Understanding the influence of user adaptation on the continuance intention towards ride-hailing services: the perspective of management support

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Abstract: This study investigates the influences of management support and behavioural adaptation on continuance intention to use ride-hailing services. Based on an extended expectation-confirmation model and by incorporating management support and user adaptation, this study proposes a research model and verifies the hypotheses using structural equation modelling with data gathered from face-to-face interviews of 472 user-drivers of dominant ride-hailing companies in Vietnam. The findings reveal that (1) perceived usefulness, satisfaction and behavioural adaptation have a determinant impact on continuance intention, (2) while management support has no significant direct association with continuance intention, the link is fully mediated by behavioural adaptation, and (3) user adaptation is also verified to be a partial mediator of the relationship of perceived usefulness and continuance intention. Both theoretical and managerial implications are provided to broaden the current understanding of the adaptation literature, suggesting that firms build stronger relationships with their user-drivers, thus sustaining firm success.

Keywords: behavioural adaptation; continuance intention; ride-hailing; applications; user-driver; management support; Vietnam.

Reference to this paper should be made as follows: Ha, M-T., Nguyen, G-D., Nguyen, M-L. and Tran, A-C. (2022) 'Understanding the influence of user adaptation on the continuance intention towards ride-hailing services: the perspective of management support', *J. Global Business Advancement*, Vol. 15, No. 1, pp.39–62.

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1 Introduction

In recent years, there has been a spectacular rise in the popularity of the ride-hailing service, a new form of transportation service, based on information technology (IT), mobile applications and the Internet (Hoppe et al., 2020; Statista, 2019; ABIResearch, 2019; Jang et al., 2021). The service has been offered intensively in hundreds of cities in numerous countries worldwide (Lavieri and Bhat, 2019; Hong et al., 2020). According to researchers, multiple ride-hailing applications (RHA) providers such as Uber, Lyft, Cabify, Didi and Grab have been established to compete with each other and the traditional taxi services in the global marketplace(Chalermpong et al., 2022; Mäntymäki et al., 2019; Sánchez-Torres et al., 2021). By 2020, the global ride-hailing market had reached $42 billion and is projected to exceed $108 billion in 2025 (Businesswire, 2021). For the Southeast Asia region (ASEAN), RHA businesses are operating in over 500 cities,reaching $13 billion earnings in 2019 and are projected to surpass $40 billion by 2025, according to Google, Temasek and Bain (Hoppe and Baijal, 2019). Among the ASEAN economies, Vietnam is an attractive ride-hailing service market, which has the highest growth rate in the region,at an annual average of 7%. According to the literature, the country's ride-hailing market has reached $3.2 billion in 2021 and it is projected to be around $4.6 billion by 2025. Although RHA, a disruptive IT-enabled service for the vital sector of transportation, has grown impressively, and RHA businesses have the potential to recover from the Covid-19 pandemic (Davis and Neves, 2021), the ride-hailing market is still in its developing stage (Breidbach and Brodie, 2017; Chalermpong et al., 2022; Fauzi and Sheng, 2021). In the Vietnamese market, RHA providers have faced both a deficiency of government regulatory guidelines on the new mode of transportation market and also fierce competition from dozens of multinational (such as Grab, Gojek, Lalamove, etc.) and domestic (such as Be, MyGo, and Fastgo, etc.) firms. In other words, RHA providers struggle to sustain the firm's growth by maintaining market share, attracting new users and, more significantly, retaining users, drivers and passengers, alike. Incumbent providers have reported losses, and have even retreated from the market (ABIResearch, 2019).

Additionally, the RHA acceptance and extensive usage are also exposed to several issues such as users' expectations from RHA benefits, adjustment from traditional practices to online riding, interaction using the mobile app during a trip, support from the RHA firm (Nguyen-Phuoc et al., 2019). Furthermore, for RHA user-drivers, other aspects such as a firm's assurances including a labour contract, social security, as well as technical and financial support also affect their usage of RHA (Chalermpong et al., 2022; Sánchez-Torres et al., 2021). Accordingly, for a ride-hailing business, while having a large number of skilled user-drivers is key to their success, appealing for potential user-drivers to adopt the running and making use of the app is just a start. However, retaining practised drivers to continue using the adopted RHA app helps the firms to become prosperous and sustainable (Fielbaum and Tirachini, 2021; Malik and Rao, 2019). At the time of writing, several studies have commenced the investigations of associations between user IT adaptation and continuance behaviours, although there has been little empirical evidence of how the users' IT adaptation process affects the post-adoption long-term use (see, for example, Bala and Venkatesh, 2016; Bhattacherjee and Harris, 2009; Nguyen and Ha, 2022), and eventually, maintain available practical users of the firm. Suprisingly, very little or no research has been carried out on the roles of the firm's support on user behavioural adaptation (ADP) and continuance intention (CI). Therefore, this study sets out to fill this gap by investigating how firm management support and user behavioural adaptation each affect continued use in the ride-hailing service context. Our work, for the first time, brings user adaptation and management support into a combined model to disclose new driving forces for users to choose to keep using the RHA. The three research questions that this study attempts to answer are: (1) What are the determinants of continuance intention to use an RHA? (2) How do these affect CI? (3) What is the mediating role of user adaptation between management support and CI?

This study makes the following contributions: first, by extending the original expectation-confirmation model (Bhattacherjee, 2001) with user adaptation and firm management support. This study first provides empirical evidence of the associations between continuance intention with firm management support and user adaptation. The second contribution is that the study demonstrates a robust confirmation that behavioural adaptation fully mediates the link between management support and CI in the context of a ride-hailing service. Thus, the research provides substantial insights into the role of the adaptation mechanism in forming user continuance usage. It is vital because, while prior studies on IT acceptance have focused only on 'initial adoption', our work investigates how users decide to continue to use (i.e., post-adoption) the ride-hailing service. The study results are valuable for firm managers in realising the significant factors of making RHA drivers continued users. In addition, the findings provide practical recommendations for implementing marketing and retaining user strategies for RHA firms in the competitive ride-hailing market.

2 Theoretical background and hypotheses development

2.1 IT continuance

Recent years have seen an increasing number of studies on information technology (IT) continuance, and more specifically, on IT post-adoption behaviours (Ofori et al., 2021; Ahuja and Thatcher, 2005; Tam et al., 2020). IT continuance refers to a user's

commitment to the continued use of information technology systems (IS) and IT-enabled services by individual users in the long run (Franque et al., 2020; Gao et al., 2015). Although the term 'continuance' refers to a suite of a user's 'post-adoption' behaviours (e.g., continuance, routinisation and infusion), the IT literature has often considered these two terms to be substitutes (Nabavi et al., 2016; Yan et al., 2021). The views of researchers on IT continuance are diverse, while Nabavi et al. (2016) claim these views as a user's post-adoption 'behavioural patterns' including both continuance intention (CI) and continuance usage (CU) (p.60), Franque et al. (2021) and Lin et al. (2017) recognise that IT continuance intention is a factor contributing to IT usage. Researchers differentiate between IT acceptance (i.e., first time or initial usage), 'current use' with 'future use', and associate 'continuance intention' with "intention to innovate the IT in the future" (Ahuja and Thatcher, 2005; Gupta et al., 2020) and 'utilisation of the IT' (Tian et al., 2021; Larsen et al., 2009). Based on the aforementioned seminal works, our work regards continuance intention as a post-adoption behavioural decision to continue using a ride-hailing app, which is an IT-enabled service system.

Previous studies on user continuance behaviours employ numerous theories and models such as the technology acceptance model (TAM) (Davis et al., 1989), theory of planned behaviours (TPB) (Ajzen, 1991), task-technology fit (TTF) (Goodhue and Thompson, 1995), unified theory of acceptance and use technology (UTAUT) (Venkatesh et al., 2003), IS success (ISS) model (DeLone and McLean, 2003), flow theory (Chang et al., 2014) and technology continuance theory (TCT) (Liao et al., 2009), to name a few. Even though IT continuance is accredited as being vital for the sustainability and the eventual success of IT-enabled service providers (see e.g., Obienu and Amadin, 2021; Venkatesh, 2022), theoretical bases of IT continuance are still mixed and are insufficient for multiple fast-changing contexts (Filieri et al., 2021; Bhattacherjee and Barfar, 2011; de Guinea and Markus, 2009; DeLone and McLean, 2016).

2.2 Expectation-confirmation theory (ECT) and IT expectation-confirmation model (ECM)

Research on IT continuance largely applies the original expectation-confirmation model (ECM), which was drawn on Oliver's (1980) expectation-confirmation theory (ECT) and is proposed by Bhattacherjee (2001). While ECT was regularly applied in marketing, sales and consumer behaviour literature, ECM has been employed primarily in technology and innovation (e.g., IT-enabled service) acceptance literature (Franque et al., 2020; Nabavi et al., 2016). Furthermore, scholars have extended the original ECM by integrating various theories and perspectives to explain multiple contexts such as online banking services, mobile payment, e-learning, social networking, health applications, e-government and mobile commerce, among others (Malik and Rao, 2019; Susanto et al., 2016; Tam et al., 2020).

Although research on IT continuance continues to grow, extant IT acceptance literature can be categorised into three main research streams of these post-adoption behaviours. The first is that,while ECM has considered CI as purposeful or planned behaviours, the original model posits that CI is driven by two factors including (1) perception of usefulness (PU) or expected benefits possibly brought by future usage of the IT and (2) summative judgements of the ongoing usage as captured in the user confirmation (CON), and then satisfaction (SA). The second research stream argues that IT continuance is also influenced by a habitual factor, a repeated behaviour and automatic

behaviour performed by users (Bhattacherjee and Lin, 2015; de Guinea and Markus, 2009). The third stream claims that IT continuance is likely to be impacted by the adaptation factor, which are the behaviours that users proactively perform to harmonise between themselves, job performance and the IT service sytem (Bala and Venkatesh, 2016; Beaudry and Pinsonneault, 2005; Nguyen and Ha, 2022).This study is motivated by the third research stream of post-adoption behaviours and extendsthe original ECM by incorporating management support and user adaptation in the RHA service context.

Based on Bhattacherjee's 2001 original ECM theoretical model, and in conjunction with the perspective that IT continuance is driven bythe users' adaptation process and, referring to the abovementioned existing empirical works in different research settings (see e.g., Franque et al., 2021; Yan et al., 2021), we propose the following hypotheses:

H1: User SA is positively associated with CI towards RHA.

H2: User PU is positively associated with CI towards RHA.

H3: User confirmation is positively associated with SA.

H4: User confirmation is positively associated with PU of RHA.

H5: User PU is positively associated with SA.

2.3 User IT adaptation in a ride-hailing service

IT adaptation has been observed by scholars for decades (Bala and Venkatesh, 2016; Bhattacherjee and Harris, 2009). The diffusion of innovation theory (DIT) regards adaptation as 're-invention', in which users might modify and confirm an IT in the multiphase process of its diffusion(Rogers, 2003), and once the IT is adapted or "confirmed", users are likely to decide to continue using it. Based on the coping theory viewpoint (Lazarus and Folkman, 1984), scholars denoted adaptation as the 'coping' process, in which "cognitive and behavioural efforts are performed by users to cope" with the IT in their workplace (Beaudry and Pinsonneault, 2005; Pillai et al., 2021). Drawing on the adaptive structuration theory (AST) (DeSanctis and Poole, 1994), Schmitz et al. (2016)postulate adaptation as a 'structuration' progression, during which users explore and exploit IT features to fit their work practice to achieve more advantageous outcomes (e.g., better performance, sustain the IT). Barki et al. (2007) integrate the views of task-technology fit (TTF) (Goodhue and Thompson, 1995), structural technology model (Orlikowski et al., 1995) and activity theory (Nardi, 1996) to suggest the model of IS use-related activity (or ISURA). This model conceptualises user adaptation as a collective construct including interaction (utilising pre-defined IT functions), adaptation with an innovative IT system (i.e., adjusting IT features) and self-adaptation (i.e. learning to use the IT). IT continuance literature claims thatuser behavioural adaptation (ADP) ispost-adoption behaviour (i.e., extending and utilising IT features) performed by individuals to carry out the assigned work (Jasperson et al., 2005; Bhattacherjee and Barfar, 2011). Drawn on previous works, the present study considers RHA adaptation to bethe activities carried out by RHA users to fine-tune attributes and features of an RHA and travel practice to fit their preferences, needs and circumstances. In the ride-hailing context, drivers perform behavioural adaptation by familiarising themselves, for instance, with interactive online payment and rider evaluations (evidently different from traditional transportation), and they must also make use of the RHA's location positioning or route

navigation functions. Furthermore, based on theoretical frameworks of IT adaptation, this study conceptualises the construct of individual usage behaviour, performed by RHA users and leads to better outcomes, and helps them to decide whether to continue using the RHA (Muhammad et al., 2020; Nguyen and Ha, 2022). Although the importance of the IT adaptation process is acknowledged, studies on IT behavioural adaptation have, surprisingly, still only been occasional. To the best of the authors' knowledge, there are no reported explanations of user adaptation from ECM and IT implementation theoretical frameworks, from which the adaptation concept has originated.

Among the few empirical studies which investigate IT adaptation, while Bhattacherjee and Harris (2009) show that user adaptation with web-based applications leads to post-adoptive behaviour with the lenses of TAM and AST, Schmitz et al. (2016) employ structuration theory (ST) (Giddens, 1984), AST and technology structuration model (Orlikowski et al., 1995) to report that the IT adaptation process brought about positive outcomes and behavioural changes (i.e., job performance and user decisions). Additionally, prior studies recognise the association between perceived usefulness and user initial actual use, which is certainly the adaptation behaviour to the IT (Nguyen and Ha, 2021; Saeed and Abdinnour-Helm, 2008; Shodipe and Ohanu, 2021). Furthermore, scholars reveal the links between user adaptation and the job outcomes such as satisfaction, benefits and extended use (or continuance)(Bala and Venkatesh, 2016; Bhattacherjee and Harris, 2009; Nguyen and Ha, 2022). In this research context, as users perceive that the RHA are useful, they are likely to enter the adaptation process, which in turn makes users accustomed to – and satisfied with – the service, and keep using the RHA. To put it together, we propose that:

H6: User ADP with RHA is positively associated with CI.

H7: User PU of RHA is positively associated with ADP.

H8: User ADP with RHA is positively associated with SA.

2.4 Management support and IT implementation

Management support (MS) is considered as an enabler of a successful IT-enabled service system implementation (Ahmed et al., 2016; Alsaad et al., 2019). 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).

IT implementation literature describes MS as being critical in enhancing the deployment of IT systems in a firm and with its users (Gavidia et al., 2021; Purvis et al., 2001; Sharma and Yetton, 2003). Orlikowski et al. (1995) regard management support as 'technology-use mediation', which is a set of purposeful and enduring management support measures, or 'meta-structuring', that help users to adapt the functions of an IT system into the workplace setting and adjust their practice to be appropriate to the IT (p.424). Ragu-Nathan et al. (2004) define top MS as how managers "understand the importance of the IS function" and "the extent to which managers involve IS activities" (pp.461–462). These IS activities include various tasks from strategic to operational, and

even routine level tasks, which lead to the best possible success of the IS usage (Alsyouf and Ishak, 2018; Ragu-Nathan et al., 2004). In addition, Chung et al. (2008) consider that management support is the way that a firm's employees observe the willingness and support of their management for widespread IT usage. Likewise, Lee et al. (2016) state that MS is the extent to which a firm's managers encourage employees to assimilate the modifications that the firm expects its users to carry out. Furthermore, the ISS model posits that MS is the strong factor for a successful e-commerce business (DeLone and McLean, 2016). Based on previous works and according to this research context, this study considers management support as the extent to which a firm's managers encourage and provide a necessary resource for RHA users to adapt to the ride-hailing app, leading to their continuing usage. Whereas introducing an innovative technology (i.e., RHA) into an already complex and high-pressure industry, such as the transportation, is very challenging, the RHA management should provide drivers with support and assurance in many facets including training (new) drivers, safety measures during interactive riding, improvement of the app's features, more secured labour contract and protection of drivers from deficient regulations of the ride-hailing market (Fielbaum and Tirachini, 2021; Sánchez-Torres et al., 2021). Indeed, a lack of commitment and leadership by a firm's management in ride-hailing affects the sustainability of the business (Migdadi et al., 2016). Unless RHA drivers observe that management does actually acknowledge and secure their efforts in adapting to the apps, they may feel discouraged and the usage will likely discontinue.

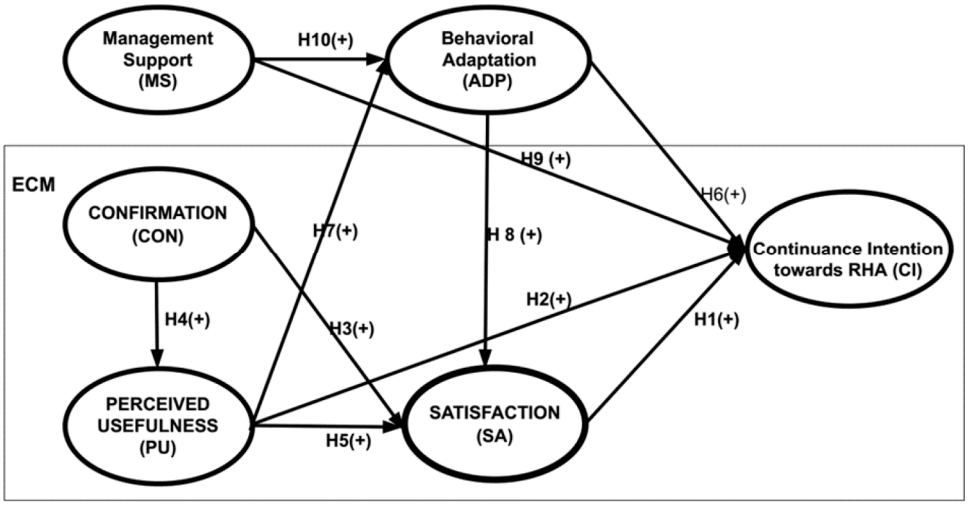
The importance of MS impact on the adoption and success of IT-enabled service systems is reported in the literature on IT implementation (e.g., Sharma and Yetton, 2003; Yigitbasioglu, 2015). Existing studies on the different perspectives, such as enterprise resource planning (ERP) (e.g. Chung et al., 2008; Hancerliogullari Koksalmis and Damar, 2021; Martins et al., 2019), sales management (Schillewaert et al., 2005), e-commerce (Mohtaramzadeh et al., 2018) and healthcare (Alsyouf and Ishak, 2018) also inform the role of MS on actual and continuance use. Furthermore, Bala and Venkatesh (2016) inspect the mechanism of how MS affects user adaptation and links to users' decisions and job performance in the context of a firm's decision support systems. While the significant link between MS and technology adaptation is claimed by Rubel et al. (2020) in the banking service, and the relationships between MS and CI can be found in healthcare (Alsyouf 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:

H9: Management support has a positive impact on ADP.

H10: Management support has a positive impact on CI.

Figure 1 presents a hypothesised model of this study that exhibits the interrelationships among the variables of interest.

Figure 1 Research model



3 Methodology

3.1 Sample and procedure

The survey questionnaire involves three parts and includes: (1) screening statements to ensure the suitability of the chosen respondents, (2) the main questions about the research variables, and (3) questions on the respondents' demographic backgrounds (Nhi et al., 2019). By applying the back-translation procedure as reported in the study by Brislin and Freimanis (2001), an initial English version of the questionnaire was translated into Vietnamese (with assistance from English language lecturers) and then verified by a panel of experts and lecturers in e-commerce and ride-hailing sectors. To ensure the content validity, a pre-test is also conducted using a group of 60 drivers who have worked with at least one ride-hailing app (Hair et al., 2018; Kim et al., 2002; Sun et al., 2021).

To ensure high response rates and lessen response bias, teams of selected senior business management students, who have agreed to join this project, have been trained on interview techniques (e.g., complying with the questionnaire order; not suggesting answers) to carry out the interviews. Data gathering took place during June 2021 and January 2022. Data screening has accepted 472 (67.4%) valid answers froma total of 700 invited participants who are driver-partners of at least one of the largest RHA service providers (i.e., Grab, Gojek, Be, MyGo and Fastgo) using conveniences ampling and direct (paper-based) interviews (Statista, 2019). Given that ride-hailing is popular in the heavily populated areas in Vietnam (Davis and Neves, 2021), data has been collected from respondents who are drivers in the five busiest cities across Vietnam, including Ho Chi Minh City, Hanoi, Da Nang, Haiphong and Bien Hoa (Worldpopulationreview, 2022). These locations are also representative of different socioeconomic backgrounds of three regions of the country.

Interviewers have approached RHA drivers at suitable places (e.g., gasoline stations, parking places) and convenient times (e.g., off-peak time; waiting-passenger break). Participants who preferred to fill out the questionnaire later by mail, phone or Google

form were guided by the interviewers with a one-week time limit to submit (Ha, 2022). Once they had completed the questionnaire, each driver received a gift worth approximately $1.5 (e.g., hand sanitiser liquid, raincoat, Covid-19 medical mask or a top-up mobile recharge) from the interviewer. The respondent characteristics of the sample are presented in Table 1.

Table 1 Descriptive statistics of respondents

	Number of respondents	*Percentage* (%)
Gender		
Female	58	12.3
Male	414	87.7
Age		
18–25	180	38.1
26–45	215	45.6
Over 45	77	16.3
Education		
Secondary degree	36	7.6
High-school degree	226	47.9
College and University degree	210	44.5
Occupational pattern		
Full-time driver	164	34.7
Part-time employee	212	44.9
Part-time students	58	12.3
Other	38	8.1
Duration of using an RHA		
Less than a month	21	4.5
Less than six months	139	29.4
Over six months	312	66.1

3.2 Measurements

All constructs are measured by scales adapted from previous researches which are similar to our research context. A seven-point Likert scale is applied for all the constructs and is shown in Appendix A. SA is measured with four items taken from Nguyen-Phuoc et al. (2019). PU is used for four items from Davis et al. (1989) and Lee and Wong (2021). Continuance intention and confirmation, both with three items, are rooted in Bhattacherjee and Lin (2015). Management support is used with four items adapted from Schillewaert et al. (2005) and Yigitbasioglu (2015). Finally, BA is assessed by adapting four items from Barki et al. (2007) and Nguyen and Ha (2022).

4 Data analysis and results

Structural equation modelling (SEM) using the IBM SPSS AMOS 24 package with a two-step approach (Anderson and Gerbing, 1988) is employed to analyse the data. Confirmatory factor analysis (CFA) has been performed to validate the research constructs. After that, the hypothesised relationship model is estimated and analysed.

4.1 Common method bias

To avoid to common method bias issue, we followed the next procedural remedies: (1) we used clear and concise measures in the questionnaire; (2) we used the Harmon's one-factor test to assess if such biases were a problem in our sample (Podsakoff, 2003). By employing CFA techniques to evaluate this bias, a common factor model (CFM) where all indicators were loaded onto the only one factor was tested (Nguyen, 2017). The results showed that the common factor model had a very poor model fit indices with χ^2/df = 11.68 (>3); RMSEA = 0.151 (>0.08); AGFI = 0.578 (<0.8); CFI = 0.463; GFI = 0.468; TLI = 0.417 (all values were far less than 0.9, cut-off values recommended by Hair et al. (2018)). This indicates that common method bias was not considered a problem in the study.

4.2 Measurement model evaluation

As is described in Table 2, the CFA indices present an excellent model fit (CMIN/DF = 2.056; CFI = 0.961 > 0.95; SRMR = 0.047 < 0.08, RMSEA = 0.047 < 0.06, PClose = 0.714 > 0.05) (Anderson and Gerbing, 1988). The standardised factor loadings (SFL) are significant, with almost all being higher than 0.70, indicating a good reliability for all of the measurement scales. Composite reliability (CR) values range from 0.757 (CON) to 0.860 (ADP), which are all larger than the threshold value of 0.70 (Bagozzi and Yi, 1988), demonstrating a satisfactory level of reliability for all the constructs, as is described in Table 2. For convergent validity, all of the average variance extracted (AVE) values are greater than the cut-off value of 0.5, except for SA (AVE = 0.478). While the AVE of the SA is a little smaller than 0.5, its CR is 0.733, more than 0.60, so the convergent validity of the construct is adequate (Fornell and Larcker, 1981). Furthermore, Malhotra and Dash (2011) argue that AVE is often too strict and reliability can be established through CR alone. Content validity is ensured by applying the existing measurement scales that are proven by empirical studies. The discriminant validity of the research constructs should be acceptable, as the AVE value of each construct is mostly higher than its squared correlations among the constructs (Fornell and Larcker, 1981), as shown in Table 3.

4.3 Structural model evaluation

The model fit measures show that it yields both absolute and incremental goodness of fit as stated by Hair et al. (2018) and Hu and Bentler (1999). The χ^2/df (2.153) is between 1 and 3, suggesting parsimony of the model. The RMSEA is 0.049, GFI is 0.922, while CFI and TLI are 0.934 and 0. 921, respectively. All hypothesised relationships are

significantly supported, except for H9, between management support and CI. Confirmation has significant associations with perceived usefulness ($\beta = 0.412$, $p < 0.001$) and user satisfaction ($\beta = 0.359$, $p < 0.001$). Perceived usefulness has positive associations with the following connected constructs: satisfaction ($\beta = 0.171$, $p < 0.05$), adaptation ($\beta = 0.229$, $p < 0.001$) and CI ($\beta = 0.225$, $p < 0.001$). In turn, satisfaction significantly influences CI ($\beta = 0.200$, $p < 0.01$) and is affected by adaptation with $p < 0.001$ and $\beta = 0.229$. In particular, the finding that management support positively influences adaptation with $\beta = 0.339$ and $p < 0.001$ and adaptation influences CI ($\beta = 0.168$, $p < 0.01$) empirically confirm our new hypotheses at first-hand. With $p > 0.05$, H9 is not supported and management support does not have a significant relationship with CI. In short, as Table 4 depicts, all of the ten hypothesised associations are statistically supported, except for the direct link between management support and CI. The results of all path analysis are shown in Figure 2.

Table 2 CFA with reliability and validity analysis

Constructs	*Items*	*SFL*	*Cronbach's alpha*	*CR*	*AVE*
Perceived usefulness (PU)	PU1	0.711***	0.769	0.784	0.550
	PU2	0.824***			
	PU3	0.493***			
	PU4	0.681***			
Management support (MS)	MS1	0.795***	0.826	0.828	0.547
	MS2	0.700***			
	MS3	0.737***			
	MS4	0.723***			
Confirmation (CON)	CON1	0.738***	0.757	0.757	0.509
	CON2	0.710***			
	CON3	0.693***			
Behavioural adaptation (ADP)	ADP1	0.670***	0.851	0.860	0.608
	ADP2	0.718***			
	ADP3	0.916***			
	ADP4	0.793***			
Satisfaction (SA)	SA1	0.730***	0.766	0.733	0.478
	SA2	0.633***			
	SA3	0.681***			
	SA4	0.511***			
Continuance intention (CI)	CI1	0.695***	0.763	0.772	0.532
	CI2	0.825***			
	CI3	0.658***			

Model fits: ***$p < 0.001$; $\chi^2 = 318.734$; CMIN/df = 2.056; CFI = 0.961; GFI = 0.936; PClose = 0.714; RMSEA = 0.047.

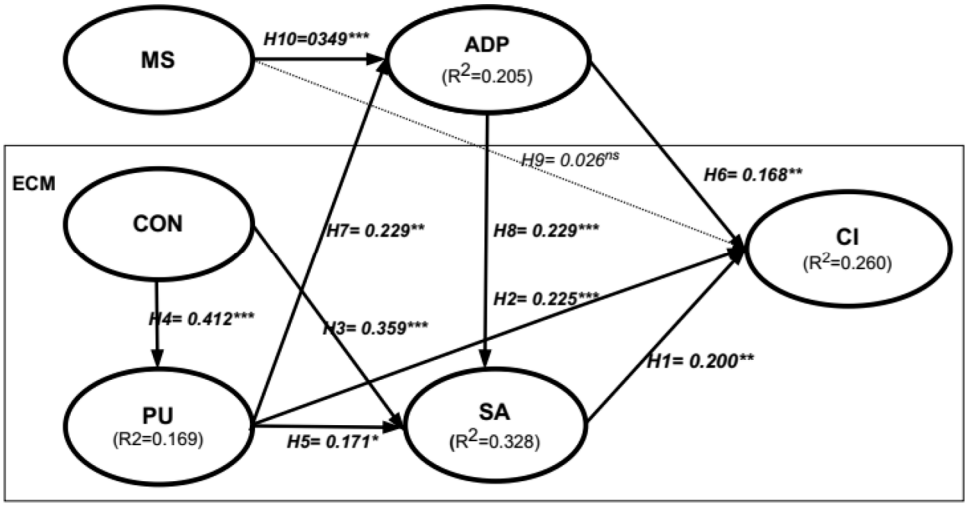
Table 3 Correlation between variables

	CR	*AVE*	*SA*	*SN*	*CON*	*PU*	*ADP*	*CI*
SA	0.733	0.478	**0.692**					
SN	0.828	0.547	0.295***	**0.740**				
CON	0.757	0.509	0.484***	0.472***	**0.714**			
PU	0.784	0.550	0.388***	0.230***	0.393***	**0.741**		
ADP	0.860	0.608	0.378***	0.396***	0.262***	0.306***	**0.780**	
CI	0.772	0.532	0.395***	0.217***	0.286***	0.381***	0.321***	**0.729**

Table 4 Hypotheses test results

Hypothesis relationship			*Standardised path estimate*	*p*	*Supported*
H1	SA-CI	Satisfaction positively relates to continuance intention	0.200	0.003	Yes
H2	PU-CI	Perceived usefulness positively relates to continuance intention	0.225	0.000	Yes
H3	CON-SA	Confirmation positively relates to satisfaction	0.359	0.000	Yes
H4	CON-PU	Confirmation positively relates to perceived usefulness	0.412	0.000	Yes
H5	PU-SA	Perceived usefulness positively relates to satisfaction	0.171	0.011	Yes
H6	ADP-CI	Adaptation positively relates to continuance intention	0.168	0.005	Yes
H7	PU-ADP	Perceived usefulness positively relates to adaptation	0.229	0.000	Yes
H8	ADP-SA	Adaptation positively relates to satisfaction	0.229	0.000	Yes
H9	MS-CI	Management support positively relates to continuance intention	0.026	0.660	*No*
H10	MS-ADP	Management support positively relates to adaptation	0.349	0.000	Yes

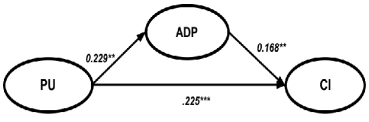
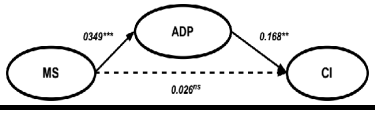
Figure 2 Results of structural model



4.4 Evaluation of mediating effect of behavioural adaptation

Furthermore, the evaluation of ADP mediating effect is carried out by employing a bootstrapping method to apprehend the cause-effect relationship fully between the variables of interest (Hayes and Preacher, 2014). The level of bias-corrected confidence interval is established at 95%, and the analysis is conducted with 5000 bootstrap samples. Our findings show that (1) the association between PU and CI is partially mediated by ADP and (2) a full mediation of ADP in the positive association of the management support and CI. Table 5 displays the mediation analysis results.

Table 5 Results of mediation test using bootstrap analysis with a 95% confidence interval

Relationship	*Mediation path*	*Estimate*	*Confidence interval*		*Probability*	*Conclusion*
			Low	*High*		
PU-ADP-CI		0.033	0.011	0.066	0.013	Partial mediation
MS-ADP-CI		0.049	0.013	0.073	0.018	Full mediation

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

5 Discussion and implications

5.1 Discussion

Despite the fact that previous studies inform that adaptation plays an important role in users' continuance intention, there has been insufficient research verifying its role, and strangely, no empirical evidence on how a firm's management support and users' behavioural adaptation jointly affect their decision for continuous use. To fill this research gap, the present study proposes a model elucidating how the ECM's factors and management support influence user adaptation, leading to the intention to continue usage. The empirical findings largely support our hypothesised model, except for the direct influence of MS and CI.

This research highlights the relationships between CI and its influencers from a user-driver perspective in a ride-hailing context in Vietnam. The most important results of this study are the significant relationship between management support and user behavioural adaptation to RHA. First, the unveiled significant relationship between management support and user adaptation to RHA is consistent with the argument of IT implementation literature (Bala and Venkatesh, 2016; Orlikowski et al., 1995; Rubel et al., 2020; Sharma and Yetton, 2003), which emphasises that management support is a driving factor of user initial use (i.e. adaptation) and acceptance of IT. As drivers initially attempt to use an innovative RHA or are exposed to new features of the mobile apps, they obviously go through the adaptation process during which they may need management

support and commitment in a host of issues from traffic safety, job security and technical app operation to financial assistance in order to achieve the fitness with the RHA (Hou et al., 2020; Mäntymäki et al., 2019; Möhlmann and Henfridsson, 2019).

Additionally, our findings also reaffirm that all relationships of the original ECM (Bhattacherjee, 2001) are significant. The results demonstrate that, from the perspective of the drivers, user satisfaction and perception of the usefulness are two main determinants of intention to continue using the RHA. These findings are in line with those observed in earlier studies across the contexts, for instance, mobile banking (Sreelakshmi and Prathap, 2020; Susanto et al., 2016), online learning (Cheng and Yuen, 2019; Islam and Azad, 2015), e-health (Chiu et al., 2021; Leung and Chen, 2019) and ride-hailing services(Malik and Rao, 2019). This is considerable evidence for RHA firms and businesses of related sectors on how to lead driver-partners in the sustainable use of the RHA.

Moreover, our study finds that user perception of the usefulness influences the behavioural adaptation to the RHA. This finding broadly supports the work of other studies which describe the positive link between perceived usefulness and behavioural use or adaptation (Mou et al., 2017; Nguyen and Ha, 2021; Saeed and Abdinnour-Helm, 2008). Furthermore, this study indicates that user behavioural adaptation has significant associations with satisfaction and continuance intention. These findings further support the claims of previous studies (Bala and Venkatesh, 2016; DeLone and McLean, 2016; Maillet et al., 2015).

Unexpectedly, management support has been found to have an insignificant effect on continuance intention. Although it is suggested that backing from a firm's management constantly leads to the users' permanent usage of the system (Boonstra, 2013), this does not appear to be the case from our empirical evidence. One reasonable explanation for the insignificance is that, as RHA drivers perceive strong promotion from managers, they are likely to choose to attempt to use the RHA first to adapt gradually to the relatively new service. Next, based on the outcome of the adaptation process, RHA drivers will self-confidently make decisions on whether to continue using the RHA firm. Another realistic possibility is that the firm's training and operational support for drivers before and during using RHA were insufficient, so they may look for legislative, financial and safety measures to protect them from the menace of a new and complex transportation sector of ride-hailing (Fielbaum and Tirachini, 2021; Hong et al., 2020). Interestingly, this insignificant relationship aligns with the findings of Alsyouf and Ishak (2018) and Wong et al. (2020), who also find that management support has an insignificant impact on CI in the settings of using innovative online service.

5.2 Theoretical implications

The impacts of management support and user adaptation on continuance intention are understudied, and this is particularly evident for their joint interrelationship with CI. The originality of the study is in its bridging the gap on the relationships between the two essential factors of IT adaptation literature including management support and behavioural adaptation, with the consequence of continuance intention in the ride-hailing service. By proposing an integrated model rooted in the foundational bases of ECM, our work is able to elucidate the relationships between CI and its influencing factors including MS, ADP, and satisfaction with an RHA.

Our work makes a few remarkable contributions to IT adaptation and continuance. First, by comprehending several recognised restrictions from the original ECM (Bhattacherjee and Barfar, 2011), IT implementation (Jasperson et al., 2005; Purvis et al., 2001) and ISS model (Petter and McLean, 2009), many scholars call for exploring the IT continuance behaviours by integrating post-adoption factors such as behavioural adaptation and other essential factors such as user management support (Bala and Venkatesh, 2016; Bhattacherjee and Barfar, 2011; DeLone and McLean, 2016; Franque et al., 2020; Kim and Malhotra, 2005). Inspired by these seminal works, this study has been one of the first attempts to examine the associations among the four factors thoroughly (i.e., management support, user behavioural adaptation and continuance intention). While management support and adaptation have been treated as substantial determinants of post-adoption behaviours (Bhattacherjee and Harris, 2009; Tang, 2019; Yan et al., 2021), none of the previous studies provides robust explanation for how the two factors affect continued use intention. Additionally, existing IT continuance literature has been short of an integrated model detailing interdependence among adaptation, management support and CI. These study findings evidently support most of the links in the hypothesised model, except for the immediate link of management support and continuance. Therefore, this study model can be served as a theoretical framework for forthcoming investigations into the adaptation mechanism of an IT system and their post-adoption behaviours in various relevant perspectives.

Second, although IT implementation literature largely identifies management support as a determinant of user usage of an IT (Jasperson et al., 2005; Puklavec et al., 2018), up to the time of writing, far too little attention has been paid on the influences of management support on user adaptation, which leads to continuance behaviours. Surprisingly, to date, no empirical evidence has ever been found to confirm the associations between management support and user behavioural adaptation with continuance intention in a unified model. For such an incentive, this present study is among the first investigations to fill the gap in the IT implementation literature by providing additional evidence on the substantial relationship between management support and user IT adaptation, leading to continuance intention. Our study advances our understanding of IT implementation, integrated with the outcome variable of continuance intention, and the management support and user adaptation perspectives.

Third, and finally, the mediating role of user adaptation for the link between firm management support and continuance intention attracts very little attention from IT acceptance researchers. In addition, no research has been found that investigates the mediating role of user adaptation for the relationship between MS and CI in the ride-hailing context. By conceptualising behavioural adaptation as a mediator, our work enhances an insight about how management support affects user post-adoption behaviours from the user-driver perspective. This study's results disclose that user adaptation fully mediates the influence of management support on CI. In the context of ride-hailing, although user-drivers enjoy the support from firm managers, their decision of whether to keep using the RHA is driven by their adaptation process, which mediates the influence of management support on continuance intention towards an RHA.

5.3 Practical implications

This paper discusses several issues of potential application to RHA managers struggling to foster users' continuance behaviour for their RHA business. First, our finding that

users' adaptation, their satisfaction and perception of the benefit of an RHA are key determinants of continuance intention suggests that managers should educate their drivers/partners on how to adapt and utilise the RHA effectively, and ensure that drivers enjoy their adaptation to it. RHA managers should facilitate users' adaptation to the RHA by providing training, manual instructions and feedback systems, so that RHA users proactively learn and find suitable ways to use the service.

Second, management support is identified as an influencer of RHA users' adaptation directly. It is recommended that firms' commitment and support for users are definitely required to improve the capacity of users to acquire the relatively innovative service, specifically to adapt it to fit their personal workstyle and circumstances. When users are supported by a firm in terms of technological (e.g., help-desk and online support), financial (e.g., car rental program) and legislative (e.g., labour agreement) aspects, they possibly make every effort to adapt to the RHA and then make the decision to remain with the firm that encourages them.

6 Limitations and future research

This research has several limitations which should be recognised and explored in future studies. First, our research has been conducted in Vietnam, which is an emerging economy, and so is limited to cross-cultural generalisability. Future studies should apply a cross-cultural approach to collect samples from different regions (e.g., western countries) to investigate users' behaviours in the context of the relatively new ride-hailing service. Second, the fact that the data for this research has been collected from only a single point of time may hinder the monitoring of possible changes in user behaviours during the usage process. Future work should employ a longitudinal design which allows the researchers to notice any changes of user behavioural adaptation, along with its determinants and outcomes. Third, our study model only focuses on management support (organisational factor) as key factors of behavioural adaptation (individual factor), together with the original ECM's variables to investigate the continuance of the RHA. Therefore, additional modifications may be needed to apply our model with other factors, as well as to other service settings.

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Appendix A

Measurement scales and items

Constructs	*Measured items*	*Sources*
Continuance Intention	CI1: I intend to continue using the platform rather than stop using it. CI2: My intentions are to continue using the platform instead of using any other means. CI3: I plan to continue using the platform in my driving job.	Bhattacherjee and Lin (2015)
Management support	MS1: I am continually encouraged to use the app by my management. MS2: My immediate supervisor explicitly supports my use of the ride-hailing app. MS3:I am convinced that my management is sure of the benefits that can be achieved with the use of the ride-hailing app. MS4: Overall, my management assists me when using the app.	Schillewaert et al. (2005), Yigitbasioglu (2015)
Satisfaction	SA1: I feel that it was a wise decision to choose to the ride-hailing service. SA2: I believe that I made the right decision to choose to drive this transport service. SA3: The method of ride-hailing meets my expectations. SA4: Overall, I am satisfied when driving ride-hailing.	Bhattacherjee (2001), Nguyen-Phuoc et al. (2019)
Perceived usefulness	PU1: I can do what I want more efficiently with ride-hailing. 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.	Davis et al. (1989), Lee and Wong (2021)
Confirmation	CON1: Ride-hailing exceeded my expectations in terms of ease of use and convenience for me. CON2: Service provided by the m-commerce provider exceeded my expectations in terms of both quality and timeliness. CON3: Overall, the majority of my expectations regarding the use of m-commerce were met.	Bhattacherjee and Lin (2015), Bhattacherjee (2001)
Behavioural adaptation	ADP1:I spent effort (both in time and energy) using the functions of the ride-hailing app to do my work. ADP2: I suggested modifications for the ride-hailing service to fit my driving style. ADP3: I have adjusted my working (driving) style to fit 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.	Barki et al. (2007), Nguyen and Ha (2022)