

An Examination of Factors Influencing the Intention to Adopt Ride-Sharing Applications: A Case Study in Vietnam

Pham Thuy Giang¹; Pham Thu Trang² & Vu Thi Yen³

¹ Deputy Head of Marketing Department, Faculty of Business Administration of Banking Academy in Vietnam

^{2,3} Lecturers at Faculty of Business Administration of Banking Academy in Vietnam

Abstract: *The aim of this paper is to examine factors influencing intention to use ride-sharing applications in Vietnam. Although ride-sharing applications are used worldwide and create ample revenue opportunities for businesses, the number of ride-sharing users in Vietnam is insignificant. Moreover, there are substantial literature on intention to use technologies, yet, there is no studies of intention to use ride-sharing applications, especially in Vietnam. We use data on 328 users living in Vietnam, and demonstrate that perceived usefulness and perceived ease of use have positive influence on attitude toward ride-sharing behaviors. Our results further indicate that attitude, subjective norms and perceived behavior control play critical roles in predicting intention to use ride-sharing applications. We discuss the practical implications of these findings and provide suggestions for future research.*

Key words: TPB, TAM, ride-sharing applications, intention to use, and Vietnam

1. Introduction

As smartphones are increasingly used worldwide from 2014 to 2017 and it is predicted that the usage is going to grow up in the period of 2017 to 2020 (Statista, 2016), the global demand for mobile applications has been expanding dramatically. In 2016, 149.3 billion mobile apps were downloaded and it is projected that this number will peak at 352.9 billion in 2021 (Statista, 2017a). In order to satisfy this demand, there are substantial number of companies operating in mobile apps developer industry. For those companies, mobile apps provide ample opportunities to make revenue. In 2016, the revenue from mobile apps was 88.3 billion U.S dollars, more than 20 billion U.S dollars compared to 2015 (Statista, 2017c).

Appearing in the late 2000s, ride-sharing is defined as a mode of transportation in which individual customers share a vehicle (car or bike) for a trip and split travel costs (Furuhata et al.,

2013). Car-sharing is not only beneficial for customers, drivers but also for society (Chan & Shaheen, 2012; Kelly, 2007; Morency, 2007). Hence, ride-sharing applications are favored worldwide. In 2017, the percentage of active paying customers from the total global population (adults aged 16 and older) is at 8.3 % and is expected to reach at 13% by 2022.

However, in Vietnam the number of users and the revenue from ride-sharing service are inconsiderable compared to those figures of China - the neighbor country. There are only 2.9% of Vietnamese adults using car-sharing: Uber and Grab in 2017 (Statista, 2017b). Additionally, the revenue from this sector is approximate US \$29 million in 2017. Noticeably, the annual revenue per user is insignificant (US\$10.61) (Statista, 2017b). In comparison, Chinese users spent US \$88.23 on car-sharing service in 2016 and the total revenue this year was around US\$22,465 million (Statista, 2017b). This leads to the need to examine Vietnamese consumer behavior of car-sharing applications.

There are substantial studies using Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM) to explain intention to use various technologies such as internet banking (George & Kumar, 2013; M.-C. Lee, 2009; Yousafzai, Foxall, & Pallister, 2010), mobile service (Wang, Lin, & Luarn, 2006), online tax service (Wu & Chen, 2005), and teachers' technology usage (Teo, 2011). Nevertheless, there is no research on intention to use car-sharing mobile apps, especially in Vietnam. Therefore, this research is going to explore factors influencing intention to use car-sharing mobile applications in Vietnam using 2 models: TPB and TAM.

2. Theoretical background

2.1. Technology acceptance model

The Technology Acceptance Model (TAM) has been one of the most popular cited

theories in various research fields such as information technology, and marketing. TAM originally was developed by Davis (1985) to explain level of acceptance of information technology and to predict usage behavior of technology users. TAM is an adoption of Theory of Reasoned Action (TRA) which was developed by Fishbein and Ajzen (1977). While TRA is designed to “explain virtually any human behavior” (Ajzen & Fishbein, 1980,p.4) TAM is used to define computer usage behavior of human particularly. Davis (1985) used TRA as a based theory to formulate TAM that included two important factors indicating possibility of influence individuals’ decisions about how and when he/she will use a new technology. These two key factors are perceived usefulness (PU) and perceived ease of use (PEOU). PU is defined as the degree to which a person’s belief of that using a particular system would improve his or her job performance (Davis, 1985). Additionally, PEOU refers to the extent to which a person believes that using a particular system would take of no effort (Davis, 1985). According to TAM, PU is directly influenced by PEOU (Davis, 1985). In addition, PU and PEOU affect attitude toward behavior and then attitude influence intention to use the new technology.

The two studies regarding TAM conducted by Davis (1989) and Davis et al. (1989) are broadly cited by related researchers. In additional, TAM has been applied to different study areas such as computer-based technology (Punnoose, 2012), information systems (Y.-H. Lee, Hsieh, & Hsu, 2011) and marketing (Hu et al., 2009)

Davis (1985) used TRA as a fundamental theory to develop TAM. The major similarity between the TAM and the TRA is that they are designed and developed to determine the relationship between attitudes and behavioral intention according to individual beliefs. Although TAM was developed based on the key concepts of TRA, it focuses more specifically than TRA on individual beliefs. While the main purpose of TAM is to explain and predict the technology usage behaviors (Davis, et al., 1989), TRA emphasizes the important of social psychological impact on human behaviors (Fishbein & Ajzen, 1975).

The considerable differences between the two theories included: First, the TRA beliefs are not specify examining a particular behavior while the TAM does. The TAM beliefs are divided into two important beliefs: perceived usefulness and perceived ease of use. These two significant factors are used to measure the influence of a person’s acceptance of the technology (Davis, 1989). Second, the TAM does not include subject norm variable that is used to define behavior intention while the TRA does.

2.2. Theory of planned behavior

Theory of Planned Behavior- TPB (Ajzen, 1985) was extended of Theory of Reasoned Action by Fishbein and Ajzen (1975). Theory of Planned Behavior intended to overcome the disadvantages of TRA by adding Perceived Behavior Control variable. It represents the necessary resources of a person to perform any activities. According to Ajzen (1991), human behavior intention is influenced by three factors: attitude toward behavior(ATT), subjective norm(SN), and perceived behavior control (PBC).

Attitude toward behavior includes positive or negative attitudes to behavior, and attitudes are also seen as key determinants to explain consumer behavior.

Subjective norm leads to the perception of social pressure. According to Ajzen and Fishbein (1975), along with attitudes, effects of social is an important factor leading to motivation for consumption as behavior intention. Social norms represent one’s beliefs as to whether someone has significant influence on them and whether they should or should not bind themselves to that behavior.

Control belief is the root of perceived control behavior. Ajzen (1991) argues that control behavior is person’s perceived in the difficulty or ease of performing a behavior. People claimed that if they have more resources and opportunities, they are forecasted to have fewer obstacles and therefore greater control over their behavior therefore greater control over their behavior. Control factors can be inside a person (skills, knowledge, etc.) or outside of the person (time, opportunity, dependency on others). In general, the TPB model is considered to be more optimal than the TRA in predicting and explaining consumer behavior in the same context and research field.

3. Research model and hypotheses

Based on the theoretical model developed in Section 2, we formulated the following research hypotheses. As TAM and TPB are used as the base models, we need to test the following TAM and TPB hypotheses in the context of ride-sharing applications context. Hypotheses 1, 2, 3, and 4 are proposed based on TAM as discussed in Section 2.1 while hypotheses 3, 4 and 5 based on TPB as described in Section 2.2.

H1: Perceived usefulness positively influences attitudes towards the use of ride-sharing applications

H2: Perceived ease of use positively influences attitudes towards the use of ride-sharing applications

H3: Attitude positively influences the intention to use ride-sharing applications.

H3: Subjective norm has positively influences the intention to use ride-sharing applications.

H4: Perceived behavior control positively influences the intention to use ride-sharing applications

H5: Perceived ease of use positively influences the perceived usefulness of the use of ride-sharing applications.

All these hypotheses are depicted in figure 1.

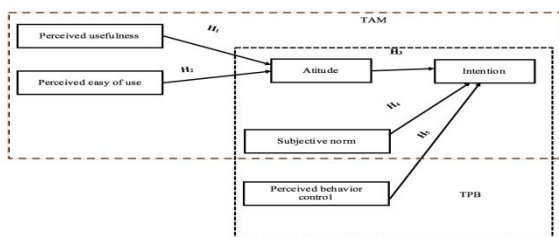


Figure 1: Research model

4. Methodology

4.1. Samples

The questionnaires were sent to 1138 Uber or/and Grab customers through emails, only 328 people responded to those emails (29%). Of 328 respondents; there was 146 male (45%). The youngest were in the age group between 15 and 19 (15%) and 2% of respondents were over 55 years old. The majority were in the age group 20 – 30 years old (30%). In terms of income, 17% of people answered the questionnaires earned less than 3 million Vietnam Dongs per month; 3% of participants were in the highest income group (above 20 million Vietnam dongs). All the respondents lived in 3 biggest cities in Vietnam, namely Hanoi, Ho Chi Minh city and Danang. In details; 43 % were answered that they were living in Hanoi; 24% were in Danang and 33% were Ho Chi Minh city residents.

4.2. Measures

The questionnaires use a 7-point Likert scale, with options ranging from strong disagree to strong agree. Most of the measurement items were adapted from previous research with modifications to suit the research context and were translated into Vietnamese. The items measuring PU and PEOU were adapted from Davis (1989). The items measuring intention to use (INT) were adapted from Venkatesh, Morris, Davis, and Davis (2003). Meanwhile, the items measuring PU and PEOU were adapted from Davis (1989). Attitude (ATT), subjective norm (SN) and perceived behavior control (PBC) items were adapted from Cheng,

Lam, and Yeung (2006). The summary of the constructs is presented in table 1

Table 1. Construct summary

Construct	Definition	Adapted from
PU	defined as the degree to which a person's belief of that using a particular system would improve his or her job performance	Davis (1989).
PEOU	refers to the extent to which a person believes that using a particular system would take of no effort	Davis (1989)
ATT	positive or negative attitudes to behavior	Cheng, Lam, and Yeung (2006)
SN	represents one's beliefs as to whether someone has significant influence on them and whether they should or should not bind themselves to that behavior.	Cheng, Lam, and Yeung (2006)
PBC	person's perceived in the difficulty or ease of performing a behavior	Cheng, Lam, and Yeung (2006)

5. Results.

5.1. Correlation matrix

Table 2. Correlation matrix

	PU	PEO	ATT	SN	PBC	INT
	U					T
PU	1					
PEO	.893	1				
U						
ATT	.906	.872	1			
	**	**				
SN	.563	.598	.68	1		
PBC	.832	.864	.819	.673	1	
		**		**		
INT	.816	.813	.879	.728	.846	1
	**	**	**	**	**	

Notes: N = 328; **. Correlation is significant at the 0.01

The table 2 presents the pairwise correlation for the study variables. The predicting variables of model 1 (PU and PEOU) were closely related to attitude toward ATT (0.906, 0.872; $p < 0.01$). Additionally, ATT, SN and PBC (dependent variables of model 2) were positively associated with INT (0.879, 0.728, 0.846; $p < 0.01$).

5.2. Analysis of the measurement reality

Cronbach's alpha scores shown in Table 3 indicated that each construct exhibited strong internal reliability. Nunnally (1978) suggested that Cronbach's alpha should be 0.7 and above.

Table 3: Construct reality

Constr ucts	Items	Cronbach's alpha	Cronbach's alpha if deleted item
PU	PU1	0.958	0.943
	PU2		0.941
	PU3		0.944
	PU4		0.947
	PU5		0.936
PEOU	PEOU1	0.944	0.913
	PEOU2		0.911
	PEOU3		0.932
ATT	ATT1	0.822	0.715
	ATT2		0.730
	ATT3		0.806
	ATT4		0.728
SN	SN1	0.946	0.942
	SN2		0.909
	SN3		0.912
PBC	PBC1	0.968	0.948
	PBC2		0.959
	PBC3		0.947
INT	INT1	0.918	0.857
	INT2		0.881
	INT3		0.906

5.3. Regression results

We have 2 models. The model's equations are as followed

(1) $ATT = \beta_1 + \beta_2 \times PU + \beta_3 \times PEOU$

(2) $INT = \beta_1 + \beta_2 \times ATT + \beta_3 \times SN + \beta_4 \times PBC$

The results of model 1 are revealed in table 4 and table 5

Table 4: Model 1 fit

Model	R ²	Adjusted R ²	F	Sig F
1	.841	.840	364.479	.000

Table 4 shows that results of model fit. As is displayed in table 4, the model 1 explained

84.1% of the variance (F statistic = 346.479, sig = 0.000)

Table 5: Model 1 regression result

	Beta	Std.Error	Sig.
(constant)	.312	.096	0.001
PU	.566	.044	0.000
PEOU	.280	.045	0.000

Table 7 presents the results of testable hypotheses about the roles of PU and PEOU in predicting ATT using ordinary least squares regression. As is shown in table 5, PU was statistically positively related to ATT ($\beta = 0.566$, $sig = 0.000$). ATT was also influenced by PEOU; however, the impact of PU was stronger than that of PEOU. Hypotheses 1 and 2 were thus supported.

The results of model 2 are summarized in table 6 and table 7

Table 6: Model 2 fit

Model	R ²	Adjusted R ²	F	Sig F
2	.831	.828	330.479	.000

Table 6 shows that results of model 2 fit. As is presented in table 6, the model 2 explained 83.1% of the variance (F statistic = 346.479, sig = 0.000)

Table 7: Model 2 regression result

	Beta	Std. Error	Sig.
Constant	.067	.130	.606
ATT	.547	.057	.000
SN	.150	.044	.001
PBC	.324	.047	.000

As is showed in table 7, ATT, AN and PBC are positively influence to INT which validated hypotheses 3,4 and 5. In details, ATT is the strongest predictor of INT ($\beta = 0.47$, $sig = 0.000$), the second strongest factor is PBC ($\beta = 0.324$, $sig = 0.000$), and SN is the smallest factor affecting INT ($\beta = 0.150$, $sig = 0.001$). Therefore, hypotheses 3,4 and 5 were validated.

6. Conclusions and limitations

In the wake of fierce competition, examining factors influencing intention to use then impacting on customer behaviors is crucial issue for businesses. As a number of scholars have noted that companies' survival depends on the ability of knowing customer behaviors. This study sharpens the knowledge of why some customers intend to

use ride-sharing applications while others do not, using a sample of 328 Vietnamese customers.

Using 2 models: TAM and TPB, our results reveal that PU and PEOU relates positively to Attitude. This finding indicates that if the customers do not perceive that ride-sharing apps are useful for their work and lives, or are easy to use, they may believe that they should not use these apps. Consistent with our predictions, we also received empirical support that attitude, subjective norms and perceived behavior control affect intention to use ride-sharing apps. This result indicates that if the app users believe that they should use these apps and if they think that they can control the process of using, as well as if their related people recommend them to use these apps, they will have intention to use these apps.

As with all empirical research, the findings of this study should be interpreted in line with some warnings. First, all measures in this study were subjective, which means that the results might be biased because subjective data tends to suffer from social desirability (Ciabusch, Martín, & Ståhl, 2010). Second, future research should explore the relationship between intention to use and actual behaviors. Third, our samples are made of mainly the group age from 20 to 30, and only 2% in the 55 and above group, it should be more useful to replicate more above 55 aged group people.

These limitations notwithstanding, we believed that this research contributes to ride-sharing intention to use literature by examining factors influencing ride-sharing applications in the Vietnam context.

References

- [1] Ajzen, I. (1985). From intentions to actions: A theory of planned behavior *Action control* (pp. 11-39): Springer.
- [2] Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- [3] Ajzen, I., & Fishbein, M. (1975). Belief, attitude, intention and behavior: An introduction to theory and research: Reading, MA: Addison-Wesley.
- [4] Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.
- [5] Chan, N. D., & Shaheen, S. A. (2012). Ridesharing in north america: Past, present, and future. *Transport Reviews*, 32(1), 93-112.
- [6] Cheng, T. E., Lam, D. Y., & Yeung, A. C. (2006). Adoption of internet banking: an empirical study in Hong Kong. *Decision support systems*, 42(3), 1558-1572.
- [7] Ciabusch, F., Martín, O. M., & Ståhl, B. (2010). Headquarters' influence on knowledge transfer performance. *Management International Review*, 50(4), 471-491.
- [8] Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Massachusetts Institute of Technology.
- [9] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
- [10] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science*, 35(8), 982-1003.
- [11] Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research.
- [12] Furuhata, M., Dessouky, M., Ordóñez, F., Brunet, M.-E., Wang, X., & Koenig, S. (2013). Ridesharing: The state-of-the-art and future directions. *Transportation Research Part B: Methodological*, 57, 28-46.
- [13] George, A., & Kumar, G. G. (2013). Antecedents of customer satisfaction in internet banking: Technology acceptance model (TAM) redefined. *Global business review*, 14(4), 627-638.
- [14] Hu, Y., Sun, X., Zhang, J., Zhang, X., Luo, F., & Huang, L. (2009). *A university student behavioral intention model of online shopping*. Paper presented at the Information Management, Innovation Management and Industrial Engineering, 2009 International Conference on.
- [15] Kelly, K. L. (2007). Casual carpooling-enhanced. *Journal of Public Transportation*, 10(4), 6.
- [16] Lee, M.-C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic commerce research and applications*, 8(3), 130-141.
- [17] Lee, Y.-H., Hsieh, Y.-C., & Hsu, C.-N. (2011). Adding innovation diffusion theory to the technology acceptance model: Supporting employees' intentions to use e-learning systems. *Journal of Educational Technology & Society*, 14(4), 124.
- [18] Morency, C. (2007). The ambivalence of ridesharing. *Transportation*, 34(2), 239-253.

- [19] Nunnally, J. (1978). *Psychometric methods*: New York: McGraw-Hill.
- [20] Punnoose, A. (2012). Determinants of intention to use eLearning based on the technology acceptance model. *Journal of Information Technology Education: Research*, 11(1), 301-337.
- [21] Statista. (2016). Number of smartphone users worldwide from 2014 to 2020 (in billions). Retrieved from <https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/>
- [22] Statista. (2017a). Number of mobile app downloads worldwide in 2016, 2017 and 2021 (in billions). Retrieved from <https://www.statista.com/statistics/271644/worldwide-free-and-paid-mobile-app-store-downloads/>
- [23] Statista. (2017b). Ride Sharing. Retrieved from <https://www.statista.com/outlook/368/127/ride-sharing/vietnam-market-revenue>
- [24] Statista. (2017c). Worldwide mobile app revenues in 2015, 2016 and 2020 (in billion U.S. dollars). Retrieved from <https://www.statista.com/statistics/269025/worldwide-mobile-app-revenue-forecast/>
- [25] Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, 57(4), 2432-2440.
- [26] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.
- [27] Wang, Y. S., Lin, H. H., & Luarn, P. (2006). Predicting consumer intention to use mobile service. *Information systems journal*, 16(2), 157-179.
- [28] Wu, L., & Chen, J.-L. (2005). An extension of trust and TAM model with TPB in the initial adoption of on-line tax: an empirical study. *International Journal of Human-Computer Studies*, 62(6), 784-808.
- [29] Yousafzai, S. Y., Foxall, G. R., & Pallister, J. G. (2010). Explaining internet banking behavior: Theory of reasoned action, theory of planned behavior, or technology acceptance model? *Journal of applied social psychology*, 40(5), 1172-1202.