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Understanding Users' Recommendation Intention of Taxi-hailing

Apps: An Internal Perception Perspective

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Abstract: Users' recommendation intention has drawn greater attention by both scholars and managers under the context of electronic commerce. Based on TAM (Technology Acceptance Model), this study aims to examine factors affecting users' recommendation intention of Taxi-hailing apps in Chinese context. Structural equation model is used in this study. Data collected from 261 Taxi-hailing apps users. The results show the following key interesting findings: (1) both perceived usefulness and perceived ease of use have positive effect on users' perceived benefits; (2) perceived benefits has positive effect on users' trust, while perceived privacy risk has negative effect on users' trust; (3) users' trust has positive effect on users' recommendation intention; (4) perceived benefits acts as a partial mediator between perceived usefulness/users' trust and perceived ease of use/users' trust, and users' trust acts as a partial mediator between perceived benefits and users' recommendation intention. Implications for researchers and practice are discussed.

Keywords: TAM, perceived benefits, perceived privacy risk, trust, recommendation intention

1. INTRODUCTION

At the information era, the use of Smartphone and mobile apps is increasingly common. One of the most popular is the use of Taxi-hailing apps. According to the report of CNNIC, in the first half of 2016, online booking taxi users reached 159 million people, online booking car users reached 122 million people. What's more, according to China intelligent travel 2015 big data report, as of the end of 2015, the smart travel platform own 300 million active passengers and 10 million owners, and the growth rate of registered users is 13% per month. Only DiDi, one of the Taxi-hailing apps, completed 1.43 billion orders, travelled 490 million hours and 12.8 billion km. Under such condition, factors' influencing users' usage and recommendation intention of Taxi-hailing apps is becoming particularly important and it has drawn greater attention by both scholars and managers. If these factors cleared, operators can save a lot of costs by making targeted marketing strategy.

Review of previous studies, scholars has studied recommendation intention mainly from two aspects. On the one hand, many scholars studied recommendation system and recommendation mechanism. For instance, Itmazi and Hijazi (2015) proposed a recommender system to recommend automatically open educational resources to a course management system after crawling them from web to solve the students "Information Overload" problem arising from searching web resources ^[1]. Liao, Cheng et al. (2014) studied a recommended integrated mechanism to enhance occupational safety and health management of blue-collar foreign workers in Taiwan ^[2]. On the other hand, some scholars studied recommendation intention from the perspective of word of mouth. For example, Eisingerich, Chun et al. (2014) found that customers are less willing to engage in electronic word-of-mouth on online social sites than traditional face-to-face word-of-mouth, thus, they hold that customers should recommend a brand face-to-face but not on Facebook ^[3]. Word-of-mouth recommendations from current students are an important source of influence when prospective MBA students are selecting a school; therefore, based on a sample of 16,297 graduating MBA students, Phd and Ma (2008) used multiple regression analysis to

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identify the factors that affect a school recommendation and to assess their relative importance ^[4].

Although many scholars have endeavored to study when customer will generate recommendation intention, the formation mechanism of recommendation intention is not yet clear. From the perspective of external stimuli, many scholars find that external stimuli, such as material incentive will make customers generate recommendation intention ^[6]. While it is not a long way, once material incentive is disappeared, customer will not generate recommendation intention any more. Thus, it is interesting to find that what has led to customer's recommendation intention? Specially, the study of customers' recommendation intention in the context of Taxi-hailing apps is ignored by scholars. The uniqueness of users' recommendation intention in the context of Taxi-hailing apps is that it will be influenced by both the use process and material incentive when you recommend Taxi-hailing apps to your friends. The use process mainly including internal perception factors, for example, users feel that the Taxi-hailing apps is useful for them, they want to recommend this app to people around them as they perceived that the app is convenient and help them save time. The material incentive mainly refer to users want to recommend this app due to they can obtain the material incentive, such as cash; otherwise, they will not generate recommendation intention. This paper holds that if the Taxi-hailing app is not useful, users will not recommend this app to their friends or people around them to get material incentive as they do not want to ruin their reputation. Therefore, this paper tries to study users' recommendation intention in the context of Taxi-hailing apps from a internal perception perspective.

Base on TAM, this study examines factors affecting users' recommendation intention in the context of Taxi-hailing apps in China. From a theoretical perspective, this paper contributes to TAM and study factors influencing users' recommendation intention of Taxi-hailing apps in Chinese context, which has rarely been researched. Furthermore, this paper explores formation mechanism of recommendation intention from a internal perception perspective. The results can help us with a deeper understanding of users' formation mechanism of recommendation intention. Practitioners would also find that the results of this research provide some insights for Taxi-hailing apps operators and could help them attract more potential and existing customers.

Section 2 reviews past literature on perceived usefulness, perceived ease of use, perceived benefits, perceived privacy risk, trust and users' recommendation intention and presents hypotheses. Subsequently, Section 3 describes the research methodology. The results of structural equation model are presented in Section 4, followed by a discussion of this research in Section 5.

2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1 TAM and perceived benefits

Technology Acceptance Model (TAM) has been widely used as a theoretical backdrop in the investigation of customers' behavior. According to TAM, the use of system is determined by one's behavioral intention, while one's behavioral intention is determined by attitude toward using and perceived usefulness and perceived ease of use. This paper applies TAM to investigate factors affect users' behavioral intention as Taxi-hailing apps can be seen as a system. Review previous studies, there is strong empirical evidence supporting perceived usefulness and perceived ease of use as significant and consistent predictor of individuals' perceived benefits in various contexts. Researchers have obtained consistent conclusions: users' perceived benefits will rise with the increase of perceived usefulness and perceived ease of use. For example, using online survey method, Han (2014) found that perceived ease of use of adoption of cloud computing has positive effect on perceived benefits of cloud computing ^[9]. From a citizens' perspective, Ohme (2014) found that both perceived usefulness and perceived ease of use have positive effect on perceived benefits ^[10]. Generally speaking, users viewed perceived benefits as a cognitive evaluation of perceived usefulness and perceived ease of use. Thus, this paper also holds that when users use Taxi-hailing apps, the more perceived usefulness and perceived ease of use user perceived, the more

benefits they will perceived. So, in light of the aforementioned evidence, this paper hypothesizes:

H1: Perceived usefulness has positive effect on perceived benefits.

H2: Perceived ease of use has positive effect on perceived benefits.

2.2 Perceived benefits, perceived privacy risk and trust

Perceived benefits are an important factor influencing customer's behavior. It has been widely researched in areas of information system, tourism, and healthcare and so on. And many scholars studied perceived benefits from different perspectives. For example, based on online automobile communities, 283 valid samples was collected in Taiwan, Kuo and Feng (2013) proposed four categories of perceived benefits of participation in online communities, including learning benefits, social benefits, self-esteem benefits, and hedonic benefits^[11]. Furthermore, Cheung (2015) proposed four values that members can derive from participation in social networking sites, including convenience of maintaining existing relationships, new relationship building, self-presentation, and enjoyment^[12]. Using taxi software mainly due to its convenience and ease of use, thus, this paper mainly focuses on the perception of users' functional benefits. Meanwhile, many scholars have examined factors influencing user's perceived benefits, including system quality, attitude, value creation, and so on, and user's perceived benefits also has been proved has effect on user's satisfaction, trust, commitment, self-disclosure in SNSs, and so on. With regard to the relationship between perceived benefits and trust, scholars have obtained consistent conclusions: perceived benefits have positive effect on user's trust^[13]. When users perceived benefits, they will generate positive attitude and emotion, and this will strengthen their trust in operators. Thus, this paper also holds that when users perceived high benefits, they will more likely to trust Taxi-hailing app operators.

Perceived privacy risk refers to the perceived risk due to users disclosing their personal information on systems. Perceived privacy risk is considered as one of important aspects of perceived risk. In the era of Internet information, users' personal privacy has drawn both scholars and managers attention. The impacts of privacy risks in the e-commerce context have been extensively tested. However, the role of privacy risks in the mobile applications still requires more empirical investigations^[14]. Research shows that when users perceived risk, they will feel worry and anxious, and this will led to their decline in trust operators^[15]. In this context, when users using Taxi-hailing app, they disclosure personal information, thus, they will perceive high privacy risk. What's more, they also concerned that their privacy is not well protected by Taxi-hailing app. Thus, the more privacy risk they perceived, the more worry and anxious they feel, and the less reluctant to trust Taxi-hailing app operators. So, in light of the aforementioned evidence, we hypothesize:

H3: Perceived benefits positively affect users' trust in operators.

H4: Perceived privacy risk negatively affect users' trust in operators.

2.3 Trust and users' recommendation intention

Trust is defined as the buyer's belief that the e-vendor is behaving ethically. Prior literature shows that trust is crucial in many transactional, buyer-seller relationships, especially those containing an element of risk, including interacting with an e-vendor. And trust has been widely researched in social media context. In this paper, we defined trust as users' trust in Taxi-hailing apps operators. Generally speaking, the more trust users perceived, the more positive behavior users will generate. For example, based on social network sites, See-To and Ho (2014) found that e-WOM in SNSs will affect customer's purchase intention through customer's trust^[16]. Using structure equation modeling method, Che and Cao (2014) proved that customer's trust in Wechat will affect customer's positive word of mouth through customer's attitude^[17]. Furthermore, under the context of service recovery, Kim, Kim et al. (2009) found that trust acts as a mediator between recovery satisfaction and WOM/revisit intention^[18]. Besides, customers' trust is also proved by scholars in affecting customers' share and recommendation intention. When users trust operators, users will generate positive attitude, and this will led

users generate positive behavior, such as share and recommendation intention. In this paper, we also hold that when users trust Taxi-hailing app operators, they will more likely to generate recommendation intention. So, in light of the aforementioned evidence, this paper hypothesizes:

H5: Trust has positive effect on users' recommendation intention.

Base on above discussion, this study try to understand when Taxi-hailing app users generate recommendation intention from an internal perception perspective. Based on TAM, this paper develops a research model to explain the role of perceived usefulness and perceived ease of use in affecting users' perceived benefits, and users' perceived benefits and perceived privacy risk affect user's trust, user's trust affect user's recommendation intention. The research model is shown in Figure 1. Compared with the traditional model, this study from an internal perception perspective and adds new variables, such as perceived benefits, perceived privacy risk and so on, and considers its influence on the user's recommendation intention. In addition, this paper applies TAM into the context of Taxi-hailing apps, which has rarely been researched.

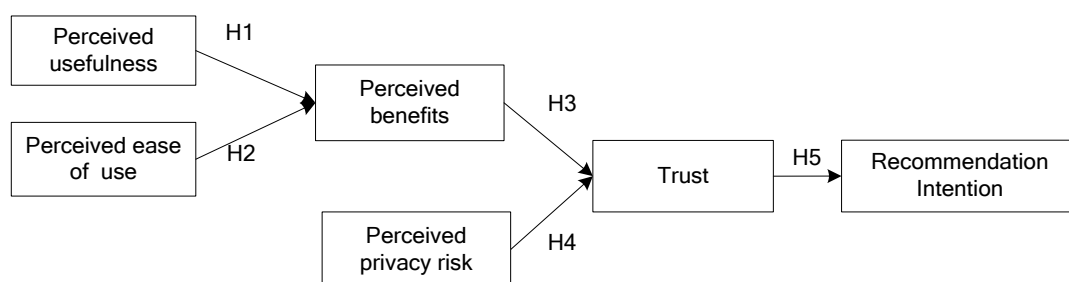


Figure 1. Research model

3. RESEARCH METHODOLOGY

3.1 Instrument development

Measure items for the research constructs were derived from prior studies. This paper selected the most commonly used items for perceived usefulness, perceived ease of use, perceived benefits, trust as well as users' recommendation intention. The scale of perceived usefulness and perceived ease of use were adapted from Davis (1989)^[19] and Venkatesh, Morris et al. (2003)^[20]. The scale of perceived benefits was taken from Hsu and Lin (2016)^[21]. The scale of perceived privacy risk was adapted from Pavlou, Liang et al. (2007)^[22]. The scale of trust was adapted from Gefen, Karahanna et al. (2003)^[23]. The scale of recommendation was adapted from Walsh and Elsner (2012)^[24]. The survey questionnaire was measured using a seven-points Likert Scale with anchors ranging from strongly agree (7) to strongly disagree (1).

3.2 Data collection

A small-scale pretest of the questionnaire was conducted to assess its logical consistency ease of understanding, and contextual relevance. Then, 233 respondents participated in an online survey. Besides, this paper also distributed the questionnaire to Wechat moments and collected 54 data. Totally, 287 respondents participated in the survey. And 26 questionnaires that have not used Taxi-hailing apps were deleted. Thus, the amount of analysis data is 261.

The final questionnaire contained 19 questions related to the various constructs, the questionnaire asked demographic information, including gender, age and income. 67.82 % of respondents are male, and 32.18% are female. In terms of age, 54.02 % of respondents are between 21 and 30, and 36.78% are between 31 and 40. Besides, 73.95% of respondents have bachelor's degree. A little more than one-third of the respondents (31.42 %) has monthly incomes between RMB 3,001 and 5,000. 41.76% of respondents hold that the size of Taxi-hailing apps that they can accept is no more than 30MB, which is comprised the largest proportion of the sample. More than one-third of the respondents (36.78 %) hold that the size of Taxi-hailing apps they can accept is 30-50MB.

3.3 Data analysis

The internal consistency reliability of each construct was assessed by finding the cronbach's alpha, composite reliability (CR) and average variance extracted (AVE). According to the suggestions of Hair, Black et al. (2009), cronbach's alpha is accepted when it exceeds 0.7, CR is accepted when it exceeds 0.7, AVE is accepted when it exceeds 0.5^[25]. Smartpls is used to calculating these indicators. These are presented in table 1. The cronbach's alpha ranges from 0.752 to 0.850, which exceeds the recommended value of 0.7. CR ranges from 0.869 to 0.898, which exceeds the recommended level of 0.70. AVE ranges from 0.625 to 0.801, which also exceeds the recommended level of 0.50. Thus, the measurement models have high reliability and adequate convergent validity. Meanwhile, this paper examined the convergent validity of the measurement items. As shows in table1, the square root of each factor's AVE is larger than its corresponding correlation coefficients with other factors, indicating the adequate discriminate validity.

Table1. Reliability and validities correlation coefficient matrix and roots of the AVEs

Items	AVE	Composite Reliability	Cronbachs Alpha	PB	PE	PR	PU	SR	ST
PB	0.801	0.890	0.752	0.895					
PE	0.689	0.898	0.850	0.720	0.830				
PR	0.696	0.871	0.829	0.391	0.431	0.834			
PU	0.661	0.886	0.828	0.730	0.645	0.344	0.813		
SR	0.715	0.882	0.800	0.655	0.664	0.301	0.724	0.846	
ST	0.625	0.869	0.800	0.613	0.568	0.170	0.606	0.655	0.790

4. RESULTS

Smartpls is used to test the significance of each hypothesis path in the research model. The result is shown in figure2.

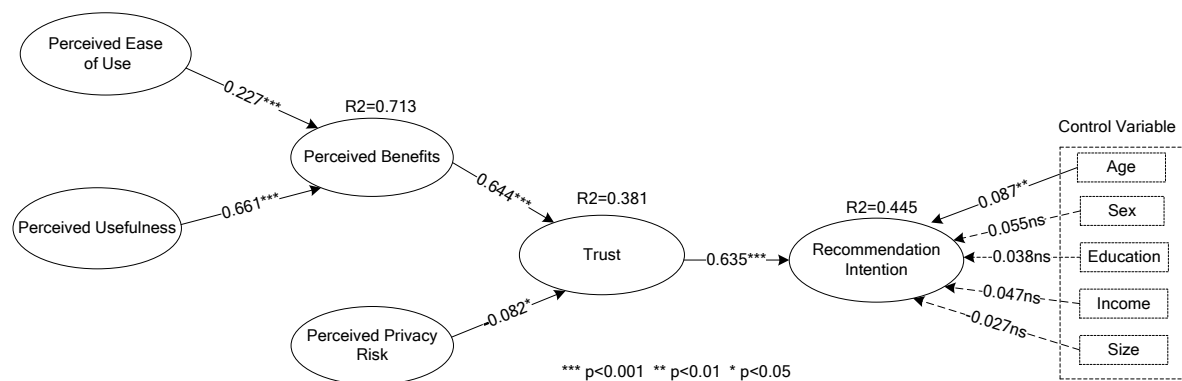


Figure 2. Results of structure model analysis.

Results of hypotheses test is shown in table 2. As shown in table2, perceived ease of use has a positive effect on users' perceived benefits, and the coefficients is 0.227; and perceived usefulness has a positive effect on users' perceived benefits, and the coefficients is 0.661. Thus, hypothesis H1 and H2 are supported. This means that users' perceived benefits will rise with the increase of perceived usefulness and perceived ease of use. Meanwhile, perceived benefits have a positive effect on users' trust, and the coefficient is 0.644. Thus, hypothesis H3 is supported. This implies that users' trust will rise with the increases of perceived benefits. Furthermore, perceived privacy risk has a negative effect on users' trust, and the coefficient is -0.082. Thus, hypothesis H4 is supported. This means that the more privacy risk user perceived, the less likely user trust app operators. Finally, users' trust has a positive effect on users' recommendation intention, and the coefficients is 0.635. Thus, hypothesis H5 is

supported. This tells us that users will generate recommendation intention when they trust app operators. R square value is also calculated as shown in figure 2. Meanwhile, the results of control variable show that only age have positive effect on users' recommendation intention.

Table 2. Results of hypotheses test

Hypothesis	Coefficients	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T value	Remarks
PB -> ST	0.644	0.639	0.037	0.037	17.296	O
PE -> PB	0.227	0.227	0.062	0.062	3.685	O
PR -> ST	-0.082	-0.065	0.040	0.040	2.020	O
PU -> PB	0.661	0.663	0.053	0.053	12.381	O
ST -> SR	0.635	0.636	0.029	0.029	21.690	O
Age -> SR	0.087	0.086	0.035	0.035	2.497	O
Size -> SR	-0.027	-0.028	0.032	0.032	0.849	X
gender -> SR	0.055	0.055	0.035	0.035	1.557	X
graduate -> SR	0.038	0.038	0.030	0.030	1.272	X
income -> SR	0.047	0.048	0.041	0.041	1.147	X

O: support; X: not support.

Numerous methods for testing hypotheses about mediation have been proposed. Amos 20.0 and Bootstrap method is used in this study to test the mediating effect of trust. Two methods including: the Bias-Corrected method and the Percentile method are used to test the mediating effect. According to the scholars' suggestion, when the confidence interval of the statistic which is measured by the Bias-Corrected method or the Percentile method does not include zero, then the statistic has an intermediary effect. The results are shown in Table 3.

Table 3. Results of mediating effects

M/(IV)/(DV)	Items	Effect	Coefficient		Bias-Corrected		Percentile	
			SE	T	95%CI		95%CI	
PB/(PE)/(ST)	Direct effect	0.211	0.071	2.977	0.072	0.351	0.072	0.351
	Indirect effect	0.348	0.061	5.705	0.240	0.477	0.237	0.477
PB/(PU)/(ST)	Direct effect	0.257	0.088	2.935	0.085	0.430	0.0846	0.430
	Indirect effect	0.344	0.084	4.095	0.186	0.502	0.188	0.507
ST/(PB)/(SR)	Direct effect	0.483	0.053	9.204	0.380	0.587	0.380	0.587
	Indirect effect	0.219	0.041	5.341	0.139	0.304	0.142	0.306

Note: Bootstrap 5 000 times, IV: independent variable; M: mediator; DV: dependent variable

From table 3, all of the T value is greater than 1.96, and the confidence interval of Bias-Corrected method and Percentile method does not include zero. Thus, perceived benefits acts as a mediating effect between perceived ease of use/trust and perceived useful/trust. On the one hand, this implies that perceived ease of use as well as perceived useful both have positive influence on users' trust. On the other hand, perceived ease of use and perceived useful affect users' trust through users' perceived benefits. Thus, operators should enhance management of users' trust and perceived benefits. Meanwhile, trust acts as a mediating effect between perceived benefits and recommendation intention. First of all, this means that perceived benefits has positive influence on users' recommendation intention. Secondly, perceived benefits affect users' recommendation intention through users' trust. This means the more perceived benefits, the more users' trust, and the more users' trust, the more recommendation intention.

5. DISCUSSION

5.1 Key finding

The purpose of this study is to examine what has led to user's recommendation intention? Based on TAM, this paper constructed an integrated model from an internal perception perspective, and perceived usefulness, perceived ease of use; perceived benefits, perceived privacy risk as well as users' trust are considered as important factors affecting users' recommendation intention. The empirical research presents some key findings. First, the results showed that perceived usefulness, perceived ease of use have positive effect on user's perceived benefits. Thus, this study proves that perceived usefulness and perceived ease of use are significant and consistent predictor of individuals' perceived benefits, which is also proved by Han (2014)^[9]. Second, perceived benefits have positive effect on user's trust; perceived privacy risk has negative effect on user's trust. This implies that perceived benefits will strengthen user's trust in operators, while perceived privacy risk will reduce user's trust in operators. Third, customers' trust has a positive effect on user's recommendation intention. Thus, when users trust operators, user does generate positive behavior, such as share and recommendation intention. Furthermore, results show that perceived benefits acts as a partial mediator between perceived usefulness/user's trust and perceived ease of use/user's trust. Thus, users' perceived benefits are an important factor must consider in affecting users' trust. Finally, user's trust acts as a partial mediator between perceived benefits and users' recommendation intention. Thus, operators should enhance the management of user's trust.

5.2 Theoretical and practical implications

The findings in this research have both theoretical and practical implications. From a theoretical perspective, this paper contributes to TAM and study factors influencing users' recommendation intention of Taxi-hailing apps in Chinese context, which has rarely been researched. Furthermore, this paper explores formation mechanism of recommendation intention from an internal perception perspective by examine the mediator role of perceived benefits and users' trust. The conclusions can deepen our understanding of factors affect user's recommendation intention of Taxi-hailing apps.

Practitioners would find that the results of this research provide some insights for Taxi-hailing apps operators and could help them attract more potential and existing users. First, perceived usefulness and perceived ease of use are two fundamental factors Taxi-hailing apps operators must consider. Especially, the effect of perceived usefulness on users' perceived benefits is significant higher than perceived ease of use. Thus, when designing apps, operators should emphatically grasp these two principles. What's more, usefulness is one of the most important aspects operators must consider.

Second, it is interesting to find that perceived benefits has positive effect on users' trust; perceived privacy risk has negative effect on users' trust. Thus, perceived benefits is an important factor Taxi-hailing apps operators must consider in winning users' trust. In the early stage of App operations, it is wise to spend a certain amount of input (material incentive) to attract users. It is better to continue for a period of time to let users form the habit of using. According to Khalifa and Liu (2007)^[26], habit is an important factor in maintaining users, which also proved by Chou and Hsu (2016)^[27]. In addition, according to the results, users are concerned that their privacy is not well protected by app operators. Thus, operators should enhance the management of user's privacy.

Third, it is interesting to find that users' trust have positive effect on users' recommendation intention. Thus, for Taxi-hailing apps operators, as long as win users' trust, they will generate recommendation intention. This is an extremely important point, because according to scholars' previous research, "other people's recommendations" were three times more effective in terms of stimulating purchases of over sixty different products than was advertising. So, it is wise to save the cost of advertisement and give users more material incentive to let users become transmitters. This is a new way of marketing, and it will be proved useful in the

future market.

Finally, perceived benefits and users' trust act as a partial mediator role during the process of users' recommendation intention. Thus, contrast to external stimulus, such as material incentive, this paper hold that user's internal perception, such as perceived benefits and trust, acts as a more important role in affecting users' recommendation intention. Thus, Taxi-hailing apps operators should strengthen management of user's internal perception, such as perceived benefits and users' trust.

5.3 Limitations and future research

Despite the design and implementation of the presented work, there are some limitations. The results should be interpreted carefully in light of these one. First, the capacity of the study is based on 261 copies of questionnaires. The sampling quantity is limited, and future research will increase the number of samples. Second, the generalizability of the results may be limited due to the method of data collecting. Some responses might fill out the questionnaire carelessness. Third, this paper mainly focuses on internal perception perspective, external stimulus, such as material incentive is not considered. Future study can focus on both internal perception factors and external stimulus factors and it would be interesting to find which factors have a greater impact on users' recommendation intention of Taxi-hailing Apps.

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