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Investigating the influence of adaptation behaviours on continuance intention to use ride-hailing applications: a case from the drivers' perspective

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Abstract: Although the growth of the ride-hailing sector has attracted much attention from scholars and practitioners, the continued usage of ride-hailing services has yet to be studied sufficiently among its two main types of users: riders and drivers. Relying on the adaptive structuration theory for individuals, expectation-confirmation model, and the decomposed theory of planned behaviour, our study proposes a research model to examine how the users' adaptation influences continuance intention to use ride-hailing applications. Our research employs a questionnaire-based and face-to-face survey to collect data from over 500 user-drivers of the largest ride-hailing firms across Vietnam. A structural equation modelling method was used to analyse the data and validate the hypotheses. Our findings broaden the understanding of users' adaptation on their continuance intention. The study also provides fresh insight into how perceived usefulness, management support, and self-efficacy affect continuance intention to use ride-hailing applications in an emerging economy such as Vietnam.

Keywords: adaptation behaviour; continuance intention; management support; self-efficacy; mobile application; ride-hailing service; Vietnam.

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1 Introduction

A form of mobile commerce (m-commerce) known as ride-hailing service application (RHA) enables rider-driver interactions using mobile applications (m-apps) for IT-enabled transportation services via smartphones (Turban et al., 2018; Chalermpong et al., 2022). Put differently, ride-hailing is a mobile application-based business model that links users, who are drivers (transportation service providers), passengers (riders), and other product suppliers (Joia and Altieri, 2018) with support of information technology (IT) systems. In general, while m-applications (i.e., platform) are where participating parties interact (economic actors) to perform services (Breibach and Brodie, 2017), RHAs are where drivers and riders match to form transportation services (Elnadi and Gheith, 2022; Nguyen and Ha, 2022). RHAs utilise a range of technological advancements to match passengers with appropriate drivers. Among these advancements are the global position system (GPS) and navigation services, mobile and internet communication, customer database processing, and mobile payment (Lee and Wong, 2021; Weng et al., 2017).

It is anticipated that the ride-hailing business would grow rapidly, reaching over \$108 billion in 2025 from \$42 billion in 2020 (Statista, 2022). Over the last five years, the RHA business in Southeast Asia has grown to five times its previous total turnover, hitting \$13 billion in 2019, and is predicted to surpass \$40 billion by 2025 (Davis and Neves, 2021). The ride-hailing service in Vietnam is expected to reach \$3.77 billion in 2022 and \$4.6 billion by 2026, with a total of 21.2 million customers, and has the highest growth rate of any Southeast Asian country (Statista, 2022). Although the ride-hailing service is still in its early phases, it has the potential to develop given the competitive challenges from several local and foreign firms, such as AhaMove and Be, as well as Grab, Gojek, and Lalamove (Chauhan, 2021; Chalermpong et al., 2022). Furthermore, because ride-hailing is a relatively new service, there are a number of obstacles to its

acceptance and spread among customers, such as how well the RHA fits into personal and group travel habits or how quickly users become used to its features (Joia and Altieri, 2018; Lavieri and Bhat, 2019). In addition, RHA companies—including big international players—have had difficulty preventing losses, holding onto market share, and maintaining growth (David, 2023). Scholars have contended that, in addition to encouraging users to embrace and utilise the services for the first time, building enduring relationships with driver and rider users to foster their loyalty, and encouraging them to stick with the ride-hailing service—these are the keys to RHA firms' commercial success (Chauhan, 2021; Tam et al., 2020). Consequently, research on behavioural adaptation is essentially required to shed light on how it encourages users to post-adoptive and continuously utilise IT (Jasperson et al., 2005; Bhattacharjee and Barfar, 2011; Bhattacharjee and Harris, 2009), and ultimately, maintaining the firm's growth.

While researchers have investigated the IT adaptation process (Jasperson et al., 2005; Saga and Zmud, 1993; Schmitz et al., 2016), the relationships between its input factors, the process of adaptation itself, and outcomes have been ignored (Schmitz et al., 2016; Nguyen and Ha, 2021). According to adaptive structuration theory for individuals (ASTI) (Schmitz et al., 2016), the adaptation process's input factors include technology characteristics (e.g., the usefulness of mobile app), individual characteristics (e.g., user IT self-efficacy), and environmental characteristics (e.g., management support), and its output variables involve user decision and performance outcomes (i.e., behavioural intention and usage) (Taylor and Todd, 1995; Bhattacharjee and Lin, 2015; Schmitz et al., 2016; Barki et al., 2007). So far, the relationships between users' adaptation and their intention to continue using an IT has not yet been fully elucidated by empirical research. There remains a notable absence of a thorough investigation of the relationship between behavioural adaptation and continuance intention within the context of platform-based ride-hailing services. It is imperative that this research gap be acknowledged and subsequently remedied. This study aims to answer the three research questions:

- 1 What factors may affect the continuance intention of mobile application users in ride-hailing services across Vietnam?
- 2 How do these factors affect the continuance intention of mobile application users in ride-hailing services across Vietnam?
- 3 Which mediating mechanism does the adaptation process play in the relationships between its input factors and the process outcome?

This research presents many significant advances that improve the understanding of user IT acceptance and adaptation behaviours. First, this study employs a combined approach of both variance and process (Rivard, 2014; De Guinea and Webster, 2017) to construct an innovative integrated theoretical framework. This framework is designed to facilitate an empirical investigation of individual-level user IT adaptation-continuance, the factors that influence it, and the resulting outcomes. By utilising a hybrid of distinctive approaches, this research aims to explain the phenomena of 'IT adaptation' and 'IT use', which are closely connected to both process and variance properties (Whelan et al., 2016; Langley, 1999). Second, this study is among the first to illuminate behavioural adaptation, CI, and their antecedents, including self-efficacy (SE), perceived usefulness (PU), management support (MS), satisfaction (SA), and behavioural adaptation (ADP), drawn from the ECM and the DTPB, respectively. There are yet undiscovered connections between CI and the adaptation process as well as its input components,

despite the fact that researchers have extensively researched CI in various contexts (e.g., Bala and Venkatesh, 2016; Bhattacharjee and Harris, 2009; Schmitz et al., 2016). Finally, the research reveals how user behavioural adaptation mediates CI. At the time of writing, there has been no study on the role of mediation of user adaptation for the relationships between critical factors (such as management support and self-efficacy) and CI in the context of ride-hailing. From the driver's viewpoint, our work enriches understanding of how these determinants impact user post-adoption behaviours by conceiving behavioural adaptation as a mediator. Additionally, this paper presents a number of suggestions that policymakers and management in app-based businesses may find useful in promoting the relatively new ride-hailing service and encouraging users to continue using it.

2 Literature review and hypotheses development

2.1 Continuance intention

While IS literature has concentrated conventionally on user adoption and initial use of innovations such as IT systems (IS) and IT-enabled services, recent studies have been more focused on user continuance or individual behaviours at the post-adoption stages (Bhattacharjee and Lin, 2015; Bhattacharjee, 2001; Tam et al., 2020; Franque et al., 2020; Gao et al., 2015). Bhattacharjee (2001) defined IT continuance intention as “an individual's intention to continue using an information system” (p.359). Based on the aforementioned seminal works, our work regards CI as a post-adoption behavioural decision to continue using a ride-hailing app, information technology adaptation

2.2 IT adaptation

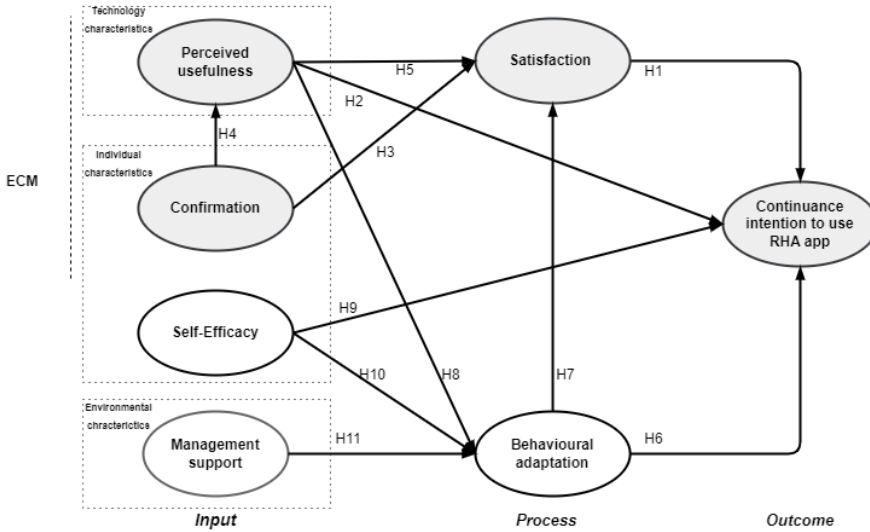
Purvis et al. (2001) proposed a six-step process for the implementation of an IT system, which includes the stage of IT adaptation. According to Rogers (1983), adaptation is ‘reinvention’, where “an innovation is changed or modified by a user in the process of its adoption and implementation.” Adaptation using novel technology (e.g., RHA) is related to ‘extension of invention’ (Leonard-Barton, 1988), ‘incorporation’, ‘routinisation’ (Cooper and Zmud, 1990), and ‘technology adaptation’ (Tyre and Orlikowski, 1994). User satisfaction, post-adoptive usage, and their decision to keep using IT-enabled service applications can all be impacted by a user's adaptation to RHA (Barki et al., 2007; Bhattacharjee and Harris, 2009; Bala and Venkatesh, 2016).

With the emergence of IT-enabled service systems, the concept of IT adaptation has moved beyond the scope of the organisational employees to users with individual characteristics and rich usage contexts (Kallinikos et al., 2013; DeLone and McLean, 2016). Several researchers have attempted to investigate IT adaptation at an individual level of research into contemporary, malleable IT systems (Jasperson et al., 2005; Bhattacharjee and Harris, 2009; Rubel et al., 2020). Based on the original ECM, this study enlightens the influence of individual adaptation with an IT-enabled service (i.e., ride-hailing) by non-technical users (i.e., ordinary RHA user-drivers). In so doing, our research responds to calls for IT adaptation research at the individual level to observe technology, user, environment, and task in various contexts collectively (Barki et al., 2007; Bhattacharjee and Harris, 2009; Schmitz et al., 2016).

2.3 Development of research model

Based on theoretical frameworks of ECM and DTPB, and inspired from previous empirical research, we propose a set of hypothesised relationships and the research model. The hypothesised relationships among ECM's, and DTPB's antecedents, including PU, SA, SE, and MS, with ADP, and CI will be discussed in the following paragraphs. The research model for the empirical study is proposed in Figure 1 in the next section.

Figure 1 Proposed research model



Source: Developed by the author for this research

2.4 ECM-based constructs and relationships

The concept of CI within an IT-enabled service context, such as the ride-hailing industry, has resemblance to the concepts of customer retention and repurchase as discussed in the fields of marketing and customer behaviour (Tam et al., 2020). According to Oliver's (1980) ECT, satisfaction is contingent upon the individual's previous encounters with the product, which subsequently shapes their decision to engage in continued consumption of the product (Yan et al., 2021). In the context of m-commerce, user satisfaction refers to the customer's subjective response or feeling towards their experience using m-commerce applications (Wang et al., 2019). While satisfied users are more inclined to persist in utilising the existing service, unsatisfied users are more likely to choose an alternative service (Susanto et al., 2016).

The influence of SA on CI has been extensively examined across multiple settings (Nabavi et al., 2016). In the context of m-app sharing commerce, the significant relationship between SA and CI was also studied by Cheng et al. (2019), Alalwan (2020) and Poromatikul et al. (2019) in ride-hailing and m-banking, respectively. Hence, based on Bhattacharjee's 2001 original ECM theoretical model, and referring to the abovementioned existing empirical works in different research settings (see e.g., Franque et al., 2021; Shaikh and Karjaluto, 2015), we suggest the following hypotheses:

H1: User satisfaction is positively associated with continuance intention to use ride-hailing service;

H2: User perceived usefulness is positively associated with continuance intention to use ride-hailing service;

H3: User confirmation is positively associated with satisfaction with ride-hailing service;

H4: User confirmation is positively associated with perceived usefulness of ride-hailing service;

H5: User perceived usefulness is positively associated with satisfaction with ride-hailing service.

2.5 Relationships of behavioural adaptation with continuance intention and satisfaction

While there have been proposals regarding the relationships among APD, SA, and CI (Barki et al., 2007; Bhattacharjee and Barfar, 2011), these links have not been extensively studied in previous research on digital platform service systems (Nguyen and Ha, 2021), and the confirmation of the three constructs in the context of ride-hailing service settings has not yet been established. Ride-hailing users who adapt more are more likely to have adapted to the platform and made it better for themselves, meaning that the users will experience satisfaction with the platform and have a propensity to sustain its usage (Beaudry and Pinsonneault, 2005; Barki et al., 2007; Bala and Venkatesh, 2016; Wang et al., 2019). Drawing on the previous literature, we propose the following hypotheses:

H6: Users' adaptation is positively associated with continuance intention to use ride-hailing service.

H7: Users' adaptation is positively associated with satisfaction with ride-hailing service.

H8: User perceived usefulness is positively associated with behavioural adaptation with ride-hailing service.

H12: The relationship of perceived usefulness and continuance intention is mediated by behavioural adaptation.

2.6 Relationships of behavioural with continuance intention and self-efficacy

Bandura (2010) defined "perceived self-efficacy as people's beliefs about their capabilities to produce effects" and claimed that "self-efficacy beliefs determine how people feel, think, motivate themselves, and behave" (p.1). Scholars defined SE as an individual characteristic that plays a vital role in determining a user's behavioural intention and usage (Prior et al., 2016). While Thakur (2018) provided empirical evidence supporting a positive correlation between SE and CI towards mobile commerce, Kang and Lee (2015) alleged that SE serves as a predictive factor for CI in the context of online services. Aldholay et al. (2018) described that self-efficacy has an positive impact on the behavioural usage of users in online learning. Based on the aforementioned observations, we propose the following hypotheses:

H9: Self-efficacy is positively associated with continuance intention to use ride-hailing service.

H10: Self-efficacy is positively associated with behavioural adaptation with ride-hailing service.

H13: The relationship of self-efficacy and continuance intention is mediated by behavioural adaptation.

2.7 Relationships of behavioural adaptation with management support

Management support (MS) has been considered as an enabler of a successful IT-enabled service system implementation (Ahmed et al., 2016). Given that a firm's top managers are in the position to provide the required resources and facilitate the IT acceptance, supported users by firm management are assured to overcome complexities and resistances to get used to the IT and take full advantage of its benefits (Boonstra, 2013; Chen et al., 2021). Existing studies in the different perspectives such as enterprise resource planning (ERP) (e.g., Martins et al., 2019), sales management (Schillewaert et al., 2005), and healthcare (Alsyof and Ishak, 2018) also informed the role of MS on actual and continuance use. While the significant link between MS and technology adaptation has been claimed by Rubel et al. (2020) in the banking service, and the relationships between MS and CI have been found in healthcare (Alsyof and Ishak, 2018), software service (Martins et al., 2019) and e-learning (McGill et al., 2014), there is little knowledge of its role of IT adaptation process, or the extent to which RHA drivers are willing to remain partnered with the firm in the ride-hailing context. Putting these arguments together, it is projected that management support has a potential impact on user behavioural adaptation and continuance intention. As such, we propose that:

H11: Management support has a positive impact on behavioural adaptation.

Thus, drawing on the seminal theories and empirical works, the research model is proposed explaining the adaptation mechanism. The adaptation process involves input factors comprised of technological characteristics (RHA usefulness), individual characteristics (user confirmation on initial use and user self-efficacy toward RHA), and an environmental factor (management support).

3 Methodology

3.1 Measurement items and scales

The measurement items of the research constructs based on the earlier literature review and the research context of ride-hailing services. The adopting and refining measurement scales of the research model constructs were finalised with the full-scale questionnaire for the survey. These study constructs were all reflective. The study has applied a seven-point Likert scale, a method of summated ratings that is simple to administer and widely popular in business research (Carifio and Perla, 2007).

The measurement of satisfaction was conducted using a set of four items selected from Nguyen-Phuoc et al. (2019) in the context of ride-hailing taxi services. The SA construct was operationalised to measure driver-users' feelings about their decision on

and experience with prior (transportation) ride-hailing service (Bhattacharjee, 2001; Nguyen-Phuoc et al., 2019). Perceived usefulness (PU) was used for four items by Davis et al. (1989) and Lee and Wong (2021). The PU construct was operationalised to measure drivers' expectation of performance and benefits of the ride-hailing service. The items are for drivers' expected efficiency and effectiveness using ride-hailing. Continuance intention and confirmation, both with three items, were rooted in the study by Bhattacharjee (2001) and Bhattacharjee and Lin (2015). The two ECM-based constructs, which have been sufficiently validated in various IT-enabled service settings, were adapted to the research context of ride-hailing service and refined appropriately to a driver-user type. Self-efficacy with four items was drawn on Shiau et al. (2020) and Venkatesh et al. (2003) and refined appropriately to ride-hailing applications. Management support was used with four items adapted from Schillewaert et al. (2005) and Yigitbasioglu (2015). Finally, adaptation was assessed by four items from Nguyen and Ha (2022). The behavioural adaptation scale has gradually been employed, generally in mobile commerce and ride-hailing settings (Ha et al., 2022). Table 1 presents the study measurements items and their sources.

Table 1 Measurements items and sources

<i>Constructs</i>	<i>Measured items</i>	<i>Sources</i>
Continuance intention	CI1: I intend to continue using the ride-hailing app rather than stop using it	Bhattacharjee and Lin (2015) and Bhattacharjee (2001)
	CI2: My intentions are to continue using the ride-hailing app instead of using any other means	
	CI3: I plan to go on using the app in my driving job	
Satisfaction	SA1: I feel that it was a wise decision to choose to ride-hailing application	Bhattacharjee (2001) and Nguyen-Phuoc et al. (2019)
	SA2: I believe I make a right decision to choose to drive this app-based transport service	
	SA3: The system of ride-hailing meets my expectations	
	SA4: Overall, I am satisfied when driving with a ride-hailing app	
Confirmation	CON1: Ride-hailing exceeded my expectations in terms of ease of use and convenience for me	Bhattacharjee and Lin (2015) and Bhattacharjee (2001)
	CON2: Service provided by the RHA provider exceeded my expectations in terms of both features and robustness	
	CON3: Overall, the majority of my expectations regarding the use of RHA were met	
Perceived Usefulness	PU1: I can do what I want more efficiently with ride-hailing	Davis et al., 1989; Lee and Wong (2021)
	PU2: I can do what I want more quickly with ride-hailing	
	PU3: Ride-hailing is useful to me as I can do what I need	
	PU4: Overall, ride-hailing is useful	

Table 1 Measurements items and sources (continued)

<i>Constructs</i>	<i>Measured items</i>	<i>Sources</i>
Self-efficacy	SE1: I can do my job by using the ride-hailing app, even when no one is around to help me	Shiau et al. (2020) and Venkatesh et al. (2003)
	SE2: I can do my driving job if I receive support provided by the RHA firm when I need it	
	SE3: I can do my job by using the Grab platform with only online support and/or manuals	
	SE4: Overall, I am confident in my capability to do my job with the ride-hailing service	
Behavioural adaptation	ADP1: I spent effort (both time and energy) using the functions of the ride-hailing app to do my work	Barki et al. (2007) and Nguyen and Ha (2022)
	ADP2: I suggested modifications for the ride-hailing service to fit my driving style	
	ADP3: I have adjusted my working style to suit the ride-hailing service	
	ADP4: Overall, I have adapted to ride-hailing app so that my working style is in harmony with how the app works	
Management support	MS1: I am continually encouraged to use the app by my management	Schillewaert et al. (2005) and Yigitbasioglu (2015)
	MS2: My immediate supervisor explicitly supports my usage of the ride-hailing app	
	MS3: I am convinced that my management team are sure of the benefits that can be achieved with the use of the ride-hailing app	
	MS4: Overall, my management assists me in utilising the app	

Source: Synthesised by the author

3.2 Questionnaire development

The questionnaire involved three parts and included:

- 1 statements to screen chosen respondents
- 2 the focal questions
- 3 demographic information (Fauzi and Sheng, 2021; Nguyen-Phuoc et al., 2021).

By applying Brislin and Freimanis's (2001) back-translation procedure, an initial English version of the questionnaire was translated into Vietnamese (with assistance from two English language lecturers). The author has conducted a pretest using face-to-face interviews with a group of respondents ($n = 30$), including ride-hailing drivers, e-commerce lecturers and professionals. The pretest objective was to check whether the questionnaire was too ambiguous to answer due to sentence length, sequence of questions, format, wording, or complicated terminology, thus warranting the robustness of the questionnaire (Hair et al., 2018).

3.3 Data collection procedure

Data gathering took place over six months, between January 2022 and June 2022, from respondents who are drivers in the largest metropolitans (i.e., Ho Chi Minh City, Hanoi, and Danang), and three provinces, including Long An, Hai Phong, and Dong Nai, were picked at random from the remaining provinces.

The selection of participants was conducted using two specific criteria:

- 1 adherence to the ride-hailing firm's prescribed uniform
- 2 possession and use of the RHA m-app on their smartphones.

The participants were politely requested to carefully review and provide their assent to a document outlining the contents and objectives of the questionnaire, as well as the assurance of anonymity for all replies. Prior to undertaking the data collection, the carefully chosen interviewers (business administration students), had guidance in the techniques and methods employed in conducting interviews. This training aimed to enhance the response rate and mitigate any interview bias.

Data collection was completed by a technique of mall-intercept face-to-face interviews using questionnaire (Malhotra, 2019). This interview procedure helps to diminish non-sampling errors throughout the data collection process (Malhotra, 2019; Prendergast et al., 2010). The interviewers sent some respondents a link to the questionnaire on the day of the interview if they said they could finish it later by email or other media. They gave them two weeks to answer. Data screening accepted 502 (62.8%) valid answers from a total of 800 invited participants who are driver-partners of at least one of the five largest RHA service providers (i.e., Grab, Gojek, Be, MyGo, and Fastgo) (Deshmukh, 2021). Of the 502 valid answers, none of the items contained missing data. The respondent characteristics of the sample are presented in Table 2.

Table 2 Descriptive statistics of respondents

	<i>Number of respondents (n)</i>	<i>Percentage (%)</i>
Gender	502	100
Male	440	87.7
Female	62	12.3
Age	502	
18–25	191	38.1
26–55	229	45.6
Over 55	82	16.3
Education	502	100
Secondary degree	32	6.4
High-school degree	271	54.0
College and University degree	199	39.6
Occupational pattern	502	
Full-time driver*	206	41.0
Part-time employee	153	30.5
Part-time student	76	15.1
Other	67	13.4

Table 2 Descriptive statistics of respondents (continued)

	<i>Number of respondents (n)</i>	<i>Percentage (%)</i>
Daily income from RHA	502	100
Less than \$8	138	27.5
From \$8 to \$16	240	47.8
From \$16 to \$24	101	20.2
Over \$24	23	4.5
Duration of using an RHA	502	100
Less than a month	6	1.2
Less than six months	189	37.6
Over six months	307	61.2

(*) Drivers work more than eight hours daily.

Source: Synthesised by the author

4 Findings

The data analysis was carried out using the IBM SPSS and AMOS package of version 24.0. First, this section presents the study sample's characteristics and data screening. Second, the measurement model evaluation is presented. Third, the structural model is assessed, and the mediation effects of the behavioural adaptation construct are discussed.

4.1 Demographic profile of respondents

The respondent characteristics of the sample are presented in Table 2.

4.2 Data analysis

4.2.1 Common method bias

Researchers claimed that common method variance (CMV) happens when “responses systematically vary due to the use of a common scaling approach on measures derived from a single data source” (see e.g., Fuller et al., 2016). According to Podsakoff et al. (2012), the systematic method variance caused two detrimental effects including ‘bias’ of estimates of construct validity and reliability, and ‘bias’ of estimates of the relationship between two different constructs (Bagozzi, 1984; Podsakoff et al., 2003). To assess the seriousness of common method bias of this study, the Harman’s single factor is employed, since all the constructs are measured through the same instrument (Fuller et al., 2016; Podsakoff et al., 2003). The test result indicates that the single factor only accounts for 23.60 % of the variance of the 28 variables which is not a majority (i.e., below 50%). In addition, eight factors with eigenvalues greater than 1 are extracted with nonrotating analysis and the cumulative total explanatory variables are 66.04% (i.e., below 70%) (Fuller et al., 2016; Podsakoff et al., 2003, 2012).

4.2.2 Reliability and validity test

The two-step method developed by Anderson and Gerbing (1988) was employed in this study. First, a measurement model was evaluated and next, a structural model was constructed to evaluate the hypothesised linkages.

4.2.3 Evaluating measurement model

There are two main assumptions that should be assessed, including

- 1 no outliers in the dataset
- 2 normal distribution (Byrne, 2016).

For the first assumption, the data screening detected no outliers. The second assumption was evaluated by examining the skewness and kurtosis indices to determine the normality of the dataset. The dataset had absolute skew values below 3 and kurtosis values below 7, suggesting a normal distribution. (Kline, 2015). Furthermore, the ratio of respondents per measured variable exceeds 17, above the threshold of 15 that is commonly used as a criterion for assessing multivariate normality of the dataset (Hair et al., 2018).

Table 3 displays the indicators of the measurement model with relevant fit values, including the standardised factor loading (SFL), composite reliability (CR), and average variance extracted (AVE). The Cronbach's alpha values for the constructs in this study vary from 0.767 (PU) to 0.831 (MS), which suggests that these constructs demonstrate internal consistency according to the established criterion of 0.60 (Hair et al., 2018; Nunnally, 1978). The CR values observed in this study vary between 0.737 (SA) and 0.837 (SE), both of which are above the threshold values (Bagozzi and Yi, 1988). Furthermore, AVEs fall within the range of 0.505 (ADP) to 0.583 (SA), which are deemed acceptable at the 0.50 significance level. This suggests that the convergent conditions have been successfully fulfilled. The obtained test findings have demonstrated good reliability the utilised research tool, hence establishing the convergent validity of the collected research data (Bagozzi and Yi, 1988; Fornell and Larcker, 1981). The model fit indicators provided strong evidence of the measurement model's good fit to the actual data. To be more precise, chi-square χ^2 was 653.637 (df = 322, p = 0.000), CMIN/df was 2.030 (less than 3), RMSEA was 0.045 (less than 0.8), GFI = 0.915 (greater than 0.9), TLI was 0.923 (greater than 0.9), CFI was 0.934 (greater than 0.9), and all results proved the very good fitness of the measurement model (Hair et al., 2018; Hu and Bentler, 1999). Moreover, the study successfully demonstrated discriminant validity as none of the squared correlations between constructs exceeded the average variance extracted (AVE) values. Table 4 presents the relationships and the discriminant validity.

4.2.4 Evaluating structural model

The analysis of model fit statistics indicated that χ^2 was 746.458, p = 0.000 with 335 degrees of freedom (df). The $\chi^2/\text{df} = 2.228$ (<3) was between 1 and 3, suggesting parsimony of the model. The RMSEA was 0.050 (<0.08), AGFI = 0.884 (>0.8), while

CFI and TLI were 0.918 (>0.90) and 0.908 (>0.90), respectively. The results reveal that the model demonstrates both absolute and incremental goodness of fit, as proposed by Hu and Bentler (1999). An exception to this trend is the hypothesis H9, a link between SE and CI, where all relationships exhibited statistical significance $p < 0.05$. Table 5 indicates that 12 out of 13 hypothesised paths were empirically supported, and significance of three hypotheses of ADP mediating role.

Table 3 CFA analysis with reliability and validity

<i>Constructs</i>	<i>Items</i>	<i>SFL</i>	<i>Cronbach's alpha</i>	<i>AVE</i>	<i>CR</i>
Perceived usefulness	PU1	0.711***	0.767	0.542	0.780
	PU2	0.805***			
	PU3	0.7155			
	PU4	0.709***			
Confirmation	CON1	0.738***	0.755	0.508	0.756
	CON2	0.710***			
	CON3	0.689***			
Self-efficacy	SE1	0.629***	0.829	0.565	0.837
	SE2	0.717***			
	SE3	0.844***			
	SE4	0.797***			
Management support	MS1	0.788***	0.831	0.557	0.834
	MS2	0.715***			
	MS3	0.746***			
	MS4	0.733***			
Behavioural adaptation	ADP1	0.757***	0.791	0.505	0.832
	ADP2	0.714***			
	ADP3	0.625***			
	ADP4	0.712***			
Satisfaction	SA1	0.730***	0.773	0.583	0.737
	SA2	0.764***			
	SA3	0.689***			
	SA4	0.775***			
Continuance intention	CI1	0.703***	0.768	0.538	0.776
	CI2	0.819***			
	CI3	0.557***			
<i>Model fits:</i>	*** $p < 0.001$; $\chi^2 = 653.637$; $CMIN/df = 2.030$; $CFI = 0.934$; $GFI = 0.915$; $TLI = 0.923$; $RMSEA = 0.045$; $PClose = 0.912$				

Source: Result output from SPSS, AMOS

Table 4 Correlation and discriminant validity

<i>Construct</i>	<i>SA</i>	<i>MS</i>	<i>CON</i>	<i>PU</i>	<i>ADP</i>	<i>CI</i>	<i>TR</i>	<i>SE</i>
SA	0.695							
MS	0.314***	0.746						
CON	0.515***	0.480***	0.713					
PU	0.398***	0.217***	0.414***	0.736				
ADP	0.355***	0.272***	0.306***	0.219***	0.703			
CI	0.402***	0.222***	0.309***	0.396***	0.435***	0.733		
SE	0.385***	0.402***	0.263***	0.320***	0.278***	0.325***	0.201***	0.751

The diagonal and bolded values describe the square root of AVEs

Source: Result output from AMOS

Table 5 Results of hypothesis testing

	<i>Hypotheses</i>	<i>Standardised path estimate</i>	<i>p</i>	<i>Supported</i>
1	H1:SA-CI	0.226	0.005**	Yes
2	H2: PU-CI	0.193	0.000***	Yes
3	H3: CON-SA	0.429	0.000***	Yes
4	H4: CON-PU	0.434	0.000***	Yes
5	H5: PU-SA	0.219	0.002**	Yes
6	H6:ADP-CI	0.192	0.000***	Yes
7	H7:ADP-SA	0.234	0.000***	Yes
8	H8: PU-ADP	0.170	0.027*	Yes
9	H9: SE-CI	0.123	0.066	No
10	H10: SE-ADP	0.159	0.002**	Yes
11	H11: MS-ADP	0.188	0.019*	Yes
12	H12: PU-ADP-CI	<i>See mediation test in Table 6</i>		Partial mediation
13	H13:SE-ADP-CI	<i>See mediation test in Table 6</i>		Full mediation

* $p < 0.05$; ** $p < 0.010$; *** $p < 0.001$.

Source: Synthesised by the author

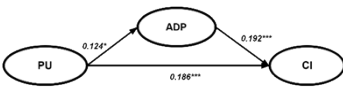
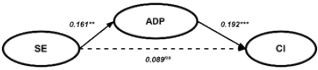
4.2.5 Evaluation of mediating effect of behavioural adaptation

Kline (2015) named the indirect effects as an ‘intervening’ by one or more ‘variables presumed to ‘transmit’ some of the causal effects of prior variables onto subsequent variables’ (p.68). Researchers have equated intervening variables in indirect effects with mediator variables or a mediator (Hayes, 2018; Kline, 2015). While the direct effects are named paths, and their statistical estimates are path coefficients, the indirect effects or mediating effects are also path coefficients with their statistical estimates as the product of involved direct effects (Kline, 2015).

The evaluation of the ADP mediating effect was carried out by employing a bootstrapping method to apprehend the cause-effect relationship fully between the variables of interest (Hayes and Preacher, 2014). The analysis was carried out using 5000 bootstrap samples, and the level of bias-corrected confidence interval was set at 95%.

The results of our study indicate that ADP has a role in partially mediating the positive relationship between PU and CI, while also fully mediating the relationship between SE and CI. The mediation analysis findings are presented in Table 6.

Table 6 Results of the mediation test using bootstrap analysis

Relationship	Mediation path	Estimate	Confidence interval		Probability	Conclusion
			Low	High		
PU-ADP-CI		0.033	0.011	0.066	0.037	Partial mediation
SE-ADP-CI		0.031	0.009	0.081	0.015	Full mediation

*** $p < 0.001$; ** $p < 0.01$; (ns) non-significant at $p < 0.05$. Bootstrap sample 5000 with replacement.

Source: Result output from AMOS

5 Discussions

This research aims to examine the relationships between CI with user ADP and its input factors. While the research model preserves the originality of the Bhattacharjee's (2001) ECM, it also synthesises two input factors of the adaptation process, MS and SE, to unveil how the adaptation process of the RHA influences the user decision to continue using the service.

The findings of the study provide confirmation for the five fundamental relationships established by Bhattacharjee's ECM (2001), specifically H1 through H5, as proposed in the original model. As evidenced by prior research on CI (Bhattacharjee, 2001; Weng et al., 2017), the post-adoptive judgement serves as confirmation, favourably affecting the user's perceptual experience, namely in terms of perceived usefulness (PU) and satisfaction (SA). The present findings further validate the notion that both perceived usefulness (PU) and perceived ease of use (SA) are influential elements that drive users' intentions to sustain their usage of remote health applications (RHAs). This aligns with previous research conducted in several contexts, including Iran (Akbari et al., 2021), Malaysia (Weng et al., 2017), and China (Si et al., 2022). Additionally, the study findings show that the association between SE and ADP (H10) is supported. This firmly agrees with the findings of Aldholay et al. (2018) for the context of applying ICT in education, Wang et al. (2013), and in the ride-hailing service with Nguyen and Ha (2022). Unexpectedly, the study reveals a lack of statistical significance in the association between user SE and CI (H9), meaning that in this context, driver-users who have high confidence in their own capability in using the RHA, did not have high intention to continue their usage of the ride-hailing app in the future. This insignificance might have two probable causes. First, as drivers feel overconfident in their ability to use an RHA, they are likely to look down on it; in other words, rather than deciding to move on with the app, they may intend to think of using a more challenging app or service. Second,

when drivers believe in their ability to succeed in using a ride-hailing app, they are unlikely to think about deciding merely to stay with an existing ride-hailing app, and they think about more attractive applications offered by other businesses in the marketplace instead.

Furthermore, the considerable results of this study are the significant relationship between MS with ADP (H11). The fresh unveiled significant relationship between MS and ADP is consistent with the argument of IT implementation literature (Bala and Venkatesh, 2016; Rubel et al., 2020), which emphasises that organisational commitment is a driving factor of user initial use (i.e., adaptation) and the adoption of IT. As such, RHA drivers initially use the RHA or exploit its new features, they obviously go through the adaptation process, during which time they may look for management support and assurance in a host of issues from traffic safety, job security, user privacy, and technical training to financial support in order to facilitate the usage to fit with the RHA (Möhlmann and Henfridsson, 2019).

6 Conclusion and implications

6.1 Conclusion

The study presents and validates an adaptation-continuance model that elucidates the functions of users' perceived usefulness (PU), perceived ease of use (SE), firm's management support (MS), and competitive intelligence (CI) while considering the mediating roles of user satisfaction (SA) and user adaption (ADP). The relationship between users' adaptive behaviours and their intention to sustain usage of a particular platform offers enhanced comprehension of an individual's mobile application adaptation. Additionally, it provides deeper insights for managers of firms operating in the ride-hailing and mobile commerce sectors, enabling them to employ a more comprehensive approach.

The study's findings offer a detailed assessment of the determinants of ADP with the usage of the m-app, and outcomes. Managers possess the necessary expertise to effectively use a firm's resources in order to support users (i.e., drivers, passengers) in their process of adaptation with the platform, hence accomplishing the objective of maintaining users who have positively adapted.

6.2 Implications

6.2.1 Theoretical implications

First, this study utilises a comprehensive methodology that incorporates both variance and process methods to establish a fresh theoretical framework for empirically examining the individual-level adaption and continuance of IT usage by users (Whelan et al., 2016; De Guinea and Webster, 2017). Second, the study introduces a research model aimed at investigating customer intention (CI) towards ride-hailing services. This work is one of the initial attempts to shed light on the interdependence of CI, SA, and the factors that precede them. Furthermore, the analysis incorporates management viewpoints to provide a comprehensive understanding of the ride-hailing service landscape. There are undiscovered connections between CI and the ADP process and its input parameters, despite the fact that academics have extensively researched CI in a variety of

circumstances (Bhattacharjee and Harris, 2009; Schmitz et al., 2016). Third, while the influence of management support on user utilisation of IT has been well recognised, it is important to note that this relationship has been understudied (Puklavec et al., 2018), recently, there has been a noticeable lack of attention to the examination of the effects of MS on user adaption and its subsequent impact on continuation usage. In light of this motivation, this work is among the first to close the knowledge gap by presenting concrete data on the significant correlation between MS and user ADP, which in turn leads to CI. Our study advances the understanding of IT implementation, integrated with the outcome variable of CI, and the MS and ADP perspectives. The final contribution is that the study is among the first to inspect the mediating role of user ADP for CI. Up to the time of writing, the mediating role of user ADP for CI has attracted very little attention from IT acceptance researchers (Yan et al., 2021; Tang, 2019). This study's results first disclose that ADP fully mediates the influence of MS on CI in m-app contexts.

6.2.2 Managerial implications

This study discusses numerous issues that are relevant to managers of app-based firms and those who aim to promote users' continued engagement with their primary business app. First, the research proves that users' behavioural adaptation and satisfaction play significant roles in determining their desire to continue using the RHA. This implies that managers must provide training to platform users (i.e., drivers/partners) on the utilisation and customisation of the platform. It is crucial to ensure that users are satisfied with the adaptation process and, more specifically, to demonstrate the advantages they would accrue upon integrating the application into their operations. Managers of the companies should put more money into improving the internal mechanism for user comments and recommendations for the platform they are modifying. Furthermore, it has been observed that SE has a direct impact on behavioural adaptability, it is advisable for managers to prioritise their endeavours in enhancing users' trust, as this facilitates their engagement with the platform, fosters active learning of its functionalities, and enables them to customise it according to their own work preferences. The most effective approach for an organisation to promote the process of adaptation is facilitating active learning through the provision of online learning tools, a support desk, and internal IT assistance for staff members. Finally, it is observed that prominent ride-hailing companies, like Grab, Gojek, and similar businesses, have seen significant growth in the Southeast Asian area. The expansion of these companies into new regions may be regarded as a deliberate strategic marketing choice. It appears that a plausible initial consideration for companies like Grab and Gojek in terms of their expansion strategy would be to target the global ride-hailing markets, such as US and European Union markets (Nguyen and Ha, 2022).

6.2.3 Limitations and future research

As with most research, this study is bound in some ways, and its limitations should be recognised and explored in future studies. First, our research was conducted in Vietnam, and so is limited to cross-cultural generalisability. Future studies should apply a cross-cultural approach to collect samples from different level economies (e.g., developed and developing countries) and different culture (e.g., Western and Eastern cultures) to investigate users' behaviours in the context of the relatively new IT-enabled services,

such as ride-hailing services. Second, the limitation of this research is in the reliance only on data acquired at a particular moment in time, which may impede the ability to effectively monitor potential changes in user behaviours during the usage process. It is recommended that future investigations use a longitudinal approach in order to effectively capture any temporal changes in continuance intention (CI) and its causal factors. The formulation of effective strategies aimed at enhancing adaptation behavioural adaptation might be advantageous for managers, as it would contribute to the establishment of continuance intention. Third, in order to explore the continuation of the RHA while excluding others, our study model only centres on two important factors of behavioural adaptation: organisational characteristic (management support) and individual characteristic (self-efficacy). Hence, it is imperative for future research endeavours to take into account several potential factors and their interrelated impacts in order to obtain more comprehensive understandings of CI. These factors may include user innovativeness and past experience.

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