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The effect of account receivable and inventory on return on assets of Chinese companies

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ABSTRACT

Working capital management become more and more vital and widely adapt in order to promote the performance of companies, which deal with the relationship between current assets and current liabilities, during the economic globalization and information age. It is difficult for companies to remain business sustainability and cause the profitability fluctuates. The objective of this study is to resolve the relationship between working capital management and companies' profitability. This study investigates the effects of account receivable and inventory on return on assets of Chinese public companies for the period 1990 - 2017. The historic accounting data is selected from CSMAR database. The research uses multiple pregression to analyze data. The results of the study shows that account receivable and inventory have a significant negative relationship with return on assets. This implies that managers can make more value and better performance for the company by means of reducing account receivable and inventory.

Key Words: Working Capital Management, Account Receivable, Inventory, Return on Assets, profitability

JEL Classification: C3; M4

I. INTRODUCTION

Working capital management cannot be emphasized too much in management a company's performance and profitability, especially during the economic globalization and information age. Working capital management handles with the company's current assets and current liabilities. Current assets and current liabilities show the liquidity of the company, which has a close connection with the company's operation. Therefore, working capital management will influence the profitability of the company. Many researchers have studied the relationship between the working capital management and profitability by analyzing the accounting data from some countries' companies. For expamle, Gill and Mathur (2010) study the American companies, Makori and Jagongo (2015) study the Kenya companies and Manzoor (2013) study the Pakistan companies. Most of them come out of the results that working capital management has a significant effect on profitability, and account receivable and inventory have a significant negative effect on return on assets which is on behalf of the profitability. There are three important components in working capital management, account receivable, account payable and inventory. Account receivable are payment which will be collected by the company caused by the credit trade. Inventory are some goods which still remained in the company. Account payable are payment which will be paid to the debtors. These two items, account receivable and inventory, also effect the cash conversion cycle. And cash flow involves the operation of the company, which reflected in profitability of a company. The profitability can be replaced by return on assets. This study focus on account receivable and inventory and researches whether the account receivable and inventory will effect the return on assets aimed to the Chinese companies.

As we known, the account receivable are cause by credit trade by some customers who the company trust. Companies usually will receive the payment according to the credit policy or contacts. The benefits to the customers is obvious, customers can have efficient cash on their hand to do some investment or run their own business. For this reason, it is believed that longer period of collection of credit receivable could give rise to the higher sales. Nonetheless the account receivable also means the cash which is locked by customers. It effect the company's own cash flow. If there is a emergency happened in company's operation, the company does not have enough cash to pay some bills which will cause defeat in company's performance and profitability. On other words, the amount of account receivable which the companies decided to hold will influence the liquidity of the companies. Eljelly (2004) uses the correlation and regression analysis to study empirically the relationship between liquidity and profitability. There is significant negative relationship between the company' profitability and its liquidity level. This study also finds the cash gap or the cash conversion cycle will effect the profitability of the companies.

Another component is inventory which is still saved by the company at the end of month or year. Traditionally, company will make a budget for next month or year to decide how much inventory should be remained at the end of this month or year. The aim is to avoid the stock-out, and sale risk. However, inventory also a kind of cost to the company, which will reduce the company's cash flow. For the same reason, the final results is influence the profitability of the company. The study written by the Shin and Spurlin (2015) demonstrates that Companies can receive the better performance and larger benefits through the inventory management which can increase the inventory efficiency. Overall, it is inconsistent to deal

with the relationship between account receivable, inventory and return on assets. It is necessary to research the relationship between account receivable, inventory and return on assets.

The result shows the account receivable has a significant negative effect on return on assets. The inventory also has a significant negative effect on return on assets which is more remarkable than account receivable to companies' profitability. This signifies that managers can make more value and better performance for the company by means of reducing account receivable and inventory. Growth of sale and current ratio, used as a control variable, show a significant positive relationship with return on assets also, which means increasing growth of sale and higher current ratio will lead companies get more return and better performance.

About the theoretical contribution, this study pays attention to the working capital management which measured by the account receivable and inventory effects the profitability which measured by the return on assets, which emphasize on the sample respondents in Chinese companies. There are many similar researches study this relationship focus on other countries. Such as Gill and Mathur (2010) study the American companies, Makori and Jagongo (2015) study the Kenya companies and Manzoor (2013) study the Pakistan companies. Thus this study will show this relation whether can be examined among in the Chinese companies. As the result of the study, in Chinese companies, the account receivable and inventory still have a significant negative relationship with the return on assets.

The next part presents the literature review and hypothesis development. Methodology and variable issues are discussed in section three, while sections four and five

discuss the empirical results, conclusion of the study.

This study explores the account receivable and inventory in working capital management whether effect the return on assets which represents the profitability of the company in Chinese. As the results, the data shows that account receivable and inventory have a significant negative effect on return on assets and inventory is more significant than account receivable. Managers can decrease the account receivable or shorter the cash conversion cycle to increase the return on assets. Besides, managers can reduce the inventory level to make the inventory efficient to get larger profitability. What's more, the two control variables: growth of sale and current ratio present a significant positive relationship with the return on assets.

II. Literature Review and Hypothesis Development

Based on previous a number of researches have founds some evidences about account receivable and inventory in working capital management to meet return on assets which represents the profitability through some model to measure accounting data from some countries' companies. This study pays attention to the working capital management which measured by the account receivable and inventory effects the profitability which measured by the return on assets, which emphasize on the sample respondents in Chinese companies. There are many similar researches study this relationship focus on other countries. Thus this study will show this relation whether can be examined among in the Chinese companies. According to Takon and Ugwu (2013), working capital management act as a quite significant role to improve the performance of manufacturing companies. And working capital relates

with the managing relationship between a company's short term assets and short term liabilities to guarantee a company can sustainably run its daily operation (Mulyono, Mulyono and Ratnawati, 2018), and have adequate cash flow to satisfy short term debt and operating expenses at minimal costs, increasing corporate profitability. There is a statistically important relationship within profitability and cash conversion cycle, tested through gross operating profit (Gill and Mathur, 2010). Gill and Mathur (2010) observes a sample of 88 American companies which are listed on New York Stock Exchange for a period of time from 2005-2007. Makori and Jagongo (2015) analyze the effect of working capital management on companies' profitability in Kenya which are listed on the Nairobi Securities Exchange (NSC) from the time period 2003 - 2012. They use the correlation and Ordinary Least Squares regression models. This study finds a positive relationship between inventory, account payable and companies' profitability and a negative relationship between account receivable, cash conversion cycle and companies' profitability. In addition, the financial leverage, sale growth, current ratio and firm size also have significant impact on the companies' profitability. Manzoor (2013) also explores the relationship between working capital management and profitability in the cement of industry of the Pakistan. He chooses the 20 companies which listed in the Karachi Stock Exchange (KSE) for the period from 2011 to 2010 for analysis. And Manzoor (2013) uses correlation matrix and multiple regressions to test the relation between working capital management and profitability. He finds there are negative significant between stock days, account receivable and firm size with profitability and financial leverage has a positive significant relation with profitability. Managers can create profits for their companies through keeping accounts receivables at an optimal level

and dealing with by correctly the cash conversion cycle. Cash conversion cycle is decided by the the length of time between cash payment for inventory and the collection of account receivable related with the sale of goods. When a profitability of company tends to decrease every year, which caused by the inefficient working capital management (Mulyono, Mulyono and Ratnawati, 2018).

For example, according to the the National Bank of Belgium, in 1997 accounts receivable and inventories were respectively 17% and 10% of total assets of all Belgian nonfinancial firms (Deloof, 2003). Usually companies are prefer to hold large inventory and a lot of trade credit policy may bring about higher sales. The reason is more inventory can reduce the risk of a sold-out and trade credit can encourage sales. (Long, Malitz and Ravid, 1993; and Deloof and Jegers, 1996). However, the account receivable and inventory represent that the money is locked up in working capital. Thus working capital investment specifically focus on break-even between profitability and risk. Decisions that tend to increase profitability tend to increase risk, and, conversely, decisions that focus on risk reduction will tend to reduce potential profitability. (García-teruel and García-teruel, 2007). they choose the sample of small and medium-sized firms from Spain for the period of 1996-2002, and find that there is a significant negative relation between an SME's profitability and trade credit and inventory. Besides, defined by lazaridis and tryfonidis (2006), they select a sample of 131 companies listed in the Athens Stock Exchange (ASE) in 2001-2004, and summary that there is a statistical significance between profitability and the cash conversion cycle which involves the account receivable, account payable and inventory. Lo, Yeung and Cheng, (2009) state a popular and widely meta-standard which can improve quality and operation in manufacturing

companies. It show that ISO 9000 can helps accelerate the material and cash flows in manufacturing supply chains. And ISO 9000 implementation cause the shortened the number of inventory days and account receivable days.

Account receivable means the a payment for goods and services delivered by companies which are expected to receive from the good credit customers. The length of credit collection time could be in few months or within one year according to the sale contract or companies' own policy. Credit trade could be a costly operation to the company if necessary arrangements are not taken by the company before delivering the goods or services to the customers (Takon and Ugwu, 2013). However, when companies reduce the amount of account receivable or the receivable collection period, which could lose their good credit customers (Nobanee, 2009). Thus, to control the credit trade is an important element in working capital management (Yadav et al., 2009). Managers prefer to apply a more comprehensive measure of working capital management (Nobanee, 2009). Working capital management handles with the relation between account receivable, inventory, and account payable.

Inventory reports the cost of raw material, work-in-process, and finished goods (Silver, Pyke and Peterson,1998). Generally, companies will hold some inventory at the end of month to avoid stock-out of next month's sale. However, it is hard to budget how much inventory companies should store to face next month's sale. Thus, if a company has overmuch inventory on hand which will cause a company lacks some cash, it will effect the liquidity of the companies or capital chain. As Shin and Spurlin said, companies should manage their inventory by inventory management or technological tools to achieve the

inventory efficient, which will make companies get more profit and better performance. Thomas and Zhang (2002) also study the impact of inventory to the company's returns and state there is a negative relation between two of them. The inventory level is a key issue to companies' operational performance and better inventory management is tightly related with companies' better financial performance and profitability (Shin and Spurlin, 2015).

According to aimed variables and goal of study have been confirmed above Whether account receivable and inventory will effect on return of asset which represents the profitability. This study raises two hypothesis as follow:

H1: Account receivable has a significant negative effect on return on assets

H2: Inventory has a significant negative effect on return on assets

III. RESEARCH METHODOLOGY

In this study, historic accounting data consists of all public companies under CSRC Industry Classification 2012 Edition from CSMAR covering the years from 1990 to 2017, resulting in 900957 firms per year.

The purpose of this research is in order to a very significant aspect of financial management known as working capital management with reference to China. Here researchers will see the relationship between account receivable and inventory and its affects on return on assets of Chinese companies. This section of the article discusses variables included in the study, the distribution patterns of data and applied statistical techniques in investigating the relationship between account receivable and inventory and return on assets.

The objective of this study is to examine the impact of the account receivable and

inventory on the return on assets. we can use the return on assets as the dependent variable and the other two as independent variables. The multiple regression technique was used in analyzing the models stated. Because there are two independent variables: account receivable and inventory, and four control variables: Financial Leverage, Log Size, Log Growth and Current Ratio.

The ideas behind regression analysis is the statistical dependence of one variable, the dependent variable in this case, return on assets(ROA), on one or more variables, the independent or explanatory variables (Takon and Ugwu, 2013). Two independent variables are account receivable and inventory. Four control variables were also included in the model. These are Financial Leverage, Log Size, Log Growth and Current Ratio. These four control variables are selected form Takon and Ugwu's (2013) and Mulyono, Mulyono and Ratnawati's (2018) research studies model. Financial leverage is an outcome of an ability in debt capacity (Ghosh and Jain, 2000). Size tracks the economies of scale and it is shows that when a company becomes larger, it is better moved to capture economies of scale. Current Ratio is one of the liquidity ratio, which explains whether a company's current assets can satisfy the company's obligations when they become due. The general form for a multiple regression analysis is given in the form below:

$$Y = a + b1\ X1 + b2\ X2 + b3\ X3 + +\ldots bn\ Xn + e$$

Where:

Y = Dependent variable

a=Constant of the equation

$b1 - bn$ = Coefficient of independent variables

X1 －Xn = Independent variables

e =Error Term

In order to test and adapt our hypothesis in this study. Dependent variable is return on assets, two independent variables are account receivable and inventory and four control variables are Financial Leverage, Log Size, Log Growth and Current Ratio. Growth of a firm's sales is calculated by variation in its annual sales value in reference to previous year's sales. Thus, the model could be written as follows:

$$ROA = a + b\ ACCTR + c\ INV + FL + Log\ Size + Log\ Growth + CR + e$$

Where:

ROA = Return on Assets

a= Constant of the equation

ACCTR = Account Receivable

INV = Inventory

log Size = Size (in logarithm)

log Growth = Growth (in logarithm)

CAR = Current Ratio

b, c = Coefficient of the independent variables

e = Error Term.

The dependent variable for this for this study is the Return on Assets while the independent variables are Account Receivable and Inventory. The control variables are Financial Leverage, Log Size, Log Growth and Current Ratio of the companies respectively. Return on Assets represents the profitability of a company. This formula has been used in many similar studies.

It most often defined as:

Return on Assets = Earning After Tax / Total Assets

This independent variables have been used by Falope and Ajilore (2009), Takon and Ugwu (2013), Mulyono, Mulyono and Ratnawati (2018) and a many of others. Account Receivable is used as the independent variable. These are customers who are yet to make payment for the goods and services (Takon and Ugwu, 2013). It is calculated thus:

ACCTR = Account Receivable / Sales * 365

Another independent variable is Inventory. These are some goods which the company on hand. The calculation is defined by in Mulyono, Mulyono and Ratnawati's (2018) study. It is calculated as:

INV = Inventory / Cost of Goods Sold *365

The four control variables are Financial Leverage, Size, Growth in sales and Current Ratio. Financial leverage is an outcome of an ability in debt capacity (Ghosh and Jain, 2000). However, an excessive amount of financial leverage increase the risk of failure. It is straightforward as

***Financial Leverage = Total Debt / Equity of Shareholder*s**

Size tracks the economies of scale and it is shows that when a company becomes larger, it is better moved to capture economies of scale (Takon and Ugwu, 2013). The study measured size as the logarithm of total assets as follows:

Size = Log Total Assets

Growth of a firm's sales is calculated by variation in its annual sales value in reference to previous year's sales. This ratio is fairly measured as follows :

$$Growth = (Sale_1 - Sale_0) / Sale_0$$

Where $Sale_1$ = this year 's sales; $Sale_0$ = previous year's sale (Takon and Ugwu, 2013)

Current Ratio is one of the liquidity ratio, which explains whether a company's current assets can satisfy the company's obligations when they become due (Khadafi and Ummah, 2014). The formula as follows:

$$Current\ Ratio = Current\ Assets / Current\ Liabilities$$

IV. EMPIRICAL RESULTS

All historic accounting data consists of all public companies under CSRC Industry Classification 2012 Edition from CSMAR covering the years from 1990 to 2017, resulting in 900957 firms per year. The original accounting data includes: Year, Security ID, Accounting period, Report type, Account receivable, Inventory, Total assets, Total liabilities, Equity of shareholder (which are from the balance sheet), Sale, Cost of good sold, Earning after tax (which are from the income statement). The process of the original accounting data is used the STATA data analysis tool and Microsoft Excel to filtrate. For instance, because there are two types of report type, only remain the Type A, drop Type B. Besides, save the accounting period 12 / 31. Another step is to drop the value of some items is "0" or ".".

After these processing steps, using STATA to calculate the value of *ROA, ACCTR, INV, FL, Log Size, Log Growth, CR.* And using multiple regression analysis, put *ROA* as dependent variable, put *ACCTR* and *INV* as two independent variables, put *FL, Log Size, Log Growth and CR* as four control variables.

The result of this study shows the account receivable and inventory have a

significant negative effect on return on assets. This suggests that managers can make more value and better performance for the company by means of reducing account receivable and inventory. Growth of sale and current ratio, used as a control variable, also show a significant positive relationship with return on assets. The rest of two control variables do not have significant impact on return on assets

The following part lists three important table to explain the data analysis and the relationship between the account receivable, inventory to return on assets and the relationship about other four control variable: Financial Leverage, Log Size, Log Growth and Current Ratio.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
roa	33659	.024	.348	-48.328	10.395
ar	33659	1399.785	216000	-12600	3.97e+07
inv	33543	553.422	23615.82	-119000	4000000
fl	33659	1.169	25.799	-2268.153	1911.699
logsize	33659	3.071	.059	2.789	3.35
loggrowth	23350	-1.623	1.279	-6.855	11.81
cr	33658	3.082	3.961	-7.874	141.318

Firstly, we discuss the result about table 1. The table 1 lists the observations, averages, maximums, minimums, and variances of all variables in the sample to observe the completeness and variability of the data. Table 1 presents a descriptive statistics of the study for Chinese companies (1992-2016) with a total observation of 33659. The main variable for this study are *ROA* (which is the dependent variable), *ACCTR, INV* (which are the independent variable) and the control variable are made of *FL, Log Size, Log Growth and CR* (Takon and Ugwu, 2013).

From the table, the 33659 observations have a mean *ROA* of 0.024 with Std.Deviation of 0.348. *ACCTR* and *INV* have a mean of 1399.785 and 553.422 with Std.Deviation of 216000 and 23615.82. *FL* has a mean of 1.169 with Std.Deviation of 25.799. *Log Size* has a mean of 3.071 with Std.Deviation of 0.059. *Log Growth* has a mean of -1.623 with Std.Deviation of 1.279. *CR* has a mean of 3.082 with Std.Deviation of 3.961. The mean of *ROA* (0.024) indicates that Chinese companies have poor performance over the study period of 1992 - 2016 by considering inflation rate (Takon and Ugwu, 2013). *ACCTR* has a Max of 3.97e+07 with Min of -12600. *INV* has a Max of 4000000 with Min of -119000. *ROA* has a Max 10.395 with a Min of -48.328. *FL* has a Max of -2268.153 with Min of 1911.699. *Log Size* has a Max of 2.789 with Min of 3.35. *Log Growth* has a Max of -6.855 with Min of 11.81. *CR* has a Max of -7.874 with Min of 141.318.

Table 2. Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) roa	1.000						
(2) ar	-0.029	1.000					
(3) inv	-0.008	0.078	1.000				
(4) fl	-0.003	0.009	0.008	1.000			
(5) logsize	0.034	-0.160	0.037	0.024	1.000		
(6) loggrowth	0.023	0.022	0.067	-0.000	-0.017	1.000	
(7) cr	0.038	0.001	-0.040	-0.021	-0.178	-0.056	1.000

Next, we talk about the summary of table 2. Table 2 displays Matrix of correlations among variables focusing on the relationship between independent variables, dependent variable and control variables, which is a step that must be completed to verify the data. Correlation indicates how two different variables response to each other, eg. What variation in one variable with the variation in other variable (Takon and Ugwu, 2013). From the table,

account receivable (ar) related negatively with return on assets (roa) showing that longer collection period will lead to reduce in return on assets. Inventory (inv) related negatively with return on assets (roa) stating that lower inventory level lead to higher return on assets. Financial leverage (fl) related negatively with return on assets (roa), which means higher financial leverage will lead higher profitability. Log size (logsize) related positively with return on assets (roa). when the company size become smaller, the return on assets will decrease. Log growth (loggrowth) related positively with return on assets (roa). when the company get more growth of sale, they will get more return. The value between these variables are small, which means multiple regression analysis can be used to test the relationship among these three different kinds of variables.

Table 3. Multiple regression analysis

VARIABLES	(1) roa
ar	-0.000*
	(-1.761)
inv	-0.000***
	(-2.986)
fl	-0.000
	(-0.983)
logsize	0.283
	(1.407)
loggrowth	0.007***
	(10.222)
cr	0.004***
	(3.419)
Constant	-0.745
	(-1.303)
Observations	23,270
R-squared	0.006
Year FE	YES

Pseudo R-sq	)

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, we analyze the table 3.Table 3 shows the multiple regression result which contain the significant relation between dependent variable: return on assets, independent variables: account receivable, inventory and control variables: Financial Leverage, Log Size, Log Growth and Current Ratio. A negative t value indicates that the mean of the previous group of samples is lower than the mean of the latter group. The t value is an indicator used to determine whether it is statistically significant. The smaller the t value, the less reliable the estimated value of the regression coefficient is, and the closer it is to zero. In addition, the larger the absolute value of the regression coefficient, the larger the absolute value of the t value. The P value is a parameter used to determine the results of hypothesis testing. If the P value is small, it means that the probability of the original hypothesis situation is very small. If it occurs, according to the principle of small probability, we have reasons to reject the original hypothesis. The P value The smaller the reason we reject the null hypothesis, the better. Overall, the smaller the P value, the more significant the results. The independent variable (account receivable) has a significant negative impact on return on assets (t = -1.761, * p < 0.1). This result agrees the hypothesis 1. The another independent variable (inventory) has a significant negative impact on return on assets (t = -2986, *** p < 0.01), which supports the hypothesis 2. Comparing with these two independent variables, inventory's p value <0.01 (which gets ***) and account receivable's p value <0.05 (which gets *). The more stars p value got the more significant related, so inventory has more significant negative effect on return on assets. Based on the results of analysis of influences of account receivable

and inventory, it implies that managers can shorter the collection period or reduce the inventory level to get better financial performance and larger return on assets. The control variable (log size) has a significant positive impact on return on assets (t = 10.222, *** p < 0.01). The another control variable (log growth) has a significant positive impact on return on assets (t = 3.419, p = 0.004*** <0.01), which means the larger firm size and increase on growth of sale can get more return. The rest of two control variables (financial leverage and log size) do not have significant impact on return on assets. Financial leverage has t = -0.983, and log size has t = 1.407 with p = 0.283.

Thus we accept two hypothesis: account receivable has a significant negative effect on return on assets, because of the p value <0.05; inventory has a significant negative effect on return on assets because of the p value <0.01. And inventory has more significant negative effect on return on assets. The multiple regression model becomes: *ROA = -0.745 - 0.000* ACCTR - 0.000*** INV - 0.000 FL + 0.283 Log Size + 0.007 Log Growth + 0.04 CR.*

V. CONCLUSIONS

Faced with working capital management become more and more important during the economic globalization, managers seek for the method to deal with the how length of credit collection period time and how much the inventory companies should be on hand. However, managers are hard to achieve the balance between the account receivable, inventory and the profitability. From the above results, this study through the multiple regression model to prove the relationship between account receivable, inventory and return on assets is significant negative effect. For this reason, when managers work with the

working capital management, they can shorter the collection days of credit trade and lower the inventory level, which can improve the performance and profitability of the company.

As for the theoretical contribution, this study pays attention to the working capital management which measured by the account receivable and inventory effects the profitability which measured by the return on assets, which emphasize on the sample respondents in Chinese companies. There are many similar researches study this relationship focus on other countries. Thus this study will show this relation whether can be examined among in the Chinese companies.

Furthermore, there are some limitations in this study, research does not examine whether the industry element will effect the result and this study could be further polished and perfected with a larger sample size, different variables involve working capital and also other external control variables which might provide a strong relationship between the variables. Sometimes in multiple regression analysis, what kind of factor to choose and what kind of expression to use for that factor is just a guess. This affects the diversity of power consumption factors and the unpredictability of some factors, making regression analysis restricted. Thus this study is left to be deeper discovered in the future.

In conclusion, this study arranges the historic accounting data to provide the evidence about account receivable and inventory impact the return on assets for a sample of 33659 observations for the period 1992-2016 after dropping some worthless data. Correlation and multiple analysis is used in examining these two hypothesis. The results show that account receivable and inventory have a significant negative impact on return on assets. And firm size and growth of sale have a significant positive effect on return on assets. This finding

is in keeping with most studies in the literature review which have been mentioned for other countries. Such as Gill and Mathur (2010) study the American companies, Makori and Jagongo (2015) study the Kenya companies and Manzoor (2013) study the Pakistan companies.

Appendices

Variable Description

roa	Return on Assets	*ROA*
ar	Account Receivable	*ACCTR*
inv	Inventory	*INV*
fl	Financial Leverage	*FL*
logsize	Size (in logarithm)	*Log Size*
loggrowth	Growth (in logarithm)	Log Growth
cr	Current Ratio	*CR*

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