The Asian Journal of Professional and Business Studies
https://journal.uptm.edu.my/index.php/ajpbs
e-ISSN 2716-666X, ISSN 2462-1072

Please cite this article as: Sim, S.-L., & Ali, A. (2020). Working Capital Management and Extent of Influence on Public Listed Firms' Performance in Industrial Product Industry. *The Asian Journal of Professional & Business Studies*, *1*(1), 36–40. https://doi.org/10.61688/ajpbs.v1i1.15

WORKING CAPITAL MANAGEMENT AND EXTENT OF INFLUENCE ON PUBLIC LISTED FIRMS' PERFORMANCE IN THE INDUSTRIAL PRODUCT INDUSTRY

Siew-Ling Sim*, Azlan Ali
University College Technology, Sarawak
Corresponding author: simsiewling@ucts.edu.my

Received 31 Mac 2020, Revised 30 April 2020, Accepted 20 Mei 2020, Published 30 June 2020

ABSTRACT

In the aftermath of global financial instability, effective working capital management has become increasingly critical for firms seeking to balance profitability and liquidity risks. This study investigates the impact of working capital management on firm performance and provides empirical insights into the relevance of theories underpinning short-term resource management. A dynamic panel data approach is employed using the one-step system Generalised Method of Moments (GMM) to address endogeneity and unobserved firm-specific heterogeneity. The sample comprises 156 Malaysian public listed companies in the industrial products sector over a ten-year period from 2007 to 2016. Working capital management is proxied by the cash conversion cycle (CCC), and firm performance is measured using profitability and market-based indicators. The findings reveal a statistically significant negative relationship between CCC and firm performance, suggesting that shorter cash conversion cycles enhance firm efficiency and profitability. Additionally, firm size is identified as a significant control variable, indicating that larger firms benefit from economies of scale, which positively influence both profitability and market valuation. This study contributes to the literature by providing evidence from an emerging market context and offers practical implications for financial managers and investors to optimise working capital policies to achieve an effective trade-off between liquidity and returns.

Keywords: Working capital management, Cash conversion cycle, Firm performance, GMM, Emerging markets, Malaysia

1. INTRODUCTION

Working capital management (hereafter called as WCM) prevails upon the efficiency in managing short-term resources wherein possession of dual objectives, i.e. profitability and liquidity. A pair of objectives is sometimes appraised to have trade-off appositeness. For example, if a firm decides to utilise its surplus cash to invest in forms of investments, it would result in increasing returns when set against maintaining its surplus cash at an idle level. However, the firm may encounter liquidity problems in the event of contingencies such as a fire in the firm's warehouse or the major customer being unable to pay off debts, which may cause the firm to suffer insolvency. Furthermore, WCM has emerged as one of the most crucial affairs in any firm, wherein Lamberson (1995) points out that financial managers have revealed the complexity in identifying the ultimate dominant determinant that influences the aptitude of firms to maintain the optimum level of working capital. Moreover, past empirical evidence has affirmed working capital management as one of the most prominent yet least apprehended drivers of corporate performance (Losbichler & Mahmoodi, 2012). Despite the fact, there is still a minimal level of knowledge up till now, in order to determine the optimal level of liquidity (Brealey, Myers & Allen, 2011).

As reported by PWC in their 2018 study which deals with more than 400 listed companies, there is a slight leap of improvement among Malaysian firms in shortening the length of the cash conversion cycle (i.e. from 55 days in 2017 to 54 in 2018). In short, the firms take 51 days to convert their raw materials or work-in-progress inventories into a ready sales product, followed by another 55 days to collect outstanding receivables from their customers, and use 55 days to pay off the debts owed to their suppliers. Despite the fact, there is still RM133 billion remains idle which means that the firms put aside the surplus cash in their book merely for the purpose of working capital requirements, though it would generate nothing

at the end. As an illustration, the cash conversion cycle for the consumer products sector has been deteriorated by 4 days in the year 2018 as corresponding to previous year whereby the firms situated in this industry have held their inventories three days longer, side by side the unrealised, idle cash has been up to RM10,000,000,000 been tied up in their book accounts which may due to the inefficiency in payables management.

In other respects, diverging from the underpinning of prominent theories that are much more relevant in long-term corporate financial decision-making, such as the distribution of dividends, capital budgeting, capital structure and corporate valuation, and working capital management (Almeida & Eid Jr, 2014). Similarly, Palombini and Nakamura (2011) have accentuated the measly enlightenment on the premises that are applied to explain the consanguinity between working capital management and firm performance (Zariyawati, Annuar, Taufiq & Abdul Rahim, 2009). In addition, the efforts and time spent managing the effectiveness of short-term resources have long been lost among finance managers and treasurers, after all, lacking apposite commitment from chief financial officers, largely in multinational conglomerates (PWC, 2017). This point of dispute may be due to the WCM's attribute of daily and redundant routines, which, to a certain degree, even if any occurrence of erroneous behaviour is oftentimes taken lightly and merely regarded as one of the restorable matters (Singh & Kumar, 2014). Despite this, previous studies have revealed that working capital management has been identified as one of the most prominent yet least comprehended antecedents of firm performance (Losbichler & Mahmoodi, 2012) irrespective of the firm's size, economic sector, industry, and the development of the country (Bhatia & Srivastava, 2016). Abundant empirical groundwork has been attested to the effectiveness of working capital management, revealing that it is compelling to the succession of firms explicitly in the relentlessly turbulent and complex business environment (Raheman, Qayyum & Afza, 2011; Padachi & Howorth, 2014).

As an emerging nation, Malaysia still relies on industrial production outputs, wherein the composition of three major sectors, that is, mining, manufacturing, and electricity, is considered. Among the three sub-sectors, the manufacturing sector contributes a sizeable weight to Malaysia's gross domestic production (GDP), which was 23.0% in 2017 with a gross output of RM1,275.8 billion (Department of Statistics Malaysia, 2019). Unequivocally, the manufacturing industry contributes substantially to spurring job creation and is a catalyst for foreign direct investments, coupled with the forecast of an increment of RM138 billion contribution from the manufacturing sector to the national economy. In conjunction with the positions of 17th out of 40 nations for the Global Manufacturing Competitiveness Index 2016 and 37th among 127 worldwide countries in the Global Innovation Index 2017, Malaysia is indeed gaining a competitive edge as it persists over its versatility.

Despite the fact that the manufacturing industry is in the proliferation stage, three junctures may impair its progression, including the shifting of plantations to low-labour-cost-producing countries such as Vietnam, technological disruption with higher costs of investment in automation, and inadequate high-skilled labour which merely consists of 18% of total employment coupled with the minimal enhancement of labour productivity (3 – 4%). Nonetheless, the opportunities come along with the emergence of business opportunities due to the relocation of factories from China due to the intensifying trade war between China and the U.S., as well as government stimulus policies encouraging firms to embrace the fourth industrial revolution to boost productivity and be less reliant on human labour (Ministry of International Trade and Industry, 2018).

A well–grounded adoption of a working capital policy is important for every organisation, particularly emerging economic entities. The effect of working capital management is extensively affected by the nature of the industry. For instance, the level of working capital requirements for the manufacturing sector is much higher than that of the services industry in view of the practical norms of manufacturers to hold more inventories for production purposes as well as granting more credit to their customers with lengthier credit terms. In such a state of affairs, firms need additional cash to run their daily operations (e.g. payment to suppliers); otherwise, they may grapple with difficulties in securing cash to pay off debts. At this point, they may face complications such as liquidation, financial distress, and even insolvency (Al-Mawsheki et al., 2019). Hence, the efficiency of working capital management is crucial, particularly for manufacturers, to counterbalance the trade-off of dual essential goals: profitability and liquidity risk. Therefore, this study investigates the influence of working capital management on corporate performance, specifically in the industrial product industry, supplementing the scant contemporaneous literature.

2. LITERATURE REVIEWS

Effective management of short-term resources is pivotal for a business to remain competitive, specifically for manufacturing firms, where the greatest amount of current assets comprises inventories to prevent the disruption of production processes (Van-Horne & Wachowisc, 2000). Numerous former researchers have been piloted in other regions which ratifies the momentous repercussion of WCM on firms' performance (Nzioki, 2013; Onodje, 2014; Padachi, 2006; Raheman et al., 2010; Ukaegbu, 2014). The aim of WCM is to ensure that a firm is commensurate in fulfilling its financial commitments, for instance, disbursement to suppliers and other creditors, such as financial institutions, immediately upon the maturity date (Ukaegbu, 2014). As evidenced by previous empirical investigations, a vigorous formulation of

The finance manager's working capital policy is crucial for a firm to effectively manage its cash conversion cycle components (i.e. accounts receivable, inventories, and accounts payable), and the implementation of policies varies across different industries (Nazir & Afza, 2009; Filbeck & Krueger, 2005). Numerous determinants have been ascertained as variables that would influence the working capital requirements of a firm (Ross, Westerfield & Jordan, 2010) which comprise the extent of business that is conditional to seasonal fluctuation, the length of the firm's operating cycle, the nature and size of the firm, the amount of working capital required to maintain non-current assets, the degree of rigorousness of the trade credit policy, the magnitude of prospective growth and expansion, the dividend policy, and the stability of macroeconomic indicators such as the rate of borrowing.

A firm's working capital policy is intrinsically scrutinised from two perspectives: investment and financing in three approaches toward risk undertaking, that is, aggressive, moderate, and conservative. An aggressive investment policy implies the practice of curtailing the holding of current assets and releasing surplus resources into high-yield investments. However, this approach is associated with higher liquidity risk, at which point the firm might have problems settling debts on schedule and failing to retain customers due to the greater likelihood of stock-outs and imposing stringent trade credit policies by requesting customers to pay earlier (Nazir & Afza, 2009).

Table 1. *Profitability and Liquidity of Working Capital Approaches*

Working Capital Approach	Returns	Liquidity	Risk
Aggressive	High	Low	High
Moderate	Medium	Medium	Medium
Conservative	Low	High	Low

Source: Ng, et al., (2017)

A disputable point of view on the empirical investigation as regards the length of cash conversion cycle which the conventional view point that typically demonstrating the shorter the CCC, the better the firm performance. Despite the majority of the results validating that a shorter CCC enhances firm profitability, Shin and Soenen (1998) counter that firms with a comparatively liberal trade credit policy are more likely to generate higher levels of sales revenue, and consequently, profitability. Meanwhile, the positive interrelation between the cash conversion cycle and firm performance is confirmed by Nobanee, Abdullatif & AlHajjar (2011) and Onodje (2014). The justification provided by such prior outcomes exemplifies that the level of economic development, such as the level of gross income per capita, is influential in fostering the adoption of an optimal working capital strategy in specific industries (Onodje, 2014).

The effective integration between cash conversion cycle components is undoubtedly an injudicious decision that may affect firm profitability (Sartorius & Hill, 1983). For instance, ordering too many raw material inventories may imperil the performance of the other two components of CCC (i.e., receivables and payables). While attempting to clear the stock, the firm may culminate in loosening its trade credit policy, whereas deferred debt collection from customers will prolong disbursement to suppliers. Moreover, firms must bear other negative incidents that may result in the deterioration of firm profitability, such as escalating holding costs, the risk of spoiled and unused inventories, accelerating the occurrence of irrecoverable debts, and impairing supplier relationships. Table 2 summarizes prior studies on the influence of working capital management on firm performance, specifically in the industrial products industry.

Table 2. *Summary of Previous Investigations about Influence of WCM towards Manufacturing Firms*

Author (year)	Panel Units	Time	Dependent Variables	Independent Variables	Control Variables	Findings
Ukaegbu (2014) / Multiple Regression Analysis	102 manufacturing firms in 4 countries (i.e. Egypt, Kenya, Nigeria & South Africa)	2005 - 2009	Gross Operating Profit (GOP)	CCC; DSO; DIO; DPO	Firm Size; Board Size; GDP	CCC: -ve, sig; DSO: -ve, sig; DIO: -ve, sig; DPO: -ve, sig (except Egypt) GDP: +ve, sig at 10%; Firm Size: +ve, sig; Board Size: -ve, sig.
Onodje (2014)	75 Nigerian manufacturing PLCs	2002 - 2011	Operating income to sales & one period lag	CCC; DSO; DIO; DPO; quick ratio; Debt equity ratio; Sales growth rate	Nil	CCC: -ve, sig; DSO: +ve, sig; DIO: +ve, sig; DPO: -ve, sig; Sales growth: not sig; Debt equity ratio: -ve, sig.

Wasiuzzaman (2015)	160 manufacturing PLCs in Malaysia	2005 - 2010	ROA	Net working capital	Sales Growth; Firm Size; Leverage; ln(GDP)	DIO: -ve, not sig; DSO -ve; sig; DPO: -ve, sig; NWC: -ve, not sig; Sales Growth +ve, sig; Firm Size +ve, sig; Leverage -ve; sig; ln(GDP): +ve, sig.
Jakpar et al., (2017)	164 Malaysian manufacturing PLCs	2007 - 2011	ROA	ln CCC; ln DSO; ln DIO	Leverage; Firm Size	ln CCC: not sig; ln DSO: +ve sig; ln DIO: +ve sig; Leverage: -ve, sig; Firm size: +ve, sig.
Kasozi (2017)	69 Manufacturing Firms listed in Johannesburg Securities Exchange	2007 - 2016	ROA	CCC, DSO, DIO, DPO,	Firm Size, Sales Growth, Leverage,	CCC: +ve, not sig; DSO: -ve, sig; DIO: +ve, sig; DPO: -ve, sig; firm size: +ve, not sig; sales growth: +ve, sig; Leverage: -ve, sig.
Ng, Ye, Ong & Teh (2017)	122 Malaysian industrial products PLCs	2007 - 2012	Gross Operating Income	CCC; DSO; DIO; DPO; Current assets ratio (CAR); Current liabilities ratio (CLR).	Firm Size; Sales Growth; Leverage	CCC: +ve, sig; DSO: -ve, sig; DIO: +ve, sig; DPO: not sig; CAR: -ve, sig; CLR: +ve, sig;

Source: Author (2020)

3. Variables Definition and Development of Hypothesis

3.1. Proxy for Firm Performance: Return on Assets (ROA) & Tobin's Q

This study constructs both accounting- and market-based firm performance indicators which are return on assets (ROA), return on equity (ROE), and Tobin's Q. ROA is signified by profits before interest and tax divided by total assets, while ROE is defined as net profits for the year divided by total equity. As both of these estimators are used to measure the financial performance of a firm, they are crucial for quantifying the financial health position as well as financial risk management. In spite of the disputation arisen by previous studies stating the feasibility of ROA as an appropriate estimator which by virtue of the deliberation sets forth a considerable high proportion of total assets among firms that might comprise of financial assets, numerous prevailing studies have still adopted ROA as their firm performance measurement (Nazir & Afza, 2009; Zariyawati, et al., 2009; Banos-Caballero, Garcia-Teruel & Martinez-Solano, 2014; Wasiuzzaman, 2015; Jakpar, et al., 2017; Kasozi, 2017). Another book-value-based firm performance indicator, ROE, is commonly used to interpose the rate of returns realised by business owners after the subtraction of all operational expenses, interest costs, and tax payables. The past studies that adopt ROE as one of their dependent variables are Afrifa and Padachi (2016); Ahmadpour, Zare & Rostami (2012); Hassan, Imran, Amjab & Hussain (2014); and Majeed, Makki, Saleem & Aziz (2013).

Tobin's Q is defined as the market capitalisation of total ordinary shares outstanding plus total debts divided by total assets. The conspicuousness of Tobin's Q has been considered by prior researchers because of its propensity to mitigate the demerit of accounting profit ratios which merely focus on historical achievements (Banos- Caballero et al., 2014). Whereas Tobin's Q places more weight on future orientation as one of the gauged elements, market capitalisation portrays the confidence level of investors towards a firm's capability in dealing with matters such as financial constraints, strategic alliances, and the stability of the international capital market (Demsetz & Villalonga, 2001).

3.2. Proxy for Working Capital Management: Cash Conversion Cycle

The proxy for working capital management adopted in this study is the cash conversion cycle (CCC). The CCC has been extensively used to assess the short-term operational efficiencies and liquidity position of a firm (Jose, Lancaster & Steven, 1996). The regressors are defined as follows: (i) days of inventory outstanding (DIO), calculated as average inventories divided by cost of sales, then multiplied by 365 days; (ii) days of accounts receivable outstanding (DSO), calculated as accounts receivables divided by sales, then multiplied by 365 days; (iii) days of accounts payable outstanding (DPO), calculated as accounts payable divided by purchases, then multiplied by 365 days; (iv) cash conversion cycle (CCC) is computed as DIO plus DSO, then subtracting DPO. The following is the first hypothesis:

Hypothesis 1: *Working capital management significantly influences firm performance indicators (return on assets, return on equity, and Tobin's Q) for PLCs in the industrial products industry.*

3.3. Control Variables

3.3.1. Firm Size (SIZE)

Prior empirical studies have validated the positive effect of firm size on firm performance, depending on the rationale that large firms are inclined to hold lower levels of cash, specifically firms with good credit ratings which secure financing from financial markets. Moreover, larger firms are likely to experience better growth opportunities, leading to superior firm performance. Hitherto, empirical evidence denotes that firms with mounted growth opportunities are likely to undergo greater fluctuations in cash flows, inducing the need to hold a greater amount of cash (Opler, Pinkowitz, Stulz & Williamson, 1999). Moreover, a higher growth rate of expansion is typically linked to improved firm performance (Aktas, Croci & Petmezas, 2015). The expected outcome is a positive interrelation with firm performance because large firms with higher credit ratings generally find it easier to obtain capital; hence, they would be more generous in granting credit to their business customers. Based on the aforementioned points, the following is the second hypothesis:

Hypothesis 2: *Firm size has significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry.*

3.3.2. Financial Leverage (LVRG)

Financial leverage is defined as total debt divided by total shareholders' equity. Incessantly, the ideal mixture of debt equity source of capital has caught the limelight of scholars as well as practitioners (Lazaridis & Tryfonidis, 2006). As illustrated by one of the ultimate theories used to exemplify working capital financing, the pecking order theory (POT), a firm which is short of funding would opt for an internal source of capital (i.e. retained profits) before proceeding with the issuance of an external supply of financing (i.e. long-term debts and equity). Excessive debt utilisation implies a lower amount of free cash flow available for operational use; as a result, the firm might suffer from high business risk. Accordingly, prior findings demonstrate a negative relationship between leverage ratio and firm performance. Alternatively, a group of researchers claims that mounting debt may lead to augmented business growth. A higher level of gearing would induce greater monitoring from external creditors, ensuring that an optimum working capital policy is adopted to increase firm profitability. Thence, the finance manager has committed to shortening the duration of the cash conversion cycle (CCC) as the cost of debt is generally higher than the utilisation of internal capital (Banos- Caballero et al., 2014). Based on the above discussion, the following hypothesis is proposed:

Hypothesis 3: *Financial leverage has significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry.*

3.3.3. Annual Sale Growth Rate (GROWTH)

Sales growth is the increment or reduction of sales revenue, which is calculated as (sales for the current year minus sales for the previous year) divided by sales for the previous year. Sales growth has been identified as a cogent variable to be controlled because sales can generate income and are one of the essential suppliers of financial resources (Singhania & Metha, 2017). Furthermore, a firm with higher sales growth often has greater cash requirements to fund its operational needs. In other words, it would elongate the cash conversion cycle considering a higher storage of inventories and an elevated amount of receivables, eventually succeeding in a higher transaction volume. Therefore, the prior results indicate a positive association between sales growth and firm performance (Abuzayed, 2012; Wasiuzzaman, 2015; Kasozi, 2017). In accordance with the above discussion, the following is the fourth hypothesis:

Hypothesis 4: *Annual sales growth has significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry.*

3.3.4.Current Assets Ratio (CATA)

The contentious point of observation on the disparity management of asset-liability might result in the growth of turnover margin; however, it induces an escalating risk of insolvency at the expense of shareholders' wealth (Padachi, 2006). As a proxy for working capital investment, the current assets ratio is the amount of current assets divided by total assets. Unorthodoxly, other scholars have explained the aforementioned ratio, implying the risk appetite of top management toward short-term investments (Nazir & Afza, 2009; Sharma & Kumar, 2011). However, there is a lack of consensus on the optimal composition of current assets, as divergent regions and economic sectors are likely to affect working capital requirements (Kasozi, 2017).

Hypothesis 5: *Current assets ratio has significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in industrial products industry.*

3.3.5. Current Liabilities Ratio (CLTA)

The current liabilities ratio (CLTA) is defined as current liabilities divided by total liabilities. CLTA is applied to scrutinise the financing policy of short-term obligations. CLR is used to measure the degree of aggressiveness in terms of the financing approach which prevails upon the firm, as it is recurrently utilising the short-term source of capital to fund its investments in current assets. The prevalence of this strategy permits firms to have more flexibility when it comes to the utilisation of funding facilities, which predisposes them to be subjected to fewer restrictions and lower financing costs. Nonetheless, the drawback of this strategy is the heightening of default risk due to the shorter maturity of obligations which might constrain the firms' ability to settle explicitly if there is any deviation of unexpected cash flows during the hiking of interest rates (Sharma, 2009; Weinraub & Visscher, 1998; Walker, 1964). Based on the aforementioned elucidation, the following hypothesis is proposed:

Hypothesis 6: *Current liabilities ratio has significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in industrial products industry.*

3.3.6. GDP Annual Growth Rate (GDP)

In this study, external factor i.e. gross domestic production (GDP) annual growth rate has been taken into consideration as working capital requirements might varied across different economic cycle as well as industries. Previous empirical evidence validates that macroeconomic indicators have asserted certain influences on the practice of how firms manage their receivables (Smith, 1987) and their level of investment in inventories (Mansoori & Muhammad, 2012). In addition, Lamberson (1995) concedes that the economic cycle is forcible in influencing the level of working capital investment, as a booming economy tends to stimulate a firm's sales revenue, resulting in enhanced profitability, or vice versa. This line of reasoning is affirmed by Garcia-Teruel and Martinez-Solano (2007), who argue that the general business environment should be considered as a control variable, as the fiscal loop may affect the amount of working capital required. Based on the aforementioned discussion, the following is the seventh hypothesis:

Hypothesis 7: *GDP growth rate has significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in industrial products industry.*

4. SAMPLE, DATA AND METHODOLOGY

4.1. Sample Selection and Data Filtration

This study adopts panel units i.e. cross-sectional study encompasses Malaysian public-listed companies consisting of both main and secondary (i.e. ACE) markets, as well as longitudinal data over 10 years, comprising the financial years of 2007 to 2016. The sources of secondary data used to run empirical testing on the research hypotheses include the audited financial statements of firms listed on Bursa Malaysia and financial analysis from Morningstar Incorporation. Moreover, Afrifa (2013) concedes that SMEs are unwilling to reveal information because they are concerned that disclosure may be made known to their competitors. Moreover, Afrifa (2013) concedes that SMEs are unwilling to reveal information due to the concern that disclosure might be made known to their competitors.

The main source of data is annual financial reports published on the Bursa Malaysia website, which is deemed a reliable but extensive source of information concerning pecuniary as well as the submission of reports or announcements to keep investors and the public fully informed of all facts and information in the approach of full, accurate, and timely disclosure (Bursa Malaysia, 2019). In addition to financial reports, other sources of data, such as Morningstar Inc., an independent investment research provider, furnishes both quantitative and non-financial data and information about a company's performance, for instance, ratios analysis, shareholding analysis, stock performance, valuation, announcement, and analysis of financial statements. Morningstar is considered one of the useful and unbiased sources of information to assist investors in making investment decisions (Kamal, 2013).

For the screening task, the researcher filtered the companies with no lost values or no values for the entire time period (2007 -2016) in order to establish the consistency of the dataset. Subsequently, the data filtration takes into account selection criteria such as consistent financial month ended for the fitted time frame of ten years (i.e. 2007–2016), absence of abnormal financial figures, that is, negative shareholder equity amount, and without missing numbers for data file compilation.

4.2. Methodology

The researcher intends to test the hypothesis regarding the influence of working capital management on firm performance through dynamic panel data which is defined as the pooling of observations on a cross-section of study objects, that is, public listed companies (PLCs) throughout several time periods (Baltagi, 2005). Panel data analysis has been extensively adopted in former studies for data estimation and modelling, undertaking of the following benefits: (i) it allows researchers to control for unobservable firm-specific or time-invariant variables which could eliminate the exposure of biased outcomes wherein may perhaps arise from the heterogeneous firm explicit features that resultant the erroneousness of estimation due to its complexity in approximation or even hard to access the data; (ii) it improves the efficiency of the econometrics estimations by taking into consideration individual differences between cross sections as well as the time differences between the periods

inclusive dummy variables (Hsiao, 2003). Dynamic panel estimators are constructed with the following proviso: (i) small T, large N panels, indicating a small number of time periods and a large number of cross-section units; (ii) a linear functional relationship; (iii) one dependent variable that is dynamic, depending on its peculiar prior accomplishment; (iv) independent variables are permitted not to be strictly exogenous, signifying that explanatory variables are conceded to be correlated with elapsed and plausibly recent realisations of the errors; (v) fixed individual effects; and (vi) heteroscedasticity and autocorrelation within individuals but not across them (Roodman, 2009). Dynamic panel data allow for one left-hand-side variable to be dynamic, that is, relying on its own historical realisations, whereby y is not required to be strictly exogenous; that is, y could correlate with past and likely present realisations of the errors. In addition, dynamic panel estimators permit heteroscedasticity and autocorrelation within individuals, but not across them (Roodman, 2009). Therefore, the researcher gauges the model using the one-step generalised method of moments (GMM) estimator (Arellano & Bond, 1991), which permits the control of endogeneity problems by inserting instrumental variables.

To further shed light on the association between working capital management and firm performance, the researcher applies more than one estimation to produce more robust evidence. In this study, one endogenous variable (firm performance) is regressed against seven exogenous variables. The regressors are the cash conversion cycle, firm size, annual sales growth rate, financial leverage, current assets ratio, current liabilities ratio, and gross domestic production (GDP) growth rate. This study includes control variables to augment its robustness. Control variables enable the model specification to be more explicit in providing a justification for interpreting the findings. The data analysis is done through STATA/MP 14.0 software. The delineation of the model estimation is as follows.

$$FP_{i,t} = \beta_0 + \beta_1 CCC_{it} + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + \beta_5 LVRG_{it} + \beta_6 CATA_{it} + \beta_7 CLTA_{it} + \beta_8 GDP_{it} + \eta_i + \upsilon_{it}$$

Notes: *FP = Measurement of firms' profitability (i.e. accounting firm measurement: return on assets & returns on equities and market firm measurement: Tobin's Q); CCC = Cash Conversion Cycle; SIZE = Firm Size; GROWTH = annual sales growth rate; LVRG = Financial Leverage; CATA = current assets ratio; CLTA = current liabilities ratio; GDP = annual GDP growth rate; i = firm; t = time; the measurement error components are υ = individual error component (a particular characteristic of each firm), and η_i= unobserved time-invariant firm-specific effect.*

5. EMPIRICAL ANALYSIS

5.1. Descriptive Analysis

Descriptive analysis is often used as a fundamental analysis to describe the attributes of a phenomenon that occurs in a particular population, that is, a sample. Table 3 presents the descriptive analysis of the criterion variables and regressors for unbalanced panel units with a total of 1,559 observations. The mean values for ROA, ROE, and Tobin's Q are 2.63%, 3.55%, and 1.65, respectively. In the interval, the average length of the cash conversion cycle is 112 days, which consists of an average of 106 days to convert raw material inventories into finished goods inventories, followed by 92 days used to collect outstanding receivables from their customers, and finally deducts 78 days, that is, the period of deferment of payment to their suppliers. Looking at this fact, the findings may imply that the firms may well still require additional financial resources to fund their working capital investment seeing the positive CCC would possibly imply that the firms are required to pay to their suppliers 112 days earlier before they receiving cash from their customers. These findings are not consistent with prior outcomes (Ng et al., 2017; Kasozi, 2017).

The average firm size (i.e., log of total assets) is 19.00, and the annual sales growth rate is 16.84%. The average financial leverage is 1.87, indicating that approximately 47% of the total assets are funded with debt. Owing to the nature of the industry, firms hold more than half of their total assets in the form of current assets (51.2 %), and current liabilities comprise 45.24% of the total assets owned by the firms. This finding points to a substantial composition of current assets that exceeds one-half of the total assets. Hence, the effective management of short-term assets, particularly inventories, appears to be highly relevant for realizing an enhanced level of profitability.

Table 3. *Descriptive Analysis*

Variable	No. of observations	Mean	Standard Deviation
ROA	1559	2.63%	8.497783
ROE	1559	3.55%	17.01282
Tobin's Q	1559	1.6505442	12.81929
DIO	1559	105.76 days	130.4491
DSO	1559	91.90 days	82.42135
DPO	1559	77.82 days	103.397
CCC	1559	112 days	134.8702
SIZE	1559	19.00234	1.417791
GROWTH	1559	16.835 %%	421.9806
LVRG	1559	1.870638	2.465701

CATA	1559	51.20%	17.01555
CLTA	1559	45.24%	52.02123
GDP	1559	4.77%	2.268

Source: Author (2020)

5.2. Correlation Analysis

Correlation analysis is one of the most comprehensive estimations that gauges the intensity of the relationship between variables, as with the appositeness of one variable that is inclined to change when associated with other variables. In other words, correlation is an estimation of the monotonic relationship between two variables. Although the results are usually used to scrutinise the relationship, the interpretation of findings is always regarded as very restricted and even comes with the discontentment of the absence of precise underlying grasp, as there is no clear-cut rule of thumb inducing inconsistent results. However, the researcher continued with this analysis because it is essential to perform fundamental analysis first before proceeding to more advanced ones. In this section, the researcher adopts the Spearman Rank-Order correlation to measure the intensity and direction of the monotonic association between two variables.

As shown in Table 4, CCC and all working capital components, except DPO, have negative and significant correlations with both accounting-based (i.e., ROA and ROE) and market valuation indicators. This implies that the magnitude of the predisposition between DIO and firms' performance indicators (i.e., ROA, ROE, and Tobin's Q) has a very feeble and inverse magnitude of predisposition, that is, -0.0953, -0.136, and -0.0849, respectively. In other words, an increase in the number of days used to convert materials into finished goods would result in a decrease in a firm's financial performance and market value. The magnitude of efficient debt collection from customers manifests a slightly greater propensity for firm performance than DIO, at which the finding still portrays a very weak association, that is, ROA: -0.1854, ROE: -0.184, and Tobin's Q: -0.1146. In contrast, the relationship between ROA and DIO demonstrates a very frail magnitude of -0.0682, at which point deferment would bring about negative consequences, such as an interruption of production due to the unavailability of materials, imperiling supplier relationships, and loss of reputation. However, DPO is not correlated with ROE and Tobin's Q. In like manner, the CCC has significant and inverse connection with both accounting and market firm performance estimators, ROA, ROE, and Tobin's Q, with magnitudes of -0.1232, - 0.1658, and -0.1074 (at p-value of 0.01), respectively, with the exposition of notably frail of how CCC relates with firm performance.

Table 4. *Spearman Rank Correlation*

	ROA	ROE	Tobin's Q	CCC	DIO	DSO	DPO	SIZE	GROWTH	LVRG	CATA	CLTA	GDP
ROA	1.0000 1559												
ROE	0.9618 1559 0.0000	1.0000 1559											
Tobin's Q	0.1729 1559 0.0000	0.1858 1559 0.0000	1.0000 1559										
CCC	-0.1232 1559 0.0000	-0.1658 1559 0.0000	-0.1074 1559 0.0000	1.0000 1559									
DIO	-0.0953 1559 0.0002	-0.1360 1559 0.0000	-0.0849 1559 0.0008	0.6975 1559 0.0000	1.0000 1559								
DSO	-0.1854 1559 0.0000	-0.1840 1559 0.0000	-0.1146 1559 0.0000	0.4906 1559 0.0000	0.2565 1559 0.0000	1.0000 1559							
DPO	-0.0682 1559 0.0071			-0.2864 1559 0.0000	0.0505 1559 0.0462	0.3957 1559 0.0000	1.0000 1559						
SIZE	0.3494 1559 0.0000	0.3964 1559 0.0000	0.0636 1559 0.0120	-0.2675 1559 0.0000	-0.2596 1559 0.0000	-0.3576 1559 0.0000	-0.1526 1559 0.0000	1.0000 1559					
GROWTH	0.3224 1559 0.0000	0.3463 1559 0.0000	0.0965 1559 0.0001	-0.1411 1559 0.0000	-0.1560 1559 0.0000	-0.1437 1559 0.0000	-0.0829 1559 0.0010	0.1737 1559 0.0000	1.0000 1559				
LVRG	-0.2417 1559 0.0000	-0.0871 1559 0.0006	0.1422 1559 0.0000	-0.1896 1559 0.0000	-0.1729 1559 0.0000		0.1455 1559 0.0000	0.2675 1559 0.0000	0.0941 1559 0.0002	1.0000 1559			
CATA	0.2085 1559 0.0000	0.1929 1559 0.0000		0.2954 1559 0.0000	0.1455 1559 0.0000	0.1590 1559 0.0000	-0.1757 1559 0.0000	0.0597 1559 0.0184		-0.1294 1559 0.0000	1.0000 1559		
CLTA	-0.1922 1559 0.0000	-0.0504 1559 0.0466	0.0648 1559 0.0105	-0.0883 1559 0.0005	-0.1164 1559 0.0000	0.0668 1559 0.0084	0.1099 1559 0.0000	0.1638 1559 0.0000	0.1267 1559 0.0000	0.8307 1559 0.0000		1.0000 1559	
GDP	0.0555 1559	0.0583 1559	0.0470 1559				-0.0551 1559		0.1870 1559			0.1039 1559	1.0000 1559

	0.0283	0.0214	0.0638	0.0296	0.0000	0.0000

Source: Author (2020)

Firm size has a positive and significant correlation with ROA, ROE, and Tobin's Q, with correlation coefficients (R) of 0.3494, 0.3964, and 0.0636, respectively. Correspondingly, the coefficient of determination (R^2) for the aforementioned DVs are equivalent to 0.12, 0.16, and 0.0041, which point in the direction of about 12%, 16%, and 0.4% of changes in ROA, ROE, and Tobin's Q can be "explained" by the association with the size of the firm. Meanwhile, other regressors, such as sales growth, leverage, CATA, CLTA, and GDP, have a very weak relationship with firm performance indicators, with a coefficient determination value between 0.002 and 0.12. The mean VIF value is 1.07, indicating the absence of multicollinearity issues, as it is below the generally applied threshold of 10.0 (Hair, Black, Babin, Anderson & Tatham, 2014).

5.3. Dynamic Panel Regression Analysis

Tables 5, 6, and 7 exhibit the five panel regression outcomes which are as follows: ordinary least square model (column two), within groups or fixed-effect model (column three), Arellano-Bond first-differenced, t-2 GMM (column four), Arellano-Bond first-differenced, t-3 GMM (column five), Blundell-Bond one-step, t-2 system GMM (column six), and Blundell-Bond one-step, t-3 system GMM (column seven) for the DVs of ROA, ROE, and Tobin's Q respectively.

Table 5. *Estimation of the Model Specification for Returns on Asset (ROA)*

Regressors	OLS levels	Within groups	1st DIF GMM t-2	1st DIF GMM t-3	1st SYS GMM t-2	1st SYS GMM t-3
ROA_{t-1}	0.5145***	0.1860***	0.1748***	0.0425	0.4656***	0.5065***
	(0.0456)	(0.0417)	(0.0401)	(0.0735)	(0.0478)	(0.0623)
CCC	-0.0037	-0.0040	-0.0073	-0.0067	-0.0019	-0.0025
	(0.0043)	(0.0068)	(0.0127)	(0.0147)	(0.0061)	(0.0064)
SIZE	5.8938***	5.5888***	4.2278**	5.2865**	4.8613***	5.8594***
	(1.0494)	(1.3668)	(1.6658)	(2.2190)	(1.2969)	(1.4698)
GROWTH	-0.0009***	-0.0004	-0.0000	-0.0000	-0.0007	-0.0012*
	(0.0003)	(0.0004)	(0.0006)	(0.0008)	(0.0006)	(0.0007)
LVRG	-0.0310	-0.0015	0.0305	0.0815	0.0112	0.1556
	(0.1560)	(0.1224)	(0.0654)	(0.1045)	(0.0961)	(0.1518)
CATA	0.1221***	0.1382***	0.1298***	0.1352**	0.0669	0.0821
	(0.0435)	(0.0464)	(0.0480)	(0.0673)	(0.0448)	(0.0552)
CLTA	-0.0436***	-0.0399***	-0.0364**	-0.0388***	-0.0373**	-0.0445***
	(0.0121)	(0.0120)	(0.0142)	(0.0145)	(0.0147)	(0.0152)
GDP	1.2868	-0.1005	-0.0527	-0.0551	-0.0470	-0.0583
	(1.3841)	(0.0921)	(0.0755)	(0.0792)	(0.0842)	(0.0904)
No. of observation	1402	1402	1,246	1,246	1,402	1,402
m1	-1.58	4.03	-6.23	-4.84	-6.38	-6.07
m2	1.54	5.69	-0.22	-0.88	0.85	0.96
Sargan			0.000	0.000	0.000	0.000
Diff-Sargan					1.000	1.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author (2020)

NOTES: roa = return on assets; ccc = cash conversion cycle; size = firm size; growth = annual sales growth rate; lvrg = financial leverage; cata = current assets ratio; clta = current liabilities ratio; gdp = annual gdp growth rate

For the first methodology, that is, pooled OLS, the R^2 of the proxies for firm's accounting performance measurements which are ROA, ROE, and Tobin's Q, are 0.4632, 0.4919, and 0.2585, respectively, signifying that all regressors are able to depict at least one-fourth of the aftereffect on firms' financial performance. Although CCC does not significantly affect financial performance, the negative indication manifests that the protracted duration of the cash conversion cycle would somehow deteriorate firms' performance. Despite this, Tobin's Q is greatly affected by its own lagged variables instead of other variables attested in the model.

Moreover, firm size is strongly significant in affecting accounting estimators, which conforms with earlier studies (Abuzayed, 2012; Bhatia & Srivastava, 2016; Jakpar et al., 2017; Siraj, Mubeen & Sarwat, 2019; Ng et al., 2017; Soukhakian & Khodakarami, 2019). Therefore, the elucidation may appertain to the larger the size of the firm, it has much preeminent bargaining power with its suppliers and customers likewise nobility to have better efficiency in term of resources utilisation in contemplation of lower unit cost of production. Moreover, previous evidence has shown that firm size is one of the most prominent antecedents of firm performance (Kieschnick, LaPlante & Moussawi, 2013).

In addition, financial leverage has been ascertained to have a negative and significant influence, but merely on ROE (Abuzayed, 2012; Bhatia & Srivastava, 2016; Hassan, Imran, Amjad & Hussain 2014; Jakpar et al., 2017; Kasozi, 2017; Makori & Jagongo, 2013; Ng et al., 2017; Pais & Gama, 2015; Wasiuzzaman, 2015). Conceding that a firm is superior in managing its operational efficiencies, or in other words, is able to keep its level of working capital at an optimal level, will then possess more retained earnings, making the firm less reliant on external capital to fund its working capital requirements. In other respects, leveraged firms are usually linked with a higher degree of financial risk that compels a higher cost of funding required by the financial providers and results in a decline in shareholders' yields.

Similarly, sales growth exhibits negative and significant effects on ROA and ROE, with the exception only applicable in static panel data methodologies. A plausible explanation is that the growth in sales may set off an upsurge in working capital requirements that could result in glitches such as overtrading which might trigger undesired consequences on firms' profitability, particularly for firms with inferior liquidity management. In addition, the insignificant and negative influence of sales growth on accounting performance indicators is established in other methodologies, wherein the verdict is coherent with preceding research (Bhatia & Srivastava, 2016; Ng et al., 2017). Despite this, GDP has an insignificant yet positive influence on all estimators of firm performance, which is consistent with previous research (Zariyawati, Annuar & Pui-San, 2016).

Table 6. *Estimation of the Model Specification for Returns on Equities (ROE)*

Regressor	OLS levels	Within groups	1st DIF GMM t-2	1st DIF GMM t-3	1st SYS GMM t-2	1st SYS GMM t-3
ROE_{t-1}	0.3476***	0.0679	0.0754	-0.0408	0.3007***	0.2722***
	(0.055)	(0.0583)	(0.0634)	(0.0748)	(0.0505)	(0.0869)
CCC	-0.0065	-0.0046	-0.0018	-0.0241	-0.0035	-0.0141
	(0.0102)	(0.0166)	(0.0329)	(0.0297)	(0.0162)	(0.0138)
SIZE	10.2161***	9.6498***	5.0120*	-0.0241	7.7630***	9.1731***
	(1.502407)	(1.9157)	(2.7709)	(0.0297)	(1.7974)	(2.3422)
GROWTH	-0.0016***	-0.0011*	0.0002	-0.0241	-0.0009	-0.0021
	(0.0006)	(0.0006)	(0.0013)	(0.0297)	(0.0010)	(0.0015)
LVRG	-2.4885	-2.6081***	-2.3644***	-2.2365***	-2.2941***	-2.1251***
	(0.5240)	(0.4536)	(0.2200)	(0.2047)	(0.3094)	(0.2662)
CATA	0.2565***	0.3062***	0.3656***	0.3421***	0.1926**	0.1780
	(0.0767)	(0.0829)	(0.0978)	(0.1122)	(0.0940)	(0.1130)
CLTA	-0.0377	-0.0316	-0.0056	-0.0183	-0.0083	-0.0241
	(0.0328)	(0.0329)	(0.0312)	(0.0319)	(0.0358)	(0.0341)
GDP	4.2101	-0.2874	-0.1776	-0.1694	-0.1324	-0.1325
	(3.5370)	(0.2114)	(0.1395)	(0.1359)	(0.1443)	(0.1381)
No. of observation	1402	1,402	1,246	1,246	1,402	1,402
m1	-1.98	7.4106	-4.04	-3.40	-4.56	-3.99
m2	2.83	11.1257	0.05	-0.29	1.17	1.36
Sargan			0.000	0.000	0.000	0.000
Diff-Sargan					1.000	1.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author (2020)

Notes: ROE = return on equities; CCC = Cash Conversion Cycle; SIZE = Firm Size; GROWTH = annual sales growth rate; LVRG = Financial Leverage; CATA = current assets ratio; CLTA = current liabilities ratio; GDP = annual GDP growth rate

Through scrutinizing the findings of both ROA and ROE, the current asset ratio validates a positive and significant effect, whereas to put. In other words, the result implies that in a situation where a firm holds a higher proportion of current assets, the higher the firm's earning capacity. This finding is consistent with those of previous studies (Al-Mawsheki et al., 2019; Soukhakian & Khodakarami, 2019). Nonetheless, the results contradict other precedent evidence (Garcia-Teruel & Martinez-Solano, 2007; Lyngstadaas & Berg, 2016; Wasiuzzaman, 2015), even supposing corroborations conducted in the identical industry (Jakpar, 2017; Kasozi, 2017; Ng et al., 2017). Additionally, it may pertain to the nature of the industrial products industry itself, in which the adoption of a conservative working capital investment strategy may well prevent the disruption of production as well as implementing a lenient trade credit policy. Nevertheless, the finding reveals that the effect of CATA on Tobin's Q is negative and significant, indicating that a higher level of current assets reduces firms' market valuation, which may be due to higher opportunity costs caused by idle cash tied up in short-term assets' investment. The disputation of results is comparable with prior studies (Vural, Sokmen & Cetenak, 2012; Yunos, Ghapar, Ahmad & Sungip, 2018).

Table 7. *Estimation of the Model Specification for Tobin's Q*

Regressor	OLS levels	Within groups	1st DIF GMM t-2	1st DIF GMM t-3	1st SYS GMM t-2	1st SYS GMM t-3
Tobin's Q_{t-1}	0.4587*** (0.0252)	0.3972*** (0.0303)	0.4578*** (0.0136)	0.0205** (0.0089)	0.4589*** (0.0250)	0.0293** (0.0113)
CCC	0.003747 (0.0038)	0.0063 (0.0063)	0.0150 (0.0151)	0.0047 (0.0062)	0.0061 (0.0054)	0.0035 (0.0039)
SIZE	0.5923 (0.6497)	0.2762 (0.4185)	0.1444 (0.4229)	-0.1294 (0.5582)	0.4105 (0.5432)	0.0036 (0.3999)
GROWTH	-0.0001 (0.0002)	-0.0000 (0.0002)	-0.0001 (0.0003)	-0.0000 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
LVRG	-0.0048 (0.1072)	0.0029 (0.0082)	0.0137 (0.0253)	0.1305 (0.2157)	0.0076 (0.0163)	0.1375 (0.1942)
CATA	0.0010 (0.0074)	-0.0048 (0.0062)	-0.0130 (0.0157)	-0.0433** (0.0194)	-0.0099 (0.0129)	-0.0294* (0.0175)
CLTA	-0.0009 (0.0014)	-0.0048 (0.0062)	0.0031 (0.0044)	0.0027 (0.0033)	0.0025 (0.0028)	0.0042 (0.0039)
GDP	1.0560 (0.7304)	-0.1411 (0.2386)	-0.1731 (0.2624)	-0.1172 (0.1334)	-0.1837 (0.2701)	-0.1278 (0.1371)
No. of observation	1402	1,402	1,246	1,246	1,402	1,402
m1	0.99	2.7911	-1.22	-1.02	-1.19	-1.24
m2	-0.97	8.7144	-1.01	-1.01	-1.00	-1.01
Sargan			0.000	1.000	0.000	1.000
Diff-Sargan					1.000	1.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author (2020)

Notes: CCC = Cash Conversion Cycle; SIZE = Firm Size; GROWTH = annual sales growth rate; LVRG = Financial Leverage; CATA = current assets ratio; CLTA = current liabilities ratio; GDP = annual GDP growth rate

Similarly, CLTA has a negative and significant effect on ROA, as it deteriorates firms' profitability if firms adopt an aggressive working capital financing strategy. In this case, a greater extent of short-term financing employed to fund assets would engender higher financial risks because of the shorter duration provided to fulfil its financial obligations. In such situations, investors are more inclined to require higher returns to trade off elevated risks and propagate higher financing costs (Bolek, 2014).

6. CONCLUSION

This study aims to provide empirical evidence on the influence of working capital management on firm performance among 156 Malaysian PLCs in the industrial product economic sector over a time period of 10 years (i.e. years 2007-2016). Two model specifications has been developed with regard to validate the inferential hypothesis, whereby employing both accounting-based firm performance proxy, return on assets (ROA) and market-based performance indicator,

Tobin's Q synchronous WCM estimator (i.e. cash conversion cycle) and control variables (i.e. firm size, sales growth, financial leverage, current assets ratio, current liabilities ratio, and GDP growth rate) which have a priori validation, are likely to overshadow the antecedences that influence firm performance. Dynamic panel data methodology (i.e. one-step system generalised method of moments) was employed to conduct data analysis to control for unobserved heterogeneity and greater efficiency, as well as to address possible endogeneity problems. The results indicate the substantial influence of working capital management on firm performance proxies, despite the exertion of the opposite direction, that is, the inverse association with ROA and positive appositeness with Tobin's Q. In other words, shortening the duration of the cash conversion cycle would increase the efficiency of asset utilisation, slightly deteriorating investors' expectations of firms' future earnings ability.

The market firm performance indicator, Tobin's Q, implies that investors may be less concerned about the effectiveness of working capital management. However, the positive association between Tobin's Q and CCC conforms to prior studies. Firm size is significantly positively linked with ROA, signifying that large industrial product companies are inclined to take more initiatives in managing short-term resources in pursuit of economies of scale and preserving adequate cash holdings in furtherance of prospective development. Nonetheless, the annual sales growth rate and GDP are positively insignificant related to any performance indicators, coupled with the elucidation stating that the actualization of industrial product firms' performance may depend on the economic progression of other emerging nations (for example, China and India) as well as supplementary to other industries (e.g., construction, electric, and electronic economic sectors). Table 8 summarises the findings in brief.

Table 8. *Validation of Hypothesis*

	ROA	**ROE**	**Tobin's Q**
Hypothesis 1: Working capital management has significantly influences firm performance indicators (that is, ROA, ROE & Tobin's Q) for the PLCs in industrial products industry	*no*	*no*	*no*
Hypothesis 2: Firm size has significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in industrial products industry	*yes*	*yes*	*no*
Hypothesis 3: Financial leverage significantly influences firm performance indicators (that is, ROA, ROE & Tobin's Q) for the PLCs in industrial products industry.	*no*	*yes*	*no*
Hypothesis 4: Annual sales growth significantly influences firm performance indicators (that is, ROA, ROE & Tobin's Q) for the PLCs in industrial products industry	*yes*	*no*	*no*
Hypothesis 5: The current assets ratio has a significant influence on firm performance indicators (that is, ROA, ROE & Tobin's Q) for the PLCs in industrial products industry	*no*	*yes*	*yes*
Hypothesis 6: The current liabilities ratio has a significant influence on firm performance indicators (that is, ROA, ROE & Tobin's Q) for the PLCs in industrial products industry	*yes*	*no*	*no*
Hypothesis 7: The GDP growth rate has a significant influence on firm performance indicators (i.e., ROA, ROE & Tobin's Q) for the PLCs in industrial products industry	*no*	*no*	*no*

This study intends to provide insights for finance managers and investors in emerging nations such as Malaysia, due to the meagre literature on the importance of working capital management for firm performance. In short, firms with more aggressive short-term investment policies in conjunction with conservative financing policies are inferred to attain better returns in book value. Apropos of the distinctiveness of the industrial products economic sector, a greater extent of short-term sources of funding, such as trade credit and short-term bank credit facilities, would increase market valuation with the rationale of a lower cost of capital. For prospective research, some antecedents, such as ownership structure, agency costs, and firm age, might be worth exploring further.

REFERENCE

Abuzayed, B. (2012). Working capital management and firm performance in emerging markets: The case of Jordan. *International Journal of Managerial Finance, 8*(2), 155–179.

Afrifa, G. A. (2013). *Working capital management and AIM-listed SME companies profitability: A mixed research method approach* (Doctoral dissertation, Bournemouth University).

Afrifa, G. A., & Padachi, K. (2016). Working capital levels influence SME profitability. *Journal of Small Business and Enterprise Development, 23*(1), 44–63.

Ahmadpour, A., Zare, M. J., & Rostami, K. H. (2012). An empirical study of the association between working capital management and performance: Evidence from the Tehran Stock Exchange. *Journal of Social and Development Sciences, 3*(8), 279–285.

Al-Mawsheki, R. M. S. A., Ahmad, N., & Nordin, N. (2019). The effects of efficient working capital management on firm performance: Evidence from Malaysian manufacturing firms. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 9*(3), 59–69.

Almeida, J. R., & Eid, W., Jr. (2014). Access to finance, working capital management, and company value: Evidence from Brazilian companies listed on BM&FBOVESPA. *Journal of Business Research, 67*, 924–934.

Altaf, N., & Shah, F. (2017). Working capital management, firm performance, and financial constraints: Empirical evidence from India. *Asia-Pacific Journal of Business Administration, 9*(3), 206–219. https://doi.org/10.1108/APJBA-06-2017-0057

Aktas, N., Croci, E., & Petmezas, D. (2015). Is working capital management value-enhancing? Evidence from firm performance and investments. *Journal of Corporate Finance, 30*, 98–113.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies, 58*, 277–297.

Baltagi, B. H. (2005). *Econometric analysis of panel data* (3rd ed.). John Wiley & Sons.

Banos-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2014). Working capital management, corporate performance, and financial constraints. *Journal of Business Research, 67*(3), 332–338. https://doi.org/10.1016/j.jbusres.2013.01.016

Bhatia, S., & Srivastava, A. (2016). Working capital management and firm performance in emerging economies: Evidence from India. *Management and Labour Studies, 41*(2), 1–17.

Bolek, M. (2014). Return on current assets, working capital, and required rate of return on equity. *E-Finance: Finance Internet Quarterly, 10*(2), 1–10. https://doi.org/10.14636/1734-039X_10_2_005

Brealey, R. A., Myers, S. C., & Allen, F. (2011). *Principles of corporate finance* (10th ed.). McGraw-Hill.

Demsetz, H., & Villalonga, B. (2001). Ownership structure and corporate performance. *Journal of Corporate Finance, 7*, 209–233.

Filbeck, G., & Krueger, T. (2005). An analysis of working capital management results across industries. *Mid-American Journal of Business, 20*(2), 11–18.

Garcia-Teruel, P. J., & Martinez-Solano, P. (2007). Effects of working capital management on SME profitability. *International Journal of Managerial Finance, 3*(2), 164–177.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2014). *Multivariate data analysis* (7th ed.). Pearson.

Hassan, N. U., Imran, M. M., Amjad, M., & Hussain, M. (2014). Effects of working capital management on firm performance. *International Journal of Academic Research in Business and Social Sciences, 4*(6), 113–132.

Jose, M. L., Lancaster, C., & Stevens, J. L. (1996). Corporate returns and cash conversion cycles. *Journal of Economics and Finance*, 20–33. https://doi.org/10.1007/BF02920497

Kasozi, J. (2017). The effect of working capital management on profitability. *Investment Management and Financial Innovations, 14*(2), 336–346.

Kieschnick, R., LaPlante, M., & Moussawi, R. (2013). Working capital management and shareholder wealth. *Review of Finance, 17*(5), 1827–1852. https://doi.org/10.1093/rof/rfs043

Lazaridis, I., & Tryfonidis, D. (2006). Relationship between working capital management and profitability. *Journal of Financial Management and Analysis, 19*(1), 26–35.

Lyngstadaas, H., & Berg, T. (2016). Working capital management: Evidence from Norway. *International Journal of Managerial Finance, 12*(3), 295–313.

Makori, D. M., & Jagongo, A. (2013). Working capital management and firm profitability. *International Journal of Accounting and Taxation, 1*(1), 1–14.

Nazir, M. S., & Afza, T. (2009). Impact of aggressive working capital management policy on firms' profitability. *The IUP Journal of Applied Finance, 15*(8), 19–30.

Ng, S. H., Ye, C., Ong, T. S., & Teh, B. H. (2017). The impact of working capital management on firm profitability. *International Journal of Economics and Financial Issues, 7*(3), 662–670.

Padachi, K. (2006). Trends in working capital management and its impact on firm performance. *International Review of Business Research Papers, 2*(2), 45–58.

Pais, M. A., & Gama, P. M. (2015). Working capital management and SMEs profitability. *International Journal of Managerial Finance, 11*(3), 341–358.

Raheman, A., Afza, T., Qayyum, A., & Mahmood, A. (2010). Working capital management and corporate performance. *International Research Journal of Finance and Economics, 47*, 151–163.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal, 9*(1), 86–136.

Ross, S. A., Westerfield, R. W., & Jordan, B. D. (2010). *Fundamentals of corporate finance* (9th ed.). McGraw-Hill.

Sharma, A. K., & Kumar, S. (2011). Effect of working capital management on firm profitability. *Global Business Review, 12*(1), 159–173.

Shin, H. H., & Soenen, L. (1998). Efficiency of working capital management and corporate profitability. *Financial Practice and Education, 8*, 37–45.

Singhania, M., & Mehta, P. (2017). Working capital management and firm profitability. *South Asian Journal of Business Studies, 6*(1), 80–97.

Soukhakian, I., & Khodakarami, M. (2019). Working capital management, firm performance, and macroeconomic factors. *Cogent Business & Management, 6*(1), 1–24.

Ukaegbu, B. (2014). The significance of working capital management in determining firm profitability. *Research in International Business and Finance, 31*, 1–16.

Wasiuzzaman, S. (2015). Working capital and firm value in emerging markets. *International Journal of Managerial Finance, 11*(1), 60–79.

Zariyawati, M. A., Annuar, M. N., & Pui-San, N. (2016). Working capital management determinants of small and large firms in Malaysia. *International Journal of Economics and Management, 10*(2), 365–377

Acknowledgement

This research was funded by the University College of Technology Sarawak (UCTS) research grant with I.D no of UCTS/RESEARCH/4/2017/07.