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DOES IMPLEMENTING A B2B ELECTRONIC MONEY C PLAN BENEFIT WORKING CAPITAL MANAGEMENT?

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ABSTRACT

Recently, banks and enterprises are gradually involved in B2B electronic money C Plan abbreviated as electronic money. However, few articles have related e-commerce to the financial area. The main purpose of this study is to investigate the relationship between financial characteristics and implementing electronic money by e-commerce, and whether implementing electronic money will affect the firm value and working capital management. The important results are described as follows: 1.We find that the companies with trouble in cash flow will stress on electronic money due to the negative relationship between cash flow and implementing electronic money. 2. Implementing electronic money will raise the turnover ratio of inventory (i.e. implementing electronic money will benefit the working capital management of electronic companies in Taiwan).

Keywords: Implementing B2B Electronic Money C Plan, Inventory Turnover Ratio, Working Capital Management, Cash Flow

1. INTRODUCTION

The development of e-commerce has caused a revolutionary change in the industry as it may reduce costs in three aspects[1]. First of all, it cuts down on procurement costs, and a company may easily find raw materials at a minimum price from suppliers through e-commerce. Second, it helps realize chain management. Third, it facilitates inventory control in an accurate manner, thereby eliminating stock-holding problems. According to David [6], the e-procurement can boost the benefit arising from transactions and therefore increase the commitment to suppliers, improve management information and ultimately obtain strategic sources at a more affordable price. Varshney [30] argue that electronic money may improve administration efficiency while diminishing administration costs. Clemons [5] and El-Sway [11] also propose that information technology may facilitate external coordination and

reduce coordination costs as well as transaction risk costs through modularization and standardization.

According to relevant studies, a company which engages in e-commerce may increase its financial performance [15, 18, 23, 24, 27, 33]. From a global perspective and based on international linkages, B2B e-commerce seems to be the direction for development of the industries. For this reason, under global e-commerce competition, the ability to be ready for electronic procurement and electronic distribution has become a crucial factor for being a central factory in electronics.

According to Stock [26], principal technology and traditional logistics management were used to integrate production activities for a company in the past, which is not enough for today's e-commerce market. A modern corporation should be able to optimize the effect of new information technology and innovative logistics management models on organizational performance and competitiveness during production activities, logistics management, and supply chain integration for organizations in the process that can be characterized as globalization and geographic diversification. The competition model has also changed from competition between

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[1] "EC Research Report", Taiwan International E-commerce Center, B2B Electronic Procurement Chain, May 2003.

companies to competition between supply chains. The key to business success is more likely to depend on its capability to integrate all the efforts made by organizations all over the world.

Chopra [3] examine the issue from a perspective concerning revenue and cost. They support that the values that e-commerce brings to companies lie in the industry where it is located and its corporate strategies. The biggest winners will be those who make the best use of the Internet and optimization that integrates electronic business models into the outlets of supply chains. For example, through the coordination between the network front end and supply chain, the integration of relevant data into a company's internal operation or suppliers responsible for the external supply chain management may effectively increase operating efficiency and customer service quality, which will have a positive impact on revenues and costs.

In terms of the Taiwan business development trends, the life cycle of a product is getting shorter. In an era of marginal profits, the control over capital costs has become another important issue. With an increasingly shorter delivery lead time and a wider diversity of customers, capital transfer should be more frequent and the need for capital allocation should be significantly increased. However, many up-stream suppliers for electronic center factories do not have sufficient operating scale and market reputations and thus can hardly obtain timely financial support from banks. Therefore, how to provide up-stream suppliers with more diversified financing sources and more competitive financing costs is a key issue for government in promoting competence of the electronics industry.

In addition to the information electronic money plans (i.e. A, B Plans), the Department of Industrial Technology (DIT) of the MEA (Ministry of Economic Affairs) in Taiwan has implemented C, D Plans and the E Plan since July 2001 to keep retaining Taiwan's industrial competitive edge and providing up-stream and down-stream suppliers with electronic services such as payment and collection, billing management, on-line financing, global inventory management and shipment tracking. Based on the existing electronic supply chain system, the DIT further integrates money flow, logistic flow and development and design, aiming to strengthen global logistics management and international competitiveness for Taiwan's industry.

Electronic companies have previously made profits quite well, but many electronic companies have met challenges to make profits as before, since the product life cycles have been shortened for electronic companies. In addition, most of the electronic companies belong to OEM/ODM companies and the profit margin seems to gradually decline. Thus, the purpose of the B2B Electronic Money C Plan is to solve the financing problem and credit trading issues. Thus, the accounts receivable turnover and inventory turnover are important concerns for electronic companies in order to improve the cash flow in working capital management and then to shorten the cash cycle as shown in Figure 1.
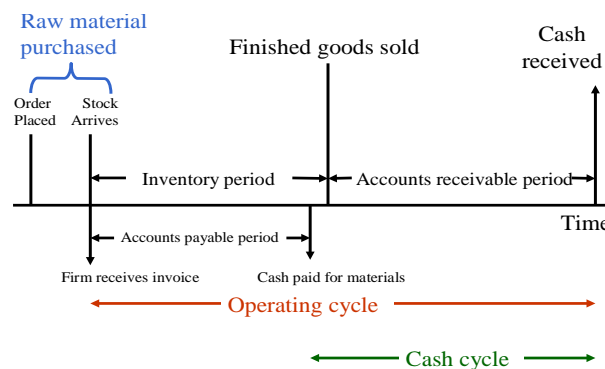

Figure 1: The operating cycle and the cash cycle [25]

If enterprises could shorten the period during buying materials, manufacturing products, selling products to buyers, and collecting money from buyers, the cash flow issues will be mitigated for enterprises. From an academic viewpoint as shown in figure 1, the longer the cash cycle, the stronger the finance demand needed for enterprises. The cost of capital might be raised for enterprises as well. Thus, whether implementing the B2B Electronic Money C Plan will benefit working capital management will be a worthwhile topic to investigate.

In recent years, Taiwan's local banks and enterprises have been gradually committed to electronic money. However, few literature studies have focused on the examination of the relation between e-commerce and finance. Implementing e-commerce is a key strategy for enterprises to enhance their operating performance. The relation between the introduction of electronic money and operating performance requires a complete examination and suggestions as references for the banking industry and companies.

This study takes the underlying stocks of Fubon Taiwan Technology ETFs (Exchange Trade Funds) as our research samples, because these stocks belong to heavy-weighted companies in Taiwan, and several of these companies issue ADRs (American Depositary Receipts) and the transparency and objectivity of their financial reports are less challenged. By using appropriate indicators and empirical approaches, we measure the influence of the introduction of electronic money flow on performance variables for center factories. From a further examination of whether implementing B2B electronic money C Plan[2] brings substantial and positive benefits for enterprises, we hope to give concrete suggestions for local enterprises engaged in e-commerce.

Thus, examining the relation between financial characteristics and implementing electronic money, examining whether performance variables vary prior to or after implementing electronic money by examining performance variables such as firm value, accounts receivable turnover ratio, inventory turnover ratio, and examining the impact of implementing electronic money on performance variables are all concerned in this paper.

In addition, after surveying relevant literatures, we find few articles have related e-commerce to the financial area. In this study, this paper might provide the following marginal contributions for the area of this research. First of all, we find that the companies with cash flow troubles will be inclined to implement electronic money due to the negative relationship between cash flow and implementing electronic money. Secondly, implementing electronic money will raise the turnover ratio of inventory (i.e. implementing electronic money will benefit the working capital management for electronic companies of Taiwan.)

The framework for this paper proceeds as follows: the next section introduces the B2B electronic C Plan and reviews the literature and list research hypotheses. Section 3 describes the research methodology. Section 4 presents the empirical results, and Section 5 offers the conclusions of this paper.

2. LITERATURE REVIEW

This study is designed to examine the electronic money C Plan promoted by the government and probe into implementing the electronic money flow and financial characteristics on financial performance. The literature review consists of three parts: a brief introduction of the electronic money C Plan, the literature studies related to performance evaluation, and the literature reports related to

performance evaluation of e-commerce. The detailed descriptions are provided below.

2.1 Brief Introduction of the C Plan

The purpose of promoting the electronic money C Plan is to help solve the problem of the financing problem for suppliers through the help of electronic money flow. Previously a bank may decide whether to provide loans to an enterprise based on L/C or mortgage targets; a supplier hardly obtained timely financing support when it received purchase orders. In such cases, a capital gap might exist. Moreover, the costs of credit investigation and financing review would be excessively high, resulting in difficulties in allocating the funds and affording the costs for SMEs (small and mid-sized enterprises). As there are always problems with accounts payable and accounts receivable, electronic orders may help improve administration efficiency and reduce administration costs when documents such as quotations, orders, delivery and inspection are completed in an electronic format (Varshney [30]). Clemons [5] and E1-Sway [11] argue that information technology may increase external coordination through the creation of modularization and standardization, thereby cutting coordination costs and transaction risk costs, which will lead to a long-term relation between organizations and a few suppliers.

The Electronic money C Plan is designed to integrate a money flow system and the supply chain of information electronic industries, enabling money flow services for immediate financing support and capital allocation during the course of electronic procurement and improving the efficiency and performance of money flow. It is expected to significantly streamline the procedure and shrink the time of payment collection for suppliers and also to elevate the order processing speed for local suppliers. Moreover, the C Plan features several major services such as online payment and collection, online-financing, integration of multiple bank accounts, capital management, and financial allocation, etc. Fairchild [12] also indicates that the operating cycle of the financial supply chain from receiving orders, production to delivery, and the financial support with assistance in production will enhance corporate operating efficiency and overall financial performance.

The Electronic money C Plan integrates banks, based on the existing electronic supply chain system, to help solve problems with payment and collection for center factories and suppliers, provides immediate on-line financing services, and establishes an electronic integration mechanism for information flow and money flow among banks, center factories and suppliers. This study, therefore, focuses on financial characteristic variables on financial performance, and establishes related hypotheses by

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[2] Most of "B2B electronic money C Plan" is abbreviated by "electronic money" in the context.

taking into account the widely quoted financial ratios, such as the financial structure, solvency capacity, operating performance, profitability, etc., and the dummy variable[3] set by whether the corporation implements electronic money. Based on the above concern, we establish Hypothesis H1~H4 to examine the relationship between financial characteristics and the implementation of electronic money, and understand which financial characteristics may be in favor of electronic money for a company.

Working capital defined in financial accounting represents operating liquidity available to a business. Working capital includes current assets and current liabilities. Current assets include cash and other assets such as marketable securities, accounts receivable, and inventory, which are expected to be converted to cash in the short run. Current liabilities including accounts payable, accrued wages, and accrued taxes are the obligations that are expected to require cash payment in the short term.

A company might have a liquidity problem if its assets cannot readily be converted into cash. Thus, whether enterprises have sound working capital management are reflected in the following financial ratios such as inventory turnover ratio, accounts receivable ratio, current ratio, acid-test ratio, etc., so we set these financial characteristics variables as having a relationship with implementing electronic money as our test hypothesis.

H1: The variable related to financial characteristics has a relationship with implementing electronic money.

H1-1: Working capital management has a relationship with implementing electronic money.

H1-2: Inventory turnover ratio has a positive relationship with implementing electronic money.

H1-3: Accounts receivable ratio has a positive relationship with implementing electronic money.

H1-4: Current ratio has a positive relationship with implementing electronic money.

H1-5: Acid-test ratio has a positive relationship with implementing electronic money.

While the debt ratio is raised, enterprises will have pressure to pay high interest expenses and debts. The B2B Electronic Money C Plan will provide online loans by current assets such as accounts receivable as a warrant. Thus, we set that implementing electronic money will reduce the borrowing of money by issuing corporate bonds, and benefit debt management for enterprises, so we set debt management as having a relationship with

implementing electronic money as our testing hypothesis.

H2: Debt management (e.g. debt ratio) has a relationship with implementing electronic money

The electronic process might be more efficient than the traditional process. Thus, it might enhance the efficiency of operating management, so the operating expenses and costs of goods sold might decline, and then raise the operation margin and net income. Furthermore, the return of equity (ROE) might have obviously been raised, so we set profitability as a relationship with implementing electronic money as our testing hypothesis.

H3: Profitability has a relationship with implementing electronic money.

H3-1: The Operating Expense has a negative relationship with implementing electronic money.

H3-2: The Costs of Goods Sold has a negative relationship with implementing electronic money.

H3-3: The Operating Margin has s positive relationship with implementing electronic money.

H3-4: The Net Income has a relationship with implementing electronic money.

H3-5: The ROE has a relationship with implementing electronic money.

The asset turnover ratio could be measured as the efficiency of using assets, since the B2B Electronic Money C Plan will enhance the efficiency of the loan process and the decline in the current asset level such as accounts receivable and inventory and raise the turnover ratio of current assets and total assets. Thus, we set the asset management as having a relationship with implementing electronic money as our testing hypothesis.

H4: Asset management (e.g. asset turnover ratio) has a relationship with implementing electronic money.

2.2 Literature Studies Related to Performance Evaluation and Performance Evaluation of E-Commerce

The core of strategic management for a business is to look for improvement of operating performance. According to Duquette [9], "performance" refers to a level relative to the assessment of the achieved mission, target and purpose of an organization using various indicators and measurement methods while performance indicators focus on the projected target or purpose achieved. Venkatraman [31] propose three facets, including financial performance, or financial indicators such as profitability, sales growth, earning after tax, or operating revenues for measurement of performance, and provide three financial indicators

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[3] The dummy variable is to set 1 for the company's implementing of electronic money, and 0 otherwise.

that will mostly represent corporate performance: Return on Assets (ROA), Return on Equity (ROE), and Return of Sales (ROS). Corporate performance is measured by non-financial indicators such as market share, marketing performance, product quality, or manufacturing value-added ratio. Furthermore, the organizational performances are not specified in the two foregoing scopes, including the target of various mutual conflict and satisfaction to the target of stakeholders. For instance, employee morale is defined as the organizational performance in the broadest sense. Dess [8] argue that ROA and ROS are the most commonly used performance indicators for strategic management.

Dyer [10] suppose that for the performance evaluation of an organization, the financial performance consists of ROA, ROE, profit, sales volume and employee value, etc.; the organizational performance consists of employee productivity, product quality, customer satisfaction and production flexibility. Delaney [7] propose two major facets: market performance and organizational performance. Market performance includes marketing capability, revenue growth ratio, profitability, and market share. Organizational performance includes product or service quality, new product or service development, the ability to attract talent, the ability to retain talent, customer satisfaction, the relation between management and employees, and the relations between employees. Murphy [21] summarize studies on the measurement of organizational performance and conclude eight major facets, namely efficiency; growth ratio, earning capacity, scale (size), liquidity, success/failure rate, market share, and leverage efficiency, in which efficiency, growth ratio and earning capacity are mostly considered. Clark [4] proposes financial indicators such as profits, sales, cash flow and non-financial indicators such as customer satisfaction, customer loyalty and brand.

According to the literature reports, organizational performance can be divided into financial performance and non-financial performance. Vickery [32] argues that manufacturing performance will be ultimately reflected by financial and marketing performance. Porter [22] also proposes that financial performance serves as a reliable evaluation of firm value for companies. Therefore, we focus on implementing electronic money into the impact of financial performance.

As an electronic money C Plan is intended for the integration of both the supply chain for the bank's industry and supply chain for the electronic industry, Knill [17] indicates that when a business starts e-commerce, the back-end operation (internal and external supply chain management) is designed as the logistics basis in coordination with the front-end operation (e-commerce), which is a key consideration for the introduction of e-commerce. Germain [13]

investigate manufacturing members of the CSCMP (Council of Supply Chain Management Professionals) and find that the corporate internal integration or the integration of up-stream and down-stream supply chains may affect financial performance and logistics performance. Kim [16] investigates Korean and Japanese companies and also indicates that a company will improve its performance in the market, finance, and customer satisfaction, if it can integrate supply chains effectively. According to the study findings by Cheng [1], they find that the better the supply chain management, the higher the performance after the introduction of e-commerce.

Subramani [27] use cumulative abnormal returns (CARs) to shareholders to examine financial performance of e-commerce. They figure out that the implementation of e-commerce will have positive effects on financial performance, namely enhancing CARs. In the study by Yang [33], it is found that the strategies for implementation of e-commerce have significant positive effects on the operating performance of system development integration.

Jih [15] examines the relationship between the application type and performance for Taiwanese companies in implementing e-commerce and indicates that B2B, B2C or corporate internal applications have a significant relationship with operating performance. Studying companies listed in the Hong Kong joint venture market, Lai [18] argue that B2B companies achieve better financial performance than B2C companies for listed companies in the TSE. Power [23] indicates that the B2B implementation strategy for human resources management will improve corporate financial performance as well. Power [24] finds that a company which engages in B2B e-commerce will surely increase corporate performance. This can be further advanced if effective strategic planning, the understanding of technology, adequate application and deliberate reform management are incorporated.

In examination of the performance for Taiwan companies in implementing electronic money, there are few literature studies which cover electronic money, financial characteristics and performance evaluation. Chiu [2], Tsou [29] and Huang [14] indicate that the implementation of electronic money may raise firm value. The promotion of the C Plan is mainly to help companies solve problems with supplier financing for managing accounts payable and receivables through electronic money. Based on the perspective above, this study establishes hypothesis 5 to examine the effects on firm value prior to and after implementing electronic money.

H5: Financial performance after implementing electronic money will be better than that before implementing electronic money.

Lee [19] examines the benefits of the banking industry and the electronics industry's participating in the government electronic project and finds that sales gross margin has positive effects on ROA, ROE and the Tobin's q for electronics manufacturers after participation in electronic money, suggesting that suppliers, after regaining higher price negotiation ability and selecting various financing portfolios, may reduce cost of goods sold and increase their overall performance and firm value. Based on the foregoing perspective, this study establishes Hypothesis 6 to examine the effects on firm values with or without implementing electronic money.

H6: Implementing electronic money has positive effect on firm value.

3. RESEARCH HYPOTHESES AND EMPIRICAL MODELS

Based on the relevant literature studies, it is found that electronic money for the supply chain will have positive effects on industrial performance. However, as mentioned above, the introduction of electronic money will bring in positive performance, which is the major topic for this study. With the widely quoted financial ratio analysis of variables such as financial structure, solvency capacity, operating performance, and profitability, this study examines the issue in three categories.

Firstly, the examination of financial characteristics and implementing electronic money are analyzed by logistic regression models. This helps us to understand which financial characteristics may be in favor of electronic money for a company. Secondly, the direct / indirect effects of implementing electronic money and financial characteristics variables on performance variables are analyzed by multiple regression models and panel data models. Thirdly, the examination of the difference between the performance of companies prior to and after implementing electronic money and companies who have or have not implemented electronic money will be analyzed by independent t-tests.

3.1 Definition and Measurement of Variables

In accordance with establishing the study hypotheses by examining the feasibility and the fitness referred relevant literature review, we establish the measured variables in this study as follows. The performance variables can be divided into financial variables (Accounts Receivable Turnover Ratio, Inventory Turnover Ratio) and firm value variables (Tobin's q).

3.1.1 Financial Variables

1. Financial variables related to working capital management
(1) Inventory Turnover Ratio = Cost of Goods Sold / Average Inventory
(2) Accounts Receivable Turnover Ratio = Sales / Average Accounts Receivable.
(3) Current Ratio = Current Assets / Current Liabilities.
(4) Quick Ratio = (Current Assets - Inventory - Prepaid Expenses) / Current Liabilities.
2. Financial variables related to debt management: Debt Ratio = Total Liabilities / Total Assets.
3. Financial variables related to profitability
(1) Net Income = Operating Margin - Operating Expenses.
(2) Operating Margin Ratio =（Operating Revenue - Operating Cost）/ Operating Revenue.
(3) Cost of Goods Sold Ratio = Cost of Goods Sold / Net Sales.
(4) Return on Equity (ROE) = Net Income / Total Equity.
(5) Operating Expense Ratio = Operating Expenses / Sales.
4. Financial variables related to asset management: Total Assets Turnover Ratio = Net Sales / Average total Assets.
5. Cash Flow Ratio: Net Cash Flow from Operating Activities / Current Liabilities

This study relates a company's cash management to its firm value. From a long-term perspective, cash flow from operating activities equals to net income plus depreciation and amortization expenses. Therefore, the cash flow from operating activities should be larger than net income. A company with accelerating growth may require vast equipment investment during a period, where the capital expenditure will be sharply raised, resulting in a negative cash flow from investment activities in a year with earnings or negative earnings. However, in case of issuance of new shares, corporate bonds may bring tremendous cash inflow, which considerably increases the cash flow from investment activities. A higher cash flow ratio represents a higher ability of net cash flow from operating activities to repay current liabilities, and therefore its performance variable might be raised.

3.1.2 Firm Value Variable

In this study, the Tobin's q serves as an indicator for measuring firm value. Tobin's q was developed by Tobin [28] as the ratio between the market value and the replacement value of the same physical asset. If the market value was reflected solely on the recorded assets of a company, the Tobin's q would be 1. If the Tobin's q is greater than 1.0, then the market value is greater than the value of the company's recorded assets. This suggests that the market value reflects some unmeasured or unrecorded

assets of the company. High Tobin's q values encourage companies to invest more in capital because they are "worth" more than the price they paid for them. However, since data on replacement costs for a company's assets are hardly obtained in Taiwan, we substitute it with a Proxy q. Lehn [20] indicate that there is a high correlation coefficient between the Tobin's q and the Proxy q. The calculation method is provided below:

$$q_{i,t} = (MV_{it} + LB_{it}) / BV_{it}$$

where MV_{it} refers to the market value of the equity for company i at the end of year t; LB_{it} refers to the book value of total liabilities of company i at the end of year t; BV_{it} refers to the book value of total assets of company i at the end of year t.

3.2 Data Collection and Selection

This study targets the underlying stocks of the Fubon Taiwan Technology ETFs, because these stocks belong to heavy-weighted companies. Some of these companies issue ADRs, and their financial reports are quite transparent and less challenged in Taiwan. Information on companies with or without implementing the electronic money C Plan, plan period, plan contents and plan achievement are obtained from the Innovative Technology Applications & Services Program (ITASP) by the DIT of the MEA. In addition, we also collect financial data of companies from the Taiwan Economics Journal (TEJ) and the Market Observation Post System and obtain data related to shareholder structure from the companies' annual reports.

These financial data are required for retrieving financial variables for this study. After excluding incomplete data from the financial statements, we collect 55 electronic/information companies listed in the TWSE (Taiwan Stock Exchange) and the OTC (Over-the-counter) Market in total.

In addition, the proposition of B2B Electronic Money C Plan tries to solve the above issues encountered by these electronic companies, and there are several companies which have joined the B2B Electronic Money C Plan, such as ASUSTEK, INVENTEC, ELITEGROUP, MITAC, TATUNG, ACER, WISTRON, etc. In this study, we collect six year data from 2001-2006 to examine what kind of financial characteristics or variables for these electronic companies cause them to implement electronic money. However, since several companies have implemented electronic money after 2003, this study examines samples with the introduction of electronic money for the data period 2004-2006, and compares it with the data before implementing electronic money for the data period 2001-2003.

3.3 Empirical Models

This study is conducted in accordance to the four parts specified below.
1. Descriptive statistics

An initial descriptive statistics analysis is made for the data collected to have an insight into the fundamental characteristics, including the number of observations, averages, minimum, maximum, and the standard deviation for variables employed in this study. .
2. Logit regression models

The logistic regression model is designed to achieve concise analysis results with the most fitness, which can be used to predict the relation between dependent variables and independent variables. In this study, a company which engaged in implementing electronic money is set to 1 while a company which has not implemented electronic money is set to 0 for understanding of the effects caused by implementing electronic money.
3. Multiple regression models

This paper uses multiple regression models to examine the relation between dependent variables and independent variables. As there is multicollinearity which exists among independent variables in a regression model, it will cause three effects: (1) effect on the accuracy of the estimators estimated by the least square method; (2) effect on the accuracy by employing statistical data; and (3) effect on the accuracy of interpreting the study findings. Thus, this study applies the variance inflation factor (VIF) to verify if multicollinearity exists among independent variables. A VIF value less than 5 indicates that the collinear problem is not serious. Otherwise, we should not proceed with the study until the variables with a high VIF value are excluded. Therefore, we should exclude the variable with multicollinear problem before processing multiple regression analysis.
4. Panel Data models

Depending on the data collected, the study models can be categorized into time series analysis models and cross section models. When we use the ordinary least square (OLS) for data processing, only the time series data or the cross-section data can be solely taken into account. If there is any data belonging to both series time series data and cross section data, the OLS method will not yield effective estimate results due to its incapability to express different characteristics of samples since the difference between these two categories of data should be taken into account. Alternatively, as the panel data model not only features time series dynamics but also concerns the characteristics between samples, this study uses both the fixed effects models and the random effects models provided by the panel data models, in addition to the OLS, to estimate the regression model and then

choose the most appropriate models for analyzing empirical results in this study.

4. EMPIRICAL RESULTS AND ANALYSES

This study proceeds with multiple regression models, testing whether the regression coefficients are statistically significant by t tests, and multicollinearity problems should be concerned by VIF values (i.e. VIF had better be less than 5.) Moreover, several models are also employed in this study. Firstly, with a logistic regression model, this study investigates what kind of financial characteristics of companies are selected by Fubon Taiwan Technology ETFs which would be inclined to implement electronic money. Secondly, the direct or indirect effects of financial characteristics to B2B electronic money on performance are examined by multiple regression and panel data models. Finally, this study uses an independent t-test to investigate the difference between performance of companies prior to and after implementing electronic money and companies with or without the introduction of electronic money. Via the above analysis, the findings of this study are provided below.

4.1 Descriptive Statistics

This section focuses on statistical descriptions of variables. Table 1 lists the descriptive statistics of the related variables during the data period 2001-2006, including the number of observation values, average, minimum, maximum and standard deviation of the variables. For example, the acid-test ratio approximates 185.716% on average, but the standard deviation reaches 130.745%, suggesting that most electronic manufacturers have acceptable solvency capacity. However, there are significant differences between companies due to higher standard deviation. Furthermore, from an observation of the current ratio, the results resemble an acid-test ratio. In addition, the ratio of fixed to total assets is quite high for the electronics industry, so a higher debt ratio is reasonable since the electronics industry seems to require capital for operating activities.

For the variables related to implementing electronic money on firm value, Tobin's q is equal to 2.157 on average (min. 0.543, max. 10.640). The average greater than 1 represents that the firm's value exceeds the replacement costs. The higher the Tobin's q value is, the higher the firm value is. However, there are considerable differences for Tobin q values among these electronic companies. In terms of the accounts receivable turnover ratio, the average turnover is about 56.582 days (max. 217.26 days, min. 12.62 days). Additionally, the inventory turnover ratio is 40.753 days on average, and the inventory

turnover ratio represents a company's production and marketing efficiency. From a viewpoint of working capital management, the inventory turnover ratio is the higher the better.

Model I:

Implementing the B2B Electronic Money C Plan[4] = F (Accounts Receivable Turnover Ratio, Total Assets Turnover Ratio, Inventory Turnover Ratio, Operating Margin Ratio, Operating Expense Ratio, Net Income, Operating Cost, Debt Ratio, Current Ratio, and Cash Flow Ratio)

Table 2 lists the results of the logit regression models defined as Model I. During the data period 2001-2006, the operating expense and cash flow ratios were negatively correlated with electronic money, implying that electronics companies with poor cash flow might pay more attention to implement electronic money, and we might infer that these companies might have a perception of risk by implementing electronic money in order to get better for working capital management. For the data period 2004-2006, financial characteristics affecting electronic money are the total asset turnover ratio, gross profit margin, and the cash flow ratio. Therefore, a company with poor cash flow would participate in implementing electronic money with a more active manner.

4.3 Effects of the Implementing Electronic Money Flow and Financial Characteristics on Performance Variables

In this section we will use multiple regression models and panel data models separately to examine the effects of implementing electronic money and the financial characteristics to firm value[5] (Model II) and apply multiple regression models to analyze the effect of the introduction of money flow and financial characteristics on the accounts receivable turnover ratio[6] (Model III) and the inventory turnover ratio[7] (Model IV). Detailed descriptions are given below.

Model II:

Firm Value (Tobin's q) = F (Accounts Receivable Turnover Ratio, Total Assets Turnover Ratio, Inventory Turnover Ratio, Operating Margin Ratio, Operating Expense Ratio, Net Income, Operating Cost, Debt Ratio, Current Ratio, Cash Flow Ratio, and Implementing Electronic Money).

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[4] The dependent variable for this logical model is to set 1 for the company's implementing electronic money, and 0 otherwise.

[5] The dependent variable for model 2 is firm value, i.e. Tobin's q.

[6] The dependent variable for model 3 is the Accounts Receivable Turnover Ratio.

[7] The dependent variable for model II is the Inventory Turnover Ratio.

Table 1: Descriptive statistics

Variable	Observations	Minimum	Max	Average	Standard deviation
Tobin's q	330	0.543	10.640	2.158	1.417
Accounts Receivable Turnover Ratio（%）	330	1.68	28.92	6.450	2.536
Days Accounts Receivable Outstanding	330	12.62	217.26	56.582	23.867
Total Assets Turnover Ratio（%）	330	0.07	4.19	1.108	0.723
Inventory Turnover Ratio（%）	330	1.88	4,277.58	40.753	282.049
Operating Margin Ratio（%）	330	-72.98	57.9	17.915	15.418
Operating Expense Ratio（%）	330	1.15	143.78	11.011	12.403
Net Income（thousand dollars）	330	-27,610,667	127,009,731	4,221,203	12,643,087
Operating Cost（thousand dollars）	330	84,957	857,777,953	50,426,187	8,789,258
Debt Ratio（%）	330	5.66	75.7	36.506	14.489
Current Ratio（%）	330	19.61	994.92	230.898	147.470
Acid Test Ratio（%）	330	17.24	893.33	185.716	130.745
After-tax EPS（dollars）	330	-6.1	33.26	3.022	4.602
Cash Flow Ratio（%）	330	-74.73	467.55	66.930	77.928
Cash Flow from Investing Activities（thousand dollars）	330	-151,000,000	17,399,958	-7,090,814.3	18,444,838
Cash Flow from Operating Activities（thousand dollars）	330	-10,906,202	196,080,297	7,408,689.7	19,624,473
Cash Flow from Financing Activities（thousand dollars）	330	-64,022,387	107,980,900	632,673.68	11,626,016
Implement B2B Electronic Money C Plan? Set dummy variable 1 for yes, 0, otherwise.	330	0	1	0.09697	0.296
Share Price at the end of the year（dollars）	330	2.1	645	60.715	79.308
Equity per share（dollars）	330	2.4	97.63	20.116	10.044
Total Equity（thousand dollars）	330	389,549	507,981,284	40,137,906	65,139,022
Total Liabilities（thousand dollars）	330	110,824	323,391,206	25,155,037	36,273,782
Total Assets（thousand dollars）	330	500,373	573,584,904	65,292,943	93,052,145

Table 2: Empirical results for logic regression models (Model I)

Sample Period	2001-2006		2004-2006	
Independent Variable	Estimated Coefficient	t-statistics	Estimated Coefficient	t-statistics
1. Constant	1.017	0.504	-0.172	-0.058
2. Accounts Receivable Turnover Ratio	-0.145	-1.110	-0.288	-1.447
3. Total Assets Turnover Ratio	0.413	1.049	1.045	1.849*
4. Inventory Turnover Ratio	-0.001	-0.511	-0.001	-0.421
5. Operating Margin Ratio	-0.012	-0.491	-0.169	-1.882*
6. Operating Expense Ratio	-0.152	-1.793*	0.005	0.049
7. Net Income	0	-0.355	0	1.393
8. Operating Cost	0	0.512	0	-1.599
9. Debt Ratio	-0.012	-0.399	0.030	0.607
10. Current Ratio	-0.003	-0.620	0.000	0.046
11. Cash Flow Ratio	-0.024	-2.604***	-0.024	-1.708*

1. The dependent variable for this logical model is to set 1 for the company which has implemented Electronic money, and 0 otherwise.

2. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

The multiple regression models defined as Model II are analyzed in Table 3. The total asset turnover ratio, gross profit margin, and the operating expense ratio are positively correlated with the company value during the data period 2001-2006. The higher total asset turnover ratio indicates better asset management efficiency. The higher gross profit margin indicates stronger profitability. In addition, both variables, total asset turnover ratio and gross profit margin, show positive effects to firm value.

However, because the operating expense ratio also has a positive effect on firm value, a possible reason for the operating expense might be relatively higher as a company would hire more employees for implementing electronic money in the initial stage. However, implementing electronic money has a negative effect on firm value, suggesting that a company which implements electronic money flow has low firm value, which might be because the costs for implementing electronic money was excessively higher, which compromises firm value. This result does not conform to what is expected in this study, and similar results are also drawn by employing the data period 2004-2006. Therefore, the supplementary tests are employed for verification as shown in Section 4.5 for further explanation.

Table 3: Empirical results for multiple regression models (Model II)

Sample Period	2001-2006		2004-2006	
Independent Variable	Estimated Coefficient	t-statistics	Estimated Coefficient	t-statistics
1. Constant	0.565	1.242	1.238	1.923
2. Accounts Receivable Turnover Ratio	0.008	0.291	-0.064	-1.329
3. Total Assets Turnover Ratio	0.8	6.786***	0.909	5.687***
4. Inventory Turnover Ratio	-0.000	-0.683	-0.000	-0.853
5. Operating Margin Ratio	0.033	5.272***	0.054	4.771***
6. Operating Expense Ratio	0.027	4.410***	-0.004	-0.203
7. Net Income	0.000	0.454	0	1.242
8. Operating Cost	-0.000	-1.101	0	-1.067
9. Debt Ratio	-0.006	-0.813	-0.012	-1.156
10. Current Ratio	0.000	0.027	-0.001	-0.832
11. Cash Flow Ratio	0.002	1.045	-0.001	-0.656
12. Implementing Electronic Money	-0.598	-2.545***	-0.625	-2.400**

1. The dependent variable is the Tobin's q .

2. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

Table 4: Empirical results for panel data models (Model II)

Model	OLS		REM		FEM	
Observations	330		330		330	
Independent Variable	Estimated Coefficient	P value	Estimated Coefficient	P value	Estimated Coefficient	P value
1. Constant	0.565	0.215	2.066	0		
2. Accounts Receivable Turnover Ratio	0.008	0.771	-0.022	0.372	-0.023	0.385
3. Total Assets Turnover Ratio	0.800***	0	0.300*	0.056	0.049	0.802
4. Inventory Turnover Ratio	-0.000	0.495	-0.000	0.678	-0.000	0.789
5. Operating Margin Ratio	0.033***	0	0.007	0.187	0.002	0.736
6. Operating Expense Ratio	0.027***	0.000	0.008	0.119	0.003	0.593
7. Net Income	0	0.650	0	0.411	0	0.473
8. Operating Cost	0	0.272	0	0.443	0	0.684
9. Debt Ratio	-0.006	0.417	-0.008	0.220	-0.005	0.412
10. Current Ratio	0.000	0.979	-0.001	0.316	-0.001	0.137
11. Cash Flow Ratio	0.002	0.297	0.003**	0.018	0.003**	0.015
12. Implementing Electronic Money	-0.598**	0.011	-0.226	0.338	-0.179	0.483

1. The dependent variable is the Tobin's q .

2. The data period is from 2001 to 2006

3. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

4. H0: OLS vs. H1: FEM, F test is significant, H0: OLS vs H1: REM, LM test is significant, and H0: REM vs. H1: FEM, Hausman test is significant. Then the fixed effect model is more appropriate than other models.

Because time series and cross section data are used for analysis, this study then takes the panel data model as the empirical model for further investigation. We employ a fixed effect model, in which models are more appropriate than other models, show that when the cash flow ratio is higher, the cash inflow from a company's regular operating activities would be more likely to repay current liabilities and its firm value would also be higher accordingly. These empirical analysis results are shown in Table 4 for Model II by employing the panel data models for the data period 2001-2006.

Model III:

Accounts Receivable Turnover Ratio = F (Total Assets Turnover Ratio, Inventory Turnover Ratio, Operating Margin Ratio, Operating Expense Ratio, Net Income, Operating Cost, Debt Ratio, Current Ratio, Cash Flow Ratio, Implementing Electronic Money)

The results of the multiple regression models are shown in Table 5. The total asset turnover ratio, operating expense ratio, and net profit after tax have positive effects on the accounts receivable turnover ratio during the data period 2001-2006, while the gross profit margin has a negative effect on the accounts receivable turnover ratio. However, there is an insignificant effect of implementing electronic money on the accounts receivable turnover ratio. During the data period 2004-2006, the total asset turnover ratio, operating expense ratio, net profit after tax and the cash flow ratio have positive effects on the accounts receivable turnover ratio, while the operating costs have a negative effect on the accounts receivable turnover ratio. Similarly there is also an insignificant effect for the implementing of electronic money on the accounts receivable turnover ratio.

Model IV:

Inventory Turnover Ratio = F (Total Assets Turnover Ratio, Operating Margin Ratio, Operating Expense Ratio, Net Income, Operating Cost, Debt Ratio, Current Ratio, Cash Flow Ratio, and Implementing Electronic Money)

The analyses of the multiple regression models for Model IV are shown in Table 6. It is found that the lower the debt ratio and the current ratio are, the higher the inventory turnover ratio is during the data period 2001-2006 and 2004-2006. In addition, a company which implements electronic money only has a minor effect on the inventory turnover ratio.

Table 5: Empirical results for multiple regression models (Model III)

Sample Period	2001-2006		2004-2006	
Independent Variable	Estimated Coefficient	t-statistics	Estimated Coefficient	t-statistics
1. Constant	5.205	6.061	4.186	4.420
2. Total Assets Turnover Ratio	1.049	4.467***	1.272	5.197***
3. Operating Margin Ratio	-0.028	-2.250**	-0.033	-1.784
4. Operating Expense Ratio	0.028	2.250**	0.0786	2.693***
5. Net Income	0.000	2.408**	0	2.557**
6. Operating Cost	0.000	-1.746	0	-1.981**
7. Debt Ratio	-0.011	-0.747	0.003	0.152
8. Current Ratio	0.002	1.567	0.000	0.131
9. Cash Flow Ratio	0.003	1.144	0.008	2.470**
10. Implementing Electronic Money	-0.446	-0.925	-0.281	-0.651

1. The dependent variable is the Accounts Receivable Turnover Ratio.

2.*, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

Table 6: The empirical results for multiple regression models (Model IV)

Sample Period	2001-2006		2004-2006	
Independent Variable	Estimated Coefficient	t-statistics	Estimated Coefficient	t-statistics
1. Constant	441.510	4.429	968.699	4.644
2. Total Assets Turnover Ratio	4.326	0.159	2.167	0.040
3. Operating Margin Ratio	-1.836	-1.257	-3.704	-0.914
4. Operating Expense Ratio	-2.177	-1.509	-9.992	-1.555
5. Net Income	0.000	0.011	0	-0.024
6. Operating Cost	0.000	-0.205	0	-0.286
7. Debt Ratio	-6.473	-3.663***	-13.903	-3.773***
8. Current Ratio	-0.420	-2.421**	-0.887	-2.263**
9. Cash Flow Ratio	-0.167	-0.477	-0.331	-0.453
10. Implementing Electronic Money	-23.024	-0.412	-50.845	-0.535

1. The dependent variable is the Inventory Turnover Ratio.

2. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

4.4 Effects of Implementing Electronic Money Flow as a Variable by Concerning an Indirect Effect on Performance Variables

This section provides the discussion over the effect of implementing electronic money as a variable by concerning an indirect effect on performance variables such as firm value, accounts receivable turnover ratio, and inventory turnover ratio. We test whether the indirect effect of implementing electronic money existed for performance variables by using the data period 2001-2006 and 2004-2006 respectively. From the empirical findings in Tables 7, 8 and 9, it is found that there are few significantly indirect effects of implementing electronic money on performance variables. Only a considerable indirect effect of implementing electronic money on total asset turnover ratio is observed in Table 8, implying that implementing electronic money will boost the total asset turnover ratio for the accounts receivable turnover ratio, which conforms to the empirical findings listed in Section 4.3.

4.5 Supplementary Verification

From the analysis in Section 4.3, we find less significant effects of implementing electronic money on performance variables such as Tobin q, the accounts receivable turnover ratio and the inventory turnover ratio. The empirical results show almost no differences between the data periods from 2001-2006 and 2004-2006.

In Table 3, we find that implementing electronic money has negative effects on firm value. Section 4.4 analyzes the indirect effect of implementing electronic money. This implies that implementing electronic money can increase the total asset turnover ratio and help raise the accounts receivable turnover ratio. However, few sample data for the inventory turnover ratio are 365 days or

above. The inventory can be sold out within a day. Thus, these sample data should be deleted. The data excluding these unreasonable data points should be investigated for follow-up analysis and comparison.

4.5.1 Effects of Implementing Electronic Money on Performance Indicators

This section applies an independent t test to examine the effect of implementing electronic money on the accounts receivable turnover ratio and inventory turnover ratio during the data period from 2001-2006. Table 10 shows, before sample correction, that the accounts receivable turnover ratio

of companies which have implemented electronic money was not significantly superior to that of companies which had not implemented electronic money. Similarly, as Table 11 shows, before sample correction, the inventory turnover ratio of companies which have implemented electronic money flow is not significantly superior to that of companies which have not implemented electronic money. For an analysis which excludes the unreasonable inventory turnover ratio and excludes unreasonable data, Table 12 shows a significantly increased inventory turnover ratio after correction.

Table 7: Indirect effects of implementing electronic money on Tobin's q

Sample Period	2001-2006		2004-2006	
Independent Variable	Estimated Coefficient	t-statistics	Estimated Coefficient	t-statistics
1. Constant	0.198	0.423	0.705	1.171
2. Accounts Receivable Turnover Ratio	0.019	0.697	-0.016	-0.356
3. Total Assets Turnover Ratio	1.000	7.733***	1.175	7.009***
4. Inventory Turnover Ratio	-0.000	-0.546	-0.000	-0.742
5. Operating Margin Ratio	0.032	5.201***	0.053	5.236***
6. Operating Expense Ratio	0.031	5.012***	-0.019	-1.108
7. Net Income	-0	-0.110	0	0.114
8. Operating Cost	-0	-1.101	-0	-0.798
9. Debt Ratio	-0.005	-0.658	-0.013	-1.359
10. Current Ratio	-0.000	-0.397	-0.001	-1.293
11. Cash Flow Ratio	0.003	1.925*	0.001	0.667
12. Implementing Electronic Money	1.536	0.460	1.536	0.452
13. Accounts Receivable Turnover Ratio*DM	-0.078	-0.323	-0.065	-0.275
14. Total Assets Turnover Ratio*DM	-0.860	-1.165	-0.946	-1.301
15. Inventory Turnover Ratio*DM	0.000	0.022	-0.000	-0.024
16. Operating Margin Ratio*DM	0.216	0.120	0.018	0.094
17. Operating Expense Ratio*DM	-0.040	-0.256	0.013	0.098
18. Net Income*DM	0	0.153	0	0.090
19. Operating Cost*DM	0	0.329	0	0.208
20. Debt Ratio*DM	-0.010	-0.188	-0.008	-0.128
21. Current Ratio*DM	0.000	0.026	-0.001	-0.059
22. Cash Flow Ratio*DM	-0.006	-0.362	-0.007	-0.395

1. The dependent variable is the Tobin's q.

2. DM is a dummy variable for the company's implementing electronic money.

   The dummy variable will be set as 1 while implementing electronic, 0 otherwise.

3. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

Table 8: Indirect effects of implementing electronic money on the accounts receivable turnover ratio

Sample Period	2001-2006		2004-2006	
Independent Variable	Estimated Coefficient	t-statistics	Estimated Coefficient	t-statistics
1. Constant	5.330	5.966***	4.335	4.399***
2. Total Assets Turnover Ratio	0.832	3.154***	0.881	2.931***
3. Operating Margin Ratio	-0.027	-2.158**	-0.032	-1.708*
4. Operating Expense Ratio	0.024	1.889*	0.068	2.251**
5. Net Income	0	2.488**	0	2.509**
6. Operating Cost	-0	-1.653*	-0	-1.648
7. Debt Ratio	-0.008	-0.532	0.009	0.553
8. Current Ratio	0.003	1.765*	0.001	0.532
9. Cash Flow Ratio	0.002	0.788	0.007	2.019**
10. Implementing Electronic Money	2.021	0.349	1.797	0.305
11. Total Assets Turnover Ratio*DM	1.557	1.899*	1.601	2.339**
12. Operating Margin Ratio*DM	0.242	0.671*	0.159	0.457
13. Operating Expense Ratio*DM	0.056	0.176	0.032	0.135
14. Net Income*DM	-0	-0.466	-0	-0.199
15. Operating Cost*DM	0	0.425	-0	-0.010
16. Debt Ratio*DM	-0.108	-1.146	-0.100	-0.927
17. Current Ratio*DM	-0.013	-0.642	-0.006	-0.306
18. Cash Flow Ratio*DM	-0.021	-0.630	-0.025	-0.839

1. The dependent variable is the Tobin's q.

2. DM is a dummy variable for the company implementing electronic money. The dummy

   variable will be set as 1 while implementing electronic money, and 0 otherwise.

3. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

Table 9: Indirect effects of implementing electronic money on the inventory turnover ratio

Sample Period	2001-2006		2004-2006	
Independent Variable	Estimated Coefficient	t-statistics	Estimated Coefficient	t-statistics
1. Constant	471.178	4.509***	1049.118	4.703***
2. Total Assets Turnover Ratio	-4.059	-0.132	-21.159	-0.311
3. Operating Margin Ratio	-1.921	-1.293	-3.822	-0.910
4. Operating Expense Ratio	-2.405	-1.617	-11.436	-1.677*
5. Net Income	0	0.165	0	0.104
6. Operating Cost	-0	-0.318	-0	-0.325
7. Debt Ratio	-6.806	-3.719***	-14.768	-3.798***
8. Current Ratio	-0.417	-2.349**	-0.861	-2.083**
9. Cash Flow Ratio	-0.242	-0.652	-0.530	-0.661
10. Implementing Electronic Money	-456.195	-0.673	-1175.076	-0.882
11. Total Assets Turnover Ratio*DM	17.021	0.178	32.386	0.209
12. Operating Margin Ratio*DM	-0.668	-0.016	-5.148	-0.065
13. Operating Expense Ratio*DM	1.556	0.042	11.327	0.208
14. Net Income*DM	-0	-0.001	0.000	0.071
15. Operating Cost*DM	0	0.070	-0	-0.030
16. Debt Ratio*DM	6.787	0.616	17.718	0.727
17. Current Ratio*DM	0.503	0.212	1.359	0.287
18. Cash Flow Ratio*DM	-0.005	-0.001	-0.086	-0.013

1. The dependent variable is Inventory Turnover Ratio.

2. DM is the dummy variable for the company's implementation of electronic money.

  The dummy variable will be set as 1 while implementing electronic money, and 0 otherwise.

3. *, ** and *** denote significance at the 10%, 5% and 1% levels respectively.

Table 10: The tests for accounts receivable turnover ratios before[8] sample correction

Accounts Receivable Turnover Ratio	Observations	Mean	Standard Deviation	t-statistics
The number of the companies with implementing electronic money	32	6.130	1.963	-0.753
The number of companies without implementing electronic money	297	6.485	2.587	-0.939

1. * and ** denote significance at the 10% and 5% levels, respectively.

2. DM is the dummy variable for the company's implementation of electronic money.

  The dummy variable will be set as 1 while implementing electronic money, and 0 otherwise.

Table 11: The tests for inventory turnover ratios before sample correction

Inventory Turnover Ratio	Observations	Mean	Standard Deviation	t-statistics
The number of companies which have implemented electronic money	32	29.137	33.098	-0.245
The number of companies which have not implemented electronic money	297	42.005	296.683	-0.708

1. * and ** denote significance at the 10% and 5% levels, respectively.

2. The t statistics shown in the 1st row (2nd row) calculated by assuming equal variance (unequal variance)

Table 12: The tests for inventory turnover ratios after sample correction[9]

Inventory Turnover Ratio	Observations	Mean	Standard Deviation	t-statistics
The number of the companies which have implemented electronic money	32	29.137	33.098	4.330*
The number of companies which have not implemented electronic money	293	13.705	17.004	2.600*

1. * ， ** denote significance at the 10% and 5% levels, respectively.

2. The t statistics shown in the 1st row (2nd row) are calculated by assuming equal variance (unequal variance)

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[8] The t test is insignificant for the Accounts Receivable Turnover Ratio for both the before and after sample correction, so Table 10 is listed in order to save space.

[9] Few sample data for the Inventory Turnover Ratio are higher than 365or above. Namely, the inventory can be sold out within a day or less. Since the sample data are quite reasonable, the Inventory Turnover Ratios after implementing electronic money are raised after deleting this sample.

4.5.2 Effects of Implementing Electronic Money and Financial Characteristics on Performance Variables

Similarly, this section firstly deletes unreasonable data and then examines the effects of implementing electronic money and financial characteristics on performance variables during the data period 2001-2006. Empirical findings are listed in Tables 13, 14, 15, and 16. Table 13 still shows a company with poor cash flow would seek to implement electronic money in a more active manner. From Table 14, the companies implementing electronic money will still have a negative effect on firm value after sample correction, which is probably due to the cost of implementing electronic money compromising firm value. However, Table 16 shows that implementing electronic money flow would significantly increase the inventory turnover ratio, but is found to have less significant effects on the accounts receivable turnover ratio in Table 15, mainly because a company purchasing raw materials from suppliers may exercise self-control over inventory management and therefore has a stronger effect on the inventory turnover ratio. However, most markets are buyer's markets, and such a requirement will not be applied to customers. Therefore the effect on the accounts receivable turnover ratio for the client end is insignificant.

Table 13: The logit regression model after sample correction

Independent Variable	Estimated Coefficient	Standard Deviation	t-statistics	p-value
1. Constant	0.387	2.069	0.187	0.852
2. Accounts Receivable Turnover Ratio	-0.110	0.128	-0.866	0.387
3. Total Assets Turnover Ratio	0.193	0.414	0.467	0.640
4. Inventory Turnover Ratio	-0.010	0.026	-0.399	0.690
5. Operating Margin Ratio	-0.146	0.084	-1.728	0.0840*
6. Operating Expense Ratio	0	0	0.014	0.989
7. Net Income	0	0	0.170	0.865
8. Operating Cost	-0.006	0.032	-0.205	0.838
9. Debt Ratio	-0.002	0.005	-0.426	0.670
10. Current Ratio	-0.026	0.009	-2.807	0.005***
11. Cash Flow Ratio	0.017	0.010	1.688	0.091*

1. The dependent variable for this logical model is to set to 1 for the company's implementation of electronic money, and 0 otherwise.
2. * 、 ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Table 14: The multiple regression model after sample correction

Independent Variable	Estimated Coefficient	Standard Deviation	t-statistics	p-value
1. Constant	0.751	0.467	1.609	0.109
2. Accounts Receivable Turnover Ratio	0.005	0.028	0.175	0.861
3. Total Assets Turnover Ratio	0.833	0.120	6.957	0.000***
4. Operating Margin Ratio	0.031	0.006	5.102	0.000***
5. Operating Expense Ratio	0.027	0.006	4.320	0.000***
6. Net Income	0	0	0.288	0.774
7. Operating Cost	0	0	-0.954	0.341
8. Debit Ratio	-0.008	0.008	-1.013	0.312
9. Current Ratio	-0.000	0.001	-0.368	0.713
10. Cash Flow Ratio	0.002	0.002	1.327	0.186
11. Implementing Electronic Money	-0.544	0.238	-2.287	0.023**
12. Inventory Turnover Ratio	-0.006	0.0034	-1.615	0.107

1. The dependent variable is Tobin's q.
2. * 、 ** 、 *** denote significance at the 10%, 5% and 1% levels, respectively.

Table 15: The multiple regression model after sample correction

Independent Variable	Estimated Coefficient	Standard Deviation	t-statistics	p-value
1. Constant	5.205	0.859	6.061	0
2. Total Assets Turnover Ratio	1.049	0.235	4.467	0.000***
3. Operating Margin Ratio	-0.028	0.013	-2.250	0.025**
4. Operating Expense Ratio	0.0280	0.012	2.250	0.025**
5. Net Income	0	0	2.408	0.017**
6. Operating Cost	0	0	-1.746	0.082*
7. Debt Ratio	-0.011	0.015	-0.747	0.456
8. Current Ratio	0.002	0.001	1.567	0.118
9. Cash Flow Ratio	0.003	0.003	1.144	0.254
10. Implementing Electronic Money	-0.446	0.482	-0.925	0.356

1. The dependent variable is the Accounts Receivable Turnover Ratio.
2. * 、 ** 、 *** denote significance at the 10%, 5% and 1% levels, respectively.

Table 16: The multiple regression model after sample correction

Independent Variable	Estimated Coefficient	Standard Deviation	t-statistics	p-value
1. Constant	16.124	6.929	2.327	0.021
2. Total Assets Turnover Ratio	4.991	1.806	2.764	0.006***
3. Operating Margin Ratio	-0.083	0.097	-0.853	0.394
4. Operating Expense Ratio	-0.077	0.096	-0.799	0.425
5. Net Income	0	0	-1.587	0.114
6. Operating Cost	0	0	1.505	0.133
7. Debt Ratio	-0.048	0.122	-0.395	0.693
8. Current Ratio	-0.035	0.012	-2.986	0.003***
9. Cash Flow Ratio	0.064	0.023	2.758	0.006***
10. Implementing Electronic Money	10.170	3.708	2.743	0.006***

1. The dependent variable is Inventory Turnover Ratio.

2. * 、 ** 、 *** denote significance at the 10%, 5% and 1% levels, respectively.

5. CONCLUSIONS

Although the electronic companies have previously made profits quite well, these companies are facing a challenge in continuing to make profits, since the product life cycles have been shortened for these electronic companies. In addition, most of electronic companies are categorized as OEM/ODM companies and the profit margins of these companies have gradually declined. Thus, the purpose of the B2B Electronic Money C Plan is to solve the financing problem and the credit trading issues. Thus, the accounts receivable and inventory turnover are important concerns for electronic companies in order to improve their cash flow in working capital management and then to shorten the cash cycle as shown in Figure 1.

In addition, working capital includes current assets and liabilities and sound working capital management emphasizes whether enterprises use current assets and liabilities efficiency. In figure 1, a company could shorten the inventory and the accounts receivable periods by raising the inventory turnover ratio and the accounts receivable turnover ratio. Then, the cash cycle will be shortened, and the financing pressure, especially for short-term financing loans, will be reduced. The paper investigates whether the B2B Electronic Money C Plan will benefit these electronic companies by shortening the cash cycle, since the sound working capital management will employ current liabilities and assets such as accounts receivable and inventory efficiently.

So, this paper uses the logistics regression model to examine the relation between financial characteristics and implementing electronic money. He applies the multiple regression models to analyze the direct/indirect effects of implementing electronic money and financial characteristics on performance variables such as the Tobin q, the accounts receivable turnover ratio and the inventory turnover ratio. Ultimately, we use an independent t test to examine the difference in performance between companies

with or without implementing electronic money. We use the panel data model for supplementary descriptions of insufficient time series data for the study samples, where a fixed effect model appropriated for other models is selected for hypotheses analysis. The related hypotheses are developed after a literature review. The measurement methods are used for verification and some conclusions based on the foregoing empirical findings are drawn as follows:

A company with poor cash flow would have insufficient cash for its operating activities, which might show a message of imbalanced operating businesses. Empirically, this study discovers that there is a negative effect from implementing electronic money on firm value, suggesting that a company with poor cash flow may be more likely to pay attention to implementing electronic money. However, the effect on the accounts receivable turnover ratio is also insignificant after implementing electronic money, which is probably because some companies with the introduction of money flow remain at the initial stage of the C Plan and have not fully developed their functions. This thereby leads to insignificant effects on company value and the accounts receivable turnover ratio.

However, the C Plan shares immediate and effective information with up-stream suppliers of companies with playing roles as center factories within the value chain, promoting the information transparency of the overall supply chain and cutting inventory costs, where the inventory turnover ratio is increased correspondingly.

Based on the study findings, the inventory turnover ratio of a company that implements B2B electronic money will be significantly improved from the comparison before and after implementing electronic money. Therefore, the B2B electronic money C Plan has a positive effect for working capital management of these electronic companies.

In addition, there are two important results which are derived from these empirical models. One is where we find that the companies with trouble in cash flow will stress on electronic money due to the

negative relationship between cash flow and implementing electronic money. The other is that implementing electronic money will raise the turnover ratio of inventory (i.e. implementing electronic money will benefit the working capital management of electronic companies in Taiwan).

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導入 B2B 電子金流 C 計劃有助益於營運資金管理？

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摘要

近年在國內銀行業與企業日漸投入電子化金流之際，然而國內相關文獻鮮少探討電子商務與財務之間的關係，本研究主要在探討財務特性與公司導入電子金流服務的關聯性，及導入電子金流服務對公司價值與營運資金的影響，並有以下的研究發現：1. 本研究實證結果發現現金流量與B2B的電子金流呈負相關，亦即代表現金流量不佳的公司，或許較有危機意識，可能比較重視金流的導入。2. B2B電子金流，有助於庫存成本下降，存貨週轉率相對提高，亦為電子金流C計劃有裨益營運資金的管理。

關鍵詞：導入電子金流C計劃、存貨週轉率、營運資金管理、金流
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