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# Impact of Working Capital Management to Business Efficiency of Association of Asia Pacific Airlines

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**Abstract:** The management of working capital plays an important role for the success of the business operations of the airline. The study is based on data from the financial statements of the airlines in the Association of Asia Pacific Airlines (AAPA) for the period of 2010-2015. The study results showed an opposite impact of day inventory outstanding and days of sales outstanding to profit before tax on assets; positive of current ratio to the profit before tax on assets and positive of financial leverage to profit before tax on equity. These results suggest that airlines need to rationalize supplies of aircraft spare parts inventory, increased the ability to recover cash from selling air transport products and strengthen collaborative relationships with suppliers in order to improve efficiency of working capital management, contribute to improve business efficiency.

**Keywords:** Working Capital Management, Business Efficiency, Airlines

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## 1. Introduction

Working capital is an integral part of the airline's capital. It includes money for fuel, supplies and spare parts of aircraft and aircraft lease deposits, cash, bank balance and so on. The working capital management is an important component of airlines financial management because it directly affects the liquidity and profitability of the airlines. So it is one of the indicators to measure performance and short-term financial strength, and help investors with the comments on the performance of airlines.

Although there have been many studies about the impact or the relationship between working capital management to business performance of the enterprise so far. However, we have not seen any research about the airlines in the Asia Pacific. This article examines the impact of working capital management to business performance of airlines in the AAPA. To solve this problem, the article will study the theoretical basis and build model, collect data and analysis data of airline in AAPA to estimate and test parameters in the model. There results will determine the importance of working capital management to business performance and suggested solutions to improve the business operational

efficiency of the airlines.

## 2. Research Overview and Theoretical Basis

### 2.1. Research Overview

There have been many studies indicate the relationship between working capital management and business performance of enterprises in different environments. The first one is the research of Amarjit Gill and colleagues [2] about the relationship between working capital and profits in the United States. Sample of 88 United States companies listed on the New York Stock Exchange in the period 2005-2007. The study results showed there were an inverse relationship between the profit before tax variable with days of sales outstanding (DSO) and debt to asset ratio (DTA) and a covariates relationship between pre-tax profit and cash conversion cycle (CCC). Thus, the findings of this study suggested that the administrators can create value for their shareholders by reducing the number of days for customer receivables.

The next one is research of Loannis Lazaridis and

Tryfonidis Dimitrios [7] in Greece on the relationship between working capital management and profitability of the companies listed on the Athens Stock Exchange with 131 sample companies during 2001 -2004. The study results showed an inverse correlation relationship between gross profit and CCC. So managers can generate profits for their company by correctly handling the CCC and keep every different component (receivables, payables, inventory) to an optimum level.

While Meanwhile Raheman and Nasr [9] chose a sample of 94 companies listed on the Karachi stock market of Pakistan for a period of 6 years from 1999 to 2004 to examine the impact of working capital management to net profit. From the study, they found an inverse relationship between the variables in working capital management (such as days of sale outstanding (DSO), DIO, CCC) and profit. Besides, they also pointed out that there is a covariates relationship between the size of company measured by the logarithm from sales and the profits. Also in Pakistan, Zubair Arshad and Muhammad Yasir Gondal [11] used data of 21 cement companies from 2004 to 2010 to study the relationship between working capital and profits. The result of study showed that there is significant negative relationship between working capital management on profitability of the firms.

In Iran, Abbasali Pouraghajan and Milad Emamgholipourarchi [1] studied the impact of working capital management to profitability and market value of companies on the Tehran stock market. By analyzing data from 400 observations (year-company) in 2006-2010. The research results indicate that there is a relation between capital management criteria and rate of return on assets (ROA) of the company, but no significant relationship with the market value criterion of the company. In addition study results also showed that managers can increase profits by reducing CCC and DTA

In the ASIAN, Binti Mohammad and Binti Mohd Saad [3] have examined the impact of the management of working capital to market value and profits of the 172 companies listed on the Malaysian stock exchange from 2003 to 2009. Results showed that negatively impacts between the components of working capital management as CCC, current ratio (CR), DTA and current liabilities on assets to ROA and rate of return on equity (ROE)

In Vietnam, Huynh Phuong Dong & Jyh-tay Su [6] studied

the relationship between working capital management and profitability of the 130 companies listed on stock exchanges in Vietnam over 3 years from 2006 to 2009 (390 observations) shows that there is a negative relationship between vigorous pre-tax profit to CCC, days of payables outstanding (DSO) and DIO. As for DPO, DTA and logarithm of revenue, profit before tax selling relationship covariates. Thus, managers can increase profitability by reducing the number of days receivable and inventories

In summary, previous studies showed that the impact of the component elements of working capital management results and business performance of the enterprise. The typical elements of the components of working capital management is DSO, DIO, DPO, CCC, CR and DTA. These findings provide a basis for theoretical and empirical research is important for the impact of working capital management to business performance of airlines in the AAPA.

## 2.2. Theoretical Basis

Working capital is an indicator related to the amount of money a business needs to maintain regular operations. It is a capital advanced to form the short-term assets or current assets. In the balance sheet, working capital is determined by current assets minus current liabilities [10]. The important elements of working capital is the amount of inventory, accounts receivable, accounts payable. Analysts generally consider these items to evaluate the efficiency and financial strength of a business.

Working capital management is the management of current assets, current liabilities and total debt to generate profits for shareholders [2]. The ability to manage working capital of enterprise the better the declining loan demand. Even if enterprise have idle cash management, the working capital is also essential because it ensures that the amount of idle capital investment will be the most efficient way for investors. Effective management of working capital of enterprise often assessed by indicators such as DIO, DSO, DPO, CCC, CR, Financial Leverage (DTE), DTA [4, 8].

- DIO is the average number of days needed for enterprise to be able to fully liquidate the amount of its inventory (including goods are still in the process of production). This index is often low, it means that the management of working capital more effectively (Formula 1).

$$DIO = \frac{\text{Average annual inventory}}{\text{Cost of goods sold}/365 \text{ days}} = \frac{(\text{Beginning inventory} + \text{Ending inventory})/2}{\text{Cost of goods sold}/365 \text{ days}} \quad (1)$$

- DSO is the average number of days that enterprise need to recover pre-sale after sale. Just like DIO, DSO is low, it means that the management of working capital more effectively (Formula 2).

$$DSO = \frac{\text{Average receivables}}{\text{Revenue}/365 \text{ days}} = \frac{(\text{Beginning receivables} + \text{Ending receivables})/2}{\text{Revenue}/365 \text{ days}} \quad (2)$$

- DPO is the average number of days that enterprise need to pay suppliers. The higher it is, the more effective working capital management (Formula 3).

$$DPO = \frac{\text{Average payable}}{\text{Cost of goods sold}/365 \text{ days}} = \frac{(\text{Beginning payable} + \text{Ending payable})/2}{\text{Cost of goods sold}/365 \text{ days}} \quad (3)$$

- CCC is determined by the days of inventory on hand plus days of sales outstanding minus days of payables outstanding. It is calculated when enterprise pay for raw materials to the cash received in the sale. If this number is small, the will be considered capable of managing working capital is good (Formula 4).

$$CCC = DIO + DSO - DPO \tag{4}$$

- CR show that the ability of businesses in the use of short-term assets to pay for its short-term debt (Formula 5).

$$CR = \frac{\text{Current assets}}{\text{Current liabilities}} = \frac{\text{Working capital}}{\text{Current liabilities}} + 1 \tag{5}$$

DTE and DTA to indicate how many liabilities (current liabilities and non-current liabilities) per unit of equity or assets of the enterprise. Meanwhile, total assets is the same as total of equity and liabilities, current liabilities is current assets minus working capital. So in the context of other factors unchanged, the higher DTE and DTA is the lower solvency will be but increased efficiency of working capital (Formula 6 and 7).

$$DTE = \frac{\text{Liabilities}}{\text{Equity}} = \frac{\text{Current assets} - \text{Working capital} + \text{non current liabilities}}{\text{Equity}} \tag{6}$$

$$DTA = \frac{\text{Liabilities}}{\text{Assets}} = \frac{1}{\frac{\text{Equity}}{\text{Current assets} - \text{Working capital} + \text{non current liabilities}} + 1} \tag{7}$$

About indicators business performance of the enterprise, there are 2 general evaluation criteria is ROA and ROE. ROA measure the performance of the enterprise without regard to the financial structure. It indicates how much enterprise generate profits from a assets unit (Formula 8). ROE also said on an equity unit can generate how much profits (Formula 9).

$$ROA = \frac{\text{Profits}}{\text{Total assets}} \tag{8}$$

$$ROE = \frac{\text{Profits}}{\text{Equity}} \tag{9}$$

$$\text{Model 1: } ROA = a_0 + a_1DIO + a_2DSO + a_3DPO + a_4CCC + a_5CR + a_6DTE + a_7DTA$$

The hypothesis of model 1: There is a relationship between the components of working capital management and the ROA of the airlines in the AAPA.

$$\text{Model 2: } ROE = b_0 + b_1DIO + b_2DSO + b_3DPO + b_4CCC + b_5CR + b_6DTE + b_7DTA$$

The hypothesis of model 1: There is a relationship between the components of working capital management and the ROE of the airlines in the AAPA.

### 3. Models and Research Methods

#### 3.1. Research Models

From the basis theoretical and synthesizing relevant research, model of the impact of working capital management to business performance of airlines in the AAPA in this study is described in Figure 1.

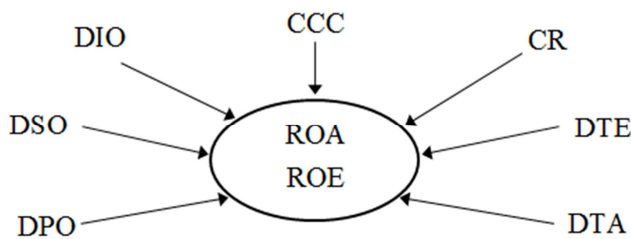


Figure 1. Proposed research model.

Dependent variable (variable represent to business efficiency): ROA and ROE, measured by profits before tax in order to eliminate the differences in income tax policy among nations.

Independent variables (variables reflect effective management of working capital): DIO, DSO, DPO, CCC, CR, DTE and DTA.

#### 3.2. Data Sources

Data were collected from the annual financial statements for 5 years from 2011 to 2015 of the airlines in the AAPA (some observers have negative profit before tax used data in the previous year 2010). Including 15 members of the Air Astana official formula, All Nippon Airways, Air Asia, Bangkok Airways, Cathay Pacific Airways, China Airlines, EVA Airways, Garuda Indonesi, Japan Airlines, Korean Air, Malaysia Airlines, Philippine Airlines, Royal Brunei Airlines, Singapore Airlines, Thai Airways and 6 members Interntional unofficially as Air China, Air New Zealand, China Eastern Airlines, China Southern Airlines, Qantas and Vietnam Airlines. A total sample of 21 airlines for 105 observations (firm-years)

Data were collected through assets value (current assets and non-current assets), equity, liabilities (current liabilities and non-current liabilities), average receivables (accounts receivable value at biginning and ending of the year), average inventory (account inventory at biginning and ending of the year), average liabilities (accounts payable value at biginning and ending of the year), revenue, cost of good sold and profit before tax (Table 1).

**Table 1.** Descriptive Statistics for sample.

Variable	No	Minimum	Maximum	Mean	Std. Deviation
Current assets	105	114,488	9,779,200	2,488,919	2,158,012
Non-current assets	105	241,419	26,202,382	8,969,018	7,493,708
Total assets	105	386,677	29,659,501	11,457,937	8,985,518
Average receivables	105	21,063	1,615,534	634,015	487,214
Average inventory	105	4,525	634,732	189,058	142,397
Average payable	105	43,568	3,089,500	869,414	868,135
Equity	105	28,939	14,502,800	3,323,378	3,442,824
Total liabilities	105	142,750	23,677,777	8,137,972	6,431,157
Revenue	105	449,367	17,022,998	7,707,506	5,530,042
Cost of good sold	105	312,532	16,489,000	6,750,320	4,986,861
Profit before tax	105	17	2,072,802	394,703	473,839

Source: Compiled from the financial statements of airlines  
Unit: Thousand USD

## 4. Findings

### 4.1. Statistics Describing the Variables

From the data in sample, the descriptive statistical indicators of variables DIO, DSO, DPO, CCC, CR, DE, DA, ROA and ROE of the airlines in the AAPA is shown in Table 2.

**Table 2.** Descriptive Statistics of the variables.

Variable	No	Minimum	Maximum	Mean	Std. Deviation
DIO	105	1.90	28.83	11.00	6.25
DSO	105	10.36	91.99	30.65	11.75
DPO	105	8.87	92.77	43.72	22.25
CCC	105	-55.70	37.68	-2.07	19.80
CR	105	0.22	3.46	0.89	0.55
DTE	105	0.59	65.55	5.09	9.24
DTA	105	0.37	1.09	0.73	0.14
ROA	105	0.00%	31.78%	3.84%	4.89%
ROE	105	0.00%	942.09%	23.05%	92.04%

Results descriptive statistics show the average time required for the airlines to fully liquidate its inventory is 11 days (28.83 is the longest and the shortest is 1.9 days). This time is quite low because it is only supplies of aircraft spare parts inventory (air transport is a service industry so no inventory product). The average time that the airline needs to recover pre-sale after sale is 30.65 days (the longest is 91.99 days and the shortest is 10.36 days). It is mainly the time to recovery of receivables from agents and airlines cooperation by Interlines contract. Meanwhile, the average time that the airline needs to pay suppliers is 43.72 days (the longest is 92.77 days and the shortest is 8.87 days). It is mainly the

time to pay for the airport, the air traffic service providers, fuel and other service providers at airports. So the results of the cash conversion cycle for airlines is average of -2.07 days (37.68 days is the longest and the shortest is -55.7 days). This suggests that the ability to manage working capital of airlines are pretty good, but also partly due to the characteristics of the air transport sector.

Current liquidity ratio shows that the airline has the ability to use current assets to pay for its current liabilities average 0.89 times (3.46 times the largest and smallest is 0.22 times). Ratio of debt to equity and debt to assets showed an average of 1 equity unit, the airlines has 5.09 debt unit (the largest is 65.55 and the smallest is 0.59) and 1 assets unit, the airlines has 0.73 debt (the largest is 1.09 and the smallest is 0.37). Due to the air transport business requires large capital, so ratios the debt to equity is quite high.

About business efficiency, profit before tax on assets and equity suggest that a assets unit, the airlines average gained 0.0384 (0.3178 is biggest and smallest is almost zero), and an equity unit the airlines average gained 0.2305 (the largest is 9.4209 and the smallest is almost zero).

### 4.2. Analyze the Correlation Between Variables

Pearson correlation coefficients indicate the relationship between the variables independently without regard to relationship with other variables. In general, independent relationship between ROA and ROE for the variables DIO, DSO, DPO, CCC and DTE have observed significance level (Sig.) is not high (Table 3).

**Table 3.** Correlation between variables.

	DIO	DSO	DPO	CCC	CR	DTE	DTA	ROA	ROE
DIO	1								
DSO	-.380**	1							
DPO	-.311**	.595**	1						
CCC	.440**	-.195*	-.869**	1					
CR	.207*	-.081	.075	-.067	1				
DTE	-.050	.031	-.231*	.262**	-.169	1			
DTA	.058	.098	-.294**	.407**	-.555**	.434**	1		
ROA	-.083	-.184	-.057	-.072	.317**	.010	-.314**	1	
ROE	-.093	-.107	-.176	.105	-.044	.350**	.185	.635**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed)

**4.3. Analyzing the Impact of Working Capital Management to Business Performance**

Analyze multivariate linear regression was used to determine the impact of working capital management to business performance of airlines in the AAPA in relationships with other variables impact. The relevance of the model is assessed by value Sig. in ANOVA analysis. Also explains the level of the independent variables in the model are reflected in adjusted R<sup>2</sup> coefficient. The parameters to be estimated in the regression is accredited through the t-value (or the Sig.) and variance inflation factor (VIF) to examine the autocorrelation phenomenon (multicollinearity)

The results of analysis of multivariate linear regression I

model 1 with the dependent variable is ROA (impact of working capital management to ROA) showed DPO turn out in the process of running a regression. The relationship between CCC, DTE and DTA with ROA does not guarantee statistical significance due to the t-value <2 (Sig.> 0.05). Just DIO, DSO and CR have a relationship statistical significance with ROA. DIO and DSO specific relationship with ROA inverse correlation coefficient -0.224 and -0.221, respectively, a statistically significant level respectively 0.048 and 0.028. CR also has a relationship with ROA covariates correlation coefficient is 0.249 and statistically significant level was 0.033. Adjustment coefficient R<sup>2</sup> shows these variables explain 15.6% change in ROA (Table 4).

*Table 4. Results of regression analyzes for ROA.*

		Standardized Coefficients (Beta)	t-value	Sig.	VIF
	(Constant)		3.015	0.003	
Variables	DIO	-0.224	-2.003	0.048	1.541
	DSO	-0.221	-2.224	0.028	1.216
	CCC	0.056	0.497	0.621	1.577
	CR	0.249	2.163	0.033	1.628
	DTE	0.128	1.251	0.214	1.293
	DTA	-0.220	-1.669	0.098	2.140
R <sup>2</sup> = 0.204			Adjusted R <sup>2</sup> = 0.156		

Sig. in ANOVA analysis = 0.001 (F = 4.196)  
 Dependent variable: ROA (%)

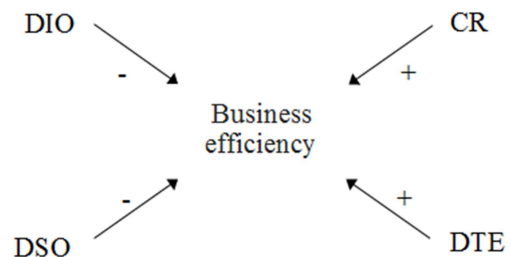
Analyze multivariate linear regression model 2 with the dependent variable is ROE (impact of working capital management to ROE) shows variable DPO also been left out in the process of running a regression. Although the independent variables also beta standardized coefficients is high but variable DTE only has statistical significance level (Sig. = 0.005 <0.05) with standardized beta coefficient is 0.299. Adjustment coefficient R<sup>2</sup> showed variations explain 11.4% change in ROE (Table 5).

*Table 5. Results of regression analyzes for ROE.*

		Standardized Coefficients (Beta)	t-value	Sig.	VIF
	(Constant)		.083	.934	
Variables	DIO	-.191	-1.670	.098	1.541
	DSO	-.188	-1.851	.067	1.216
	CCC	.027	.237	.813	1.577
	CR	.106	.904	.368	1.628
	DE	.299	2.853	.005	1.293
	DA	.132	.978	.331	2.140
R <sup>2</sup> = 0.165			Adjusted R <sup>2</sup> = 0.114		

Sig. in ANOVA analysis VA = 0.006 (F = 3.233)  
 Dependent variable: ROE (%)

The VIF value of the two models are in the range from 1 to 10 showed no autocorrelation between the independent variables in the model (Chu Hoang Trong and Nguyen Mong Ngoc, 2005). The Sig. value in ANOVA analysis is less than 0.05 showed the sample model can be used for practice. Thus, with this data management variables impacts working capital significantly to ROA is DIO, DSO, CR and to ROE is TDE. Research model after performing this study was presented at Figure 2.



*Figure 2. The model after the experimental research.*

## 5. Conclusion and Proposed Solutions

This study supports the findings of Raheman and Nasr [9] or Amarjit Gill and colleagues [2] and Huynh Phuong Dong and Jyh-tay Su [6] opposite impact of DIO and DSO to business performance of the enterprise. But the study results are not consistent with the research of Binti Mohammad and Binti Mohd Saad [3] about the positive impact of CR on business performance. In addition, this study also indicate the impact of working capital management to business performance of airlines in the AAPA. The conditions which other factors do not change if reducing 1% day of inventory on hand and days of sales outstanding will help airlines increase ROA is 0.0024% and 0.00221%. And while increasing current ratio or financial leverage by 1% will help airlines increase ROA is 0.00249% or ROE is 0.00299%.

In fact there are many factors affecting the business performance of the enterprise in general and in particular airlines. Meanwhile a new study just impact assessment of the management of working capital in the range of AAPA. However, the results of this study suggest airlines in AAPA and Vietnam airlines in particular can increase business efficiency by enhancing the efficiency of working capital through issues following:

*First*, the rationalization of aircraft spare parts and supplies inventory to a minimum to reduce day of inventory on hand, while ensuring reliability by structures simply type of aircraft to be able to mutual sharing, increase the supply of spare parts and supplies in time for the aircraft operator.

*Second*, increase the ability to recover money from the sale of air transport products from the agent and airlines sell products by Interlines contract to be able to reduce the Cash Conversion Cycle, increase business results.

*Third*, increase cooperation relationships with providers of services at airports and flight services to limit pay in advance increases or extend the reasonable current liabilities for Improve business efficiency.

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## Biography



**Nguyen Hai Quang** (1969, Vietnam) PhD. in Economics (2008) – University of Economics Ho Chi Minh City, Vietnam. Head of training Department, Lecturer and Researcher at Vietnam Aviation Academy. Research Experience: Air transportation management and operation, logistics in the air transport. About 6 books for training, 2 scientific research projects, 11 publications in scientific journals and about 1 paper on conference proceeding.