsulates customers who engage in the CC of ride-sharing and not drivers. We employed a mixed-methods approach in a three-pronged study: a qualitative study utilizing individual interviews to conceptualize and contextualize the SQ evaluations of CC; a text mining of mobile app reviews to shed further light on these evaluations; and a quantitative study using close-ended surveys to test the service quality-satisfaction and satisfaction-continuance relationships of CC. Three service touchpoints were revealed and scrutinized: *platform* (ride-sharing applications), *vendor* (ride-sharing drivers), and *co-sharer* (ride-sharing passengers). We discovered three SQ dimensions that consumers appraise from the platform perspective: *platform reliability*, *platform responsiveness*, and *platform assurance*. We found two SQ dimensions that consumers consider from the vendor perspective: *vendor competence* and *vendor empathy*. From the co-sharer perspective, we uncovered one SQ dimension that consumers evaluate, namely *co-sharer empathy*. We also found that *customer satisfaction* of CC is positively influenced by *platform reliability*, *platform responsiveness*, *vendor competence*, *vendor empathy*, and *co-sharer's empathy*, but not *platform assurance*. Finally, we find that the continuance of CC is positively influenced by *customer satisfaction*.

The rest of the paper is organized as follows. We begin by presenting the literature review, explaining the theoretical foundations of our study, and developing the research propositions. Following that, we offer three distinctive studies that help us to answer our research questions. Next, we discuss the findings from our results, the implications of those findings for theory and practice. Finally, we acknowledge our limitations and propose potentially fruitful directions for future research.

Literature review

Collaborative consumption and the sharing economy

The sharing economy's proliferation indicates that consumption without ownership is outgrowing conventional consumption practices (Alt et al., 2019; Maalouf et al., 2020). Today's consumption of products and services is

increasingly influenced by marketing innovations that allow the core value of products to be delivered in the form of service in a shared environment (Lim et al., 2021). In particular, the quantum of business associated with CC or the SE is estimated to grow from US$15 billion in 2014 to US$335 billion by 2025.[2] This growth is linked to the changing perceptions of ownership of products for consumption (Jain & Mishra, 2020; Morewedge et al., 2021). A recent survey by PwC suggests that almost half of American consumers believe that access is the future of consumption, while the ownership of assets feels like a burden.[3] Further, extant studies also indicate that CC offers the benefits of reduced ownership, personal commitment, and lower transaction costs (Botsman & Rogers, 2010; Abramova et al., 2015; Schlagwein et al., 2020). In turn, this sentiment presents a unique opportunity for new ways of conducting business that leverage the means of sharing.

The rise of SE creates significant implications for buyers and sellers (Belk, 2014; Muller, 2020). New business models can be developed by rethinking the core business, such as the servitization of conventional products (Constantiou et al., 2017; Han et al., 2020) and the productization of traditional services (Koskinen et al., 2020; Valtakoski & Järvi, 2016). Highlighting the various forms of sharing, Möhlmann (2015) explains CC as a well-organized system where participants conduct sharing activities in renting, lending, trading, bartering, and swapping goods, services, transportation solutions, and accommodation space, or money. According to Lim (2020), this phenomenon represents consumption practices that characterize SE.

The adoption of CC has been attributed to various factors (Hamari et al., 2016; Marimon et al., 2019; Wei et al., 2021). In particular, the promise of mitigating environmental damage due to burgeoning human needs has been at the core of CC as growing concerns about climate change and yearning for social embeddedness through communities have made the proposition of CC an appealing alternative for consumers (Albinsson & Yasanthi Perera, 2012; Eckhardt et al., 2010; Cheng et al., 2020; Hossain, 2021).

Past studies have documented similar benefits of sharing behaviour among users in the online environment, such as electronic knowledge-sharing repositories (Bock et al., 2005) and online communities of practice, namely: Stackoverflow and Github (Wenger & Snyder, 2000). Other studies have found that non-sustainable consumption activities (Eckhardt et al., 2010; Oliveira et al., 2021), intrinsic motivation for self-benefit, self-determination, and economizing resources has been a critical determinant of the likelihood of choosing "sharing" over "ownership" alternatives for consumption (Hamari et al., 2016; Möhlmann, 2015; Oliveira et al., 2021; Xu, 2020). Prior research on service quality in sharing economy is emerging but remains detached. Among the earliest systematic literature reviews, Ju et al. (2019) and Yas et al. (2020) identify potential attributes of SQ in SE. While various studies have asserted in their concluding remarks that a customer's participation and continuation in CC is likely to be closely linked to the quality of service delivered (Hartono et al., 2014; Möhlmann, 2015; Hamari et al., 2016), only a few studies have explicitly theorized and tested the service quality-loyalty relationships. This contention is supported by a recent systematic review of service quality in sharing economy by Akhmedova et al. (2021), who concluded that the distinction between the antecedents of service mechanisms that produce outcomes of SQ (e.g., satisfaction, loyalty) in CC remains "very blurred," leading to their call for additional research to scrutinize the service quality-loyalty relationship in the SE. Thus, our study endeavours to address this research gap, explained in the following sections, with the theoretical underpinnings of this relationship.

Measuring service quality-loyalty relationships in ride-sharing services

The extant literature on service quality-loyalty relationship reports that SQ was primarily measured by variables extracted from the SERVQUAL, E-S-QUAL frameworks, while the Expectation Confirmation Theory strongly influenced the mutual relationship among "continuance intention" and customer satisfaction". A recent literature review conducted by Yas et al. (2020) has examined whether SQ and customer satisfaction directly affected customer loyalty. Another detailed literature review conducted by Akhmedova et al. (2021) maps the emerging field of SQ in CC-based business models.

Among the earliest studies that examined SQ in SE, Priporas and associates (Priporas et al., 2017a, b) applied the Social Exchange Theory and employed Akbaba's Service Quality Framework in the tourism and hospitality segment to reveal interrelationships among service quality, satisfaction, and loyalty among Airbnb customers in Phuket. Next, Cheng et al. (2018) employed the SERVQUAL framework and the Expectation Confirmation Theory in a mixed-methods approach using interviews and survey data to examine user loyalty mechanisms from an SQ viewpoint. They explored the antecedents of SQ from both online and offline perspectives, revealing that a higher degree of attitude moderates the relationship of the consumer towards CC-based cab services and lead to a greater perceived loyalty across both online and offline services.

[2] PwC Report on "Sharing or paring? Growth of the sharing economy": https://www.pwc.com/hu/en/kiadvanyok/assets/pdf/sharing-economy-en.pdf

[3] The Sharing Economy-Consumer Intelligence Series: https://www.pwc.com/us/en/technology/publications/assets/pwc-consumer-intelligence-series-the-sharing-economy.pdf

Next, Marimon et al. (2019) proposed CC-Qual, a novel measurement scale to assess customer perceptions of SQ across CC services. They examined consumer perceptions by drawing responses from European consumers who had prior experience using a CC service (e.g. Airbnb, Uber, Glovo, BlaBlaCar, and Couchsurfing). Their theoretical model was derived from an amalgamation of offline and online SQ constructs based on the classical SERVQUAL and E-S-QUAL frameworks. Finally, Sthapit et al. (2019) studied the relationships among the dimensions of various consumption values (e.g. functional, social, and emotional) among the Airbnb hosts and guests using Value Co-creation Theory. Subsequently, they measured how these factors affected the consumer's satisfaction and continuance intention to reuse Airbnb.

Wang et al. (2020) employed the Sociotechnical Theory and DeLone, and McLean's IS Success Model to identify several antecedents: *social* (e.g. user experience, the social utility of sharing); *technical* (e.g. system quality, service quality); *economic* (e.g. extrinsic rewards) among Airbnb hosts. They explained hosts' trust and continuance intention with these antecedents regarding shared accommodation services in a unique approach. Arteaga-Sánchez et al. (2020) extended the Expectation Confirmation Theory to focus on the users of BlaBlaCar from Spain. The measurements for SQ were adapted from SERVQUAL, and they found that "social value" was a significant antecedent of satisfaction and continuance intention in the context of CC services.

Akhmedova et al. (2020a) challenged the incumbent antecedents of loyalty and service quality and sought to examine the relationships between them in SE settings (Airbnb, BlaBlaCar). They conducted a two-stage analysis (case study followed by surveys) to identify the following: SQ and customer value are antecedents of loyalty in a CC service, while SQ offered by peers can increase the primary value derived by a customer.

Akhmedova et al. (2020b) applied Transaction Cost Theory to understand different antecedents of customer loyalty in SE, such as platform responsiveness, reliability, and website organization (or mobile app). For bicycle-sharing CC, Shao et al. (2020) applied the SERVQUAL framework and found that a customer's positive confirmation affected the service satisfaction, which further augmented his/her continuance intention.

Table 1 presents the extant literature examining "service quality" perspectives of "continuance intention" in "collaborative consumption" business models.

Theoretical foundation

Scholars have long endeavoured to theorize "service quality" as customers' distinctive perception and proposed significant factors associated with a "satisfying" service offering. Subsequently, increased SQ can enable customers to positively influence their perception of the service and lead to continued future usage. In this study, we adopt a combination of the *SERVQUAL* and *E-S-QUAL* frameworks as the overarching theoretical lenses, with the assumption that efforts to extend conceptualization and contextualization often consider and build upon existing theories in their original form (Biswas et al., 2020; Lim & Weissmann, 2021; Parasuraman et al., 2005; Parasuraman et al., 2005). Subsequently, we apply the *Expectation Confirmation Theory* to examine customers' continuance intention in the context of CC.

SERVQUAL and E-S-QUAL frameworks

In their authoritative study, Parasuraman et al. (1985) proposed the SERVQUAL model that consisted of five dimensions of SQ (*reliability*, *assurance*, *tangibles*, *empathy*, and *responsiveness*) which was successful in explaining offline SQ for traditional services (such as public transportation, banking, insurance, maintenance and repairs, securities brokerage, and telecom networks). However, SERVQUAL does not focus on the online/electronic service quality needed for electronic marketplaces, e-commerce platforms, digital businesses, and, more recently, mobile-application based business transactions. To mitigate these shortcomings, Parasuraman and associates have proposed the following theoretical models to examine alternative versions of SQ: website service quality (e-SQ) (Zeithaml et al., 2002) and electronic service quality (E-S-QUAL) (Parasuraman et al., 2005). The E-S-QUAL model consisted of four primary dimensions of electronic SQ (*efficiency*, *fulfilment*, *system availability*, and *privacy*), which successfully explained SQ for online services.

Scholars have applied the E-S-QUAL framework to evaluate the SQ of businesses that operated primarily with the help of the Internet and online services such as e-commerce, digital music, travel agencies, bookstores, concierges, and banking (Bernardo et al., 2012; Berbegal-Mirabent et al., 2016). The contemporary attractiveness of CC businesses has led to several academic studies referring to the E-S-QUAL model for explaining shared accommodation (Ju et al., 2019); car-hailing (Marimon et al., 2019; Akhmedova et al., 2020b; Zuo et al., 2019); and food delivery (Akhmedova et al., 2020b). Scholarly studies that explore the E-SQ of online ride-sharing services are still in their infancy, while only a few have examined car-hailing applications in the context of CC (Cheng et al., 2018; Marimon et al., 2019; Arteaga-Sánchez et al., 2020).

In this study, we juxtapose the SQ dimensions from both SERVQUAL and E-S-QUAL. To do so, we map the five dimensions of SQ defined by the SERVQUAL model in the following manner: *reliability* (or the ability

Table 1 Extant literature examining service quality perspectives of continuance intention in sharing economy

Academic Source	Theoretical Framework(s)	Context	Methodology	Finding(s)
Priporas et al. (2017a)	Akbaba's Service Quality Framework, Social Exchange Theory	Airbnb Thailand	QN using PLS-SEM	Convenience and assurance are critical to repurchase intention
Priporas et al. (2017b)	Akbaba's Service Quality Framework	Airbnb Thailand	CFA, QN using PLS-SEM	Interrelationships among service quality, satisfaction, and loyalty
Cheng et al. (2018)	SERVQUAL, Expectation Confirmation Theory	Car-hailing service in China	QL; QN using PLS-SEM	Attitude moderates the perception of the consumer towards SE
Marimon et al. (2019)	SERVQUAL, E-S-QUAL	Airbnb and Uber in Europe	QN using PLS-SEM	Scale development for CC
Sthapit et al. (2019)	Theory of consumption values; Value Co-creation	Airbnb Italy	QN using PLS-SEM	Co-creation, low information overload affects the continuance
Wang et al. (2020)	Sociotechnical Theory,DeLone and McLean's IS Success Model	Airbnb worldwide	QN using CB-SEM	Trust & privacy assurance drives continuance intention
Arteaga-Sánchez et al. (2020)	SERVQUAL, Expectation Confirmation Theory	BlaBlacar (Spain)	QN using PLS-SEM	The social value affects satisfaction/repurchase
Akhmedova et al. (2020a)	Value Co-creation Theory	Airbnb (USA); BlaBlacar (Spain);Sharing Academy	QL; QN using PLS-SEM	Perceived quality & customer value affect loyalty/repurchase
Akhmedova et al. (2020b)	Transaction Cost Theory	Airbnb, Cabify, Uber, Just-eat, Deliveroo (Spain)	QCA	Website, platform, and peer affect loyalty
Shao et al. (2020)	SERVQUAL, Expectation Confirmation Theory	Dockless bicycle-sharing in China	QN using PLS-SEM	Positive confirmation affects satisfaction
This Study	SERVQUAL, E-S-QUAL Expectation Confirmation Theory	Taxi ride-sharing services in India	QL; QN using SEM; TM with eWOM	Platform, vendor, and co-sharer influence satisfaction and continuance intention

QL: Qualitative Techniques (e.g. Case Studies; Interviews), *QN*: Quantitative Techniques (e.g. empirical modelling, surveys using questionnaires), *TM*: Text-Mining, *PLS-SEM*: Partial Least Square based Structural Equation Modelling, *CB-SEM*: Covariance based Structural Equation Modelling, *QCA*: Qualitative Comparative Analysis, *CFA*: Confirmatory Factor Analysis, *eWOM*: electronic word-of-mouth

to perform "ride-sharing service" consistently), *assurance* (or the ability to instil confidence and trust among ride-sharing consumers), *tangibles* (or the appearance of physical materials such as the vehicle), *empathy* (or the provision of care demonstrated by the co-passenger/vendor), and *responsiveness* (or the attendance to request from the ride-sharing platform). Similarly, we map the four SQ dimensions from the E-S-QUAL model in the following manner: *efficiency* (or the ease and speed of accessing and using the ride-sharing platform), *fulfilment* (or extent to which the platform's promises about order delivery and item availability are fulfilled), *system availability* (or the correct technical functioning of the ride-sharing platform), and *privacy* (or degree to which the ride-sharing platform is safe and protects customer information).

Expectation confirmation theory

The Expectation Confirmation Theory (ECT) was proposed by Oliver (1980) as a foundational framework to study purchase intention among consumers. Since then, scholars have extensively employed ECT to evaluate customer satisfaction and subsequent repurchase behaviour across marketplaces (Anderson & Sullivan, 1993; Oliver et al., 1994). In Information Systems (IS) domain, Bhattacherjee (2001a, b) were among the earliest to apply ECT and examine a consumer's continuance intention while using an IS. According to the ECT, a consumer compares his/

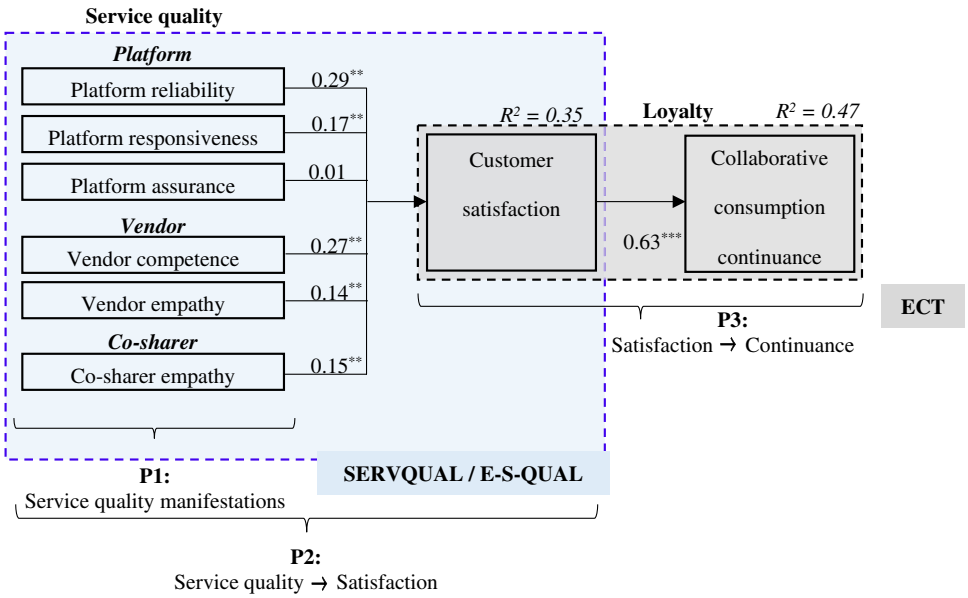

Fig. 1 Service quality and loyalty in transportation-related collaborative consumption (Study-3). Note: Structural model in Study 3 is informed by the findings in Study 1 and Study 2

her prior expectations about the service to that of the observed (or actual) performance while examining post-purchase satisfaction (Bhattacherjee, 2001b). When the customer perceives the performance of that service to be higher than expected, a positive disconfirmation occurs; otherwise, resulting in a negative disconfirmation. Thus, the *willingness to repurchase* or *continuance intention* for that service is key to its overall success. Therefore, a higher level of *customer satisfaction* invariably leads to a greater *repurchase intention* for the service. In this manner, SQ encapsulates the expectation-performance evaluation that a customer makes concerning the quality of service experience (Akhmedova et al., 2021; Lewis & Booms, 1983; Oliver et al., 1994) and originating from the expectancy-disconfirmation paradigm (Amat-Lefort et al., 2020; Bhattacherjee, 2001a, b; Parasuraman et al., 2005). After the service delivery by its providers, the customer evaluates the associated dimensions of SQ (Li & Shang, 2020; Omar et al., 2021), and their subsequent behaviour reflects customer loyalty (Akhmedova et al., 2021; Lim et al., 2021). This form of customer behaviour manifests as *continuance* or *non-continuance* with existing service providers due to being *satisfied* or *dissatisfied* with the service experience (Hussain et al., 2019; Jia et al., 2020; Saha, 2009; Salim et al., 2020). In this manner, the consumer's perception of overall satisfaction derived from that service can be successfully measured by the difference between *outcome performance* and *prior expectation* about the service (Nunkoo et al., 2020; Yas et al., 2020).

Recently, a few studies have employed ECT to examine the post-consumption satisfaction and subsequent consumption continuance in the context of CC, such as *shared accommodation* (Priporas et al., 2017a; Priporas et al., 2017b; Liang et al., 2018; Ju et al., 2019); *car-hailing services* (Cheng et al., 2018; Arteaga-Sánchez et al., 2020); and *bicycle-sharing* (Shao et al., 2020). However, studies that examine ride-sharing services in the context of the widened geographical scope of emerging markets are scant in extant literature (Akhmedova et al., 2021).

Therefore, in this study, we seek to employ a combination of service quality frameworks (SERVQUAL and E-S-QUAL) and ECT to propose a theoretical model to uncover the electronic service quality-satisfaction and satisfaction-continuance relationships in the context of transportation-related CC in India as a way to extend our extant understanding of consumer behaviour in SE. Such treatment is in line with Akhmedova et al. (2021)-s call for superior conceptual and contextual adaptations of collaborative consumption-service quality studies for the CC-based business models in emerging economies (Tandon et al., 2017). The constructs and the measurement model for our study are built upon these theoretical frameworks, as presented in Fig. 1.

Development of propositions

Given the unique nature of CC, wherein the service offered is mediated by multiple service touchpoints (e.g. platform, vendor) (Lim et al., 2021), we develop a mixed-methods approach that may allow us to ascertain the nature of SQ manifested in the service touchpoints that customers experience when they engage in CC practices. Thus, similar to Jia et al. (2020), the following research propositions (P) are presented:

P1. Service quality manifests through different service touchpoints in collaborative consumption.

P2. Service quality positively influences customer satisfaction of collaborative consumption.
P3. Customer satisfaction positively influences collaborative consumption continuance.

Proposition P1 examines the manifestation of SQ across the service touchpoints in a ride-sharing service through Study-1. Initially, qualitative interviews were conducted in Study-1 to explore these service touchpoints, which were further verified in Study-2 through a detailed topic modelling and text analytics approach. So, proposition P2 seeks additional support on the manifestation of SQ across service touchpoints through Study-2. Finally, Study-3 covers all the three propositions P1, P2, and P3 such that it further validates and generalizes the initial findings reported in Study-1 and Study-2 through a detailed analysis of survey responses collected from CC customers.

Methodology and design of study

Study-1 is qualitative in nature that applies a grounded-theory method (Charmaz & Belgrave, 2007) to explore the SQ dimensions that typically manifest across different service touchpoints in ride-sharing CC services. The grounded-theory methodology offers freedom to the researchers to generate new concepts and explain human behaviour. It has the following characteristics: (1) simultaneous data collection and phase-wise investigation of the research problems; (2) creation of codes developed from data, not from preconceived hypotheses; (3) memo-making to clarify and fill out codes, which is a crucial intermediate step between coding data and writing first drafts of the research paper; (4) a detailed literature review is not mandatory in the initial stages of the study (Charmaz & Thornberg, 2021; Makri & Neely, 2021). We applied the grounded-theory approach and conducted a thematic analysis on the qualitative interview data to reveal SQ manifestation across different service touchpoints in ride-sharing CC services.

Study-2 consisted of text-mining and topic analysis of customer reviews extracted from the ride-sharing app Ola (based in India) that enabled reaffirming and refining the findings from Study-1. Similarly, Study-2 was performed concurrently with Study-1 but by two different co-authors to minimize bias. Study-2 involved topic-modelling through Latent Dirichlet Association (LDA), an unsupervised Bayesian machine learning technique that enables discovering topics in a large corpus of text (Vallurupalli & Bose, 2020). Study-2 echoed the first study's findings, wherein six of seven SQ manifestations across three service touchpoints were present. Further, it confirmed that the seventh manifestation of SQ (namely, *vendor tangibility*) from Study-1 was indeed negligible, given that it was not reported significant from the topic models. Therefore, the triangulation between human and machine in qualitative research is witnessed when the findings of Studies 1 and 2 are taken collectively (Kim et al., 2021).

Study-3 was a survey-based examination that sought to validate the service quality-loyalty relationship established by the theoretical background and using insights uncovered from Studies 1 and 2. In other words, Study-3 relies on the service quality-loyalty relationship that was theorized as a research proposition (rather than hypotheses) in the theoretical background (Bacharach, 1989; Jia et al., 2020). Therefore, we cannot identify the SQ dimensions, service touchpoints and the second-order relationships accurately without conducting Studies 1 and 2. Importantly, Study-3 relied on a powerful statistical technique, namely Partial Least Squares Structural Equation Modelling. As a result, Study-3 confirmed that customer satisfaction of CC is positively influenced by five out of six SQ dimensions across three service touchpoints and that customer satisfaction positively influences the collaborative consumption continuance.

In this manner, we conducted a mixed-method approach combining (i) interviews; (ii) text-mining of customer reviews; (iii) a questionnaire-based survey to examine the service quality-loyalty dimensions in CC-based business models (Cheng et al., 2018; Ranjbari et al., 2020; Akhmedova et al., 2020b; Yoon et al., 2021). In the following sub-sections, first, we present our Study-1 with its goal, methodology, sampling approach, and research findings. Second, we present Study-2 with its objectives, methodology, and research findings. Third, we offer Study-3 with its goal, methodology, sampling approach, measurement model evaluation, structural model evaluation, and research findings.

Study-1: Qualitative phase

Objective The first study explores the manifestation of SQ across the service touchpoints in transportation-related CC (Proposition 1).

Methodology We selected a qualitative approach that utilized individual interviews to conduct the initial exploration. Extant studies that support this technique have previously undertaken the mixed-method analysis in the context of business and consumer research (Cruz-Cárdenas et al., 2019). The interview team, which consisted of two co-authors and one trained research assistant, had a priori discussion to establish a common understanding of the research purpose and proposition. In the interviews, participants were asked about their ride-sharing experiences and their quality evaluation of ride-sharing services. The interviews were conducted face-to-face in English and lasted between 15 to 35 min, with an average of 25 min. The interviews were also recorded and transcribed verbatim. Then, we conducted a thematic analysis with the interview data to

reveal SQ manifestation across the service touchpoints in CC across the transportation sector. We adopted an inductive approach recommended by Corbin and Strauss (2015) and applied the NVivo software. Next, we performed two levels of encoding: the first level was performed independently by two co-authors, (i.e. one who served and one who did not serve as an interviewer); before they were corroborated and agreed upon to develop the second level of themes, which followed the same independence-corroboration process in the prior level. This approach is also in line with the procedure suggested by Braun and Clarke (2006), which includes familiarising with qualitative data, generating initial codes, searching for themes, defining conceptual boundaries of themes, and reporting thematic findings. We measured the inter-rater reliability through Cohen's Kappa, and a score of 0.82 was obtained, which falls within the range of 0.81 to 1.00, thereby indicating an almost perfect agreement (McHugh, 2012). Inconsistencies were deliberated until we reached a consensus. The thematic findings' reliability was ensured as co-authors coded and reviewed the themes independently and as the methods and process of the study were reported transparently (Guba, 1981).

Sampling approach We undertook a purposive sampling approach to collect the sample (Lim & Ting, 2012). In particular, we collected interview data from 54 graduate students from a reputed post-graduate management institute in Eastern India who regularly use Ola app-based ride-sharing services to attend classes (see Table 2). The choice of the Ola ride-sharing application in our study is validated by Akhmedova et al. (2021). They insisted on performing SQ analysis with local platforms rather than continuing academic research with global platforms such as Airbnb and Uber. This study's sample is appropriate given that graduate students we purposively recruited were regular users of ride-sharing services (i.e. sampling criteria and theoretical representation). This study emphasized basic consumer behaviour independent of sample characteristics (i.e. nature of study and research goal), which is in line with the rationales that typify student samples that have been widely used in business and consumer research (Peterson & Merunka, 2014).

Moreover, this study is more interested in uncovering how SQ manifests across the various service touchpoints in the context of transportation-related CC rather than a generalized manifestation, which we addressed in the third study (Study-3). Finally, we attained theoretical saturation after interviewing the 24th participant, but we continued our exploration by interviewing all the 54 interested participants. We did not provide any additional monetary incentive or benefits, and participation was voluntary. No participant opted out of the interview despite being informed upfront that they could do so at any point in time during the interview.

Table 2 Participant background in qualitative Study-1

Gender	Post-graduate major	N	Age	N	Total
Male	Finance	04	21–28	22	
	Marketing	12			28
	Supply Chain	07	29–35	06	
	Information Systems	05			
Female	Finance	03	21–28	24	
	Marketing	09			26
	Supply Chain	09	29–35	02	
	Information Systems	05			
Total					54

Postgraduate course is Master of Business Administration

Findings When speaking about ride-sharing experiences, most participants referred to three themes that represented service touchpoints: *ride-sharing applications* (platform), *ride-sharing drivers* (vendor), and *ride-sharing passengers* (co-sharer) (see Table 3). From the platform perspective, most participants expressed that the service delivered by ride-sharing applications must be reliable (70% or $n = 38$), responsive (74% or $n = 40$), and assuring (54% or $n = 29$). From the vendor perspective, most participants indicated that ride-sharing drivers should be competent (43% or $n = 23$) and empathetic (64% or $n = 35$) to their service request. In contrast, from the co-sharer perspective, most participants suggested that co-passenger empathy is vital in evaluating the service experience (57% or $n = 31$). A few participants mentioned tangibles (17% or $n = 9$) in vehicle condition from the vendor perspective. Only one participant considered it to be an essential consideration of SQ—the others, when probed further, conceded that they did not pay much attention to the vehicle as they believe that there is nothing much that the driver could do with the car, and thus rather pay more attention to the service they received (see summary of findings from Table 3).

In summary, the findings from Study-1 suggest that *service quality* in transportation-related CC platforms can be conceptualized and contextualized based on three touchpoints (i.e. *platform reliability*, *platform responsiveness*, *platform assurance*), vendor (i.e. *vendor competence*, *vendor empathy*), and co-sharer (i.e. *co-sharer empathy*). Finally, *vendor tangibles* were not included as we collectively decided that our qualitative data and subsequent results obtained from Study-1 may not provide enough support for the same.

Study-1 is limited to a purposive sampling approach where the students were chosen for qualitative interviews.

Table 3 Themes and quotes from individual interviews (Study-1)

Theme	Frequency of occurrence *Out of 54 respondents*	Examples of quotes
Platform *Ride-sharing application*		
Platform reliability	38 / 54	Ola is reliable. It calculates fares accurately while you are booking your ride. The charges are also consistent and reasonable. It is also very accurate to the booked location and times of pick up and drop off. (ST23) The shared rides were great, and the app is extremely smooth. I can rely on Ola to travel to campus without waiting for public transport. (ST15) The updated app is faster than the previous version, but it has many ads and spam notifications, which eats up screen space on my mobile. While I was travelling back home from the campus, I had mistakenly clicked an ad that took me away from the navigation screen. It was already evening and raining heavily, and I got frightened. Ultimately, Ola is a ride-hailing app and not a digital marketing company. (ST07)
Platform responsiveness	40 / 54	The platform allows me to make last-minute modifications to my destination during the ongoing pooled ride without making any alterations in the route to be taken (highlighted in the map) for my co-passengers. I am happy that the mobile app is accommodative, smart, and offers comparable service qualities to passengers, whether in a personal cab or a shared ride. (ST31) While coming to campus, there were no issues so far except drivers. Nevertheless, the responses to complaints were mostly swift. (ST01) I had a bad experience during one of my shared rides back to my home, and I demanded a response to my complaint within the next 48 h. I waited but never received any calls from the helpdesk guys. I am sorry to say this, but the Ola app does not provide pickup services from all locations in Kolkata. Often, the Google map does not work for the driver, and he is unable to navigate. It solely becomes a pain for the passenger to instruct the driver over the phone. (ST30) I had been using Ola for three years, and I was hopeful about the new ride-sharing feature. The services are good, and they only need to improve on the passenger rates and offers. I think the app should be more lite so that it does not lag in low internet conditions. (ST33)
Platform assurance	29 / 54	The Ola app interface is customer friendly. It would be good for us if the default payment option is "cash" instead of online payments. (ST05) While sharing cab rides, unknown co-passengers can see my name and destinations (often my home or academic school). However, I am confident that the platform does not store or allow personal data sharing after the pooled ride. (ST18) The app used to be excellent previously. But, Ola has been offering some postpaid services, and it wanted to access my bank account through OTP and SMS. Are they trying to invade my digital privacy? I have no confidence but to uninstall the Ola app. (ST34)
Vendor *Ride-sharing driver*		
Vendor competence	23 / 54	The driver arrives at the location on time. The drivers have a very good navigation system. They are also professionally well equipped. (ST40)
Vendor empathy	35 / 54	The drivers are very polite and good. Overall, my experience has been excellent. (ST40)
Vendor tangibles	09 / 54	When Ola was first launched in Kolkata, most drivers used to be new. Nowadays, there are a lot of poorly maintained vehicles, a very sad state of affairs. (ST03)
Co-sharer *Ride-sharing passenger*		
Co-sharer empathy	31 / 54	One passenger persuaded the driver to take shortcuts, and the cab went away from the main roads. While this passenger was alighting from the cab, new car-pooled passengers began to join the ride. When I finally reached my destination, I was half an hour late and had to sit through an extra four kilometres. (ST45) As a customer, I am not happy about this app service. My reasons are: 1) OLA app always allocated me a car that was already booked by a passenger when I booked my trip. 2) The driver said to me, "please wait. I will come to your location shortly when I drop the passenger, but he never arrived". (ST21)

Table 4 Service quality manifestation through keyword-mapping based on Latent Dirichlet Association (Study-2)

Keyword	Platform *Ride-sharing application*			Vendor *Ride-sharing driver*		Co-sharer *Ride-sharing passenger*
	Platform reliability	Platform responsiveness	Platform assurance	Vendor competence	Vendor empathy	Co-sharer empathy
app	0.0407					
book		0.0394				0.0120
cab						0.0225
cancel		0.0380			0.0410	
care					0.0495	
charge			0.0178			0.0325
complain		0.0325				
connection		0.0298				
co-passenger						0.0401
customer					0.0618	0.0577
driver	0.0459			0.0822	0.0523	
hang		0.0098				
issue				0.0089	0.0055	
location						0.0089
mismatch					0.0190	
modify	0.0090					
money			0.0026			
ola	0.0515	0.0110	0.0280	0.0215		0.0155
payment			0.0027			
pool						0.0495
poor					0.0239	
response				0.0419	0.0545	
ride		0.0253		0.0637		
safe			0.0526			
service					0.0328	0.0180
share				0.0110		0.0635
time	0.0365	0.0489				

So, to overcome this limitation, we were motivated to conduct Study-2 with a generalized setting. Further, the findings from Study-1 rely on primary data using interviews, which is validated by Study-2 using the dataset that we collected from Google Playstore for the Ola mobile app. In the next section, we present the detailed analysis of Study-2.

Study-2: Text mining and topic Modelling phase

Objective The second study aims to find additional support on SQ manifestation across the service touchpoints in transportation-related CC observed in the first study (Proposition 1).

Methodology We performed a text mining of mobile app reviews in this study. In particular, we began by extracting customer reviews of a leading cab-sharing company in India (Ola) before conducting text mining and topic analysis using LDA (Vallurupalli & Bose, 2020). Topic analysis from text mining of online customer reviews has been popular in extracting various themes in service quality (Ding et al., 2020; Zuo et al., 2019; Mejia et al., 2020; Lee et al., 2021). This unsupervised Bayesian machine learning technique enables discovering topics in a large corpus of text (Blei et al., 2003). LDA uses the probability of words co-occurring within documents to identify sets of topics and their associated words (Vallurupalli & Bose, 2020). LDA determines words associated with a topic, and researchers assign labels to these topics based on an assessment of the content given the set of words. The *lda* and *tm* packages in the R environment provide the platform for extracting the per-topic-per-word probabilities.

Findings Our text mining and topic analysis of app reviews (see Table 4) found evidence of SQ manifestations in three service touchpoints of the *platform*, *vendor*, and *co-sharer,* which Study-1 had revealed. In terms of the platform (or ride-sharing application), top keywords such as "Ola", "app", "book", and "time" associate with the various SQ manifestations of the *platform: reliability*, *responsiveness*, and *assurance* of the ride-sharing app (i.e. Ola). In terms of the vendor (or ride-sharing drivers), top keywords such as "driver", "care", and "service" associate with the SQ manifestations of *vendor: competence* and *empathy*. In terms of co-sharer (or ride-sharing passengers), top keywords such as "share", "customer", "pool", and "co-passenger" associate with the SQ manifestation of *co-sharer empathy*. Few keywords bonded with multiple constructs, for instance, "time" with *platform reliability* (prob. = 0.0365) and *platform responsiveness* (prob. = 0.0489); "driver" with *platform reliability* (prob. = 0.0459), *vendor competence* (prob. = 0.0822) and *vendor empathy* (prob. = 0.0523), where the highest probability indicated strongest topic association. Finally, we did not find any high "per-topic-per-word probability" keywords related to *vendor tangibility* (e.g. vehicle, car seat), which led us to the conviction that tangibles were relatively insignificant for CC-based ride-sharing.

The findings from Study-2 cannot be generalized due to limitations in the data source and because the themes extracted after topic modelling are restricted to one context only. Additionally, the mobile app review data available on Google Playstore consist of limited information[4]- e.g. exact geographical location of the passenger's journey is not available. In addition, detailed information about the co-passengers and the driver (or vendor) is unavailable on the reviews. This information is also critical for our SQ analysis. So we were motivated to conduct the survey-based Study-3 through random selection of passengers across different geographical locations (Kolkata, New Delhi, and Bengaluru) and collect the maximum possible information with the help of a detailed questionnaire.

Further, the identification of topics and establishing a relationship between topics and associated keywords need subjective interpretation. Therefore, we conduct Study-3 and examine 187 valid responses collected from consumers who booked Ola ride-sharing services to analyse the findings more objectively. Furthermore, we employ the PLS-SEM technique to examine the survey responses, thereby strengthening the conceptualization and contextualization of SQ manifestations in transportation-related CC services. In this manner, the findings of Study-1 and Study-2 informed the strategy of Study-3.

[4] Ola App reviews: https://play.google.com/store/apps/details?id=com.olacabs.customer&showAllReviews=true

Table 5 Background of respondents participating in the quantitative study (Study-3)

Gender	Location	N	Age	N	Total
Male	Kolkata	36	21–32	44	
	New Delhi	32	33–44	20	92
	Bengaluru	24	45–56	28	
Female	Kolkata	29	21–32	57	
	New Delhi	41	33–44	22	95
	Bengaluru	22	45–56	16	
Total					187

Study-3: Quantitative phase

Objective The third study examines the service quality-loyalty relationship in CC using the SQ manifestations revealed in the first and second study. (Propositions P1, P2, and P3).

Methodology We used partial least squares structural equation modelling (PLS-SEM) on quantitative data obtained from a survey administered paper-based questionnaires to customers of Ola ride-sharing services to conduct the empirical analysis. In particular, we validated our model using "semPLS" and "seminr" packages in R, wherein the measurement model and structural model were validated using the consistent PLS mechanism and a bootstrap sample of 10,000 observations with the "bias-corrected and accelerated (BCa) bootstrap" option to generate stable confidence intervals for the path coefficient estimates (Hair et al., 2016; Streukens & Leroi-Werelds, 2016). The questionnaire consisted of two parts: the first part consisted of questions measuring the constructs in the study on a seven-point Likert scale, and the second part consisted of basic demographic questions. The questionnaire (see Table 6) was developed in consultation with the extant literature and the findings from Study-1 and Study-2. In addition, the questionnaire underwent a pre-test with three subject-matter experts to establish content validity and a pilot study with a purposive sample of 45 students in a business school in Eastern India who used Ola ride-sharing services to confirm face validity. The pre-test and pilot study contributed to the refinement of questions and questionnaire structure before being administered in the main study.

Sampling approach Though the sampling approach is similar to Study-1, the population is dissimilar—i.e., Study-1 employed a student sample, whereas Study-3 utilized a consumer sample from Ola customers. We identified consumers who arrived at airports, railway stations, and shopping malls in three Indian metro cities: Bengaluru, Kolkata, and New Delhi. They were required to book their rides using Ola app-based services only. This, in turn, enabled us to

Table 6 Measurement model (Study-3)

Construct	Item ID	Item	Descriptive		Indicator reliability		*t*-statistic	Convergent validity	Internal consistency reliability	Source (Adapted)
			M	SD	Loading (≥0.70)	Loading^2 (≥0.50)	Sig. 95% (>2.61)	AVE (≥0.50)	ρ (≥0.70)	
Platform reliability	PRB1	The platform adjusts to last-minute alterations in my route with high accuracy.*	3.88	0.57	0.53*	0.28*	5.77	0.70	0.87	Cheng et al. (2018); Lee et al. (2000); McKnight et al. (2002); Parasuraman et al. (1988); Parasuraman et al. (2005).
	PRB2	The platform operates in the early morning as well as late hours.	3.84	0.89	0.98	0.95	92.40			
	PRB3	The platform allows tracking with minimal interruption (e.g. advertisements).	3.66	0.77	0.93	0.86	51.80			
Platform responsiveness	PRP1	Cancellation is easy and fast on this platform.	4.64	1.13	0.86	0.73	34.85	0.68	0.86	
	PRP2	The customer care team provides swift solutions to complaints and queries.	4.11	0.81	0.88	0.77	26.39			
	PRP3	In the case of poor internet connectivity, I can still make bookings in offline mode.	2.65	0.91	0.73	0.53	15.50			
Platform assurance	PA1	I feel safe while conducting transactions on the platform.	5.52	1.45	0.84	0.71	16.83	0.70	0.82	
	PA2	I feel secure as the platform safeguards the sharing of personal information.	4.07	1.05	0.83	0.68	10.83			
Vendor competence	VC1	The driver completes the ride within ETA for every co-passenger shown in the app.	2.72	1.14	0.78	0.61	19.02	0.60	0.81	Cheng et al. (2018); Parasuraman et al. (1988); Marimon et al. (2019); Akhmedova et al. (2020a)
	VC2	The driver follows traffic rules during ride-sharing.*	5.10	0.88	0.65*	0.42*	12.77			
	VC3	The driver chooses efficient and timely routes for every co-passenger.	3.18	0.72	0.87	0.75	23.85			
Vendor empathy	VE1	I feel that most drivers would act in customers' best interests.	4.36	0.95	0.93	0.86	48.77	0.59	0.81	
	VE2	I rely on the competence and professionalism of the driver.*	3.29	0.98	0.67*	0.45*	10.19			
	VE3	If a customer requires help, most drivers will do their best to help.	2.94	1.15	0.68	0.46	14.96			
Co-sharer empathy	CE1	I feel that most co-passengers would act in the best interests of other passengers.	1.89	0.86	0.95	0.90	49.43	0.88	0.93	
	CE2	The co-passenger respects the sharing of personal space within the vehicle.	3.31	1.02	0.92	0.84	43.12			

Table 6 (continued)

Construct	Item ID	Item	Descriptive		Indicator reliability		t-statistic	Convergent validity	Internal consistency reliability	Source (Adapted)
			M	SD	Loading (≥0.70)	Loading² (≥0.50)	Sig. 95% (>2.61)	AVE (≥0.50)	ρ (≥0.70)	
Satisfaction	SA2	I am thoroughly satisfied with my ride-sharing experience.	3.97	0.80	0.89	0.79	26.02	0.77	0.91	Udo et al. (2010); Venkatesh et al. (2012).
	SA2	I am satisfied with my decision to take ride-sharing.	4.95	0.67	0.80	0.63	19.70			
	SA3	I think that I made the correct choice to use ride-sharing.	4.39	0.75	0.93	0.86	66.70			
Continuance	CT1	I intend to use ride-sharing services frequently.	6.02	0.98	0.96	0.91	26.32	0.67	0.85	
	CT2	I am motivated to use ride-sharing in the next few weeks.	4.48	1.27	0.71	0.50	04.85			
	CT3	I will not uninstall the ride-sharing app from my mobile device.	5.81	1.01	0.87	0.76	13.86			

All items were measured on a seven-point Likert scale, with "1" representing strongly disagree and "7" representing strongly agree; *ID* Identification, *M* mean, *SD* standard deviation, *AVE* average variance extracted, ρ = Dillon-Goldstein's rho; * = items removed due to low individual loading and squared loading

Abbreviations: *PRB* platform reliability, *PRP* platform responsiveness, *PA* platform assurance, *VC* vendor competence, *VE* vendor empathy, *CE* customer empathy, *SA* satisfaction, *CT* continuance

sample our intended target population for this study—that is, the consumers of Ola ride-sharing services. In total, we collected 215 responses to paper-based questionnaires from consumers of Ola who consented to participate in our survey. These responses were subjected to data cleaning, where we removed straight-line responses and responses with a high degree of missing data (≥ 20%). Thus, the final sample consisted of only 187 valid responses, with 92 males and 95 females (see Table 5), which meets the "10-times rule" suggested by Hair et al. (2016) (i.e. ten times the most [six] links pointing at a latent variable [customer satisfaction] in the model). PLS is also appropriate for a multi-path model when the sample size is small (Chin, 1998), and our choice of sample size is supported by Hair et al. (2016) (Exhibit 1.7, Page 26).

Measurement model evaluation

We assessed the quality of the reflective measures in terms of internal consistency reliability, indicator reliability, convergent validity, discriminant validity, and common method bias (see Tables 5 and 6). We established the internal consistency reliability using Dillon-Goldstein's rho (ρ). The ρ of all constructs ranged from 0.81 to 0.93 and met the threshold of ≥0.70 (Chin, 1998; Henseler et al., 2016).

We evaluated the indicator reliability using the individual loading and squared loading of the items measuring the study's constructs. The individual loadings and squared loading of items included in the structural model ranged from 0.71 to 0.98 and 0.50 to 0.95. They met the threshold of ≥0.70 and ≥ 0.50, respectively (Hair et al., 2016). Thus, the t-statistic for each item was significant. However, we dropped three items from the structural model as they did not meet the threshold, namely PRB1, VC2, and VE2 (Table 6).

Convergent validity was assessed using the average variance extracted for each construct. The average variance extracted of all constructs ranged from 0.59 to 0.88 and met the threshold of ≥0.50 (Fornell & Larcker, 1981) (Table 7).

We established the discriminant validity by comparing average variance extracted, squared correlation, and heterotrait-monotrait ratio. The average variance extracted for each construct was greater than the squared correlation for each pair of constructs (Fornell & Larcker, 1981). Furthermore, the heterotrait-monotrait ratios ranging from 0.21 to 0.76 indicated that each pair of constructs was distinct as the ratios met the threshold of ≤0.85 (Henseler et al., 2015) (Table 7).

We evaluated the common method bias using Harman's single-factor approach, wherein items were subjected to exploratory factor analysis (Harman, 1967). Our analysis indicated that the first factor explains 46.82% of the total variance and thus met the ≤50% threshold, thereby indicating that common method bias is not an issue in this study.

Table 7 Correlation matrix and heterotrait-monotrait ratios (Study-3)

	PRB	PRP	PA	VC	VE	CE	SA	CT
PRB	**0.84**							
PRP	0.40 (0.56)	**0.82**						
PA	0.14 (0.76)	0.40 (0.69)	**0.84**					
VC	0.40 (0.65)	0.47 (0.59)	0.32 (0.71)	**0.77**				
VE	0.32 (0.53)	0.31 (0.68)	0.54 (0.61)	0.13 (0.49)	**0.77**			
CE	0.41 (0.57)	0.22 (0.57)	0.47 (0.74)	0.11 (0.47)	0.34 (0.55)	**0.94**		
SA	0.45 (0.45)	0.51 (0.55)	0.31 (0.62)	0.41 (0.55)	0.49 (0.47)	0.38 (0.30)	**0.88**	
CT	0.27 (0.21)	0.16 (0.28)	0.41 (0.28)	0.21 (0.33)	0.25 (0.32)	0.25 (0.28)	0.31 (0.26)	**0.82**

Figures in regular font indicate squared correlation values between constructs; Figures in bold font indicate the square root of AVE of each construct (≥0.70); Figures in brackets indicate HTMT ratio for discriminant validity assessment (<0.85)

Abbreviations: PRB platform reliability, *PRP* platform responsiveness, *PA* platform assurance, *VC* vendor competence, *VE* vendor empathy, *CE* customer empathy, *SA* satisfaction, *CT* continuance, *HTMT* heterotrait-monotrait

Structural model evaluation and findings

The PLS-SEM evaluated the structural model after attaining a validated measurement model (please see Fig. 1 and Table 8).

In general, the findings from Study-3 indicate that the model had good explanatory power. In particular, the findings suggest that customer satisfaction of transportation-related CC ($R^2 = 0.35$) is positively influenced by platform reliability ($\beta = 0.29$, $p < 0.01$), platform responsiveness ($\beta = 0.17$, $p < 0.01$), vendor competence ($\beta = 0.27$, $p < 0.01$), vendor empathy ($\beta = 0.14$, $p < 0.01$), and co-sharer's empathy ($\beta = 0.15$, $p < 0.01$), but not platform assurance ($\beta = 0.01$, $p > 0.01$), and that continuance of CC ($R2 = 0.47$) is positively influenced by customer satisfaction ($\beta = 0.627$, $p < 0.01$). No issue of multicollinearity was observed (VIF < 5) (Hair et al., 2016).

Moreover, the effect size (f^2) of significant relationships were reasonably good as they ranged between medium to high. In particular, Hair et al. (2016) note that the threshold values for low, medium, and high effect size are 0.02, 0.15, and 0.35, respectively. In this regard, the effect size of platform reliability ($f^2 = 0.20$), platform responsiveness ($f^2 = 0.19$), vendor competence ($f^2 = 0.24$), vendor empathy ($f^2 = 0.15$), and co-sharer empathy ($f^2 = 0.27$) on customer satisfaction of transportation-related CC are medium, whereas the effect size of customer satisfaction ($f^2 = 0.75$) on the continuance of CC is high. The effect size of platform assurance ($f^2 = 0.01$) on customer satisfaction is low and thus negligible.

Finally, we performed a post-hoc mediation analysis in Study-3 to scrutinize the potential of mediation effects (Zhao et al., 2010; Nitzl et al., 2016). The findings indicate that customer satisfaction completely mediates platform reliability ($\beta = 0.18$, $p > 0.01$), platform responsiveness ($\beta = 0.11$, $p > 0.01$), vendor competence ($\beta = 0.17$, $p > 0.01$), and vendor empathy ($\beta = 0.09$, $p > 0.01$) and partially mediates co-sharer empathy ($\beta = 0.10$, $p < 0.01$) with the continuance of CC. No mediation effect was observed for platform assurance ($\beta = 0.01$, $p > 0.01$).

Discussion

Research findings

Among the six service quality dimensions in CC based ride-sharing services: *platform reliability*, *platform responsiveness*, *vendor competence*, *vendor empathy*, and *co-sharer empathy* are positively related to *customer satisfaction* (Propositions P1 and P2 are supported), while we did not observe any significant support to examine the relationship between *platform assurance* and *customer satisfaction* from our Study-3. Additionally, we discontinued the construct *vendor tangibles* in subsequent Studies 2 and 3, which emerged insignificantly from the previous Study-1 (17% or $n = 9$ out of 54 participants).

For *platform reliability*, our findings are consistent with Cheng et al. (2018) and Marimon et al. (2019), who highlighted the significance of the CC-based ride-sharing platform, primarily *whether the platform operates in the early*

Table 8 Structural model (Study-3)

Research proposition	Path	VIF	Standard beta	Standard error	*p* value	Outcome	R^2	f^2
P2: Service quality ➔ Satisfaction	*Platform*						0.35	
	• Platform reliability ➔ Satisfaction	3.58	0.29	0.07	0.00	Supported		0.20
	• Platform responsiveness ➔ Satisfaction	1.27	0.17	0.05	0.00	Supported		0.19
	• Platform assurance ➔ Satisfaction	2.21	0.01	0.07	0.85	Not supported		0.01
	Vendor							
	• Vendor competence ➔ Satisfaction	2.24	0.27	0.06	0.00	Supported		0.24
	• Vendor empathy ➔ Satisfaction	1.34	0.14	0.04	0.00	Supported		0.15
	Co-sharer							
	• Co-sharer empathy ➔ Satisfaction	1.70	0.15	0.04	0.00	Supported		0.17
P3: Satisfaction ➔ Continuance	*Loyalty*						0.47	
	• Satisfaction ➔ Continuance	1.00	0.63	0.09	0.00	Supported		0.75
Post-hoc mediation: P2 ➔ P3	*Platform*							
	• Platform reliability ➔ Satisfaction ➔ Continuance		0.18	0.05	3.44	Complete mediation		
	• Platform responsiveness ➔ Satisfaction ➔ Continuance		0.11	0.04	2.82	Complete mediation		
	• Platform assurance ➔ Satisfaction ➔ Continuance		0.01	0.04	0.86	No mediation		
	Vendor							
	• Vendor competence ➔ Satisfaction ➔ Continuance		0.17	0.04	3.77	Complete mediation		
	• Vendor empathy ➔ Satisfaction ➔ Continuance		0.09	0.03	2.94	Complete mediation		
	Co-sharer							
	• Co-sharer empathy ➔ Satisfaction ➔ Continuance		0.10	0.03	0.00	Partial mediation		

VIF variance inflation factor, R^2 coefficient of determination, f^2 effect size

morning as well as late hours, or *how fast it allows tracking with minimal interruption to the customer service*. In particular, the earlier measures: "site organization" (Bernardo et al., 2012; Marimon et al., 2019); "ease of use and navigation" (Bernardo et al., 2012; Shah, 2020); "error-free and quality content" (Lee, 2018; Shah, 2020) are congruent with our findings related to *platform reliability*. Platform reliability appeared as the most robust antecedent for customer satisfaction. While, an interesting finding from our study was that ride-sharing customers were less concerned *whether the platform adjusted to last-minute alterations in the route with high accuracy*, thereby suggesting that co-passengers were cautious while selecting pickup and drop locations at the beginning of a ride.

Our findings are consistent for platform responsiveness and coincide with extant research (Cheng et al., 2018; Marimon et al., 2019; Amat-Lefort et al., 2020). In particular, CC-based ride-sharing features such as *easy and fast cancellation* or *swift and responsive customer care team* are congruent with the construct "platform responsiveness and agility" (Marimon et al., 2019); "mobile system efficiency and availability" (Bernardo et al., 2012; Shah, 2020) and "mobile customer service and billing" (Shah, 2020). Additionally, from Study-2, the top keywords associated with the construct (or topic) "platform responsiveness" are "book," "cancel," "complain," "connection," "hang," and "ride" (see Table 4).

Our study did not find strong support for *platform assurance* provided by CC-based ride-sharing services. While few extant studies found support for trustworthiness and platform security (Cheng et al., 2018; Li et al., 2021; Shah, 2020), other scholars did not harmonize similar results (Marimon et al., 2019) or ignored cybersecurity challenges that might appear in platform transactions using digital wallets and credit cards (Arteaga-Sánchez

et al., 2020). Often, *trust* and *user privacy* play central roles in realizing the perceived benefits of e-commerce businesses (McKnight et al., 2002; Udo et al., 2010), and they subsequently create loyalty (or repurchase intention), and CC-based platforms are no exception (Liang et al., 2018; Jia et al., 2020; Wang et al., 2020). However, we found that co-sharers (or co-passengers) in CC-based ride-sharing services were sceptical about safe and secure transactions on the platform (indicating *trust* and *security*) or safeguarding against sharing of personal information (indicating *user privacy*) (Wang et al., 2020). These cybersecurity concerns also relate to the recent incidents where customers had been victims of insecure CC-based apps,[5] unauthorized transactions through stolen credit-cards,[6] and personal data sold by hackers on black markets.[7] This mistrust also echoed in the keyword-topic association probabilities extracted from customer reviews that were reported in Study-2 for construct "platform assurance", where "safe" had the highest association probability (0.0520) among the five keywords (see Table 4).

Next, we analyze the effect of *vendor competence,* and our novel findings are congruent with few extant studies in CC-based ride-sharing services (Marimon et al., 2019; Shah, 2020). The role played by a vendor (or driver) in ride-sharing services is similar to an Airbnb host whose proficiency and hospitality skills attract customers and encourage repurchase intention (Priporas et al., 2017a; Wang et al., 2020; Ding et al., 2020). While Cheng et al. (2018) reported the effect of "competence" as an essential indicator of offline SQ in ride-hailing services, and Shah (2020) identified the "safety and personnel" construct, they did not examine co-sharing services in particular. Although Marimon et al. (2019) identified the influence of the "peer service supplier" (similar to "vendor competence") towards the perceived quality of CC-based service, their study falls short of examining it further, specifically in the context of co-sharing ride services. In contrast, our study measures "vendor competence" with CC-based ride-sharing features such as *whether the driver completes the ride within ETA for every co-passenger* or *chooses efficient and timely routes for every co-passenger.* The themes of interview quotes ($n = 35$ out of 54) in our Study-1 (see Table 3) also support these findings.

We then examine the impact of *vendor empathy,* and our findings concur with studies that explored regular ride-hailing services (Cheng et al., 2018; Sthapit & Björk, 2019). However, recent studies by Marimon and associates (Marimon et al., 2019; Amat-Lefort et al., 2020) and Akhmedova and associates (Akhmedova et al., 2020a; Akhmedova et al., 2020b) fail to identify "vendor empathy" as a critical antecedent to evaluate SQ in co-shared rides for CC services. Instead, they reported an additional cycle of expectation-perception gap analysis of the peer service provider, which synchronizes with the *vendor empathy* proposed in this study. This SQ manifestation also echoed in the keyword-topic association probabilities extracted from customer reviews in Study-2 for construct "vendor empathy" with the top four keywords: "customer," "response," "driver", and "care" (see Table 4).

Next, this study identifies *co-sharer empathy* as a novel construct to measure the SQ manifestations in CC-based ride-sharing services. While extant studies (Cheng et al., 2018; Sthapit & Björk, 2019; Marimon et al., 2019; Amat-Lefort et al., 2020; Akhmedova et al., 2020b) have examined the antecedents of SQ and consumption continuance in ride-hailing services, co-sharing is a relatively new phenomenon and is available in few countries only. This unique setting enables us to observe whether *co-passengers act in the best interests of other passengers* and *each co-passenger respects the sharing of personal space within the vehicle,* which could, at best, be compared to the "quality of service provided by peers" (Akhmedova et al., 2020a). The interview ($n = 31$ out of 54) in Study-1 (see Table 3) and top keywords from topic-modelling: "share," "customer," "pool", and "co-passenger" (see Table 4) also support these findings.

Finally, we explain the absence of *vendor tangibles* as an antecedent towards the overall customer SQ and continuance intention of CC in ride-sharing services. While a few extant studies highlighted the importance of tangibles (Cheng et al., 2018; Amat-Lefort et al., 2020; Shah, 2020), others did not find strong evidence about the positive impact of the physical appearance of shared assets during the rides (Alonso et al., 2018; Marimon et al., 2019). Possible explanations could be as follows. First, co-shared car rides (e.g. Uber Pool, Uber Express Pool, and Ola Share) were introduced as cheaper and sustainable alternatives to regular car-hailing services (e.g. UberX, Uber Go, Ola Mini)[8,9]; unlike other platform-based CC services. Here, multiple co-passengers share the same vehicle as a public transport system (such as bus, tram, or train) which runs along a fixed route with no deviations.[10] Second, the timespan of service consumption

[5] OLA Cabs online service had a serious glitch: https://www.deccanchronicle.com/150901/technology-latest/article/ola-cabs-online-service-had-serious-glitch-exposed-crucial-user

[6] How Hackers Take Abandoned Chinese Uber Accounts for a Wild Ride: https://www.sixthtone.com/news/1002770/how-hackers-take-abandoned-chinese-uber-accounts-for-a-wild-ride

[7] Uber Newsroom "2016 Data Security Incident": https://www.uber.com/newsroom/2016-data-incident/

[8] First came UberPool. Now there's an even cheaper option, but it requires some extra effort: https://www.washingtonpost.com/news/dr-gridlock/wp/2018/02/21/youve-heard-of-uberpool-now-uber-is-offering-express-pool/

[9] Uber Pool: https://www.uber.com/in/en/ride/uberpool/

[10] Ola Share Express: https://www.olacabs.com/express

in CC-based car-hailing services is so small that customers prefer to ignore its *tangibility* (e.g. nice car, rough seats, bad suspension, and smelly interiors) when compared with other relevant factors. Therefore, this finding is in contrast with other CC-based services such as Airbnb (tangible: "house") or UberX (tangible: "car"), where the tangible component is at the core of the service offering.

Theoretical implications

Our study has several important theoretical contributions, mainly towards the SERVQUAL and E-S-QUAL frameworks and the Expectation Confirmation Theory while examining SQ dimensions in the context of CC-based ride-sharing services. First, we extend the following aspects of the SERVQUAL framework - (i) reaffirm that SQ is a multi-dimensional concept that necessitates (re) conceptualization and (re) contextualization when its evaluation is conducted in new service settings (here "CC-based co-shared car-hailing services). Although service quality is a multi-dimensional concept (Zhang et al., 2019; Patten et al., 2020), its dimensions, however, may not be entirely consistent and remain significant uniformly across all services. In this aspect, our study presented evidence of consumers ignoring *tangibles* as a significant component while evaluating the SQ; (ii) identify the existence of "multi-level" interactions of a customer (i.e. co-sharing passenger) with an agent (i.e., CC-based platform, vendor, other co- sharing passengers), in addition to the "double" interaction proposed by Amat-Lefort et al. (2020). Therefore, the traditional frameworks can now be interpreted as an aggregation of "multiple" closed cycles, and their mutual interactions can be extended to "co-passengers". Thus, the expectation-perception gaps now become "co-passenger / platform" (i.e. mobile app) gap, "co-passenger / peer service-provider" (i.e. vendor) gap, and "co-passenger / co-passenger" gap; (iii) propose a new dimension of SQ: *co-sharer empathy*, echoed by "quality of service provided by peers" (Akhmedova et al., 2020a) which also reflects the "co-passenger / co-passenger" gap reported in (ii).

Second, our study contributes to the Expectation Confirmation Theory (ECT) in the following ways - (i) complements existing studies that have employed the ECT by integrating various SQ dimensions and customer satisfaction into an inclusive framework and then investigating their joint influences on collaborative continuance intention (Saha, 2009; Hussain et al., 2019; Jia et al., 2020); (ii) derive insights from the post-hoc mediation analysis (see Table 8) between the service touchpoints and continuance intention (P2 ➔ P3) regarding CC-based ride-sharing services. The five SQ antecedents demonstrate significant yet asymmetric influences on the co-sharers' satisfaction, which successively improves their continuance intention. This asymmetric influence is currently lacking in CC-based research with ECT (Ju et al., 2019; Arteaga-Sánchez et al., 2020). It is given by the following relationship: *platform reliability* > *vendor competence* > *platform responsiveness* > *vendor empathy* > *co-sharer empathy*.

Third, our study contributes to the Stakeholder Theory in the following ways - (i) identifies a new stakeholder "co-sharing passenger" in the context of CC-based ride-sharing services. While, online trust and the relationship with its antecedents can be regarded from the standpoints of various participating stakeholders (Donaldson & Preston, 1995; Shankar et al., 2002) such as *customer* and *vendor* (or peer service-provider) in traditional CC-based services (Wang et al., 2020) such as home-sharing (e.g. Airbnb), or personal car-hailing (e.g. UberX, Ola Mini), the notion of a new stakeholder, namely, "co-sharing passenger" is relatively unique; (ii) each stakeholder will co-exist, with their mutual relationships enjoying the intrinsic values, and their interests will continue to balance among each other without dominating others. Their co-existence will lead to increased customer satisfaction in the car-hailing service, leading to a positive continuance intention of the co-passengers.

Managerial implications

Our study is also important for managers due to the following reasons. First, it proposes a novel framework to examine and validate that CC-based ride-hailing platforms must consider service quality strategies from three service touchpoints—*platforms*, *vendors*, and *co-sharer*s to satisfy and promote customer loyalty. Platforms need to ensure that their service rendered is reliable and uninterrupted (Alt et al., 2019). To ensure reliability, platforms may need to operate throughout the day, including early morning and late hours. Platforms should also ensure that the service interface (apps) allows customers to track their journey with minimal interruption (e.g. advertisements) on the active screen. Finally, to ensure responsiveness, platforms need to ensure that their service interface (apps) can respond to customer demands quickly (e.g. hassle-free cancellation, customer service support) with minimum bandwidth (i.e. to accommodate instances of poor internet connectivity among customers). Additionally, our study highlights that *platform reliability* (path coefficient = 0.29) and *vendor competence* (path coefficient = 0.27) are the two antecedents of service quality with the most robust path coefficients. These findings indicate that customers in co-shared car-hailing services are primarily concerned about (i) online SQ attribute: the CC-based "platform" and its reliability"; (ii) offline SQ attribute: the "vendor" (here driver) and their competence as a peer service provider (Akhmedova et al., 2020a). Following these insights, managers at these firms can benefit by working on these factors on priority, and therefore plan

to improve "customer stickiness" by (a) displaying realistic ETA for the journey and reduce the expectation-perception gap in the service delivery (b) improve the prevailing route-planning algorithm such that it benefits the driver in serving co-passengers; (c) train drivers to promote quality driving, and reduce traffic accidents.[11]

Second, our results suggest that *platform assurance* is not significantly related to the continuance of collaborative consumption-based co-shared car-hailing services, implying that co-passengers in our sample do not consider platform assurance to affect customer satisfaction in the Indian context. However, the measurement model (Table 3) indicates that the participants in the survey were responsive (mean = 4.07 out of 7) with a reliable indicator (loading = 0.83), convergent validity (AVE =0.70) and internal consistency reliability ($\rho = 0.82$). Still, this finding offers interesting recommendations for CC-based platform businesses and service providers. Technology specialists such as app developers, user experience designers, and quality professionals need to focus on a safe and secure user experience on these CC-based car-hailing platforms, especially in India. CC-based car-hailing services such as Ola and Uber acknowledge that they are not entirely safe and require the "wisdom of the crowd" to solve critical cybersecurity problems that might have missed the expert's eyes[12,.13] Therefore, cybersecurity experts at these businesses must aim to protect user data privacy by averting sharing of sensitive passenger information and ethically report any software vulnerabilities that may cripple the regular services of the platform.[14]

Third, the topic modelling employed in our study reveals many interesting themes and their associated keywords from actual customer reviews submitted to the platform. Among the themes that emerged as significant from this study, "co-sharer empathy" and "vendor empathy" draw our attention with the maximum number of associated keywords. These thematic insights can be useful for CC-based businesses to improve customer satisfaction in the long run. For instance, to improve "co-sharer empathy," car-hailing companies can simply look at the following keywords: "share," "customer," "pool", "co-passenger," "charge," and "book", then trace them back to the originating customer reviews and seek innovative solutions to amend their inadequacies. Similarly, to improve "vendor empathy," a similar strategy could be employed by examining the keywords: "driver," "customer," "response", "care," "mismatch," and "service." Such data-driven analyses based on user-generated contents are highly insightful and more effective than traditional market research practices that evaluate customer satisfaction (Mejia et al., 2020; Vallurupalli & Bose, 2020). In this manner, CC-based service providers can reduce the expectation-perception gap in their service quality swiftly yet efficiently. Additionally, the advertisement content communicated through various media channels needs redesign using these unique thematic features. For instance, Ola launched a series of advertising campaigns named "Heroes of Ola" to recognize the efforts of drivers (here vendors) and encouraged customers to share their stories on various social media platforms. Such a unique strategy can lead to improved "vendor empathy" as drivers ensure that customers have an enjoyable ride, even if it means going beyond their call of duty.[15]

Conclusion

In summary, this study enlightened our understanding of CC in three significant ways. First, this study sheds light on consumer perception and evaluation of service quality in CC by revealing the manifestations of service quality across service touchpoints in the SE. Next, this study delineated the effects of service quality on customer satisfaction, which considers the different service quality indicators in CC. Finally, this study concludes that when customers are satisfied with their CC experience in the SE, continuance with CC will be successful.

Notwithstanding the contributions of this study to theory and practice, several limitations are acknowledged, which may pave the way for future research. First, the study uses a single context to validate the service quality-loyalty relationship in CC: app-based ride-sharing services. Given the fruitful discovery of unique manifestations of service quality across myriad service touchpoints, we encourage future research to consider re-examining this relationship in other contexts of CC, such as home-sharing services. Such an investigation holds two potential benefits. (a) It enhances the theoretical generalizability of the service quality-loyalty relationship in service settings with multiple touchpoints, albeit with the potential of different manifestations under the central idea of SQ dimensions manifested across different touchpoints. (b) It overcomes generalizability, where the

[11] Maruti Suzuki collaborates with Ola to create a pool of skilled drivers: https://www.olacabs.com/media/in/press/maruti-suzuki-collaborates-with-ola-to-create-a-pool-of-skilled-drivers-and-promote-entrepreneurship

[12] New York Times - "Inside Uber's $100,000 Payment to a Hacker, and the Fallout": https://www.nytimes.com/2018/01/12/technology/uber-hacker-payment-100000.html

[13] Indian ethical hacker helps Uber fix flaw in its app that exposed user numbers, email: https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/indian-ethical-hacker-helps-uber-fix-flaw-in-its-app-that-exposed-user-numbers-email/articleshow/71096117.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

[14] Ola Bug Bounty Program: https://whitehat.olacabs.com/

[15] Heroes of Ola | YouTube: https://www.youtube.com/hashtag/heroesofola

context is underemphasized and less relevant. For example, ride-sharing is absent or limited in societies with well-functioning public transportation (Pearson, 2018). Second, this study combines both conventional and contemporary data collection and analysis techniques in a three-pronged study. While the former consists of thematic analysis on qualitative interview data and partial least squares structural equation modelling with the quantitative survey. In contrast, the latter includes LDA and text mining. These efforts, however, remain limited, given that contemporary techniques are increasingly employed in research due to their sophistication and predicting consumer behaviour more precisely. Thus, we encourage future scholars to facilitate rigorous research designs, such as those developed herein, but with a greater disposition of analysis methods, such as behavioural experiments (Lim et al., 2019).

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