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A STUDY ON ACCEPTANCE ATTITUDE OF MOBILE PAYMENT USERS TOWARD OPEN BANKING PHASE III IN TAIWAN BY USING TAM

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ABSTRACT

This research is aimed to investigate potential users of open banking phase III in Taiwan. It also discusses the need and expectation of these users in connection with functions of open banking, such as online deposit, loan, credit card, payment and phone money transfer. The similarities between functions of open banking phase III and that of mobile payment give the idea for this research to conduct questionnaire survey on those experienced mobile payment users. Technology Acceptance Model (TAM) is used to measure the acceptance of those potential users for open banking.

This study sampled from Taiwan mobile payment users by questionnaire survey and collected a total of 275 valid samples. Samples were grouped into two categories, “mobile payment heavy users” and “non-mobile payment heavy users”. By reviewing Technology Acceptance Model, it is hypothesized that heavy mobile payment users who are stimulated by open banking functions will have higher “perceived usefulness” and “perceived ease of use” toward open banking phase III in Taiwan. It will therefore lead to higher “behavioral intention to use”.

The research results show that there is no positive impact for heavy mobile payment users on perceived usefulness toward open banking phase III, while there is a positive impact between heavy users and perceived ease of use toward open banking phase III. In addition, the results also indicate that higher perceived usefulness and perceived ease of use lead to higher behavioral intention to use.

KEYWORDS: Open Banking, Mobile Payment, Technology Acceptance Model (TAM)

INTRODUCTION

As open banking is reshaping the relationship between banks and consumers, this change has called for more immediate actions to catch the momentum for Taiwan. The Financial Supervisory Commission of Taiwan announced its plan to begin open banking phase I in 2019 and followed by phase II in 2020. However, the phase III did not hit the road until beginning of 2024. People in Taiwan took more skeptical views at

this point that would this new joint service be preferred by consumers and create more opportunities for financial industries.

The idea of open banking was initiated in U.K. in 2015 to trigger more transparency and competition among banks and to bring data access rights back to customers. Interestingly enough, since the establishment of Open Banking Implementation Entity (OBIE) and the Payment Services Regulation in 2017, open banking has gained its momentum and received popularity among U.K. consumers.

Despite different approaches to open banking by Taiwan and by U.K., it will be helpful to understand consumers' viewpoints toward the current open banking phase III policy in Taiwan. Given the relatively short period of time for open banking phase III, the similarities between functions of open banking phase III and that of mobile payment did help this study solving the problem for proxy in the research. The questionnaire surveys were conducted on consumers who had experienced mobile payment.

The purpose of the research includes the followings:

(1) To understand mobile payment user's attitude toward open banking phase III in Taiwan.
(2) To shad light on Taiwan's open banking policy.
(3) To provide useful references for bank's decision on open banking.

LITERATURE REVIEW

Open banking was first initiated and later put into practice in U.K. Because it has been a relatively new idea to banking and consumer markets, there is not a large literature. We include information on development of open banking in different countries, especially in U.K. In addition, three phases to carry out open banking policy in Taiwan are discussed. Finally, the Technology Acceptance Model (TAM) is reviewed in this section.

The idea of open banking was initiated in U.K. in 2015 to trigger more transparency and competition among banks and to bring data access rights back to customers. Interestingly enough, since the establishment of Open Banking Implementation Entity (OBIE) and the Payment Services Regulation in 2017, open banking has gained its momentum and received popularity among U.K. consumers. In 2016, EU promulgated the Payment Service Directive 2 (PSD2) to allow the third-party payment service provider (TPP) to collaborate with financial institutions in providing payment initiation services and account information services.

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Figure Development of Open Banking in Different Countries

The idea of open banking is to bring back the data access to customers. With the consumer's consent, the Third-party Service Providers (TSP) are authorized to develop innovative financial products and services with financial data from banks. There will be Application Programming Interface (API) serving as the platform to all the services. It is hopeful to increase competition and transparency with financial innovation. Eventually, it will benefit both consumers and banking industry.

In Taiwan, the government did not act as U.K. and E.U. to enforce this policy with regulations. Like Singapore and Hong Kong, Taiwan took three steps to introduce open banking. The Financial Supervisory Commission of Taiwan announced its plan to begin open banking phase I in 2019 and followed by phase II in 2020. However, the phase III did not hit the road until beginning of 2024. For the phase I of open banking, public information such as time deposit interest rate, commercial loan rate, currency exchange rate from different banks are provided to consumers at once. For the phase II of open banking, consumer's account information at different banks can be integrated to give convenience to the customers. Finally, the phase III of open banking is dealing with consumer's transaction information and it will allow TSP to help customers in payment and transfer, including deposit, loan, credit card, mobile payment and transfer. It is because the open banking phase III might raise concerns for personal information safety, consumers so far take more skeptical views on the phase III of open banking in Taiwan.

Technology Acceptance Model (TAM)

Davis (1986) proposed the Technology Acceptance Model in investigating consumer's attitude toward new product technology. He argues that the external variables influence perceived usefulness and perceived ease of use when facing new product technology.

These attitudes will have impacts on consumer's behavioral intention to use and eventually on actual system use of the new product technology. The variables included in the model are External Variable (EV), Perceived Usefulness (PU), Perceived Ease of Use (PE), Attitude toward Using (AU) and

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Behavioral Intention to Use (BI). Later with modification, the second version Technology Acceptance Model II excludes attitude toward using because it lacks of significance.

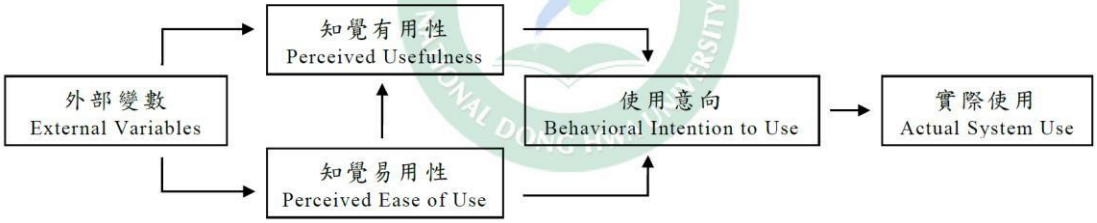

Figure Technology Acceptance Model II

METHODOLGY

This study focuses on the acceptance attitude of mobile payment users to understand consumer's viewpoints toward open banking phase III in Taiwan. The Technology Acceptance Model (TAM) proposed by Davis (1989) is used to measure variables in the study.

Research Design and Research Hypothesis

Bandura (1982) in his self-efficacy theory argued that self-efficacy comes from the results of external environment individual capacity and personal achievement. Self- efficacy brings self-confidence and helps determining level of motivations. Davis (1986) further applied the idea to investigate consumer's attitude toward new product technology. He argued that the external variables influence perceived usefulness and perceived ease of use when facing new product technology. These attitudes will have impacts on consumer's behavioral intention to use and eventually on actual system use of the new product technology.

The Technology Acceptance Model was first used in studying company's internal decision to use new production system (Adams, Nelson & Todd, 1992). Later when internet technology prevailed, the model was applied to examine consumer's acceptance attitude on new product technology.

In order to introduce open banking, Taiwan's Financial Supervisory Commission began with open banking phase I in 2019 and followed by phase II in 2020. Due to some reasons, the phase III did not hit the road until beginning of 2024. People in Taiwan took more skeptical views at this point that would this new joint service be preferred by consumers and create more opportunities for financial industries. Although there are different approaches to introduce open banking in Taiwan and in U.K., it will be helpful to understand consumers' viewpoints toward the current open banking phase III policy in Taiwan.

Technology Acceptance Model is used in this research since open banking phase III is considered the external variables with new product technology. Given the relatively short period of time for open banking phase III, the similarities between functions of open banking phase III and that of mobile payment did help this study solving the problem for proxy in the research. The questionnaire surveys were conducted on consumers who had experienced mobile payment. Consumers were divided into two groups, i.e. mobile payment heavy users and non-mobile payment heavy users, to observe different acceptance attitudes toward open banking phase III.

Variables suggested in Technology Acceptance Model, such as Perceived Usefulness (PU), Perceived Ease of Use (PE) and Behavioral Intention to Use (BI) were used to measure consumer's acceptance attitude. According to the model, it is hypothesized that there will be more significant impacts for heavy users than for non-heavy users on perceived usefulness and perceived ease of use. As for the relationship between perceived usefulness and perceived ease of use, Davis (1989) suggests that perceived ease of use has a significant positive impact on perceived usefulness. It is also based the theory from Technology Acceptance Model; this study hypothesizes that there are significant positive impacts on behavioral intention to use from perceived usefulness and from perceived ease of use toward open banking phase III for Taiwan's mobile payment users.

In accordance with the above theoretical arguments, the five hypotheses of this study are developed and stated as follows：

H1: Mobile payment heavy users have more significant positive impacts than non-heavy users on perceived usefulness.

H2: Mobile payment heavy users have more significant positive impacts than non-heavy users on perceived ease of use.

H3: Perceived ease of use has significant positive impacts on perceived usefulness.

H4: Perceived usefulness has significant positive impacts on behavioral intention to use for open banking phrase III.

H5: Perceived ease of use has significant positive impacts on behavioral intention to use for open banking phrase III.

The figure below illustrates the research framework and hypotheses proposed in this research：

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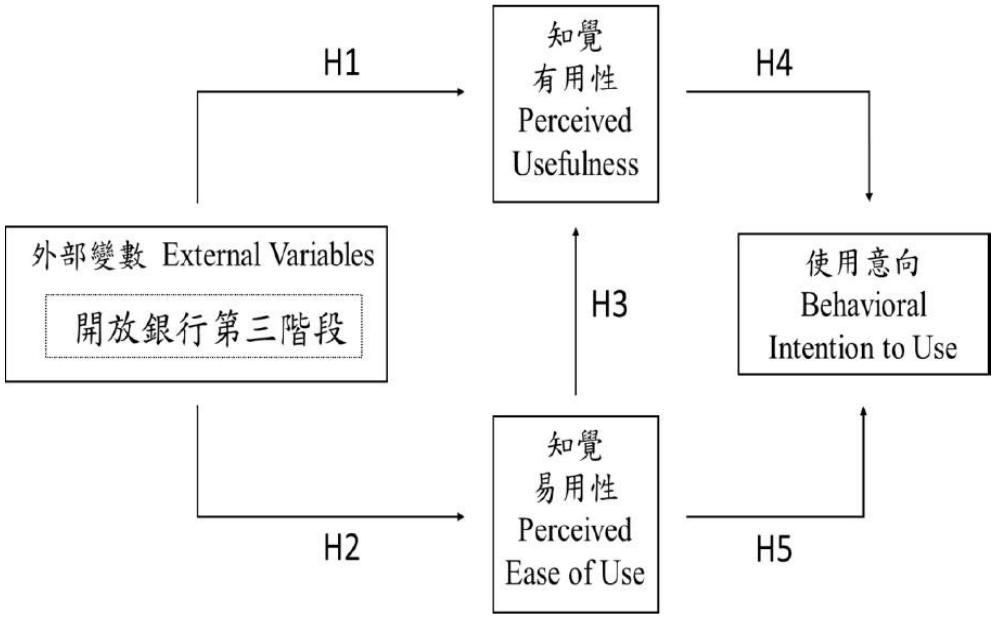

Figure Research Framework

Data Measurement and Sampling Procedure

This research uses questionnaire survey to collect data regarding to consumer's attitude toward open banking phase III in Taiwan. Technology Acceptance Model is applied to measure the variables. For Perceived Usefulness (PU), Perceived Ease of Use (PU) and Behavioral Intention to Use (BI), the 7-point Likert scale is used with 1 meaning strongly disagree and 7 meaning strongly agree.

Given the similarities between functions of open banking phase III and that of mobile payment, questionnaire surveys were conducted on consumers who had experienced mobile payment in Taiwan. Pilot surveys and expert opinions were used to modify the questionnaire before the formal surveys given out. As for the sampling procedure, the research gave out questionnaire through SurveyCake and e-mails to ensure a wide range of population is covered.

Contribution to The Gap of Current Literature

Open banking in U.K. has earned increasing popularity from consumers and created potential business opportunities for retail banking. To the contrary, it took relatively long time for Taiwan Financial Supervisory Commission to kick-start the process of open banking phase III. Current research on open banking rarely includes the consumer attitude of mobile payment and open banking phase III users in Taiwan. The results of this study provide useful information especially related to perceived usefulness attitude of Taiwanese mobile payment heavy users. It can add additional insights to academic literature

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as well as serve as references for government and banks on open banking policy.

RESULTS & DISCUSSION

In this section the statistical results from Pearson correlation analysis and linear regression analysis are described and discussed. Conclusions are given accordingly for each hypothesis in the research. There is a total of 275 valid samples collected and the descriptive analysis for the data are as follows : (1) Gender: 47.7% Male and 52.3% Female; (2) the major age group: 44% age of 21-30; (3) Education: undergraduate and graduate account for more than 80%; (4) Occupation: 15.2% manufacturing, 12.7% service, students 18.1% and others.

Pearson Correlation Analysis

To assess the linear relationship between two variables in this study, Pearson correlation analysis is used to observe strength and direction of this relationship. The values of Pearson correlation coefficient between -1 and +1 indicates different levels of negative or positive linear relationship. The cross-coefficient table below shows that there are positive relationships between each of the two variables (e.g. perceived usefulness, perceived ease of use and behavioral intention to use) for mobile payment user's attitude toward open banking phase III in Taiwan. Furthermore, there also exists positive relationship between the mobile payment heavy user variable and each of the above three attitude variables. The results allow us to undertake regression analysis to test the hypotheses.

Table Pearson Correlation Coefficient

	PU	PE	BI	HEAVY USERS	GENDER	AGE	EDUCATION	FINANCIAL RELATED
PU	1							
PE	.780**	1						
BI	.727**	.673**	1					
HEAVY USERS	.203**	.233**	.200**	1				
GENDER	.067	.083	.034	.173**	1			
AGE	-.187**	-.192**	-.189**	-.298**	-.293**	1		
EDUCATION	.252**	.142*	.213**	.159**	-.029	-.177**	1	
FINACIAL RELATED	.021	.089	.079	.171**	-.055	.025	.158**	1

Note： P*<0.05、P**<0.01

Regression Analysis

Linear regression analysis is applied to see if hypotheses of this study hold. Since this research is

considered as exploratory research, 90% confidence interval is used. Statistical results of each regression model for individual hypothesis are presented and discussed as follows.

H1: Mobile payment heavy users have more significant positive impacts than non- heavy users on perceived usefulness.

The Pearson correlation coefficient indicates that there is a significant positive relationship between mobile payment heavy user variable and perceived usefulness. However, the regression results show no significant relationship (β=0.011、 p =0.790). It is therefore we conclude that hypothesis H1 does not hold.

H2: Mobile payment heavy users have more significant positive impacts than non- heavy users on perceived ease of use.

The Pearson correlation coefficient indicates that there is a significant positive relationship between mobile payment heavy user variable and perceived ease of use. The regression results also confirm the significant positive relationship (β=0.171 p=0.08) at the 90% confidence level. It is therefore we conclude that H2 holds.

H3: Perceived ease of use has significant positive impacts on perceived usefulness.

Both Pearson correlation analysis and regression analysis show that there is significant positive relationship between perceived usefulness and perceived ease of use (β=0.760、 p<0.001). The above statistical results are in accordance with Technology Acceptance Model of Davis (1989) and we conclude that H3 holds.

By summing up the above conclusions, we can be sure that either the regression model with perceived usefulness as the dependent variable (F=77.197、Adjusted R^2=0.625) and with perceived ease of use as the dependent variable (F=4.781、Adjusted R^2=0.065) provide good explanations for acceptance attitudes in this study.

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Table Regression Analysis for PU as The Dependent Variable

Independent Variable / Controlled Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity	
	B	Std. Error	β			Tolerance	Variance Inflation Factor, VIF
(CONSTANT)	.797	.318		2.503	**0.07†**		
HEAVY USERS	.027	.102	.011	.266	.790	.839	1.192
PE	.757	.038	.760	19.699	**<0.001*** **	.918	1.089
GENDER	.001	.093	.000	.006	.995	.894	1.118
AGE	-.007	.033	-.009	-.214	.831	.814	1.229
EDUCATION	.241	.061	.153	3.959	**<0.001*** **	.921	1.086
FINANCIAL	-.319	.170	-.072	-1.874	**0.8†**	.938	1.066
R^2			.633				
Adjusted R^2			.625				
F			77.197				

Note： $p^{\dagger}<0.1$、$p^{*}<0.05$、$p^{**}<0.01$、$p^{***}<0.001$；Perceived Usefulness (PU) as the dependent variable

Table Regression Analysis for PE as The Dependent Variable

Independent Variable / Controlled Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity	
	B	Std. Error	β			Tolerance	Variance Inflation Factor, VIF
(CONSTANT)	4.836	.410		11.785	**<0.001*** **		
HEAVY USERS	.433	.160	.171	2.716	**0.08†**	.862	1.160
GENDER	.055	.147	.023	.373	.709	.895	1.118
AGE	-.097	.052	-.121	-1.878	**0.06†**	.824	1.213
EDUCATION	.136	.096	.086	1.417	.158	.928	1.077
FINANCIAL	.224	.270	.050	.830	.407	.941	1.063
R^2			.082				
Adjusted R^2			.065				
F			4.781				

Note： $p^{\dagger}<0.1$、$p^{*}<0.05$、$p^{**}<0.01$、$p^{***}<0.001$；Perceived Ease of Use (PE) as the dependable variable

H4: Perceived usefulness has significant positive impacts on behavioral intention to use for open banking phrase III.

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H5: Perceived ease of use has significant positive impacts on behavioral intention to use for open banking phrase III.

From results of Pearson correlation analysis, we observe there are significant positive relationships between each of the two variables (e.g. perceived usefulness, perceived ease of use and behavioral intention to use) for mobile payment user's attitude. The same statistical results are suggested by regression analysis. The standardized coefficients and significance levels are β=0.505、P<0.001 (for perceived usefulness and behavioral intention to use) and β=0.262、P<0.001 (for perceived ease of use and behavioral intention to use) respectively. We can therefore conclude that both H_4 and H_5 hold.

Table Regression Analysis for BI as The Dependent Variable

Independent Variable / Controlled Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity	
	B	Std. Error	β			Tolerance	Variance Inflation Factor, VIF
(CONSTANT)	.073	.398		.184	.855		
PU	.570	.075	.505	7.561	<0.001***	.367	2.728
PE	.294	.074	.262	3.966	<0.001***	.375	2.665
HEAVY USERS	.052	.126	.018	.412	.681	.839	1.192
GENDER	-.092	.114	-.034	-.805	.422	.894	1.118
AGE	-.040	.041	-.044	-.983	.327	.813	1.229
EDUCATION	.056	.077	.032	.728	.467	.870	1.149
FINANCIAL	.180	.212	.036	.853	.395	.926	1.080
R^2			.564				
Adjusted R^2			.552				
F			49.275				

Note：p†<0.1、p*<0.05、p**<0.01、p***<0.001；Behavioral Intention to Use (BI) as the dependent variable

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The following figure includes statistical results for all five hypotheses in this research.

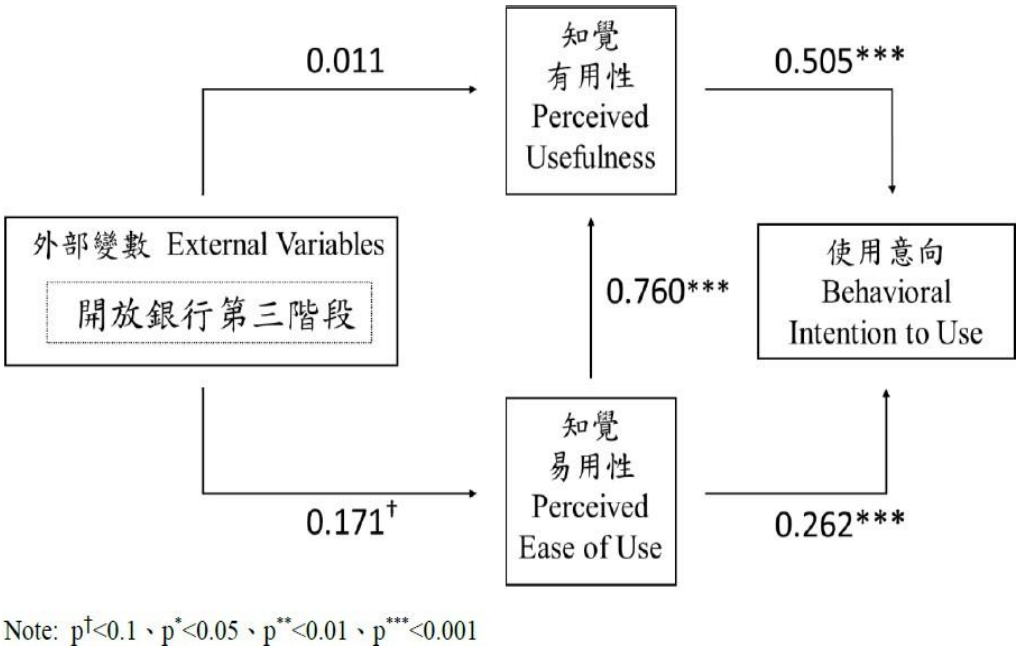

Figure the Statistical Results for Hypothesis Testing

CONCLUSION

This study focuses on consumers' attitudes toward the open banking phase III in Taiwan. Given the similarities between functions of open banking phase III and that of mobile payment, the questionnaire surveys were conducted on consumers who had experienced mobile payment. Technology Acceptance Model (TAM) was used to measure the acceptance of potential users for open banking in Taiwan. Pearson correlation analysis and regression analysis were applied to statistically test the hypotheses. The research results show that there is no positive impact for mobile payment heavy users on perceived usefulness toward open banking phase III, while there is a positive impact between heavy users and perceived ease of use toward open banking phase III. In addition, the results also indicate that higher perceived usefulness and perceived ease of use lead to higher behavioral intention to use.

Conclusion on Impacts of Open Banking Phase III on Mobile Payment Heavy Users: The research results suggest different statistical conclusions for hypothesis H1. Pearson correlation analysis shows there is a positive relationship between mobile payment heavy user and perceived usefulness while the regression analysis shows there is no significant positive relationship. According to the two-factor theory of Herzberg (1959), there are motivational factors and hygiene factors that influence consumer's satisfaction and dissatisfaction. From related reports we find mobile payment

technology tends to be motivational factor that positively influences consumer's perceived usefulness. However, in this research we find open banking phase III to be considered as hygiene factor that does not give significant positive impact on consumer's perceived usefulness. The possible reason for this can be that mobile payment has already included most of functions open banking phase III will bring to consumers in Taiwan. Therefore, those who answered the survey did not have high expectations as hypothesized.

On the other hand, the research results show consistent conclusions for hypothesis H2. There is a significant positive relationship between mobile payment heavy users and perceived ease of use. It is obvious that based on the experience from using mobile payment, consumers feel confident to accept new technology from open banking phase

III. The statistical results of hypothesis H3 match the technology acceptance model that perceived ease of use has a significant positive impact on perceived usefulness.

The above conclusions lead policy makers and banks in Taiwan to lay emphasis on more innovative functions that can attract consumers' interests when deal with open banking phase III policy.

Conclusion on Consumer's Behavioral Intention to Use for Open Banking Phase III : The statistical results of hypothesis H4 and hypothesis H5 show that higher perceived usefulness and perceived ease of use lead to higher behavioral intention to use for consumers in Taiwan. This conclusion is in line with Technology Acceptance Model that the external variables with new technological information from open banking phase III, make consumers' perceived usefulness and perceived ease of use positively influence their intention for future use of open banking.

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