WORKING CAPITAL EFFICIENCY AND FIRM VALUE OF SELECTED FIRMS LISTED AT NAIROBI SECURITIES EXCHANGE, KENYA

BY

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A THESIS SUBMITTED TO THE SCHOOL OF BUSINESS AND LEADERSHIP STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY IN BUSINESS ADMINISTRATION AND MANAGEMENT (FINANCE) OF ST. PAUL'S UNIVERSITY.

OCTOBER, 2023

Declaration

This thesis is my original work and has not been presented for award to any other institution. No part of this thesis should be reproduced without authority of the author or/ and St. Paul's University.

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Dedication

This work is dedicated to Mr. Robinson Njeru, Victor Kirathimo, Wisdom Mutoria, my parents, my siblings and aunties for their care and inspiration during the period of writing the thesis.

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Operational Definition of Terms

Firm value: Maximization of shareholders' wealth which is reflected by market capitalization and stock indices in relation to book value within a given period.

Firm size: An indicator that relates to the total assets of a firm. This study adopted natural log of asset to measure firm size.

Liquidity: The firm's capability to settle its day-to-day obligations as and when they become due as indicated by current assets in relation to current liabilities.

Market capitalization: The overall value of the outstanding shares of a firm which is indicated by the market price per share multiplied by the total number of outstanding shares in a given period of time.

Selected listed firms: The publicly trading firms at Nairobi Securities Exchange, which take part in open exchange of financial assets except those quoted in banking, investment and insurance sectors due to their unique aspects of working capital regulation.

Working capital: The amount of funds available to a firm after settling current obligations using the short-term assets.

Working capital efficiency: A firm's capability to maintain ideal working capital that has the capacity to meet everyday obligations and minimize the risk that is linked to liquidity while equally, enhancing productivity. For the purposes of the study, working capital efficiency was measured using working capital turnover ratio.

Abbreviations and Acronyms

ANOVA	Analysis of Variance
APT	Accounts Payables Turnover
ART	Accounts Receivable Turnover
CBK	Central Bank of Kenya
CCC	Cash Conversion Cycle
CMA	Capital Markets Authority
FV	Firm Value
IT	Inventory Turnover
ISE	Indonesian Stock Exchange
ISERC	Institutional Scientific and Ethical Review Committee (for St. Paul's University)
KNBS	Kenya National Bureau of Statistics
LIQ	Liquidity
NACOSTI	National Commission for Science, Technology and Innovation
NSE	Nairobi Securities Exchange
OECD	The Organization for Economic Cooperation and Development
PBV	Price to Book Value
PE	Price to Earnings
PS	Price to Sales
ROA	Return on Assets
ROE	Return on Equity
VIF	Variance Inflation Factor

WCE	Working Capital Efficiency
WCM	Working Capital Management
WCT	Working Capital Turnover

Abstract

Firm value of listed firms remains integral to shareholders and other stakeholders since it has a bearing on investor returns. In Kenya, development plans have been made by the Capital Markets Authority such as development of 2014-2023 master plan. However, statistical evidence indicates that value of firms listed at NSE has been declining over the past years as indicated by the price to book value ratio. Empirical evidence indicates that working capital efficiency is key in explaining firm value. The listed firms have invested in working capital though evidence indicates that firm value has continued to decline due to inefficient working capital practices. This continues to be a concern for empirical research in Kenya owing to inadequate convincing evidence describing the nature of the relationship. In view of this, the study sought to assess the effect of working capital efficiency on firm value of selected firms listed at Nairobi Securities Exchange, Kenya. The study further assessed the mediating effect of liquidity and moderating effect of firm size on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya respectively. Additionally, the study sought to establish the joint effect of working capital efficiency, liquidity and firm size on firm value of selected firms listed at Nairobi Securities Exchange, Kenya. The study was anchored on agency theory, cash conversion cycle theory, pecking order theory and trade-off theory. The philosophical underpinning of the study was the positivism paradigm in addition to Explanatory research design. A census of 41 firms formed the target population. A document review guide was used to collect secondary data that was obtained from the NSE handbooks and audited financial statements of the firms. Data was analyzed using descriptive statistics, trend analysis, Pearson correlation analysis, and panel regression analysis. Hypothesis testing was at 0.05 significance level. Preliminary statistical tests including normality, heteroscedasticity, autocorrelation, stationarity and model specification tests were done and ethical considerations were adhered to. Random effects model was adopted to estimate the panel data regression analysis. The study found a positive and statistically significant effect of working capital efficiency on firm value; liquidity had a positive and statistically significant full mediating effect on the relationship between working capital efficiency and firm value; and the study established a negative and statistically significant moderating effect of firm size on the relationship between working capital efficiency and firm value. Further, the study found a statistically significant joint effect of working capital efficiency, liquidity and firm size on firm value. Hence the study recommends the developing of working capital and liquidity policies for selected listed firms in order to enhance efficiency and optimal levels across sectors in consideration of nature and size of firms. In relation to practice, firm managers have a role of ensuring efficiency of the key components of working capital such as adopting just-in stock systems, restructuring receivables processes, and developing proper frameworks that could nurture their relationship with suppliers and not at the expense of the firm. In view of finance theory, the study recommends the need to broaden the scope of knowledge into aspects of more practical and innovative techniques that stakeholders and firms can adopt in order to increase working capital efficiency and positively affect firm value.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The notion of firm value continues to attract remarkable attention and discussion in the field of finance for decades (Gitman, 2009; Priya & Mohanasundari, 2016; Zutter & Smart, 2019; Sudiyatno et al., 2020). This scholarly search has been prompted by the dominant paradigm on the main goal of a firm where one school of thought puts emphasis on profit maximization (Jafar et al., 2010; Levitt, 2016; Silveira & Vasconcelos, 2020) while the other emphasizes on firm value maximization through shareholder wealth growth (Gitman, 2009; Zutter & Smart, 2019; Najaf et al., 2020; Rahim, 2021). Lawrence and Zutter (2012) concurs with Jensen (2001) that the goal of firm value maximization goes beyond profit maximization because it has a bearing on the investors returns and other stakeholders. Despite diverse schools of thought on which one goal supersedes the other, a consensus has been made that creation of shareholder value is a critical aspect in realization of overall firm objectives. However, regardless of the scholarly work that has been done on the concept of firm value and its significance, the dimension of efficient working capital and the effect it has on firm value remain an area for further empirical investigation in Kenya.

Literature supports the nexus between working capital efficiency (WCE) and value of firms that are listed in an economy. Firms are able to enhance their value if they embrace an efficient working capital plan (Lawrence & Zutter, 2012; Zutter & Smart, 2019; Gunay & Cokins, 2021). Furthermore, working capital efficiency translates to enhanced firm value (Prasad et al., 2019; Adiputra & Hermawan, 2020). On the other hand, it is important to note that WCE has direct effect on liquidity and productivity of a firm

(Raheman & Nasr, 2007; Samiloglu & Demirgunes, 2008; Oseifuah & Gyekye, 2016). Therefore, firms that efficiently manage their working capital components are less likely to face liquidity risk.

The ideal level of liquidity indicates that a firm is able to clear off its current obligations as and when they fall due thus firm value (Chabachib et al., 2020). On the other hand, the size of a firm in relation to its total assets affects the direction of the relationship between WCE and firm value since large firms have advantage over small firms and they are able to source for funds and therefore create confidence in investors to capitalize with them (Santosa, 2020; Widhiastuti, 2021). Afiezan et al. (2020) concurs that firms with large asset base are able to access financing since suppliers have confidence that the obligations will be met as they fall due. However, the moderating effect of firm size on the relationship between WCE and value of firms is yet to gain consensus.

The OECD Capital Market Series (2019) indicates that globally, even though there is decrease of the total listed firms, their general firm value has continued to increase in many developed economy markets in the latest years. This has been occasioned by the fact that the markets host a reduced number of larger firms, and the listed firms use public equity markets to increase capital more widely than new firms. For instance, in the United States (U.S.) the value of listed firms has doubled in actual terms during the previous two decades. The firm value of U.S. stock market as indicated by market capitalization in 2013 was at 24,035 billion U.S. Dollars and has grown over the years to 40,720 billion U.S. Dollars by the end of year 2020 (World Bank, 2021).

The PwC report (2022) indicates that while the firm value of global equity market has continued to increase, the African equity market has continued to record a decline in firm value recently decreasing by 28% in 2021 compared to 2020. The major reason for the decline is that fast developing technology firms across key markets in Africa continue to source for development capital outside the equity markets as a result of perceived heavy regulations. The World Bank (2021) report indicates that firm value as indicated by average market capitalization for 11 African countries was at 116 billion U.S. Dollars in 2020 compared to the global stock market capitalization of 1,372 billion U.S. Dollars for 67 countries during the same period.

In Kenya, the Capital Markets Authority (2022) report indicates that the value of firms listed at NSE continues to be highly volatile and to decline as shown by market capitalization and NSE 20-Share Index trends respectively. For instance, the market capitalization was at Ksh. 1,272 billion in year 2012, Ksh. 2,300 billion in year 2014, Ksh. 1,931 billion in year 2015, Ksh. 2,593 billion in year 2021, and Ksh. 1,986 billion by end of year 2022. Additionally, the NSE 20-Share Index trend indicates that there was a sharp decline from a high of 4,133 points in the year 2012 to a low of 1,676 points by the end of the year 2022. According to Gworo (2019) and Musembi (2020), various factors have been attributed to the decline of firm value. For instance, Bahraini et al. (2021) asserts that firm size, liquidity, and overall asset turnover affect firm value. However, a consensus has not been reached due to diverse results by various studies thus an issue for further empirical investigation.

The CMA (2021) report indicates that the government through CMA advanced a master blueprint covering the duration of 2014-2023 that envisioned that NSE, Kenya would be the market of choice for domestic, regional and global investors by year 2023. Further, NSE has made various developments such as demutualization, launch of derivative market, and cross boarder automations (Onyuma, 2020; Musembi, 2020; Christopher et al., 2021). However, despite the developments, the value of firms quoted at Nairobi Securities Exchange continues to decline as reflected by the market capitalization in addition to the NSE 20-share index. Owing to this decline, the study sought to evaluate the effect that working capital efficiency has on firm value of selected firms listed at NSE, Kenya.

1.1.1 Firm Value

Firm value is an indicator of financial performance since a high value has a bearing on shareholders returns and prosperity (Sondakh, 2019). Furthermore, firm value is the overall indicator of a firm that reflects maximization of shareholders' wealth in relation to its market capitalization which is product of the price per share and outstanding shares (Adiputra & Hermawan, 2020). According to Olalere (2021), firm value is an economic indicator that replicates the market value of a firm. Therefore, given the various definitions, this study defines firm value as the maximization of shareholders' wealth which is reflected by market capitalization and stock indices in relation to book value of equity within a given period.

The value of firms listed at NSE has been declining as shown by the unfavorable trends leading to unpredictable earnings of stocks. For instance, the value of firms listed at NSE, Kenya, as indicated by market capitalization as percent of GDP was at 44.06% in 2006 and

declined to 21.18% by the year 2020. This was comparatively low compared to United States of America market which was at 194.34% in 2020 and South Africa market which was at 313.48% in 2020 (World Bank, 2021). The value of shares traded declined by 3.2% to Ksh. 149.0 billion in 2020 from Ksh. 154.0 billion in 2019 which has affected the investment decisions of investors (Kenya National Bureau of Statistics, 2021).

Firm value plays a critical role in listed firms since it has a bearing on investor perceptions thus investment decisions (Sondakh, 2019; Agung et al., 2021; Pujiati & Averina, 2022). A high firm value creates positive perception in investors hence increasing their confidence to invest in such a firm (Adiputra & Hermawan, 2020; Pujiati & Averina, 2022). This is because enhanced firm value is a sign that the running of a firm is successful in managing its resources (Salim & Firdaus, 2020) and therefore ability to maximize the shareholders' wealth. Above and beyond, the value of a firm is significant towards other stakeholders. For instance, suppliers are able to rate credit worthiness of a firm by analyzing its firm value (Agung et al., 2021) since a high value means that the firm has optimal liquidity and therefore it has the capacity to clear its financial responsibilities in a timely manner. Further, according to Adiputra and Hermawan (2020), financial management perspective indicates that the fundamental objectives of a firm have changed from profit maximization to firm value or investor wealth maximization.

Listed firms continuously make effort to develop their firm value in order to attract positive investor perceptions (Diantoro et al., 2022; Pujiati & Averina, 2022; Rahman & Howlader 2022). Firms whose value in relation to stock prices is at a high level, raises the affluence of stockholders and therefore investors are attracted to capitalize their funds in

such firms (Agung et al., 2021; Diantoro et al., 2022). It is with this understanding that firms are shifting their focus from not only maximizing the profits but to mainly generate value for the shareholders. According to Rahman and Howlader (2022) firms recompense their managers as a result of their performance which is indicated by the share prices in the market and firm value. Therefore, the view of maximizing firm value by financial managers cannot be overemphasized since investors opinion concerning the valuation of a firm as indicated by the trend of share prices is key to firm value.

Literature documents various financial ratios as conventional measures for firm value. The ratios are market based such as Tobin's Q ratio (La Rocca, 2010; Adiputra & Hermawan, 2020; Dang et al., 2020). Further, other measures include equity and enterprise multiples which are also part of market ratios such as price to earnings ratio (P/E), price to sales ratio (P/S), price to book value ratio (P/BV), and enterprise value to earnings before interest tax depreciation and amortization (EV/EBIDTA) respectively (Gupta, 2019; Battisti et al., 2020). According to Calhoun (2020), multiples are vast choice of equity market valuation tools since they are more precise, easier to use and more adaptable compared to other valuation tools and they are used as a comparative point of check. For instance, investors are able to compare the worth of stocks in the marketplace in relation to stock value recorded in accounting books using PBV ratio.

The study adopted price to book value ratio as a measure for firm value. This is because PBV ratio has capacity to link the share marketplace prices with the value that the stocks have on books of account hence indicating whether a stock is overvalued or undervalued (Sondakh, 2019; Salim & Firdaus, 2020). According to Hirdinis (2019), PBV is a key

indicator of how a firm is able to generate its firm value in relation to the total funds that have been capitalized since a high ratio demonstrates a positive capacity to create value. Empirically, various scholars adopted the PBV ratio to measure firm value such as Sudiyatno et al. (2020), Salim and Firdaus (2020), Bahraini et al. (2021), and Sutriono et al. (2021) which is expressed by market capitalization or market value in relation to book value of shares.

The PBV ratio indicates the ability of a firm to generate firm value compared to the quantity of assets invested (Sondakh, 2019). This means that PBV ratio is a significant ratio that can be used as a parameter to measure the realization of investments in a firm. Hirdinis (2019) states that investors are able to establish when the stock prices are realistic and when they are inflated by considering PBV ratio. The achievement of managing firm's resources can be shown by its firm value as a result of maximization of the stockholders' wealth (Salim & Firdaus, 2020). Therefore, investment decisions of firm resources are key in enhancing the value of a firm since effective use of finances define the amount of yields that a firm will attain within a given period (Agung et al., 2021). This means that firm managers have a major role in valuation analysis before making key investment decisions.

Investors heavily rely on the level of firm value to estimate the achievement of a firm which is indicated by its stock prices since increasing share rates is an indication that there are expected noble prospects (Reschiwati et al., 2020). This implies that investors are quite sensitive to changes and trends of stock prices. On the other hand, Hirdinis (2019), notes that firms can be able to know investor's perception concerning their stocks by analyzing the movement of stock prices within a given period since their value is shown by the

trading power of shares. This means that both firms and investors can benefit from the market prices in relation to stocks and make informed decisions.

1.1.2 Working Capital Efficiency

Working capital efficiency entails administration of the components of working capital in a manner that demonstrates a suitable volume of operational capital is sustained to have an effective operation of a firm and for realization of similar goals of liquidity and productivity (Ghosh & Maji, 2004). It involves the arrangement and regulation of the short term assets and obligations in order to eliminate the risk that is associated with liquidity while concurrently doing away with excess investment of these assets (Ashraf, 2012; Maheshwari, 2014). Prasad et al. (2019) defines working capital efficiency to be the degree that indicates the ability of a firm in harmonizing the sum relating to investment employed for receivables and inventories in relation to the payables on acquisition of inventories. Therefore, in view of the various definitions, working capital efficiency relates to the ability of a firm to maintain ideal level of current assets and current liabilities and minimize the risk linked to liquidity while simultaneously enhancing profitability.

According to PwC (2022), a survey report, the subject of working capital efficiency plays a critical part in survival and sustainability of a firm in relation to the management of day to day processes. For instance, the trade survey by the PwC (2022) indicated that 65% of respondents who were top managers of various firms pointed out that working capital efficiency is a major goal for change management and streamlining of activities. According to Rata and Amtiran (2021), while working capital efficiency (WCE) is an indicator of how well a firm is managing its short term resources in an optimal manner, it

equally remains significant to the eternal and long term stability or attainment of a firm and in realizing its overall goal of wealth maximization. Firm administrators are able to create worth for their stockholders through embracing working capital efficiency (Gunay & Cokins, 2021). Therefore, this explains the relevance of working capital efficiency to the overall firm goal of maximizing shareholders' wealth which translates to firm value.

Efficient working capital involves maintaining optimum amount of receivables, payables and inventories and efficient administration of cash and short-term liabilities while sustaining a tradeoff between high yields and firm liquidity (Lazaridis & Tryfonidis, 2006; Aktas et al., 2015). In this regard, failure to manage firm operations efficiently in relation to the working capital, may lead to bankruptcy or economic distress (Gunay & Cokins, 2021) which gives a negative perception to investors thus negatively affecting firm value. Seth et al. (2021) notes that those firms whose working capital efficiency is high, are not potential to facing financial limitations and they are able to reduce resources that are idle when capitalizing in working capital. Regardless of the nature and size of a firm, all firms require working capital for everyday operations (Ahangar, 2020). Therefore, enhancing its efficiency is paramount in achievement of the overall firm goals.

Literature documents various financial ratios that can be adopted to measure working capital efficiency. Cash conversion cycle ratio is common and various scholars have employed it as an indicator of working capital efficiency (Deloof, 2003; Ashraf, 2012; Pitt, 2014; Kundu et al., 2022). Other ratios include total cash cycle, net trade cycle (Seth et al., 2021), working capital turnover ratio (Husnan, 2002; Charles, 2009; Wibowo & Rohyati, 2018; Almomani et al., 2021; Rata & Amtiran, 2021), and cash turnover, receivables

turnover and inventory turnover (Amanda, 2019). On the other hand, Prasad et al. (2019) introduced a multiplicative multiplier and contends that although various researchers have applied cash conversion cycle as a key indicator of working capital efficiency, the ratio has inadequate ability to give the direct measure and to completely evaluate the effect of an organization's venture concerning the working capital.

Financial ratios are common and appropriate measures of various aspects of efficiency of a firm by investors and analysts (Lan, 2012; Hamzah, 2022). Working capital turnover ratio (WCT) was adopted in this study to measure working capital efficiency. The ratio is a key indicator of the efficiency of working capital while assessing the overall effectiveness in relation to the subject of operations of a firm within a given period and is expressed by net sales per net working capital (Charles, 2009; Wibowo & Rohyati, 2018; Rahim, 2021). Various scholars such as Wibowo and Rohyati (2018), Almomani et al. (2021), Rahim (2021), Rata and Amtiran (2021) adopted this metric as a measurement of working capital efficiency. The ratio is critical in measuring WCE since it incorporates all the working capital components and since it is involved in the overall conversion of cash cycle (Jasmani, 2019). Therefore, the ratio was relevant in the study since the main objective was to assess the effect that working capital efficiency had on value of firms.

Working capital turnover ratio is an indicator of how well and proficient a firm is able to efficiently manage its working capital within a given period of time (Wibowo & Rohyati, 2018). This means that WCT ratio is significant to firm managers since they are able to evaluate how efficient their working capital strategies are and the areas they need to improve in a stipulated period of operation. According to Simorangkir (2019), the ratio is

an assessment of how well working capital rotates within a given duration of time in a firm. Therefore, constant monitoring of the ratio promotes efficiency in managing the key elements of working capital.

Firm managers are required to devote significant degree of time and determination in order to realize an ideal volume of working capital by ensuring that there is a trade-off between gainfulness and liquidity of a firm since insufficient WC may result to economic exposures and lead to bankruptcy in the long run (Akbar et al, 2021). Therefore, working capital efficiency is an indication that a firm is successful both in short term and long-term aspects (Rata & Amtiran, 2021). This implies that managers should make deliberate effort in ensuring that the key elements of working capital are administered appropriately in order to have an ideal amount that will sustain the required financing of firm operations.

Literature links working capital efficiency to firm value by elucidating that the financial managers who embrace effectiveness of working capital contribute to the overall goal of maximizing the stock prices which positively contributes to firm value (Zutter & Smart, 2019). According to Seth et al. (2021), firms make value for their investors through handling the components of working capital efficiently. Therefore, a continuous program in optimal working capital level increases firm value not only in the short term but also as a long-term gain. This means that investing in optimal utilization of current assets helps to promote ideal liquidity level and thus create value for shareholders.

1.1.3 Liquidity

Liquidity is defined as the ability to convert assets to cash as well as being able to meet current obligations (Subramanyam, 2014). It is concerned with the ability that a firm

demonstrates in clearing off the debts promptly and when they are due (Sondakh, 2019). Furthermore, it is the ability to handle the financial debts as and when they fall due to creditors (Hidayah & Rahmawati, 2019; Adiputra & Hermawan, 2020; Nuryani & Sunarsi, 2020). In regard to the diverse definitions, liquidity focuses on how timely a firm is able to settle its day-to-day obligations as and when they fall due. Therefore, it plays a critical role in the relationship between working capital efficiency and firm value.

Liquidity is key and plays significant role in managing the operations of every day obligations in firms since it has effect on current and long term processes (Farhan et al., 2019). This is because firms that are able to maintain optimum liquidity attract more investors and they promote credit worthiness among their creditors (Akenga, 2017; Hidayah & Rahmawati, 2019). A policy paper by Demmou et al. (2021) indicates that firms may experience liquidity risk if the resources are not liquid to meet the short term overheads. This implies that firm managers should seek to maintain optimal liquidity level that is able to sustain their operations in meeting its day-to-day obligations since liquidity risk may expose them to bankruptcy and insolvency problems. According to Mootian and Mukoma (2020), selected listed firms are more likely to be exposed to the liquidity risk since they have asset-liability development gap. This is because there are no regulations that exist on maintenance of a proportion of cash reserves which can be used in an event of a disruption in economic stability as is the case with financial listed firms.

The conventional measures of liquidity as documented in literature are quick ratio and current ratio (Lan, 2012; Farhan et al., 2019; Ningsih & Sari, 2019). The quick metric indicates the proficiency of a firm in handling everyday debts by adopting the greatest

liquid resources or assets that are closer to cash (quick assets) (Ningsih & Sari, 2019). On the other hand, current ratio is logically linked to all kinds of liquid assets (Tahir et al., 2020). The current ratio is expressed as the current assets existing for operation in relation to short term liabilities required to be compensated throughout the operation (Akben-Selcuk, 2016). This study employed current ratio to measure firm liquidity. Various scholars such as Putra and Sedana (2019), Farhan et al. (2019), Rahmawati (2020) and Tahir et al. (2020) used current ratio as an indicator for liquidity.

Current ratio is key in indicating the aggregate current assets retained by a firm in relation to the short term obligations (Husna & Satria, 2019). In this regard, the ratio indicates the ability of a firm to handle the short duration obligations using the overall short-term assets. A high ratio signifies that a firm is successful, efficient and effective in handling its business operations in relation to the short-term resources and firm dues (Nuryani & Sunarsi, 2020). Therefore, when the ratio is high, it is a positive indication that the firm is able to manage the current obligations when they are payable (Farhan et al., 2019). This implies that if the ratio is low, it is a negative signal that the firm is not able to handle the day-to-day obligations when they are due.

Investment decisions in a firm are primarily based on the optimal liquidity level since its limitations can negatively affect or have a bearing on those choices (lin et al., 2005; Tahir et al., 2020). This is because an ideal liquidity level is a major indicator that the firm is able to settle the daily operations without constraints (Adebiyi, 2021; Paramita & Andika, 2021; Hendry, 2021). According to Kahfi (2022), there is need to maintain an adequate level of liquidity using working capital since it affects maximization of shareholders'

wealth or firm value. This is in the view that the capacity by a firm to clear the current obligations when they are due, creates a positive perception to investors thus increasing share prices (Adiputra & Hermawan, 2020) which translates to firm value. Hence, liquidity plays a critical mediating role on the relationship between working capital efficiency and firm value.

Firm managers require efficient or optimal working capital in order to sustain optimal liquidity which is critical in fulfilling a firm's financial obligations (Kahfi, 2022). High liquidity gives an optimistic indication to stockholders that the condition of a firm is good therefore increasing demand for stocks and positively increasing share prices (Nuryani & Sunarsi, 2020). This means that there exists a link between working capital efficiency, liquidity and firm value since efficient working capital leads to ideal level of liquidity which positively translates to firm value. Jihadi et al. (2021) indicates that liquidity has a significant effect on value of firms.

1.1.4 Firm Size

Firm size denotes the volume and collection of creation capability a firm owns or amount and variety of goods and services that a firm is able to provide at the same time to its customers (Shaheen & Malik, 2012). It is an indicator that categorizes dimensions of a firm using various models such as aggregate assets, the log size, entire sales, and worth of stock marketplace (Zuhroh, 2019). Firm size is a measure that relates to total assets which defines whether a firm is large or small (Mahmood & Mahmood, 2019). Based on the aforementioned views, firm size is an indicator that signifies the capacity that a firm has that relates towards the overall firm assets.

Firm size plays a significant role on value of a firm mutually, that is in a direct and indirect manner since it affects both firm's characteristics and the goodwill and image of a firm (Santosa, 2020). This is because firms that are large in size in relation to total assets indicate that they have grown and they have good prospects over a constant period of time hence produce higher returns compared to those that have small total asset base (Husna & Satria, 2019). This means that firm size in relation to its aggregate assets is critical in attracting investors. Furthermore, large firms have the capacity to engage in various investments as a result of the capability to trade in variety of manufactured goods and lines which offer them an advantage in scale and size over the small firms (Yadav et al., 2022).

Firm size can be measured using overall assets, trades sales, or capital (Husna & Satria, 2019), or number of employees (Neher & Miles, 2020) depending on the context of a study. Natural log of aggregate assets was adopted in this study as an indicator of firm size. Any particular firm that has huge total assets is considered to be large in size and a good indicator to investors hence higher market value for its stock causing an increase in market capitalization (Ahmed et al., 2019). Moreover, greater and high volumes of overall assets translate to more resources a firm can capitalize in. Therefore, firm size can be determined through the volume of assets that a given firm has (Zuhroh, 2019). Various scholars such as Abeyrathna and Priyadarshana (2019), Azhar and Ahmed (2019), Mahmood et al. (2019) adopted natural log of total assets to measure firm size.

The significant aspects of firm size are demonstrated by its ability to establish firm's competences through its fundamental strength and can indicate the failure or realization of a firm (Ssendagire, 2020). The relevance is that investors also consider the scope of a firm

in relation to its total assets to determine firm value because huge assets show that the firm has worthy projections, in a comparatively steady duration, and can be able to maximize returns compared to those that have smaller resources (Husna & Satria, 2019). This means that size in terms of resources or assets is critical not only as a goodwill of the firm but also to the other stakeholders. According to Rashid et al. (2022), the effect of firm size on the financial management decisions which involve investing, funding, and other fiscal choices is significant.

Large firms have more assets to invest in hence, they are able to take advantage of enhanced access to both current and long-term debt (Mahmood et al., 2019). Therefore, size of a firm has a bearing on how its working capital efficiency relates to firm value. This is because large firms will be able to obtain funds for running day to day operations and at the same time attract investors who will buy stocks and therefore increase the firm value (Sondakh, 2019). The implication is that when firm size rises, the relationship relating to working capital efficiency and firm value is expected to increase while the relationship is expected to weaken if the size decreases. According to Husna and Satria (2019) firm size is a key element that has a significant effect on firm value.

1.1.5 Firms Listed at Nairobi Securities Exchange, Kenya

Nairobi Securities Exchange (NSE) is a leading securities market in Africa located in Kenya and makes available a platform for raising funds through offering a wide range of products such as equities, Exchange Traded Funds (EFTs), bonds, Real Estate Investment Trusts (REITs), data and training services in an effort to meet investors' needs (Nairobi Securities Exchange, 2021). According to CMA (2023), NSE has 13 sectors which consist

of Exchange Traded Funds, Energy and Petroleum, Insurance, Manufacturing and Allied Agricultural Investment, Commercial Services, Real Estate Investment Trust, Telecommunication, Automobiles and Accessories, Construction and Allied, Banking and Investment Services. The sectors are further classified in to two main categories: financial firms which have unique aspects of working capital and liquidity regulations that are listed under the banking, insurance, and investment sectors. The other category is the firms listed under the remaining 10 sectors whose working capital is not controlled by regulatory bodies and in view of this study, they are the selected firms listed at NSE, Kenya.

The NSE (2021) report indicates that the exchange contributes to Kenya's economic development because, besides providing a platform for investors and issuers to trade and raise capital respectively, the government is also able to raise capital which facilitates funding of the recurrent expenditure and other projects. However, firm value for the publicly trading firms at NSE has continued to weaken as indicated by NSE-20 index and fluctuating market capitalization trends. According to CMA (2022) the NSE 20-Share Index trend indicates a progressive drop from a high of 4133 points in the year 2012 to a low of 1676 points by the end of the year 2022.

The market capitalization and price to book value ratio have been highly volatile and declining as indicated in the CMA (2022) report and annual reports for 2012-2021 respectively. For instance, the market capitalization and PBV trend for the year 2012 to year 2021 was as indicated in Figure 1:

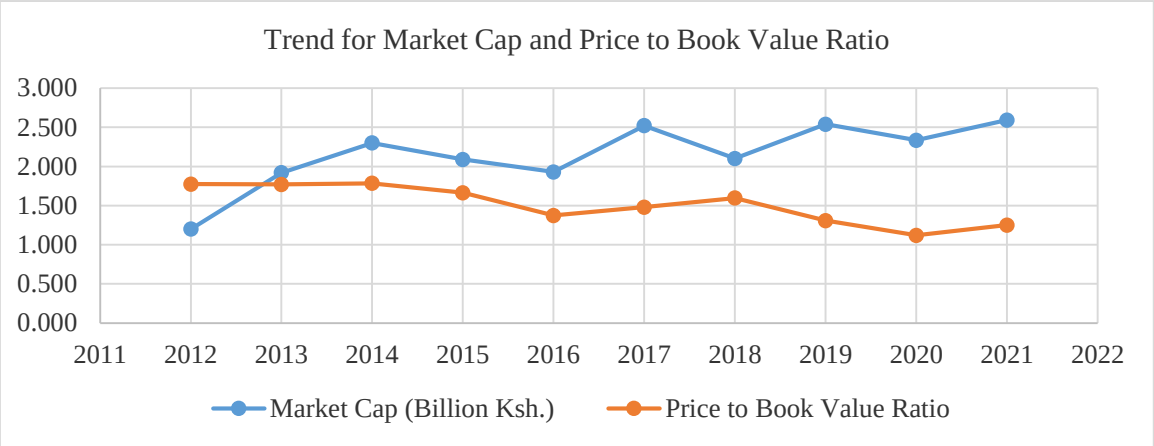


Figure 1: Market Cap and PBV ratio trends
Source: CMA (2022); Annual Reports (2012-2021)

Figure 1 indicates a volatility trend of market capitalization and declining trend of price to book value ratio of firms listed at NSE. The results indicate that market capitalization increased in the year 2012 to year 2014, then there was a decline in the year 2015 to the year 2016 and the volatility continued up to the year 2021. Gworo (2019), notes that earnings volatility has effect on firm value because it gives a negative signal to investors. Furthermore, the NSE (2021) report indicates that market volatility has negative effects on the trading operations of the listed firms.

The PBV ratio as indicated in Figure 1, declined from a high of 1.77 points in 2012 to a low of 1.25 points by end of year 2021. Nevertheless, the total worth of stocks traded continued to decline since the value was at Ksh. 172 billion in 2017, Ksh. 176 billion in 2018, Ksh. 154 billion in 2019, Ksh. 149 billion in 2020, and Ksh. 138 billion in 2021 (Kenya National Bureau of Statistics, 2022). Therefore, the reports indicate that the firm value has been highly volatile and declining hence affecting the ability of investors to predict the worth of their investments in stock.

According to NSE (2021) report, the current status of efficient working capital as calculated through working capital turnover ratio was at 0.5 in 2020 and 2021. This indicates that the listed firms have invested in working capital while firm value has continued to decline hence the need for efficient working capital. The overall firm liquidity of firms quoted at NSE as indicated by current ratio was at 13.53 in 2020 and 10.07 in 2021. Further, the firm size as measured by total assets declined slightly by 4% since it was at Kshs. 2.31 billion in 2020 and dropped to Kshs. 2.2 billion in 2021.

Nairobi Securities Exchange has had various development programs in the recent past. The programs as indicated in the NSE (2022) report include completion of the integration of bond system in February 2022 and launch of Unquoted Securities Platform in March 2021. Further, the introduction of Real-time Derivatives Market data was finalized in March 2021. The transitioning to a new connectivity solution was done in October 2021 which is the first frontier market to launch day trading in an effort to enhance market liquidity and collaborate with sustainable share market's derivatives trading network in order to stimulate the sustainability of financial markets (NSE, 2022). Therefore, it is important to note that there are several growth plans that have been taking place at the NSE, Kenya.

1.2 Statement of the Problem

Firms listed at Nairobi Securities Exchange, Kenya form an integral part of the Kenyan economy and its development. This is achieved through equity markets which enable them to increase commercial capital, enhance investments by promoting funds mobilization, provide opportunity for savers to invest, and advance capital for governments (African

Development Bank Group, 2020). However, the value of firms in the stock market at NSE has been declining over the years (Gworo, 2019; Musembi, 2020). Empirical evidence indicates that working capital efficiency is key in explaining firm value. This forms a good basis for further empirical enquiry in Kenya where there is inadequate evidence describing the nature of the relationship.

Statistical evidence indicates a declining trend in firm value of selected firms trading at the NSE. This view is derived from the NSE 20-Share Index trend which shows a continuous decrease from a high of 4133 points in the year 2012 to a low of 1676 points by the end of the year 2022 (CMA, 2022). The price to book value ratio (PBV) of the selected listed firms at NSE was at 1.7 in the year 2012 and has declined to 1.25 by the end of the year 2021 (NSE Annual Reports, 2012-2021). Additionally, the market capitalization as an indicator of firm value has been highly volatile as indicated by (CMA, 2022) thus negatively affecting the investors decisions. For instance, the East African Breweries Ltd had the highest market capitalization in the year 2012 of Ksh. 209 billion and had declined to Ksh. 130.48 billion by end of the year 2021. However, working capital efficiency has been linked to firm value (Zutter & Smart, 2019; Seth et al., 2020) hence need for further empirical investigation.

Related collaborative evidence indicates that there are research gaps that exist in the current literature that this study sought to address. For instance, Gunay and Cokins (2021) studied a comparative measurement on efficiency of working capital for tourism firms and found that WCE depends on the season a firm is operating on. The evaluation adopted the Pooled Ordinary Least Square (OLS) model to estimate the regression. However, Pooled

OLS model presupposes that to some degree, a pair of higher-level objects remain alike, and therefore can absolutely be 'pooled' towards one population making it unsuitable for panel data (Bell & Jones, 2015; Vijayakumaran, 2019; Matthias & Eberl, 2020; Hamiye Beyaztas & Bandyopadhyay, 2020). Therefore, the model is faced by various limitations when estimating panel data.

The effect of working capital management efficiency on value of firms listed in China was evaluated by Vijayakumaran (2019) and results indicate that WCE is negatively linked to firm value. The study conceptualized working capital efficiency using net trade cycle (NTC) and its components. The NTC only considers days' payables unsettled, days receivables due, and days inventory owing, and does not consider other components of working capital. However, Rahim (2021) contends that working capital turnover ratio is a key measure of WCE that considers all the elements of working capital. Further, contrary to the results of Vijayakumaran (2019) and Etim et al. (2022) found that net working capital has positive and significant effect on firm value. This implies that there is need for more empirical search.

In view of the aforementioned paragraphs, there is a link that exists between working capital efficiency and firm value. However, evident research gaps exist, they have been derived from the previous studies making it an area for further empirical investigation. For instance, measurement of working capital efficiency has been done using ratios such as cash conversion cycle that have failed to address conceptualization in a more rigorous way. Also, some of the methodologies such as Pooled OLS that were adopted are inadequate to estimate panel data. Further, the findings of various studies have been inconsistent hence a

need for additional empirical studies. Moreover, various studies have been conducted in advanced and other developing countries which have different economic structures, political and financial regulations. It is in view of this background that this study was motivated to evaluate the effect of WCE on firm value of selected firms listed at NSE, Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

To evaluate the effect of working capital efficiency on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

1.3.2 Specific Objectives

The study sought to achieve the following specific objectives:

i. To assess the effect of working capital efficiency on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

ii. To examine the mediating effect of liquidity on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

iii. To establish the moderating effect of firm size on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

iv. To determine the joint effect of working capital efficiency, liquidity and firm size on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

1.4 Research Hypotheses

The study sought to test the following null hypotheses:

H_{01} Working capital efficiency has no significant effect on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

H_{02} Liquidity has no significant mediating effect on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

H_{03} Firm size has no significant moderating effect on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

H_{04} Working capital efficiency, liquidity and firm size have no significant joint effect on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

1.5 Significance of the Study

This study sought to evaluate the effect that working capital efficiency had on firm value of selected firms listed at NSE, Kenya. The study aimed at providing significant contributions to policy formulators in relation to incorporating adequate regulatory frameworks of liquidity and enhancement of firm value into their policies. For instance, the aim of CMA is to have a vigorous, facilitative and receptive policy and supervisory structure for capital markets growth and proficiency. In its effort to achieve this goal, the study intended to provide significant knowledge on the importance of enhancing firm value through efficient working capital.

In view of finance theory, the goal of the study was to contribute to the already prevailing finance knowledge in relation to working capital efficiency and its effect on firm value. Insights on whether WCE has effect value on a firm are critical to firm managers as they make their investment decisions in order to attract more investors. The study additionally made significant contributions to the literature on liquidity as a mediator and firm size as a moderator on the relationship between WCE and firm value of firms listed at NSE. Further, the study aimed at assessing the joint effect of WCE, liquidity and firm size on the value of a firm. This additional knowledge was insightful to scholars and firm managers.

Given that practitioners can use various ratios to evaluate firm value including Tobin's Q ratio, this study purposed to bring deeper insights concerning use of equity-based multiples as a measure of firm value. The use of price to book value ratio as an equity based multiple provided additional information to experts and stockholders. Hence, investors and corporate managers would also benefit from this additional knowledge in order to boost their confidence in investing in listed firms. Furthermore, a significant contribution of the study was also to be linked to the Sustainable Development Goals (SDGs) in their effort to promote decent work and economic growth. This is because firm value is critical to the Kenyan and African economic growth therefore promoting sustainability.

1.6 Scope of the Study

The study sought to establish the effect of working capital efficiency on firm value of selected firms listed at NSE, Kenya using a data set of 10 years: year 2012 to year 2021. The scope was informed by the declining trend documented in the CMA (2022) statistical bulletins and decrease in growth of the sectors during year 2012 to year 2021. The variables of the study comprised of firm value that was measured using PBV ratio, WCE

that was measured using working capital turnover ratio, liquidity that was measured using current ratio, and firm size that was measured using natural log of total assets.

The target population of the research was 41 firms listed at NSE whose working capital or liquidity is not under any regulation. Therefore, the study focused on the selected firms listed at NSE because firms listed under banking, investment and insurance sectors have their unique aspects of working capital and liquidity regulation. The study employed secondary data that was retrieved from NSE handbooks and audited financial yearly statements for the 10 years for all the 41 firms. The historical data was similarly gathered from the annual reports on yearly basis.

1.7 Organization of the Study

The thesis is structured into five Chapters. Chapter one presents the background of study and conceptualization of the study variables including firm value, working capital efficiency, liquidity and firm size. The section also presents the statement of the problem, the objectives, significance and scope of the study. Chapter two provides the literature review comprising of the theoretical and empirical review. It also presents the conceptual framework indicating the relationship between the study variables. Chapter three presents the research methodology in relation to the research philosophy, design, and target population. The section also comprises of the data collection instrument, procedure, analysis and presentation, diagnostic tests, the empirical model, and ethical considerations. Chapter four is a presentation of research findings and discussion. Chapter five comprises of the summary, recommendations, contributions to knowledge, limitations and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents a review relating to the scholarly work done regarding the objectives of the study. The chapter presents a theoretical evaluation of theories that anchored this study, empirical review of scholarly work done in earlier research, and an overview of the research gaps that the studies demonstrated. Additionally, a conceptual framework showing relationships among the variables of the study is presented.

2.2 Theoretical Review

A background evaluation of the key theories that underpinned this study is presented in this sub-section. The study was anchored on agency theory, pecking order theory, cash conversion cycle theory, and trade-off theory.

2.2.1 Agency Theory

Agency theory proposed by Jensen and Meckling (1976) relates to the concept of a firm. It postulates that principal-agent conflicts occur in an event the wellbeing of principal (stockholder) and agents (managers) is not aligned. The theory defines the shareholders' interests as maximization of firm value or shareholders' wealth while the agents' interest is to enhance the profitability of a firm. Further, the theory proposes that owing to information imbalance where directors have more information concerning the operations of the firm than shareholders, internal financing is cheaper compared to external financing (Jensen & Meckling, 1976; Myers & Majluf, 1984). Therefore, a principle of the theory is that managers should embrace working capital efficiency so as to minimize agency costs and increase internal funding which ultimately enhances firm value (Adhikari et al., 2021).

The main assumptions of agency theory are that there exists risk aversion, dominance of effectiveness, self-regard, information asymmetry, goal friction, and information as a product (Otekunrin et al., 2021). However, the theory has been criticized by various researchers in regard to lack of practicality concerning a manager's motivation and behavior, the legal explanation of governance made by the theory is questionable, and the proposals made by the theory are found to have economic ineffectiveness (Segrestin & Hatchuel, 2011). Furthermore, the theory was criticized for not capturing the existence of agent-agent conflicts that may arise among the managers of a firm (Panda & Leepsa, 2017). In an ideal situation, there are conflicts that may arise between the agents which have implications on the interests of principals.

The approach of the theory indicates that agency costs rise when a firm has large amounts of free cash flows due to high expenditures which result from ineffectiveness in organization of resources or investments making loses (Jensen & Meckling, 1976). Therefore, the relevance of agency theory on the concept of working capital efficiency and its effects on firm value is that the firm manager is viewed as an agent of the principal (shareholder) who should pursue to fulfil the goal of the investors of maximizing firm value through efficient working capital (Aminu & Zainudin, 2015; Amponsah-Kwatiah & Asiamah, 2021). In this case, the manager has a role of minimizing agency costs and agency problems through ensuring that there is optimal level of working capital and investments are able to yield returns that will enhance maximization of firm value.

Agency costs that arise due to conflict between principal and agents may be reduced by making decisions concerning efficient working capital with the best interest of the

stockholder and thus grow firm value (Otekunrin et al., 2021). This implies that appropriate control of working capital is significant in minimization of agency costs in a firm. This is because agency problems deepen as a result of poor administration of firms through reserving excess cash, particularly with small development prospects, hence sinking in complications related to overcapitalization (Bhuiyan and Hooks, 2019) and ultimately affecting firm value. Tekin and Polat (2020) back up this view by noting that the main focus of the agency theory is to minimize as much as possible the costs associated with agency problems and relationships. Overall, in view of this study, the preposition of the theory on emphasis of shareholder interest which are to maximize their wealth and thus enhance firm value, makes it relevant in contributing to the variable or concept of firm value.

2.2.2 Trade-off Theory

The trade-off theory (TOT) was advanced by Kraus and Litzenberger (1973). The theory postulates that firms have a duty to weigh the costs and benefits of holding liquid assets. The theory indicates that it is possible for a firm to maintain optimum liquidity through working capital efficiency and minimize bankruptcy risk and therefore enhance firm value (Panigrahi, 2018). This is because low working capital increases profitability but minimizes liquidity since short term assets are costly compared to long term assets. Therefore, to balance and develop sufficient level of liquidity, an efficient working capital system is critical for any given firm. The ideology is also reinforced by the concept of cash conversion cycle that postulates that working capital efficiency enhances firm liquidity which leads to firm value (Oseifuah & Gyekye, 2016).

The theory assumes that firms prefer debt as a source of financing and that there are fixed costs that are associated with financial distress and bankruptcy (Kraus & Litzenberger, 1973). However, Myers (1984) notes that there are costs linked to bankruptcy and financial distress. According to Adair and Adaskou (2015), the presence of bankruptcy costs implicates a balance between firm value and benefits of tax. On the other hand, Ai et al. (2020) criticizes the theory by contending that although the theory has been in existence for more than half a century, various aspects present limitations of the theory such as the view that that firms prefer debt as a source of funding while in ideal situation, they employ both debt and equity. This is because more productive firms have less debt since the firms prefer internally generated financing and use debt as the last option which is held by assumptions of pecking order theory. Ideally, it is critical to note that a firm will prefer internal financing since it has low costs compared to external funding.

The balance between liquidity and profitability of a firm requires that firm managers handle their working capital efficiently so as not to fall into the risk of bankruptcy since optimal liquidity promotes growth and expansion thereby enhancing maximization of firm value (Panigrahi, 2018). The theory is founded on the premise that there is cost of maintaining liquidity and there are benefits that a firm gets from holding sufficient level of liquidity (Anjum & Malik, 2013). In this case, the task that firms have is to ensure that liquidity is maintained and there is an ideal volume through efficient working capital in order to enhance firm value. Sondakh (2019), notes that liquidity has a significant effect on firm value hence remains critical on all aspects of a firm. Therefore, the theory was adopted in this study to anchor liquidity as mediating variable in the relationship between working capital efficiency and firm value.

Firm liquidity and profitability are directly linked with the ability of a firm to manage its working capital and is key in defining its failure or realization (Singh & Pandey, 2008). Therefore, trade-off between liquidity risk and high yields of a firm is essential because very low working capital will increase its gains but on the other hand minimize liquidity since short-term assets are expensive compared to long term assets (Panigrahi, 2018). The theory upholds that firms should weigh and investigate the different costs and paybacks of various options of leverage strategies (Ahmadimousaabad et al., 2013). As a result, trade-off is vital for a firm to enhance an ideal level of liquidity which is achieved through efficient working capital in order to enhance firm value.

2.2.3 Pecking Order Theory

Pecking Order Theory was proposed by Myers and Majluf (1984). The theory postulates that there exists asymmetry information among firm administrators and investors hence managers have a preference when making funding decisions. The theory forecasts that firms with large tangible assets will have minimal asymmetry information difficulties hence less agency expenditures (Chen & Chen, 2011). The theory emphasizes that firm managers will prefer internal financing such as retained earnings to debt and equity financing, and prefer debt financing to equity funding in that hierarchy (Hsu et al., 2013). Hence, efficiency in operating resources of a firm is key in achieving the goal of internal funding.

The notable assumption that the theory demonstrates is that the cost of depending on internal sources of finance is less compared to external funding, and that employing debt funding as a source of external funding is more beneficial compared to equity issues (Nugroho et al., 2018). However, Yıldırım and Çelik (2021) criticizes the theory by noting

that it is ineffective for high and small leverage firms since high leverage firms have a preference of equity financing because internal funding is not enough, while the small leverage firms will choose debts as the initial preference of financing.

An evident inference of the theory is that due to asymmetric information, firms prefer internal financing to external funding (Chaklader & Padmapriya, 2021). According to Chen and Chen (2011), the size of a firm has a bearing on the level of asymmetric information in that large firms have minimal level due to their ability to access external financing compared to smaller firms. Further, the theory emphasizes that the source of funding for the day to day obligations requires efficient management of working capital components (Ajibolade & Sankay, 2013). Yıldırım and Çelik (2021) indicates that smaller firms are the ones that are sensitive or comply to pecking order. Therefore, the theory is linked to the concept of firm size due to its perspective of short term financing (Ling et al., 2021) and preference of internal funding to external financing depending on the size of a given firm.

Pecking order theory supports firm size, in view of this study, since it predicts that the size of firms determines minimization of asymmetry problems (Chen & Chen, 2011) which translates to efficient working capital hence internal financing and enhanced firm value. In this case, the theory indicates that the size of a firm will determine on acquisition of internal funding since large firms have wider asset base and therefore able to raise funding compared to smaller firms. On the other hand, the theory states that due to information asymmetry among the prospective investors and firm managers, a firm will choose reserved earnings to debt, short-range debt to long-term debts and dues above equity (Chen & Chen, 2011; Agyei et al., 2020).

Asymmetric information results to choice of funds from within over those from external as supported by the theory (Myers & Majluf, 1984). This means that due to the hierarchical financing nature that the theory presents, it is important to note that large firms in relation to assets would be at a better position to acquire financial support whether from external sources compared to smaller ones. As documented by Chen and Chen (2011), large firms have minimal problems relating to information asymmetry, they are also able to reduce agency costs.

2.2.4 Cash Conversion Cycle Theory

Cash conversion cycle (CCC) theory was proposed by Richards and Laughlin (1980). The theory postulates that working capital efficiency enhances firm's liquidity that translates to firm value while inefficient working capital decreases productivity and leads to low firm value. According to Oseifuah and Gyekye (2016), CCC is a theory for analysing working capital efficiency of a firm. This is because the theory indicates that firms should aim at reducing conversion cycle span in order to minimize those risks that are associated with poor working capital administration. This is consistent with the view of Deloof (2003) who noted that a long CCC increases the level of savings in working capital. This means that firms should aim at shortening the cash conversion cycle in order to have an efficient working capital thereby enhancing liquidity and ultimately increase firm value (Oseifuah & Gyekye, 2016; Amponsah-Kwatiah & Asiamah, 2021).

The theory assumes consistency in inventory turnover, receivables collection, payables payment, and other general firm operations over time (Oseifuah & Gyekye, 2016). However, Mahmood et al. (2022) indicate that the theory has been criticized by various

scholars due to the view that cash conversion cycle is inconsistent and it is dependent on time, size and nature of a firm. For instance, large firms, manufacturing, retail, wholesale, and service industries have different lengths of CCC. According to Yilmaz and Nobanee (2022), the CCC elements are determined by a number of firm characteristics such as cash flows, the increase or decrease in sales, firm size and tangibility. Ideally, it is important to note that the concept of the duration of cash conversion cycle varies with time, scope, and nature of a firm given various dynamics that affect the operations of a firm.

The theory explains the concept of the period a firm takes right from acquiring of stock or raw materials to converting it to cash or sales (Kipkemoi et al., 2018). It involves enhancing efficiency in running of working capital components proportionately with improved control of current investments to ensure that a firm has optimal liquidity which ultimately has effect on risk, productivity and firm value (Yazdanfar & Öhman, 2014). Therefore, the theory was significant in this study given its contribution in describing the importance of working capital efficiency and how it affects liquidity which has ultimate outcome on firm value. In this regard, the theory, in view of this study, was used to anchor working capital efficiency.

Otekunrin et al. (2021) indicate that various seminal scholars such as Richards and Laughlin (1980) and Gitman (2003) have adopted the theory to support efficiency of working capital administration. The theory points out that a short cycle of cash conversion will enhance liquidity, productivity, and firm value in a firm, while a long cycle will weaken liquidity, productivity, and eventually firm value. Oseifuah and Gyekye (2016) concurs with this view by stating that the length of CCC or efficient working capital

determines the outputs of productivity, liquidity, and in the long run firm value. This is because a smaller cycle is connected to high productivity because it is as a result of efficient working capital (Egbunike & Uyanne, 2021). The aim of the study was to assess the concept of working capital efficiency and its effect on firm value. Therefore, the view of the theory is to enhance firm value, it is critical that firm managers aim at minimizing the length of CCC through WCE since it has a long term outcome of value creation.

2.3 Summary of Theoretical Review

The study was anchored on various theories that supported the variables of the study as discussed in the preceding section. Firstly, the view of the study is that agency theory supports firm value variable in that the theory emphasizes on the importance of fulfilling the shareholder (principal) interest of maximizing wealth and increase firm value in order to minimize agency conflicts. The principle of the theory is that firm managers (agents) can be able to create value for shareholders by managing working capital components efficiently. Secondly, trade-off theory postulates that working capital efficiency leads to optimal liquidity which translates to the long-term goal of firm value. Hence, the view of the study is that the theory supports liquidity as a mediator on the relationship between working capital efficiency and firm value.

The pecking order theory was adopted by the study due to its contribution that the degree of asymmetric information that makes firms prefer internal financing to external funding is determined by the size of a firm and the same has a bearing on how firms manage working capital efficiently to enhance firm value. The theory postulates that smaller firms adopt the hierarchical preference of funding compared to large firms which have access to external

financing. Therefore, the view of the study is that the theory supports firm size as a moderator on the relationship between WCE and firm value. Finally, the view of the study is that cash conversion cycle (CCC) theory supports working capital efficiency theory as a result of its preposition that WCE is critical in enhancing firm value and this can be achieved by shortening the CCC.

2.4 Empirical Review

This section presents a broad and critical evaluation of relevant studies done by other scholars with a goal of recognizing the research work that has been done in relation to this study while at the same time, providing a base for articulating the gaps that the study sought to address. The organization of the review is guided by the objectives of the study.

2.4.1 Working Capital Efficiency and Firm Value

Working capital efficiency across listed firms in the European member countries was studied by Afrifa et al. (2022) using data set of 2009-2018. Stochastic frontier analysis was adopted to estimate the model of the study. The findings indicate that WCE in larger firms is higher compared to that of smaller firms, greater cash holding enhances working capital efficiency, increased competition negatively affects WCE compared to low competition, high exports and sales reduce WCE, and increase in bank credit enhance WCE. However, only some elements of working capital comprising of trade receivables, trade payables, and inventory holding were used as indicators of WCE and did not consider other components. Further, the study employed stochastic frontier analysis (SFA) methodology to estimate the models while Yu et al. (2023) contend that SFA is relevant to technical efficiency and assumes a clear distribution of inadequacy term and the production

function. Further, the study was done in European context that has different economic structures from Kenya.

The effect of working capital efficiency on firm value of Indian open trading firms was investigated by Kundu et al. (2022) using the 2015-2019 data set. The study adopted Dynamic Panel Arellano-Bond n-step to estimate the model. The findings indicated that that working capital efficiency links positively with firm value. However, the results are inconsistent with those of Vijayakumaran (2019) that indicated a negative relationship between WCE and firm value, posing a knowledge gap. On the other hand, firm value was measured using an enterprise ratio of Enterprise Value (EV)/EBITDA. However, equity founded multiples such as P/BV are considered to be greater compared to enterprise grounded multiples when determining the value of equity markets for firms listed in the developing economies (Gupta, 2019).

Nexus between working capital management (WCM) and profitability was assessed by Jaworski and Czerwonka (2022) for firms quoted at Warsaw Stock Exchange, Poland using data for 1998-2016. Current ratio (CR), working capital (WC), and cash conversion cycle (CCC) were adopted as indicators of WCM while return on assets (ROA) was employed to gauge profitability. Random and fixed effects models were employed as estimators of the panel data regression. It was found that there was a non-linear significant relationship amid WC, CR and profitability. Further, CCC was found to have a linear negative relationship with profitability. However, CR that was used to indicate WCM is a common ratio for liquidity. Additionally, CCC is affected by industry characteristics and therefore may

differ significantly across industries and sectors. The contextual dynamics make it difficult to replicate the findings.

The relationship between running of working capital, leverage and firm value was investigated by Ilham et al. (2022) for firms publicly trading at Indonesia using data set for 2016-2020. It was found that there was a positive significant effect of working capital administration on firm value while leverage has a negative significant effect on firm value. However, the data was analyzed using time series technique only and did not factor in the cross-sectional components. In addition, the study was done in Indonesia which has different economic and regulatory frameworks compared to Kenya hence the findings may not be replicated.

Effect of working capital management policies on profitability was studied by Arnaldi et al. (2021) for manufacturing SMEs at Czech Republic, Central Europe using a dataset for 2014-2018. Days sales outstanding (DSO), days sales inventory (DSI), and days payable outstanding (DPO) were adopted as proxies for WCM policies while EBITDA was employed to measure profitability. The dynamic model, GMM, was used to estimate the regression analysis of the study. The empirical outcomes indicated that longer repayment period had no effect on profitability. The DSI and DPO had a negative significant effect on a firm's profitability. However, the focus of the study was on Europe which has different economic and financial structures hence replication of the findings may not be applicable in this context. The indicators of WC policies were limited to payables, receivables and inventory ignoring other elements such as cash and cash equivalents which have a key role in operations and administration of working capital policies.

The determinants of working capital management and how they improve the performance of Indian banks were examined by Senan et al. (2021) using a balanced panel data of 2008-2018. The GMM, pooled OLS, FE and RE were used in the study as estimation models for the regression analysis. The empirical findings indicated that the most important elements of working capital included net profit margin, fiscal policy, profit after tax, and the cycle of WC that had effect on performance of banks as measured by ROA. On the other hand, using ROE as the metric for performance, return on capital employees, net profit margin, size of assets, and liquidity ratio had a significant positive effect on bank performance. However, the results may not be replicated given the diversity in economic, social, and political aspects of India compared to the context of this study.

Efficient working capital model was evaluated by Seth et al. (2021) for manufacturing businesses in India using data envelopment analysis. The study employed a sample of 1391 companies using a data set for 2008-2019. It was found out that working capital efficiency was steady during the period under consideration. Additionally, the study found that the ability to create resources from within, interest rate, GDP, output, age, and size have significant effect on working capital efficiency. Working capital efficiency was evaluated using cash conversion cycle which is limited to receivables, payables, and inventory. However, use of working capital turnover ratio incorporates all the components of working capital. Furthermore, focus of the study was on listed manufacturing firms in India which have different operating cycles and structures hence limiting replication of results in the context of this study.

Effect of working capital administration on performance of a firm was investigated by Hameer et al. (2021) for quoted manufacturing firms in Malaysia using panel data for 2009-2018. Inventory days, receivables days, and payables days were used as proxies for working capital administration while return on assets was used to measure performance. Pooled OLS was used to estimate the panel regression model of the empirical study. It was found that inventory days and receivables days had a negative significant association with performance. Further, payables days were found to be insignificant on their association with firm performance. However, the conceptualization of working capital management was based on three components only and ignored other elements like cash turnover. Additionally, the Pooled OLS does not consider time-varying distinct effects since it assumes that the association between explanatory and outcome variable is constant over time which may affect the accuracy of estimates in panel data.

Assessment of a comparative measurement of efficient working capital was done by Gunay and Cokins (2021) for Borsa İstanbul publicly trading tourism firms using panel data for 2013-2020 during the Covid-19 period and earlier quarters. Pooled Ordinary Least Square (OLS) was employed to estimate robustness of the index technique advanced by Bhattacharya (1995; 2007). It was found that working capital was efficient during the third quarter of 2020, subsequent, third, and fourth quarters of the Pre-Covid-19 period. Further, it was indicated that firms had inefficient working capital in their first quarter. However, Vijayakumaran (2019) noted that the Pooled OLS methodology presumes that a pair of higher-level objects are similar, and therefore can absolutely be 'pooled' to one population making it inappropriate for panel data. Furthermore, working capital efficiency was

measured using Bhattacharya (1995; 2007) index method which is used to measure technical efficiency that is concerned with production and resource allocation processes.

Working capital efficiency and its effect on profitability was investigated by Rata and Amtiran (2021) for the Sami Jaya Credit Cooperative in Kupang in the period 2015-2019. It was indicated that working capital was inefficient during the period of analysis which affected profitability of the firms. Therefore, working capital efficiency was found to be significant on firm's profitability. However, the findings may not be replicated in this context since the focus was on Jaya Credit Cooperative whose financial structures are different from those of selected firms publicly traded at NSE, Kenya. Further, the focus of the study was limited to profitability of firms and did not consider firm value.

The effect of working capital administration on financial distress of selected firms listed at NSE, Kenya was assessed by Muigai and Nasieku (2021) using panel data for 2009-2018. The random effects model was used to estimate the panel data regression analysis in the study. The CCC, inventory holding period, and debtor's collection period were used as proxies for WCM. Further, the Altman's Z-score index was employed as the proxy for financial distress. The empirical results indicated that CCC had a significant positive effect on the financial distress of firms. There was a negative significant effect of inventory holding period on the distress index. Further, it was found that the receivables period had no significant effect on financial distress. However, Altman's Z-score has various limitations when used in panel data analysis. For instance, the index assumes that the coefficients used in the index are constant over time while panel data coefficients vary over time across individuals. Therefore, ignoring the time-varying aspects in panel data is

critical and could lead to biased and inaccurate results. Additionally, since financial distress is not static over time but rather, it is dynamic in nature, use of the index may only focus on static part of financial distress thus ignoring the changes over time. On the other hand, CCC varies across firms in different industries and therefore may not give sufficient state of WCM across sectors.

Effect of working capital management on financial performance was assessed by Ibrahim and Isiaka (2021) for selected publicly trading firms at Nigerian Stock Exchange using a dataset for 2014-2018. The sample of 71 firms out of 101 target population was obtained using stratified method. Estimation of the regression model was done using Pooled OLS, fixed effect, and random effect models and results presented. It was found that there was a statistically significant effect of administration of working capital and financial performance. However, in addition to the contextual dynamics that would make it difficult to replicate the findings, the stratified method applied on panel data assumes that strata remain stable over a period of time. On the other hand, change of strata may translate to the primary stratification being not as much representative, potentially leading to bias.

The development of working capital management and the effect it has on shareholder value and profitability was investigated by Högerle et al. (2020) for listed firms in Germany using panel data for 2011-2017. Market value added (MVA), and ROCE were used as metrics for shareholder value and profitability respectively. On the other hand, CCC was employed as an indicator for efficient WCM. Results of the Hausman test indicated that FE model was appropriate to estimate the ROCE regression while RE was used for MVA regression analysis. The empirical findings indicated that efficient WCM declined over a

period of time while a shorter CCC was found to have a positive significant effect on shareholder value and profitability. However, CCC ratio has limitations of variations across industries where some have shorter CCC while others have a longer one depending on the nature of the firm. Therefore, it may provide inaccurate estimations when comparing firms in different industries. Additionally, Germany is a more developed economy compared to the current context hence the findings may not be replicated.

The nexus between net working capital and firm value was investigated by Baños-Caballero (2020) with a sample of 30 countries for a data of 1995-2013. The Fama and French valuation model for cross-section regressions was employed. The empirical results indicated that net working capital had a positive significant effect on the value of firms. However, from the list of study population, the empirical investigation considered developed countries such as United States, United Kingdom, Canada, Germany, Belgium, Singapore, and many others hence the outcome may not be replicated in this context. Additionally, the Fama-French model assumes constant risk premiums for factors over a given period of time. Ideally, risk premiums vary over time and therefore, the model may not be able to capture the fluctuating risk situations and their effect on assets in longitudinal data.

One-way ANOVA was used to establish the nexus between working capital and profitability of a firm by Kabir et al. (2020) for firms listed at Karachi Stock Exchange using a dataset for 2016-2019. Pearson's correlation was employed to test the strength and direction of the association amid variables of the study. The findings indicated that working capital had a negative significant association with firm profitability. However, the

single-direction ANOVA used for analysis disregards time dynamics by handling every observation as independent and overlooks autocorrelation which is regularly existent in panel data. As a result, this may translate to biased estimates and inaccurate inferences. Furthermore, the findings may not be replicated in this context due to diversity of economic structures.

Static and dynamic models were used by Ali et al. (2020) to investigate the effect of administration of working capital on profitability of listed firms in Pakistan using panel data of 2007-2018. The cash conversion cycle (CCC), payable deferral period (PDP), receivable collection period (RCP), and inventory conversion cycle (ICP) were used as indicators of WCM. Return on assets (ROA) was employed as a proxy for profitability in the study. It was found that there was a positive significant association between ICP, PDP and ROA. The CCC was found to have a negative significant effect on ROA while RCP had a negligible effect on ROA. However, use of CCC ratio as an indicator for WCM was faced by limitations that the cycle varies across industries and therefore comparison would give inaccurate results. Further, the empirical findings may not be replicated in this context due to economic and financial regulatory dynamics.

Drivers of working capital management and their effect on profitability of steel firms listed at stock exchange in Vietnam were evaluated by Pham et al. (2020) using panel data of 2010-2019. Multivariate regression models were used to perform the analysis of the study. The empirical findings indicated that there was a strong significant effect of WCM on profitability of firms. Further, WCM factors comprising of days' inventory outstanding, days payable outstanding, days sales outstanding, current ratio, size and growth had a

positive effect on profitability. On the other hand, cash conversion cycle and financial leverage had a negative effect on profitability. Notably, the cash conversion cycle had a negative effect which was negligible. However, the empirical results may not be replicated in Kenya due to variations in economic conditions and financial frameworks. Additionally, the focus was on management aspects of working capital and did not consider the efficiency of WC and profitability.

The nexus between working capital management, liquidity and seasonality of stock market was evaluated by Ayunku and Ekokeme (2020) amid firms listed in Nigeria using data for 2011-2018. Simple random method was employed to obtain a sample of 50 firms for analysis in the investigation. Inventory days, receivable days and payable days were employed as indicators of WCM while liquidity was indicated by current ratio. Panel OLS was used to estimate the regression analysis. The empirical findings showed that the stock market was efficient in Nigeria since it could not be predicted by firm liquidity and WCM. However, the results may not be replicated in Kenya due to variance in regulatory frameworks and economic conditions. Further, the cash and cash equivalents were ignored as indicators of WCM.

The working capital administration and its effect on market value was investigated by Udenwa et al. (2020) for industrial firms in Nigeria in the period 2008-2017. Cash conversion cycle ratio was used to estimate the administration of working capital while market capitalization was used to measure market value. The findings indicated that working capital administration has a negative significant effect on the market value. However, in addition to the contextual gap, the CCC ratio is limited to receivables,

payables and inventory and does not consider other current assets compared to working capital turnover ratio.

Working capital efficiency and its effects on firm value of selected publicly trading firms in China was evaluated by Vijayakumaran (2019) for the period 2004-2013. Fixed effects model was employed on the approximation of the panel data regression. Findings of the study indicated that effective working capital had a negative outcome on firm value. In the study, indicator of working capital efficiency was limited to net trade cycle using elements such as days' inventories on-hand, and days' payables unsettled, and days' sales unpaid. However, Rahim (2021) contends that working capital turnover ratio is a key indicator of working capital efficiency since it more inclusive and considers all the constituents of working capital. Additionally, the study was conducted in China whose financial regulatory processes and economic structures vary from the Kenyan context.

The ordinary least square was used to estimate a panel regression model in an investigation by Soukhakian and Khodakarami (2019) on the effect that WCM had on performance of manufacturing firms listed at Iran, using panel data of 2010-2016. To control endogeneity, the empirical investigation used two-stage least squares. CCC was employed as an indicator for working capital management while performance of a firm was measured using ROA. The findings indicated a negative significant effect of the WCM on the performance of a firm. The implication of the results was that a shorter CCC enhanced the firm performance positively. However, the limitation of CCC ratio as an indicator of WCM is that there are variations on the length that a firm takes to acquire and convert stock into cash across various firms in different sectors. The focus of the empirical investigation was

on manufacturing firms hence the findings may not be replicated in this context. While two-stage least square can be used to control endogeneity, the main limitation is that increase of squared terms may complicate a model which may result in over fitting. This risk is popular in panel data due to the presence of time-specific trends and individual-specific trends.

Efficiency of working capital organization and working capital guidelines and their effect on profitability of a firm were studied by Al-Mawsheki et al. (2019) for industrial firms in Malaysia using data for 2010-2016. Cash conversion cycle was employed to estimate WCE in the study. It was found that WCE had a negative significant effect on the profitability of firms. Further, it was shown that policies governing working capital had a positive and significant effect on the productivity of a firm. However, the CCC ratio does not include all the elements of working capital and the cycle is subject to firm characteristics compared to working turnover ratio. Further, the study was done in Malaysia and was limited to the manufacturing firms making replication of results difficult in this context.

Evaluation of large and small scale Jordanian Industrial quoted firms was conducted by Shubita (2019) who assessed the effect of their working capital management (WCM) on cash holdings using panel data for 2006-2016. Hausman test results indicated that fixed effect model was the most suitable model to adopt for estimation of the study data. Working capital net of cash (WCNC) and cash conversion cycle (CCC) were employed as proxies for WCM. The empirical findings indicate that WCM predicted strongly the cash holdings of firms. Further analysis indicated that determinants of cash holding varied significantly in relation to large and small scale firms. However, the results may not be

replicated in this context due to economic and financial structural differences. Additionally, the cycle of cash conversion varies across sectors hence comparison may not give accurate results.

The generalized least square (GSL) model was employed to evaluate the effect of efficient working capital on firm performance by Van et al. (2019) for listed firms in Vietnam within the period of 2009-2018. The CCC and net trade cycle were used as indicators for WCE while ROA and Tobin's q were employed to measure firm performance. The findings indicated that ideal working capital had a significant effect on performance of a firm as measured by ROA. A key assumption of the GSL is that the specification of the model is accurate, however, due to variations of panel data, if the model is not correctly specified, then the outcome of the estimation is subject to biasness or inefficiency. Also, due to variations in contextual factors such as economic and financial regulations, the results may not be replicated in this context.

Using fixed effect model, Omanga and Oluoch (2019) studied the effect of administration of working capital on tax efficiency for selected firms listed at NSE, Kenya using panel data for 2013-2018. Working capital management was measured using cash, inventory, payables and receivables management while total tax expense, current income tax, and EBIT were used as indicators of tax efficiency. The findings indicate that there was a positive significant effect of management of cash and inventory on tax efficiency. The management of payables and receivables was found to have a negative significant effect on tax efficiency. However, the focus of the empirical investigation was on tax efficiency as

the outcome variable while other main output of a firm was not considered in the evaluation.

Working capital efficiency and its effect on performance of a firm was studied by Prasad et al. (2019) for listed firms whose data was found in the CMIE Prowess database during the year 2017. The study finds that operational capital effectiveness multiplier is a direct evaluator of productivity on working capital efficiency (WCE). However, the new direct measure of WCE was profitability in nature. This implies that the measure may not apply in studies where concepts of firm value are under consideration since the measure is limited to profitability. This study focused on firm value as the main goal of a firm and WCE was measured using working capital turnover ratio. Further, the focus of the study was on the firms found in the Prowess database which was mainly the Indian firms. Therefore, the results of the study may not be replicated in this context due to diverse economic structures and regulations.

The nexus between management of working capital and profitability was evaluated by Alsulayhim (2019) for selected firms listed at the Saudi Stock Exchange for a data of 2007-2016. Pooled OLS was used to estimate the panel data regression model in the empirical study. CCC and current ratio were employed as the indicators for WCM while return on assets, return on equity, return on capital employed, gross operating profit, and net operating profit were used as proxies for profitability. From the empirical results, it was found that there was a positive significant association between WCM and profitability of the selected listed firms. However, the pooled OLS estimator has various limitations especially when handling panel data. For instance, while panel data has time-varying

individual effects, the assumption of the pooled estimator is that the variables are constant over time for all individuals. Therefore, if there is a time varying aspect of individuals, the model may give biased and inaccurate estimates. Also, the pooled OLS is not able to control endogeneity in data set which is common in a panel data which may translate to inconsistent estimates. Further, the CCC measurement of WCM assumes that there is a constant flow of cash throughout the financial period in a firm while various firms face seasonality in their operations.

Empirical investigation on interaction and effect of working capital efficiency on liquidity was done by Das et al. (2018) for pharmaceutical listed firms in India using data set for 2012-2017. The Ordinary Least Square model was used to estimate the regression analysis in the empirical study. Current and quick ratios were used as the indicators for liquidity while cash conversion cycle (CCC) was the proxy for WCE. The results indicate that there was insignificant effect of WCE on liquidity of firms. However, the OLS estimation technique does not consider the time-varying of distinct effects which is common in panel data. This may affect the accuracy of the estimates and give biased or incorrect results. Furthermore, CCC as an indicator of WCE is limited to receivables, payables, and inventory components of WC and its main assumption is that there is constant cash flow across the financial year of firms which may not be the case due to changes in operations.

Effect of working capital efficiency on firm value was evaluated by Shah and Arif (2018) for firms quoted at Karachi stock market in Pakistan using a data set for 2004-2016. The study adopted linear and fixed effect techniques to estimate the model. The investigation finds a positive effect of working capital efficiency on firm value. Fama and French

estimation model was adopted on the methodology which is limited in handling low average returns which may be a common issue with some of the listed firms. Furthermore, economically, Pakistan is ranked highly in relation to Gross Domestic Product compared to this context hence the findings may not be replicated.

The association between administration of working capital and financial performance was investigated by Daniya (2018) for listed conglomerate firms in Nigeria using a panel dataset for 2005-2014. Debtors' collection period (DCP), creditors payment period (CPP), and cash conversion cycle (CCC) were used as indicators of WCM. Return on investment (ROI) was employed as a proxy for performance. To estimate the regression analysis for the panel data, ordinary least square (OLS) was employed. The empirical outcome was that DCP and CPP had a negative significant association with ROI. The association between CCC and ROI was positive but insignificant. However, the OLS estimation technique used has various limitations when handling panel data which may affect the estimates and accuracy of findings. For instance, OLS ignores a time-fluctuating distinct effect which is key in panel data. The CCC indicator of WCM has variations based on the industry which may affect the results.

2.3.2 Working Capital Efficiency, Liquidity and Firm Value

Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model was employed to assess the mediating effect of stock market liquidity by Abo El-ata et al. (2023) on the relationship between stockholder sentiment and share market volatility of listed firms at Egyptian Stock market over the period 2017-2021. The study finds that that stock market liquidness partially mediates the association between investor sentiment and

stock market unpredictability. However, besides the contextual gap, it was also observed that the study adopted GARCH model which is relevant in time series data while the study used data that had equally cross-sectional and time sequence components (panel statistics).

The mediating effect of liquidity on the association between third party capitals, adequacy ratio, and prime lending rate and productivity was studied by Pujiati and Averina (2022) for profitable banks in Indonesia using data set for 2009-2018. Cluster sampling method was used and data was analysed using path analysis technique. It was found that there exists an indirect effect on the association among the variables of the study as mediated by liquidity. Since the study focused on Indonesian commercial banks the results may not be replicated in this context owing to their unique regulation of liquidity compared to the selected firms listed at NSE, Kenya.

The mediating effect of liquidity on the relationship amid working capital turnover, accounts receivables turnover, and size of a firm and productivity was investigated by Paramita and Andika (2021) for firms publicly trading at PT. Rahma Furniture and Cakrawana Furnindo, Semarang using financial data for the period 2016-2020. The study adopted census method to analyse the firms in the target population using Two Stage Least Square. The empirical findings indicate that working capital turnover, receivables turnover, and size of a firm have a positive significant effect on liquidity. Further, liquidity did not have mediating effect on the link between working capital turnover and productivity, but liquidity had limited mediating effect on relation between receivables turnover and productivity. However, normality, multicollinearity and heteroscedasticity

tests were the only ones considered by the study and did not consider autocorrelation and stationarity tests which are key in panel data to assure validity of estimates.

The role of liquidity in mediating the relationship amid risk related to credit, market risk and financial productivity was investigated by Purnama et al. (2021) for firms at Badung Regency, Indonesia using data set for 2017-2019. The results indicate that liquidity has no mediating effect on the correlation amid the risks related to credit and market and the productivity of firms. However, liquidity was measured using cash ratio which excludes receivables while it is a key component of working capital. Furthermore, the frameworks related to economic, political and social are different to those of Kenya, hence the findings may not be replicated in this context.

Liquidity and its meditating effect on the relationship between corporate governance and performance was evaluated by Tahir et al. (2020) for selected sectors whose working capital and liquidity are not under any regulation in Pakistan using data for 2010-2018. The Seemingly Unrelated Regression (SURE) model was employed by the empirical study to analyse and estimate the research data. Tobins' Q and ROA were used as indicators for financial performance while liquidity was measured using current ratio. It was found that liquidity mediates the relationship between corporate governance and performance. However, Pakistan operates on a different fiscal and economic regulations compared to Kenya and therefore, the results may not be replicated in this context.

Liquidity as a mediator on the relationship between incomes quality and value of market was examined by Alsufy et al. (2020) for firms quoted in Amman Stock Exchange in Jordan in the duration 2012-2017. Fixed effects method was adopted to estimate the panel

data regression analysis in the investigation. It was determined that liquidity and earnings quality had a positive effect on the market value of share prices while there was a mediating effect of liquidity on the link between incomes quality and market value. However, quick ratio was employed as a proxy for liquidity while it takes away inventories which are a critical element of working capital. The share prices were used as indicators for market value and did not consider the outstanding shares which is a key component of market value. Further, the study focused on multicollinearity test in diagnostic analysis while other main tests of panel data were not considered.

Liquidity and its role as a mediator in the association between performance and financial ratio was assessed by Bawono and Falakh (2019) for banks in Indonesia using data set for 2015-2018. The outcomes indicate that liquidity had no mediating effect on the link between financial ratio and banking productivity. The study measured liquidity using financing to deposit ratio (FDR). However, FDR is limited to total assets funded by clients' deposits and ignores other sources of bank funding such as interbank financing, or crisis liquidity funding given by central bank compared to current ratio. Therefore, FDR may not give the overall liquidity position of a bank. Further, the study focused on banking performance whose working capital regulation is different from the selected firms listed at NSE, Kenya hence the findings may not be replicated in this context.

2.3.3 Working Capital Efficiency, Firm Size and Firm Value

The role of firm size as a moderator in the relationship between working capital and profitability was evaluated by Shaik (2021) for manufacturing firms quoted at Tadawul Stock Exchange, Saudi Arabia using data of 2008-2019. Pooled OLS regression model

was used to estimate the analysis of the study. ROA, ROE, Tobins Q ratio, and GROP were employed as indicators of financial performance while WC was examined using days' sales in inventory and days payables unsettled. On the other hand, log of aggregate assets was used as a metric of firm size. It was found that components of working capital positively and significantly affect the profitability of a firm while using all the performance indicators except for GROP that indicated a negative significant association. Firm size was also found to have a significant effect on the relationship. However, the estimation model adopted is not appropriate for panel data since it does not account for the time varying element which is key. Further, the indicators of working capital were relatively of low-level data and not all the components like receivables and cash were considered.

The random effects technique was used to estimate a regression model in an investigation by Obaje and Abdullahi (2021) to assess firm size as a moderator on the association between board organization and financial profitability of listed deposit taking banks in Nigeria using data set for 2012-2019. The findings indicate that firm size has a negative significant moderating effect on the relationship between the structure of a board and financial productivity of banks as measured by ROA. However, the study focused on the board structure and productivity of banks. Further, the dynamics in Nigeria in relation to economy, social and regulatory frameworks are different from those of this context and therefore, the findings may not be replicated.

The moderating effect of firm size on capital structure of firms was evaluated by Hussain et al. (2020) for enterprises listed in Pakistan using data of 2013-2018. Static and dynamic panel analysis methods were employed in the study. The results indicated that firm size

had a statistically significant moderating effect on the capital structure of firms. However, since the sample of the study was 29 firms for a period of six years, the analysis may have been exposed to small sample biasness because panel analysis requires relatively large number of observations. Additionally, Pakistan has a more developed economy compared to the current context given diverse financial structures and regulatory frameworks.

Fixed effects model was used to estimate a regression analysis in an investigation by D'Amato and Falivena (2020) on the moderating effect of firm size on the association between corporate social responsibility and firm value of Western European quoted firms. It was found that firm size moderates the link between CSR and firm value. Tobin's Q and price to book value ratio were used as proxies for firm value. However, the results may not be replicated in this context given that Europe is a more developed country, and the financial regulatory structures are different. Furthermore, the focus was on CSR and firm value of the Western European openly trading firms.

The moderating effect of firm size was assessed by Kijkasiwat and Phuensane (2020) on the association between innovation and performance of a firm for SMEs in Central Asia and Eastern European. Stratified random method was adopted to obtain the sample of the empirical investigation. It was found that firm size had a statistically significant moderating effect on the link between innovation and performance of a firm. However, since the focus was on SME's, the findings may not be replicated in this context since their financial structure and regulations is different from that of listed firms. Moreover, Eastern Europe and Central Asia are more developed countries compared to Kenya.

The investigation by Ssendagire (2020) examined firm size and its moderating effect on the association between working capital level and firm productivity of manufacturing corporations in Uganda for a period of five years. Stratified sampling technique was used to get a sample of 116 corporations out of 169 firms of the aimed population. The findings obtained in the study indicate that size of a firm has no moderating effect on the relationship between working capital level and firm productivity. The findings were inconsistent with those of Dalci et al. (2019) and Pervaiz and Akram (2019) which indicated that firm size moderates the association between WCM and firm profitability posing a knowledge gap. Furthermore, the level of working capital was measured using cash position ratio which is only limited to cash as the current asset disregarding other current assets such as receivables and inventory which are key in levels of working capital in a firm.

Pooled OLS, fixed effects, and random effects were adopted as estimators of a panel data in a study by Dalci et al. (2019) to evaluate firm size as a moderator on the relationship between working capital management (WCM) and profitability of selected firms at Germany using data set for 2006-2013. The findings indicate that firm size moderates the relationship between management of working capital and profitability. However, WCM was measured using cash conversion cycle which does not incorporate all the elements of working capital and is limited when comparing it in panel data since it assumes that there were constant cash flows through out a financial period. The results may not be replicated in this context due to diverse economic structures in Germany.

Firm size as a moderator in the relationship between management of working capital and firm profitability was investigated by Pervaiz and Akram (2019) for selected firms quoted at the Pakistan stock market using data set for 2013-2018. The study adopted Pooled OLS model to estimate the regression model. From the findings, it was indicated that firm size has negative moderating effect on the relationship between management of working capital and firm profitability. WCM was measured using cash conversion cycle ratio which does not consider entire elements of working capital. Furthermore, the Pooled OLS brings together all the observations and disregards the aspect of time series which is key in panel data hence the estimates may be affected to give inaccurate results.

Firm size as a moderator in the relationship between working capital finance and profitability was assessed by Mahmood et al. (2019) for listed firms in China using data set for 2000-2017. Generalized Methods of Moments (GMM) technique was used in estimating the regressions of the study. It was found that size of a firm had a robust controlling effect in the link between working capital finance and productivity. However, those results may not be replicated in this context due to varying economic, political and regulatory frameworks with those of China. Furthermore, the first step transformation of GMM technique may not be adequate in cases of unbalanced data.

The Pooled OLS estimation model was used in an investigation by Buallay and Hamdan (2019) on firm size as a moderator in the relation between corporate authority and scholarly capital effectiveness of firms listed in stock market of Saudi using data set for 2012-2014. It was found that firm size moderates the relation between corporate control and academic capital efficiency. However, the Pooled estimator that was adopted has

limitations in estimating data that has time series aspects hence may affect the findings. Furthermore, the focus was on the firms listed at Saudi stock market which has different economic structures and financial regulations from those of this context.

2.3.4 Working Capital Efficiency, Liquidity, Firm Size and Firm Value

Analysis of the effect of liquidity and firm size on performance of a firm was done by Putri et al. (2023) for manufacturing firms quoted at Indonesia Stock Exchange using panel data of 2018-2021. Purposive sampling method was used to obtain a sample of 46 firms out of 71 firms of overall population. Pooled OLS was used to estimate the regression analysis of the empirical investigation. The outcome showed that firm size had a significant effect on performance of a firm while liquidity had no effect on firm performance. However, the regression equation and model of estimation ignored time-variance aspect while the data was panel in nature. Pooled OLS has limitations in analyzing the lagged effects and dynamics, and it assumes exogeneity which may be present in panel data thus affecting accuracy of results. Further, the sampling technique is prone to biasness of the researcher due to the predetermined criteria. Replication of results is affected by the dynamics of the contexts in relation to economic and financial frameworks.

The effect of both liquidity and corporate governance on firm value was investigated by Nguyen et al. (2022) using a meta-analysis that covered a worldwide scope using data set for 1980-2018. Random effects model was used to estimate the regressions of the study. Firm value was measured using Tobin's Q in that study. It was found that illiquidity had a negative significant effect on firm value while corporate governance had a negative significant effect on firm value. However, the results cannot be replicated in this context

since the study focused on the worldwide approach which has various economic, political, social and financial regulatory dynamics. While the aim of the study was to determine the effect of liquidity and corporate governance on value of a firm, the indicators of liquidity was illiquid factors.

The effect of working capital efficiency, liquidity, and firm size on profitability of firms was evaluated by Oktaputri and Setyorini (2022) firms in the infrastructure sector listed at the Indonesian Stock Exchange using a dataset for 2016-2020. Working capital turnover ratio, current ratio, and log of overall assets were used as indicators of WCE, liquidity, and size of a firm. Return on assets was employed as a proxy for profitability of firms. To obtain the sample, purposive technique was adopted by the empirical study while OLS was used to estimate the regression analysis. The findings indicated that WCE, liquidity and firm size had a negative significant effect on firm profitability. However, the OLS that was adopted to estimate the research data that was panel in nature, assumes that the association amid the explanatory variables and the outcome variable is constant over time which is not the case with panel data. Further, purposive technique is potential to researcher's bias.

Investigation on the effect of working capital, liquidity, firm size, and solvency on profitability was done by Simbolon et al. (2022) for firms under consumer goods industry listed at Indonesia Stock Exchange using data for 2017-2019. To obtain the research sample of 249, purposive method was used. Ordinary least square (OLS) was used to estimate the regression analysis for the empirical investigation. The findings indicated that working capital and liquidity had no significant effect on profitability while firm size had statistically significant effect on profitability of firms. However, since the data used was

panel in nature, use of OLS model to estimate the regression had potential limitations such as, its assumptions that the independent variables are not correlated with error terms thus unable to handle endogeneity which is common in panel data. Furthermore, use of purposive method to obtain a sample is potential to bias by the researcher thus may affect accuracy of the estimates.

The effect of liquidity, firm size, and profitability on firm value was studied by Nurwulandari (2021) for manufacturing firms listed at Indonesia Stock Exchange using a data set for 2014-2019. Purposive sampling was adopted by the study to obtain a sample of 19 firms. Current ratio, natural log of total assets, and PBV ratio were employed as measures of liquidity, firm size and firm value respectively. The study finds that liquidity had a negative and insignificant effect on firm value, while firm size and profitability had a positive and insignificant effect on firm value. However, the findings may not be replicated in this context since the sampling technique adopted is prone to researcher's biasness and therefore estimations may be inaccurate. Further, the manufacturing firms in Indonesia operate within a different context in relation to financial regulations and economic conditions.

The investigation by Vu Thi and Phung (2021) was to assess the joint effect of working capital, capital structure and corporate governance on financial productivity of SMEs in Taiwan using data set for 1995-2018. The data was panel in nature and was analyzed using panel regression model. It was found that working capital, corporate governance and capital structure had a negative effect on the productivity of the SMEs. However, in addition to the contextual gap in the study relating to the diverse economic structures hence

results may not be replicated, working capital was measured using cash conversion cycle ratio which is limited to receivables, payables and inventory elements and is different across firms in various sectors over time.

Mutual effect of liquidity, firm size and capital structure on profitability was evaluated by Setiawan and Pereira (2021) for firms under the mining sector in Indonesia using data of 2013-2019. Purposive sampling was used to obtain the sample of the empirical investigation for the panel data. Pooled OLS was used to estimate the regression model of the study. The current ratio (CR) and firm size (FIRMSIZE) were used as indicators of liquidity and size respectively while debt to equity (DER), long term debt to asset (LTDA), and short-term debt to asset ratios (STDA) were used as proxies for capital structure. Return on equity ratio was used as a metric for profitability in the study. The results indicated that DER, LTDA, and FIRMSIZE had a significant effect on ROE. On the other hand, STDA and CR had insignificant effect on ROE. However, while the study used panel data, the model of estimation did not consider the time-variation element since Pooled OLS ignores time component. Additionally, the purposive sampling method used is potential to biasness which could affect the accuracy of the findings. The results may not be replicated in this context due to dynamics on the context of the study.

Investigation on the effect of liquidity, activity ratio and profitability on dividend payout ratio was done by Arsyad et al. (2021) for manufacturing firms listed at Indonesia Stock Exchange using data of 2015-2019. Current ratio, total assets turnover and return on investment were used as indicators of liquidity, activity ratio and profitability respectively. A sample of 70 firms was employed based on some predetermined criteria by the empirical

study. The findings of the regression analysis showed that liquidity and activity ratio had no significant effect on dividend policy except for profitability that had significant effect. However, the predetermined criteria that were used to obtain the sample may have been prone to researcher's biasness. Additionally, due to the diverse contextual aspects of economic and financial structures, replication of results may be difficult in the current study.

Investigation of the effect of liquidity, firm size, and profitability on firm value was done by Afinindy et al. (2021) for firms under food and beverage sector quoted at IDX, Indonesia using data of 2013-2018. Purposive sampling method and partial least square (PLS) model were used in the empirical examination. It was found that liquidity and firm size had no significant effect on firm value while profitability had a statistically significant effect on firm value. However, PLS estimation technique assumes that the data is only cross-sectional ignoring the dynamics of individual-level which are present in panel data. The sampling technique has a potential of researcher's biasness which may affect the results and conclusions of an empirical study. Further, the dynamics in context concerning the regulatory structures and economic factors make replication of findings difficult.

Partial Least Square (PLS) was used by Dewi et al. (2021) to assess liquidity, profitability and firm value using financial distress as a mediator for industrial open trading firms in Indonesia in the period 2016-2020. It was found that liquidity and profitability of a firm have no direct effect on firm value. Financial distress was found to be a mediator between profitability and firm value with liquidity as a predictor. However, besides the fact that Indonesia has diverse economic structures compared to those of Kenya, the PLS technique

used in the study does not clearly take into account time reliance or serial association in panel data compared to fixed or random effects models.

Structural equation modelling (SEM) technique was employed by Hapsoro and Falih (2020) in an investigation to establish the effect of both liquidity and firm size on firm value of ASEAN region firms in the Osiris database for the period 2015-2018. A sample of 65 firms was obtained using purposive sampling system. Log of aggregate assets and current ratio were used as metrics of firm size and liquidity respectively while Tobin's Q was used as a measurement for firm value. To evaluate the goodness of fit, the study employed partial least square analysis (PLS). The outcome indicates that liquidity and firm size had a positive significant effect on firm value. The results were related to those of Chabachib et al. (2020) who determined that there was a positive significant effect of liquidity and firm size on firm value. However, the sampling method that was used has limitations of producing biased sample which could affect the outcome of a study. Additionally, there are diverse economic, social and financial structures relating to the present context of study hence the outcome may not be replicated.

The investigation done by Bintara (2020) dwelt on the effect of working capital turnover (WCT), liquidity, and leverage on profitability for building construction, real estate and property firms quoted in Indonesia. ROA was adopted to measure profitability in the study. It was found that liquidity and WCT had no effect on profitability while leverage had negative effect on profitability of firms. However, in addition to the contextual gap present, purposive sampling was adopted while it is potential to scholar's bias compared to other sampling methods.

The joint effect of liquidity and firm size on firm value was studied by Chabachib et al. (2020) for firms trading publicly at the ISE using secondary data for 2014-2018. A sample of 128 firms was obtained using purposive sampling. Price to book value ratio was adopted as the metric for firm value while current ratio and log of overall assets were adopted as indicators of liquidity and size of a firm respectively. Path analysis was used as the regression analysis technique in the study. It was found that the size of a firm and liquidity have a positive significant effect on firm value. However, it was noted that the study used purposive sampling which is prone to researcher's biasness. Further, the study was done in a different context economically, politically and regulatory frameworks thus affecting the replication of results to the current context.

The joint effect of liquidity and profitability on firm value was investigated by Sari and Sedana (2020) for firms listed under construction and building subsector at the Indonesia Stock Exchange whose secondary panel data was for 2013-2017. Pathway analysis was used to test the hypotheses of the study whereas a census method was adopted. The empirical results showed that liquidity had a negative effect on firm value while profitability had a positive effect on firm value. However, the empirical outcomes were different from those of Chabachib et al. (2020) who found that liquidity had a positive effect on firm value. The inconsistent findings pose an empirical gap that required further empirical investigation. Additionally, the investigation focused on construction and building subdivision only while the context has different economic and financial regulations thus the findings cannot be generalized and replicated in Kenya.

The empirical investigation by Afiezan et al. (2020) assessed the effect of liquidity and firm size on the liability policy of manufacturing firms listed at IDX using data for 2016-2019. Purposive sampling was used to obtain the sample of the study. Current ratio and natural log of assets were employed as the indicators of liquidity and firm size correspondingly while total debt capital was used as a metric for liability policy. Best linear unbiased estimator (BLUE) was employed to run the linear regression analysis. The results indicate that liquidity has a negative effect on debt policy while firm size has no significant effect on debt policy of the firms under consideration. However, unlike fixed or random effects model, the BLUE estimator is not able to handle unobserved heterogeneity which may lead to biased on unreliable results. Further, the sampling technique employed is also inclined to biasness of the researcher.

The effect of liquidity, firm size, CSR and dividend policy on firm value was evaluated by Adiputra and Hermawan (2020) for industrial firms in Indonesia using data set for 2016-2018. It was found that size of a firm and policies linked to dividends have a significant effect on firm value. On the other hand, it was indicated that liquidity and corporate social obligation have no significant effect on firm value. Fixed effects technique was used to estimate the regression of the study. However, in addition to the contextual gap evident in the study, the purposive sampling method that was employed is prone to researcher's biasness.

Investigation on the effect of liquidity, firm size, and productivity on firm value was done by Reschiwati et al. (2020) for banking firms publicly trading in Indonesia in the period 2014-2018 using funds structure as a mediator. Panel regression was used to analyze the

data using causative descriptive and associative approach. Current ratio, log of aggregate assets, and Price to book value ratio was adopted to measure liquidity, firm size and firm value respectively. It was found out that liquidity, firm size and productivity have significant effect on a firm's financial structure. Further, it was shown that funds structure does not mediate the effect of liquidity and productivity on firm value, but it mediates the effect of firm size on the value of a firm. However, the results may not be replicated in Kenya due to variations in economic and regulatory structures. Also, the banking sector has its liquidity regulated by financial regulatory agencies.

Assessment of the effect of liquidity and firm size on cash holding was done by Rasyid (2020) for manufacturing firms listed at IDE, Indonesia using data for 2016-2018. Purposive sampling method was employed in the empirical inquiry. Fixed effects model was employed to estimate the panel data regression analysis. Natural logarithm of aggregate assets and current ratio were used as proxies for firm size and liquidity. The findings indicated that liquidity had a positive significant effect on cash holding while firm size had insignificant effect on cash holding. However, the method of sampling used in the study has various limitations. For instance, the method is inadequate in permitting statistical inference since the sample may not be a representation of the study population. In panel data, the absence of statistical inference may translate to limited generalization of the results and biased estimates. Further, the findings may not be replicated in the current context due to dynamics in financial and economic regulations.

Analysis of the effect of liquidity and firm size on capital structure was investigated by Arilyn (2020) for listed firms under chemical sector at ISE using data for 2014-2018. A

sample of 8 firms out of the 13 total population was obtained using purposive sampling. The ordinary least square model was used to estimate the regression analysis. The empirical outcome indicated that liquidity had a significant effect on capital structure while firm size had insignificant effect on capital structure. However, the purposive method that was used to obtain the sample of the study, is limited in that it is likely to have researcher's bias since it highly depends on the researcher's decision-making and ruling. As a result, the subjective approach may have effect on findings of the study. Furthermore, the findings of the study may not be replicated due to variance in economic structures and financial frameworks.

The random and fixed effects techniques were adopted by James (2020) to evaluate the effect of liquidity and firm size on firm value for Nigerian listed firms in the period 2007-2016. Market value was used to conceptualize firm value, while current ratio and log of overall assets were used to measure liquidity and size of a firm respectively. It was found that liquidity has no significant effect on firm value while firm size has a significant effect on firm value. However, market value measured firm value and did not consider the values that relate to the records of the firm compared to a ratio such as price to book value. Further, the Nigerian context has different financial frameworks and economic structures hence the results may not be replicated in Kenya.

The effect of working capital investment and liquidity on profitability in a developing economy was examined by Ahkam and Alom (2019) for selected firms listed in Dhaka Stock Exchange, Bangladesh using data of 1998-2014. The ROA, total debt to total asset, and current ratio were used as indicators of profitability, working capital investment, and

liquidity respectively. The financial listed firms were omitted from the study due to their unique structure, and because they heavily depend on borrowed funds. The Generalized Method of Moments (GMM) was employed to examine the objectives of the study. The empirical results indicate that working capital investment and liquidity had a significant effect on profitability. However, from the conclusion of the study, it was found that every emerging economy has unique features and economic regulations that make replication of results difficult. Additionally, to handle endogeneity, GMM model depends on instrumental variables which may be challenging in panel data.

The joint effect of working capital turnover and liquidity on profitability was assessed by Jasmani (2019) for listed firms at PT. Sumber Cipta Multiniaga using data collected from annual published statements. Census method and survey technique were used by the study in collection and analysis of the research data. It was found out that WTO and liquidity had a simultaneous significant effect on the profitability of a firm. However, the study focused on profitability and ignored the aspects of firm value which are critical to the success of a firm and shareholders as a whole. Further, the contextual gap was evident due to variations in relation to economic, social and technological aspect hence the outcome may not be reproduced in a different context.

Path analysis technique was employed by Hirdinis (2019) to analyze the effect of firm size and financial structure on firm value and moderating effect of profitability on the association for the mining firms openly trading in Indonesia in the period 2011-2015. It was observed that firm size has a significant negative effect on firm value while financial structure has a significant positive effect on firm value. Nevertheless, it was noted that

profitability is not able to mediate the effect of firm size and financial structure. However, in addition to the contextual gap in the study, the technique of path analysis has limitations in analyzing panel data since it has time elements. The technique assumes that data values are constant and do not change over time.

2.4 Summary of Empirical Review and Research Gaps

The broad review of the existing empirical literature guided by the objectives of this study facilitated to recognize various research gaps that this study sought to address ranging from methodological, conceptual, knowledge to contextual gaps. Table 2 below presents a summary of empirical review in view of the preceding discussion and highlights the research gaps in tabular form.

In relation to methodological gaps, various studies employed Pooled Ordinary Least Square model to estimate panel data regressions. However, the model has various limitations when applied to panel data. For instance, the model assumes that the relationship between independent and dependent variable is constant over time which may not be the case in longitudinal data. Furthermore, the main conceptual gap was on the measurement of working capital efficiency. Various studies adopted cash conversion cycle ratio to measure WCE. However, the assumption of the ratio that cash flows and cash cycle are constant over a given period of time is a limitation in panel data since the cycle varies with the nature of a sector while cash flows are dependent on various economic factors within a given period. In relation to contextual gaps, the study observed that various studies that were conducted in relation to the objectives of the study observed that

they were conducted in more diverse economies and financial regulations hence the findings of the studies may not be replicated in the context of this study.

Table 1 Summary of Empirical Review and Research Gaps

Author (s)	Objective	Key finding (s)	Research Gaps	How Current Study Seeks to Fill the Gaps
Abo El-ata et al. (2023)	To assess share market liquidity as a mediator in the relationship between investor sentiment and share market unpredictability of firms quoted at Egyptian Stock Exchange in the period 2017-2021.	Stock market liquidity partially mediates the relationship between stockholder sentiment and share market volatility.	Besides the presence of contextual gap, the research adopted GARCH model which is used in time series data while the study data was panel in nature.	Random effects model was used to estimate panel data regression models.
Putri et al. (2023)	To analyze the effect of liquidity and firm size on performance for manufacturing firms quoted at Indonesia Stock Exchange using panel data of 2018-2021.	The result indicated that firm size had a significant effect on performance of a firm while liquidity had no effect on firm performance.	The regression equation and model of estimation ignored time-variance aspect while the data was panel in nature. Pooled OLS has limitations in analyzing the lagged effects and dynamics, and it assumes exogeneity which may be present in panel data thus affecting accuracy of results. Further, the sampling technique is prone to biasness of the researcher due to the predetermined criteria. Replication of results is affected by the dynamics of the contexts in relation to economic and financial frameworks.	Random effect model was used. A census method was employed.
Afrifa et al. (2022)	To evaluate working capital efficiency across	WCE of larger firms is higher compared to that of	The study measured WCE using some working capital	This study adopted working capital turnover ratio that

	firms quoted in entire 28 European associate countries for the period 2009-2018	lesser firms, greater cash allotment enhances WCE, increased competition negatively affected WCE compared to low competition, high exports and sales reduced WCE, and increase in bank credit enhanced WCE.	components: inventory holding, trade payables, and trade receivables and did not consider other components such as cash and cash equivalents. The study employed stochastic frontier analysis (SFA) methodology to estimate the models used to measure technical efficiency and assumes a clear distribution for the production function and inefficiency term.	considers various working capital components. This study adopted random effects model to estimate panel data regression models.
Kundu et al. (2022)	To investigate the effect of efficient working capital on firm value of listed firms at India in the period 2015-2019.	There is a positive relationship between working capital efficiency (WCE) and firm value.	The results were inconsistent from those of Vijayakumaran (2019) which indicated that there is a negative association between WCE and firm value posing a knowledge gap. Firm value was measured using an enterprise ratio of Enterprise Value (EV)/EBITDA. However, equity founded multiples are considered higher compared to enterprise-grounded multiples when evaluating the value of equity markets for registered firms.	The focus was on working capital efficiency and firm value. This study adopted price to book value ratio equity based multiple.
Pujiati and Averina (2022)	To determine the liquidity role in mediating the	There is indirect effect on the association of	Focus was on commercial banks at Indonesia. However,	This study focused on the selected firms listed at NSE,

	association between third party funds, adequacy ratio, and prime lending rate and productivity of moneymaking banks in Indonesia for the period 2009-2018.	variables of the study using liquidity as mediator.	the outcomes cannot be duplicated in this context owing to the unique regulation of working capital compared to the selected firms listed at NSE, Kenya.	Kenya.
Ilham et al. (2022)	To investigate the association between running of working capital, leverage and firm value for firms publicly trading at Indonesia in the period 2016-2020.	There is a positive significant effect of working capital administration on firm value while leverage has an negative significant effect on firm value.	The data was analyzed using time series technique only and did not factor in the cross-sectional components. The study was done in Indonesia which has different economic and regulatory frameworks compared to Kenya hence the findings may not be replicated.	The considered the data elements of time series and cross sectional for robust results. The study was done in the Kenyan context.
Nguyen et al. (2022)	To investigate joint effect of liquidity and corporate governance on firm value using a meta-analysis covering worldwide scope in the period 1980-2018.	It was indicated that illiquidity had a negative significant effect on firm value while corporate governance had a negative significant effect on firm value.	The results cannot be replicated in Kenya since the study focused on the worldwide approach which has various economic, political, social and financial regulatory dynamics. Further, the aim of the study was to determine the effect of liquidity and corporate governance on value of a firm. On the contrary, the conceptualization of liquidity was illiquid factors.	This study focused on the Kenyan context. Measurement of liquidity was done using current ratio.
Simbolon et al. (2022)	To investigate the effect of working capital, liquidity, firm size, and	Working capital and liquidity had no significant effect on	Since the data used was panel in nature, use of OLS model to estimate the regression had	Random effects model was used.

	solvency on profitability for firms under consumer goods industry listed at Indonesia Stock Exchange using data for 2017-2019.	profitability while firm size had statistically significant effect on profitability of firms.	potential limitations such as, it assumes that the independent variables are not correlated with error terms thus unable to handle endogeneity which is common in panel data. Furthermore, use of purposive method to obtain a sample is potential to bias by the researcher thus may affect accuracy of the estimates.	Census method was employed in the empirical investigation.
Oktaputri and Setyorini (2022)	To assess the effect of working capital efficiency, liquidity, and firm size on profitability of firms in the infrastructure sector listed at the Indonesian Stock Exchange using a dataset for 2016-2020.	WCE, liquidity and firm size had a negative significant effect on firm profitability.	The OLS that was adopted to estimate the research data that was panel in nature, assumes that the relationship amid the explanatory variables and the outcome variable is constant over time which is not the case with panel data. Further, purposive technique is potential to researcher's bias.	Random effects model was employed. Census method was used.
Jaworski and Czerwonka (2022)	To evaluate the nexus between profitability and working capital management (WCM) for firms quoted at Warsaw Stock Exchange, Poland using data for 1998-2016.	There was a non-linear significant relationship amid WC, CR and profitability. Further, CCC was found to have a linear negative relationship with profitability.	CR that was used to indicate WCM is a common ratio for liquidity. Additionally, CCC is affected by industry characteristics and therefore may differ significantly across industries and sectors. The contextual dynamics make it difficult to replicate the findings.	Working capital turnover ratio was used as a proxy for WCE.
Gunay and Cokins (2021)	To do a comparative measurement for working capital efficiency of Borsa	Working capital was efficient during the third quarter of 2020, second,	The study adopted Pooled Ordinary Least Square (OLS) to estimate the robustness of	This study adopted random effects models to estimate the regression models.

	İstanbul listed tourism firms for the period 2013-2020 during the Covid-19 period and earlier quarters.	third, and fourth quarters of the Pre-Covid-19 period. Further, it was found that firms had inefficient working capital in their first quarter.	the index method which presumes that paired higher-level objects are similar, and therefore can absolutely be 'pooled' into one population making it inappropriate for panel data. Working capital efficiency was measured using Bhattacharya (1995; 2007) index method which is used to measure technical efficiency.	This study adopted working capital turnover ratio to measure WCE.
Nurwulandari (2021	To assess the effect of liquidity, firm size, and profitability on firm value for manufacturing firms listed at Indonesia Stock Exchange using a data set for 2014-2019.	The study finds that liquidity had a negative and insignificant effect on firm value, while firm size and profitability had a positive and insignificant effect on firm value.	The findings may not be replicated in this context since the sampling technique adopted is prone to researcher's biasness and therefore estimations may be inaccurate. Further, the manufacturing firms in Indonesia operate within a different context in relation to financial regulations and economic conditions.	Census method was adopted. This study was conducted in Kenya.
Seth et al. (2021)	To evaluate the model of working capital administration effectiveness of the manufacturing industries in India by means of data envelopment analysis.	Working capital management efficiency was steady in the period under consideration. Additionally, the study found that the ability to create resources from within, size, output, age, gross domestic product,	Working capital efficiency was measured cash conversion cycle which is limited to receivables, payables, and inventory. However, use of working capital turnover ratio incorporates all the components of working capital. Furthermore, focus of	This study adopted working capital turnover ratio to measure efficient working capital. This study was conducted in Kenya.

		and interest rate have significant effect on working capital management efficiency.	the study was on manufacturing firms listed in India which have different operating cycles and structures hence limiting replication of results.	
Paramita and Andika (2021)	To examine liquidity as a mediator on the association between working capital turnover, accounts receivables turnover, and size of a firm on productivity of firms quoted at PT. Rahma Furniture and CakrawanaFurnindo, Semarang. The financial data that was collected was for the period 2016-2020.	There was no meditating effect of liquidity on the relationship between working capital turnover and productivity but there is a partial intervening effect of liquidity on the association among receivables turnover and profitability.	The study considered normality, multicollinearity and heteroscedasticity tests only and did not consider autocorrelation and stationarity tests which are key in panel data to assure validity of estimates.	This study considered the key tests of a panel data.
Rata and Amtiran (2021)	To investigate the effect of working capital effectiveness on productivity of the Sami Jaya Credit Cooperative in Kupang in the period 2015-2019.	It was established that working capital was inefficient during the period under analysis which affected productivity of firms.	The results may not be replicated in this context since the focus was on Jaya Credit Cooperative whose financial structures are different from those of selected listed firms at NSE, Kenya. The focus of study was limited to productivity of firms and did not deliberate on firm value.	The study focused on the firms listed at NSE, Kenya. The focus was on firm value.
Purnama et al. (2021)	To investigate liquidity and its role as a mediator	Liquidity has no mediating effect on the	Liquidity was measured using cash ratio and it excludes	Current ratio was used to estimate liquidity.

	on the association among risk related to credit, market risk and financial productivity for firms at Badung Regency, Indonesia in the period 2017-2019.	correlation among the risks related to credit and market and the productivity of firms.	receivables while it is a key component of working capital. Furthermore, the frameworks related to economic, political and social are different to those of Kenya, hence the findings may not be replicated in this context.	The study was done in Kenya.
Obaje and Abdullahi (2021)	To assess firm size as a moderator on the relationship between board organization and financial productivity of listed deposit taking banks in Nigeria in the period 2012-2019.	Firm size has a negative significant effect on the relationship between the structure of a board and financial productivity of banks as measured by ROA.	The study focused on the board structure and productivity of banks. Further, the dynamics in Nigeria in relation to economy, social and regulatory frameworks are different from those of Kenya. Therefore, the findings may not be replicated in the current context.	The focus of this study was on working capital efficiency and its effect on firm value, Kenya.
Vu Thi and Phung (2021)	To study the joint effect of working capital, capital structure and corporate governance on financial productivity of SMEs in Taiwan in the period 1995-2018.	It was found that working capital, corporate governance and capital structure had a negative effect on the productivity of the SMEs.	In addition to the contextual gap in the study relating to the diverse economic structures hence results may not be replicated in this context, working capital was measured using cash conversion cycle ratio which is limited to receivables, payables and inventory elements compared to working capital turnover ratio that considers all the current assets.	Working capital turnover ratio was used to conceptualize working capital efficiency. The study was done in Kenya.
Dewi et al. (2021)	To assess liquidity, profitability and firm value using financial	It was observed that liquidity and profitability of a firm have no direct	Besides the fact that Indonesia has diverse economic structures compared to those	Random models were used in this study.

	distress as a mediator for industrial open trading firms in Indonesia in the period 2016-2020.	effect on firm value. Financial distress was found to be a mediator between profitability and firm value with liquidity as a predictor.	of Kenya, the PLS technique used in the study does not clearly take into account time reliance or serial association in panel data compared to fixed or random effects models.	
Shaik (2021)	To evaluate the role of firm size as a moderator in the relationship amid working capital and profitability of manufacturing firms quoted at Tadawul Stock Exchange, Saudi Arabia using data of 2008-2019.	It was found that components of working capital positively and significantly affect the profitability of a firm while using all the performance indicators except for GROP that showed a negative significant association. Firm size was also found to have a significant effect on the association.	The estimation model adopted is not appropriate for panel data since it does not account for the time component which is key. Further, the indicators of working capital were relatively of low level data and not all the components like receivables and cash were considered.	This study adopted random effects estimator that has the ability to handle unobserved heterogeneity in panel data. Working capital turnover ratio was used to measure WCE.
Arsyad et al. (2021)	To investigate of the effect of liquidity, activity ratio and profitability on dividend payout ratio for manufacturing firms listed at Indonesia Stock Exchange using data of 2015 – 2019.	Liquidity and activity ratio had no significant effect on dividend policy except for profitability that had significant effect.	The predetermined criteria that was used to obtain the sample may be prone to researcher's biasness. Additionally, due to the diverse contextual aspects of economic and financial structures, there is no replication of results in the current study.	Census method was adopted in the study.
Senan et al. (2021)	To evaluate the determinants of working capital management and how they improve the performance of Indian banks was examined by	The empirical findings indicated that the most important elements of working capital included; net profit margin, fiscal policy, profit after tax,	The results may not be replicated given the diversity in economic, social, and political aspects of India compared to the context of this study.	The study was done in Kenya.

	using a balanced panel data of 2008-2018.	and the cycle of WC that had effect on performance of banks as measured by ROA. On the other hand, using ROE as the metric for performance, return on capital employees, net profit margin, size of assets, and liquidity ratio had a significant positive effect on bank performance.		
Muigai and Nasieku (2021)	To determine the effect of working capital administration on financial distress of selected firms listed at NSE, Kenya and was assessed using panel data for 2009-2018.	The empirical results showed that CCC had a significant positive effect on the financial distress of firms. There was a negative significant effect of inventory holding period on the distress index. Further, it was found that the receivables period had no significant effect on financial distress.	Altman's Z-score has various limitations when used in panel data analysis. For instance, the index assumes that the coefficients used in the index are constant over time while panel data coefficients vary over time across individuals. Therefore, ignoring the time-varying aspects in panel data is critical and could lead to biased and inaccurate results. Additionally, since financial distress is not static over time but rather, it is dynamic in nature, use of the index may only focus on static part of financial distress thus ignoring the changes over time. On the other hand, CCC varies across firms in different industries and therefore may not give	PBV ratio was used as a proxy for firm value. Working capital turnover ratio was used as a metric for WCE.

			sufficient state of WCM across sectors.	
Setiawan and Pereira (2021)	To evaluate the mutual effect of liquidity, firm size and capital structure on profitability for firms under the mining sector at Indonesia using data of 2013-2019.	The results indicated that DER, LTDA, and FIRMSIZE had a significant effect on ROE. On the other hand, STDA and CR were insignificant effect on ROE.	While the study used panel data, the model of estimation did not consider the time-variation element since Pooled OLS ignores time component. Additionally, the purposive sampling method used is potential to biasness which could affect the accuracy of the findings. The results may not be replicated in this context due to dynamics on the context of the study	Random effects model was used. A census method was adopted.
Afinindy et al. (2021)	To investigate the effect of liquidity, firm size, and profitability on firm value for firms under food and beverage sector quoted at IDX, Indonesia using data of 2013-2018.	Liquidity and firm size had no significant effect on firm value while profitability had a statistically significant effect on firm value.	PLS estimation technique assumes that the data is only cross-sectional ignoring the dynamics of individual-level which are present in panel data. The sampling technique has a potential of researcher's biasness which may affect the results and conclusions of an empirical study. Further, the dynamics in context concerning the regulatory structures and economic factors make replication of findings difficult.	Random effects model was employed. A census method was used.
Hameer et al. (2021)	To investigate the effect of working capital administration on performance of a firm for	It was found that inventory days and receivables days had a negative significant	The conceptualization of working capital management was based on three components only and ignored	Random effects model was employed. Working capital turnover was

	quoted manufacturing firms in Malaysia using panel data for 2009-2018.	association with performance. Further, payables days were found to be insignificant on their association with firm performance.	other elements like cash turnover. Additionally, the Pooled OLS does not consider time-varying distinct effects since it assumes that the association between explanatory and outcome variable is constant over time.	used as a proxy for WCE.
Ibrahim and Isiaka (2021)	To assess the effect of working capital management on financial performance for selected publicly trading firms at Nigerian Stock Exchange using a dataset for 2014-2018.	There was a statistically significant effect of administration of working capital on financial performance.	In addition to the contextual dynamics that would make it difficult to replicate the findings, the stratified method applied on panel data assumes that strata remain stable over a period of time. On the other hand, change of strata may translate to the primary stratification being not as much representative, potentially leading to bias.	Census method was adopted.
Arnaldi et al. (2021)	To determine the Effect of working capital administration policies on profitability for manufacturing SMEs at Czech Republic, Central Europe using a dataset for 2014-2018.	Longer repayment period had no effect on profitability. The DSI and DPO had a negative significant effect on firm's profitability.	The focus of the empirical investigation was on manufacturing firms based in Europe which has different economic and financial structures hence replication of the findings may not be applicable in this context. The indicators of WC policies were limited to payables, receivables and inventory ignoring other elements such as cash and cash equivalents	Working capital turnover ratio was employed as a proxy for WCE.

			which have a key role in operations and administration of working capital.	
D'Amato and Falivena (2020)	To evaluate moderating effect of firm size in the relationship between corporate social responsibility and firm value of Western European quoted firms.	It was found that firm size moderates the link between CSR and firm value.	The results may not be replicated in Kenya given that Europe is a more developed country and the financial regulatory structures are different. Furthermore, the focus was on CSR and firm value of the Western European openly trading firms.	The study was done in Kenya and the focus was on WCE and firm value.
James (2020)	To evaluate the effect of liquidity and firm size on firm value for Nigerian listed firms in the period 2007-2016.	It was found that liquidity has no significant effect on firm value while firm size has a significant effect on firm value.	The market value approximated firm value and did not consider the values that relate to the records of the firm. Further, the Nigerian context has different financial frameworks and economic structures hence the results may not be replicated in Kenya.	Price to Book Value ratio was used to estimate firm value. The study was done in Kenya.
Alsufy et al. (2020)	To investigate liquidity as a mediator on the correlation between earnings quality and market value of firms quoted in Amman stock market in Jordan in the period 2012-2017.	Earnings quality and liquidity had a positive contribution on the market value of share prices while liquidity mediates the correlation between earnings quality and market value.	Liquidity was measured using quick ratio which takes away inventories. The study measured market value using share prices only and did not consider the outstanding shares is a key component of market value.	Liquidity was measured using current ratio. Price to book value ratio was used to measure firm value.
Tahir et al. (2020)	To assess liquidity as a mediator in the relation between corporate	Liquidity mediates the link amid corporate governance and	Pakistan operates in a different monetary and economic regulations compared to Kenya	The study was conducted in Kenya.

	governance and productivity of selected sectors in Pakistan in the period 2010-2018.	productivity.	and therefore, the findings may not be replicated in Kenya.	
Ssendagire (2020)	To study firm size as a moderator on relationship between working capital volume and firm productivity of industrial firms in Uganda for a period of five years.	Firm size has no moderating effect on the association between between working capital capacity and firm productivity.	The working capital level was indicated using cash position ratio which is only limited to cash as the current asset disregarding other current assets such as receivables and inventory which are key on a level of firm's working capital. The findings were inconsistent with those of Dalci et al. (2019) and Pervaiz and Akram (2019) which shown that size of a firm moderates the relation between working capital administration and firm productivity posing a knowledge gap.	This study adopted working capital turnover ratio that considers all working capital components.
Adiputra and Hermawan (2020)	To evaluate the joint effect of liquidity, firm size, corporate societal responsibility, and policy related to dividend on firm value for industrial firms in Indonesia in the period 2016-2018.	Size of a firm and policies linked to dividends have a significant effect on firm value. On the other hand, it was shown that liquidity and corporate social obligation have no significant effect on firm value.	In addition to the contextual gap evident in the study, the purposive sampling method that was employed is prone to researcher's biasness.	Census method was used in this study. The study was done in Kenya.
Udenwa et al. (2020)	To study the effect of working capital administration on the	Working capital administration has a negative significant effect	In addition to the contextual gap, the CCC ratio is limited to receivables, payables and	Working capital turnover ratio was used to measure WCE.

	market value for industrial firms in Nigeria in the period 2008-2017.	on the market value.	inventory and does not consider other current assets matched with working capital turnover ratio.	
Bintara (2020)	To assess the joint effect of working capital turnover (WCT), liquidity, and leverage on the ability of a firm to gain high yields on building construction, real estate and property firms quoted in Indonesia in the period 2013-2018.	Liquidity and WCT have no effect on profitability while leverage has negative effect on profitability of firms.	In addition to the contextual gap present, purposive sampling was adopted while it is potential to scholar's bias compared to the census method.	This study was done in Kenya and a census was taken.
Reschiwati et al. (2020)	To investigate the joint effect of liquidity, firm size, productivity on firm value of banking firms publicly trading in Indonesia in the period 2014-2018 using funds structure as a mediator.	It was found out that liquidity, firm size and productivity have significant effect on a firm's financial structure. Further, it was shown that funds structure does not mediate the effect of liquidity and productivity on firm value, but it mediates the effect of size of a firm on value of a firm.	The results may not be replicated in Kenya due to variations in economic and regulatory structures. further, the banking sector has its liquidity regulated by financial regulatory agencies.	The study was done in Kenya. The study focused on selected firms listed at NSE whose liquidity is not controlled by regulatory institutions.
Chabachib et al. (2020)	To investigate the effect of liquidity and firm size on firm value for firms trading publicly at the ISE using secondary data for 2014-2018.	It was established that the size of a firm and liquidity have a positive considerable effect on firm value.	The study used purposive sampling which is prone to researcher's biasness. Further, the study was done in a different context economically, politically and regulatory frameworks thus affecting the	This study used census method where all the firms on the target population were analyzed. This empirical investigation was done in Kenya.

			replication of results to the current context.	
Afiezan et al. (2020)	To assess the effect of liquidity and firm size on the liability policy of manufacturing firms listed at IDX using data for 2016-2019.	Liquidity has a negative effect on debt policy while firm size has no significant effect on debt policy of the firms	The BLUE estimator is not able to handle unobserved heterogeneity which may lead to biased on unreliable results. Further, the sampling technique employed is also inclined to biasness of the researcher.	Random effects model was used and is able to handle the limitations. This study employed census method
Hapsoro and Falih (2020)	To establish the effect of firm size and liquidity on firm value of ASEAN region firms in the Osiris database for the period 2015-2018.	Liquidity and firm size have a positive significant effect on firm value.	The sampling method that was used, has biasness limitations which could affect the outcome of a study. Additionally, there are diverse economic, social and financial structures relating to the present context of study hence the outcome may not be replicated.	This study employed census method. This empirical investigation was done in Kenya.
Sari and Sedana (2020)	To investigate the joint effect of liquidity and profitability on firm value for firms listed under construction and building subsector at the Indonesia Stock Exchange whose secondary panel data was for 2013-2017.	Liquidity had a negative effect on firm value while profitability had a positive effect on firm value.	The empirical outcomes were different from those of Chabachib et al. (2020) who found that liquidity had a positive effect on firm value. The inconsistent findings pose an empirical gap that required further empirical investigation. Additionally, the investigation focused on construction and building subdivision only while the context has different economic and financial regulations thus the findings	The aim of this empirical study was to assess the mediating role of liquidity on the association between WCE and firm value for selected firms that are quoted at NSE, Kenya.

			cannot be generalized and replicated in Kenya.	
Kijkasiwat and Phuensane (2020)	To investigate the moderating effect of firm size on the association between innovation and performance of a firm for SMEs in Central Asia and Eastern European.	Firm size had a statistically significant moderating effect on the relationship between innovation and performance of a firm.	The study adopted Stratified Sampling technique. The focus was on SMEs, and therefore the findings may not be replicated in this context since their financial structure and regulations is different from that of listed firms. Moreover, Eastern Europe and Central Asia are more developed countries compared to Kenya.	Census method was employed. The focus of this empirical study was on selected firms listed at NSE, Kenya.
Hussain et al. (2020)	To assess the role of firm size as a moderator in capital structure of firms for enterprises listed in Pakistan using data of 2013-2018.	Firm size had a statistically significant moderating effect on the capital structure of firms.	Since the sample of the study was 29 firms for a period of six years, the analysis may have been exposed to small sample biasness because panel analysis requires relatively large number of observations. Additionally, Pakistan has a more developed economy compared to the current context given diverse financial structures and regulatory frameworks.	The target population was 41 firms for a period of 10 years. The context was selected firms listed at NSE, Kenya.
Baños-Caballero (2020)	To determine the nexus between net working capital and firm value with a sample of 30 countries for a data of	Net working capital had a positive significant effect on the value of firms.	From the list of study population, the empirical investigation considered developed countries such as United States, United	Random effect model was used in this study. This empirical investigation was done in Kenya.

	1995-2013.		Kingdom, Canada, Germany, Belgium, Singapore, and many others hence the outcome may not be replicated in this context. Additionally, the Fama-French model assumes constant risk premiums for factors over a given period of time. Ideally, risk premiums vary over time and therefore, the model may not be able to capture the fluctuating risk situations and their effect on assets in longitudinal data.	
Högerle et al. (2020)	To investigate the growth of working capital management and the effect it has on shareholder value and profitability for listed firms in Germany using panel data for 2011-2017.	Efficient WCM declined over a period of time while a shorter CCC was found to have a positive significant effect on shareholder value and profitability.	CCC has limitations of variations across industries where some have shorter CCC while others have a longer one depending on the nature of the firm. Therefore, it may provide inaccurate estimations when comparing firms in different industries. Additionally, Germany is a more developed economy compared to the current context hence the findings may not be replicated.	Working capital turnover ratio was used as an indicator of WCE.
Pham et al. (2020)	To assess the factors of working capital management and their effect on profitability of steel firms listed at stock exchange in Vietnam	There was a strong effect of WCM on profitability of firms. Further, WCM factors comprising of days' inventory outstanding, days payable	The empirical results may not be replicated in Kenya. Additionally, the focus was on management aspects of working capital and did not	The study was based in Kenya. The focus was on efficient WC and its effect on firm value.

	using panel data of 2010-2019.	outstanding, days sales outstanding, current ratio, size and growth had a positive effect on profitability. On the other hand, cash conversion cycle and financial leverage had a negative effect on profitability. Notably, the cash conversion cycle had an negative effect which was negligible.	consider the efficiency of WC and profitability.	
Rasyid (2020)	To assess the effect of liquidity and firm size on cash holding for manufacturing firms listed at IDE, Indonesia using data for 2016-2018.	The findings shown that liquidity had a positive significant effect on cash holding while firm size had insignificant effect on cash holding.	The method of sampling used in the study has various limitations. For instance, the method is inadequate in permitting statistical inference since the sample may not be a representation of the study population. In panel data, the absence of statistical inference may translate to limited generalization of the results and biased estimates. Further, the findings may not be replicated in the current context due to dynamics in financial and economic regulations.	Census method was used in this study.
Arilyn (2020)	To analyze the effect of liquidity and firm size on capital structure for firms quoted under chemical	Liquidity had a significant effect on capital structure while firm size had insignificant effect on	The purposive method that was used to obtain the sample of the study, is limited in that it is likely to have researcher's	Census method was adopted.

	sector at Indonesia using data for 2014-2018.	capital structure	bias since it highly depends on the researcher's decision-making and ruling. As a result, the subjective approach may have effect on findings of the study. Furthermore, the findings of the study may not be replicated due to variance in economic structures and financial frameworks.	
Kabir et al. (2020)	To establish the nexus between working capital and profitability of firms listed at Karachi Stock Exchange using a dataset for 2016-2019.	Working capital had a negative significant association with firm profitability.	The single-direction ANOVA used for analysis disregards time dynamics by handling every observation as independent and overlooks autocorrelation which is regularly existent in panel data. As a result, this may translate to unbiased estimates and inaccurate inferences. Furthermore, the findings may not be replicated in this context due to diversity of economic structures.	Random effects model was used in this empirical investigation.
Ali et al. (2020)	To investigate the effect of administration of working capital on profitability of listed firms in Pakistan using panel data of 2007-2018.	There was a positive significant association between ICP, PDP and ROA. The CCC was found to have a negative significant effect on ROA while RCP had a negligible effect on ROA.	Use of CCC as an indicator for WCM in panel data is faced by limitations that the cycle varies across industries and therefore comparison would give inaccurate results. Further, the empirical findings may not be replicated in this context due to economic and financial regulatory dynamics.	Working capital turnover was used as a proxy for WCE.

Ayunku and Ekokeme (2020)	To evaluate the nexus between working capital management, liquidity and seasonality of stock market amid firms listed in Nigeria using data for 2011-2018.	The empirical findings showed that the stock market was efficient in Nigeria since it could not be predicted by firm liquidity and WCM.	However, the results may not be replicated in Kenya due to variance in regulatory frameworks and economic conditions. Further, the cash and cash equivalents were ignored as indicators of WCM.	Working capital turnover ratio was used as an indicator for WCE.
Vijayakumaran (2019)	To evaluate efficient working capital administration on firm value of selected firms listed in China under the period 2004-2013.	Working capital efficiency has a negative effect on firm value as evaluated by net trade cycle on firm value.	Working capital efficiency was evaluated using net trade cycle and its elements such as days' sales unpaid, days' inventories on-hand, and days' payables unsettled. The research was done in China whose financial regulatory processes and economic structures vary from the Kenyan context.	This study adopted working capital turnover ratio that considers all working capital components. This study was conducted in Kenya.
Dalci et al. (2019)	To establish the effect of firm size as a moderator on the correlation between working capital administration and productivity of selected firms in Germany for the period 2006-2013.	Firm size moderates the association regarding working capital and productivity.	Working capital management was indicated using cash conversion cycle which does not incorporate all the elements of working capital compared to working capital turnover ratio.	This study used working capital turnover ratio to measure WCE.
Prasad et al. (2019)	To assess working capital efficiency and its effect on financial performance of quoted firms whose data was found in the CMIE Prowess database during the year 2017.	Working capital efficiency multiplier can measure profitability directly in evaluation of working capital efficiency (WCE).	The new direct measure of WCE was profitability in nature. This implies that the measure may not apply in studies where concepts of firm value are under consideration since the measure is limited to	This study focused on firm value as the main goal of a firm and WCE was measured using working capital turnover ratio. This study focused on selected

			profitability. Focus was on firms found in the Prowess database which is mainly the Indian firms. However, the findings of the study may not be replicated in this context due to diverse economic structures and regulations.	firms listed at NSE.
Bawono and Falakh (2019)	To assess intervening effect that liquidity and profitability had in the relationship concerning financial ratio and performance of banks in Indonesia for the period 2015-2018.	Liquidity and profitability have no mediating effect on the relation between financial ratio and banking performance.	The study measured liquidity using financing to deposit ratio (FDR). However, FDR is limited to total assets funded by clients' deposits and ignores other sources of bank funding such as interbank financing, or crisis liquidity funding given by central bank which is not the case with the current ratio. Focus was on banking performance whose working capital regulation is different from the selected firms listed at NSE, Kenya	This study measured liquidity using current ratio. The focus of the study was on firm value.
Pervaiz and Akram (2019)	To establish the role that firm size plays as a moderator on the relation between working capital management and firm productivity of selected firms listed in Pakistan	Firm size has a negative moderating effect on the correlation between working capital administration and firm profitability.	Working capital management was measured using cash conversion cycle ratio which does not consider entire elements of working capital. The Pooled OLS brings	This study measured working capital efficiency using working capital turnover ratio. This study adopted random

	Stock Exchange in the period 2013-2018.		together all the observations and disregards the aspect of time series which is key in panel data hence has effect on the estimates.	effects models to estimate the regression models.
Mahmood et al. (2019)	To assess firm size as a moderator on the correlation between working capital finance and productivity of Chinese listed firms in the period 2000-2017.	There is a strong moderating effect of firm size on the association between working capital finance and profitability.	The first step transformation of GMM technique may not be adequate in cases of unbalanced data. The results of the study may not be replicated in Kenya due to varying economic, political and regulatory frameworks with those of China.	This study adopted random effects models to estimate the regression models. The study was conducted in Kenya.
Buallay and Hamdan (2019)	To investigate the role that size of a firm plays as a moderator on the correlation between corporate governance and intellectual capital efficiency of stock market firms at Saudi in the period 2012-2014.	Firm size moderates the relationship between corporate governance and intellectual capital efficiency.	The study used pooled estimation model on panel data. However, the pooled model has limitations of estimating data that has time series aspects. The focus was on the firms quoted in Saudi stock market which has different economic structures and financial regulations from those of this context. Therefore, the replication of results may not apply in Kenya.	This study adopted random effects models to estimate the regression models. The study was conducted in Kenya.
Al-Mawsheki et al. (2019)	To study the effect of working capital organization efficiency and working capital	WCE has a negative significant effect on the productivity of firms. Further, it was shown that	Cash conversion cycle was employed to estimate WCE in the study. However, the CCC ratio does not include all the	Working capital turnover ratio was used to estimate WCE.

	guidelines on firm productivity of industrial firms in Malaysia in the period 2010-2016.	policies governing working capital had a positive and significant effect on the productivity of a firm.	elements of working capital compared to working turnover ratio. The study was done in Malaysia and was limited to the manufacturing firms making replication of results difficult in Kenya.	The study was done in Kenya.
Hirdinis (2019)	To study the effect of firm size and financial structure on firm value while productivity moderated the association for the mining firms openly trading in Indonesia in the period 2011-2015.	It was observed that firm size has a significant negative effect on firm value while financial structure has a significant progressive effect on firm value. Nevertheless, it was noted that productivity is not able to mediate the effect of firm size and financial structure.	In addition to the contextual gap in the study, the technique of path analysis has limitations in analyzing panel data since it has time elements. The technique assumes that data values are constant and do not change over time.	Random effects model was used to estimate the models.
Jasmani (2019)	To assess the effect of working capital turnover and liquidity on profitability at PT. Sumber Cipta Multiniaga using data collected from annual published statements.	Working capital turnover and liquidity had a simultaneous significant effect on the profitability of a firm.	The study focused on profitability and ignored the aspects of firm value which are critical to the success of a firm and shareholders as a whole. Further, the contextual gap was evident due to variations in relation to economic, social and technological aspect hence the outcome may not be reproduced in a different context.	This empirical study focused on the aspects of firm value and how it is affected by WCE. This evaluation was done in Kenya.
Ahkam and Alom	To determine the effect of	Working capital	From the conclusion of the	Random effects model was

(2019)	working capital investment and liquidity on profitability in a developing economy for selected firms listed in Dhaka Stock Exchange, Bangladesh using data of 1998-2014.	investment and liquidity had a significant effect on profitability.	study, it was found that every emerging economy has unique features and economic regulations that make replication of results difficult. Additionally, to handle endogeneity, GMM model depends on instrumental variables which may be challenging for panel data.	adopted for estimation.
Van et al. (2019)	To evaluate the effect of efficient working capital on firm performance by for listed firms in Vietnam within the period 2009-2018.	Ideal working capital had a significant effect on performance of a firm as measured by ROA.	A key assumption of the GSL is that the specification of the model is accurate, however, due to variations of panel data, if the model is not correctly specified, then the outcome of the estimation is subject to biasness or inefficiency. Also, due to variations in contextual factors such as economic and financial regulations, the results may not be replicated in this context.	Random effects model was adopted following a model specification test.
Soukhakian and Khodakarami (2019)	To investigate the effect that WCM had on performance of manufacturing firms listed at Iran, using panel data of 2010-2016.	There was a negative significant effect of the WCM on the performance of a firm.	The limitation of CCC as an indicator of WCM is that there are variations on the length that a firm takes to acquire and convert stock into cash across various firms in different sectors. The focus of the empirical investigation was on manufacturing firms hence the findings may not be replicated in this context. While two-	Working capital turnover ratio was used as a metric for WCE. Random effects model was used to estimate the regression.

			stage least square can be used to control endogeneity, the main limitation is that increase of squared terms may complicate a model which may result in overfitting. This risk is popular in panel data due to the presence of time-specific trends and individual-specific trends.	
Alsulayhim (2019)	To evaluate the nexus between management of working capital and profitability of selected firms listed at the Saudi Stock Exchange for a data of 2007-2016.	From the empirical results, it was found that there was a positive significant association between WCM and profitability of the selected listed firms.	The pooled OLS estimator has various limitations especially when handling panel data. For instance, while panel data has time-varying individual effects, the assumption of the pooled estimator is that the variables are constant over time for all individuals. Therefore, if there is a time varying aspect of individuals, the model may give biased and inaccurate estimates. Also, the pooled OLS is not able to control endogeneity in data set which is common in a panel data which may translate to inconsistent estimates. Further, the CCC measurement of WCM assumes that there is a constant flow of cash throughout the financial period in a firm while various firms face seasonality in their	Random effects model was used in this study. Working capital turnover ratio was used as a proxy for WCE.

			operations.	
Omanga and Oluoch (2019)	To assess the effect of administration of working capital on tax efficiency for selected firms listed at NSE, Kenya using panel data for 2013-2018.	The findings showed that there was a positive significant effect of management of cash and inventory on tax efficiency. The management of payables and receivables was found to have an negative significant effect on tax efficiency.	The focus of the empirical investigation was on tax efficiency as the outcome variable while other main output of a firm was not considered in the evaluation.	The main focus of this empirical study was firm value as the main goal of firms.
Shubita (2019)	To evaluate large and small scale Jordanian Industrial quoted firms in relation to the effect of that working capital management (WCM) has on cash holdings using panel data for 2006-2016.	WCM predicted strongly the cash holdings of firms. Further analysis indicated that determinants of cash holding varied significantly in relation to large and small scale firms.	The results may not be replicated in this context due to economic and financial structural differences. Additionally, the cycle of cash conversion varies across sectors hence comparison in panel data may not give accurate results.	Working capital turnover ratio was employed as an indicator for WCE.
Shah and Arif (2018)	To evaluate working capital efficiency and its effect on firm value of publicly traded firms at Karachi Stock Exchange in Pakistan over a period 2004-2016.	Working capital efficiency had a positive effect on firm value.	Fama and French valuation model was adopted on the methodology which is limited when handling low average returns which may the issue with some of the listed firms. Pakistan is highly ranked in relation to Gross Domestic Product compared to Kenya hence the findings may not be replicated in this context.	Random effects model was adopted for estimation This study was conducted in Kenya.
Daniya (2018)	To evaluate the	DCP and CPP had a	The OLS estimation technique	Random effect model was

	relationship between administration of working capital and financial performance for listed conglomerate firms in Nigeria using a panel dataset for 2005-2014.	negative significant association with ROI. The association between CCC and ROI was positive but insignificant.	used has various limitations when handling panel data which may affect the estimates and accuracy of findings. For instance, OLS ignores time-fluctuating distinct effects which is key in panel data. The CCC indicator of WCM has variations based on the industry which may affect the results.	employed. Working capital turnover ratio was used as the indicator for WCE.
Das et al. (2018)	To evaluate the interaction and effect of working capital efficiency with liquidity for pharmaceutical listed firms in India using data set for 2012-2017.	There was insignificant effect of WCE on liquidity of firms.	The OLS estimation technique did not consider the time-varying of distinct effects which is common in panel data. This may affect the accuracy of the estimates and give biased or incorrect results. CCC as an indicator of WCE is limited to receivables, payables, and inventory components of WC and its main assumption is that there is constant cash flow across the financial year of firms which may not be the case due to changes in operations.	Random effect model was employed. Working capital turnover ratio was used as the indicator for WCE.

Source: Review of Empirical Literature, 2023

2.5 Conceptual Framework

The insights resulting from the review of the existing literature formed a foundation of the conceptual framework which is designed to show the relationship of variables in relation to the objectives of the study. Firm value was the dependent variable, working capital efficiency was the independent variable, liquidity was the mediating variable, and firm size was the moderating variable.

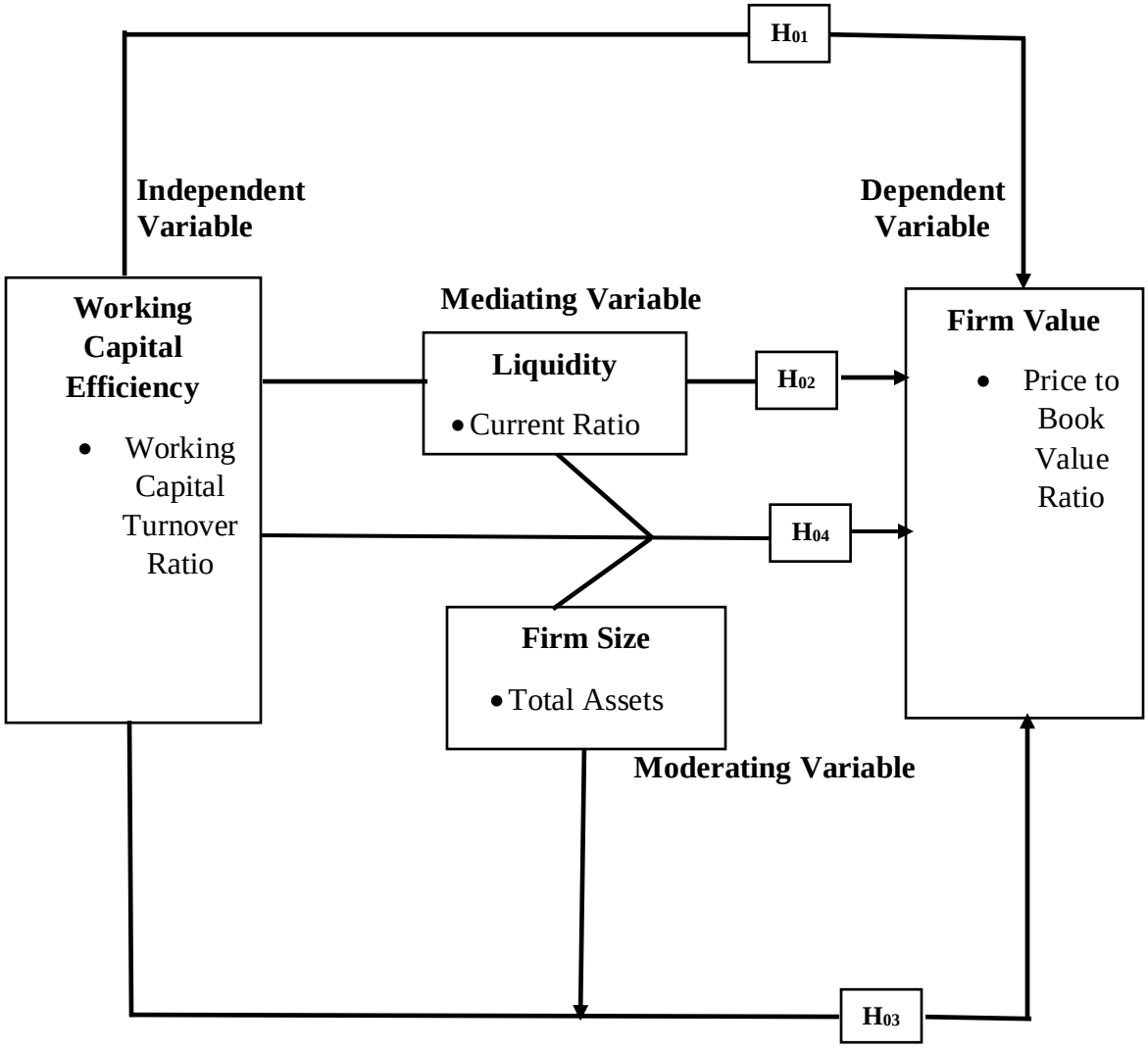


Figure 2: Conceptual Model

Source: Author, 2023

The conceptual model in figure 1 above displays the relationship regarding the variables of the study. Firm value was the dependent variable and was measured using price to book value ratio. Working capital efficiency was the independent variable and was measured using working capital turnover ratio. Liquidity in this study was a mediator and was measured using current ratio. Further, firm size is the moderating variable and was measured using natural log of total assets. The study also sought to establish the joint effect of working capital efficiency, liquidity and firm size on firm value of selected firms quoted at Nairobi Securities Exchange, Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents a discussion of scientific techniques which were adopted by the study to guide on how the research was done in order to achieve its objectives. Precisely, the chapter presents the research philosophical underpinning that was based on the assumptions of the study. To achieve meaningful, reliable and valid outputs, the chapter presents the research design, empirical models, target population, data collection instrument, data collection procedure, data analysis and presentation, and diagnostic tests that were adopted. The operationalization and measurement of variables, and ethical considerations are also presented in this chapter.

3.2 Research Philosophy

Research philosophy is the structure of beliefs and assumptions employed in advancement of knowledge in a particular field (Saunders et al., 2015). This study adopted positivism as its research philosophy. Research philosophy can be expressed using ontology which demonstrates nature of realism, and epistemology which is concerned with how researchers obtain reality (Abu-Alhaija, 2019). Therefore, when choosing the research philosophy, the primary consideration is the assumptions which guide a research study.

Positivism philosophy is founded on two main assumptions: objectivity and generalizability (Saunders et al., 2015; Abu-Alhaija, 2019). The philosophy was recommended by Creswell (2009) since positivists evaluate a problem to identify and measure the elements that have an effect on particular outcomes (Creswell, 2009).

According to Saunders et al. (2015) positivists are able to enhance objectivity since the data they collect is measurable and quantifiable, and they can use a theory to develop hypothesis which is tested scientifically. Therefore, positivism philosophy helps to give details on cause and effect relationships hence enabling prediction. The philosophy was also adopted by various scholars such as Muthoni (2019) and Kangea et al. (2022) in their quantitative studies.

The cause and effect concept of working capital efficiency and firm value of selected firms in the NSE share market was presented in this study. Further, the study was founded on the assumption that the outcomes of this quantitative research were based on objectivity, observable and measurable facts which are supported by positivism philosophy. Assalahi (2015), notes that the knowledge derived by positivists is regarded as measurable and observable. The study equally tested hypotheses to confirm or reject the statistical significance of the defined variables in relation to firm value. According to Ikram and Kenayathulla (2022), positivism philosophy is commonly used in quantitative studies where techniques with systematic processes as natural sciences can be applied to study social sciences.

The underlying assumptions of this study made positivism philosophy applicable and significant to adopt. For instance, the study assumed that its investigations, findings and interpretation of the results would be based on objectivity with no room for individual biases. Creswell (2009) notes that positivists are concerned with objectivity of entire research process in a study. Furthermore, the research data that was collected from the annual reports and NSE handbooks was assumed that it would be observable for hypothesis

testing hence verifiable. Positivists believe that the knowledge that comes up from a research process should be verifiable since it is observable and measurable (Assalahi, 2015). This means that empirical evidence should be able to test and prove the understanding and perceptions resulting from scientific claims in view of the positivism approach.

3.3 Research Design

Research design is the road map or procedure of an investigation that guides on how research activities are to be carried out in order to achieve specific objectives (Creswell, 2009; Blumberg et al., 2014; Jackson et al., 2015). This study employed explanatory research design. Explanatory research design is non-experimental in nature which does not only seek to associate the observable variables, but endeavours to show the depth by explaining the occurrence of a phenomenon (Arango-Morales et al., 2019). Chen et al. (2020) indicates that explanatory research is commonly used to test research hypotheses that are quantitative in nature in addition to looking for explanations or cause and effect of certain relationships.

The explanatory design was also used by various scholars in their quantitative studies such as Omagwa and Muathe (2019) and Onsongo et al. (2020). The relevance of research design to this study was that the objective was to identify the degree and nature of cause and effect relationship among working capital efficiency, liquidity, firm size and firm value. Also, as indicated by Chen et al. (2020) the design is applicable in testing of hypotheses of quantitative data that aims at elucidating cause and effect of given relationships. Therefore, the research data of the study that was used in the analysis was

quantitative in nature and had cross sectional and time series elements and various hypotheses of the study were tested to inform the relationships of variables.

3.4 Empirical Model

Various models may be adopted to analyze quantitative data including logit and probit models, discriminant analysis, and regression analysis. Logit and probit, and discriminant analysis are suitable for analysis of categorical Y variable classification (Orumie & Bartholomew, 2022). However, the main benefit of panel data regression analysis is that it allows researchers to acquire unlimited perceptions into the dynamics of relationships between variables over time while controlling for unobserved individual heterogeneity and handle possible biases (Botzen et al., 2019). Therefore, the study used panel data regression analysis to analyze data. The first empirical model was to test for H_{01} where working capital efficiency was regressed on firm value as shown below:

The expectation of the study was that working capital efficiency there is a links to firm value. The study expected that working capital efficiency plays a critical role in value creation of the selected firms.

$$\boldsymbol{FV_{it} = \beta_0 + \beta_1 WCE_{it} + \varepsilon_{it}} \quad \textbf{.....3.1}$$

Where:

$\boldsymbol{FV_{it}}$ = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

$\boldsymbol{WCE_{it}}$ = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

$\boldsymbol{\beta_0}$ = constant term

$\boldsymbol{\beta_1}$ = Beta Coefficient

ε_{it} = Error term of firm *i* at time *t*

3.4.1 Testing for Mediated Relationship

To test for mediated relationship, this study adopted the four causal steps recommended by Baron and Kenny (1986). Various scholars have also used the steps to test for mediation such as Teimet et al. (2020), Ssendagire (2020) and Dallmeyer et al. (2023). The first step was to establish whether the independent variable (working capital efficiency) is a significant predictor of the dependent variable (firm value) in the absence of the mediator (liquidity) as below:

By testing the null hypothesis, the study expected that liquidity would mediate the relationship between working capital efficiency and firm value. The study expected that ideal level of liquidity is achieved through efficient working capital which translates to the ultimate goal of firm value.

$$FV_{it} = \beta_0 + \beta_1 WCE_{it} + \varepsilon_{it} \quad \text{.....3.2}$$

Where:

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

β_0 = constant term

β_1 = Beta Coefficient

ε_{it} = Error term firm *i* at time *t*

The second step was to determine whether the independent variable (WCE) was a significant predictor of the mediating variable (LIQ) in the absence of the dependent variable (FV) as below:

$$LIQ_{it} = \beta_0 + \beta_1 WCE_{it} + \varepsilon_{it} \quad \text{.....3.3}$$

Where:

LIQ_{it} = Liquidity (measured by Current ratio) of firm *i* at time *t*

WCE_{it}= Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

β_0 = constant term

β_1 = Beta Coefficients

ε_{it} = Error term firm *i* at time *t*

The third and fourth steps were tested using a single regression model as indicated below. In the third step, the mediator (liquidity) was to significantly predict the dependent variable (firm value) while controlling for the independent variable (working capital efficiency) while in step four, the independent variable (WCE) was to insignificantly predict the dependent variable (firm value) while controlling for the mediator (liquidity).

$$FV_{it} = \beta_0 + \beta_1 WCE_{it} + \beta_2 LIQ_{it} + \varepsilon_{it} \quad \text{.....3.4}$$

Where:

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

LIQ_{it} = Liquidity of firm *i* at time *t*

β_0 = constant term

β_1- β_2 = Beta Coefficients

ε_{it} = Error term firm *i* at time *t*

The decision criterion was based on the p-value of the beta coefficients in the specific steps. If p-value of β_1 in model 1,2 and 3 was statistically significant ($p \leq 0.05$) and if the p-value of β_1 in step 4 was not statistically significant ($p \geq 0.05$) then there would be full mediation. On the other hand, if p-value of β_1 in steps 1,2 and 3 was statistically significant ($p \leq 0.05$), then there was partial mediation. However, if p-value of β_1 in steps 1, and 2 was statistically insignificant ($p \geq 0.05$), then there would be no mediation.

3.4.2 Moderator Effect Relationship

This study adopted moderation process by Baron and Kenny (1986) to test for a moderated relationship. The process was analyzed using a single regression equation to estimate that there was a relationship between firm value and working capital efficiency and the significance of the interaction term as shown below.

The study expected that firm size would moderate relationship between working capital efficiency and firm value. The study expected that the effect of efficient working capital on firm value was varied across firms of different sizes of the various sectors.

$$FV_{it} = \beta_0 + \beta_1 WCE_{it} + \beta_2 FS_{it} + \beta_3 WCE*FS_{it} + \varepsilon_{it} \quad \text{.....3.5}$$

Where:

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

FS_{it} = Firm Size (measured by natural log of total assets) of firm *i* at time *t*

$WCE*FS$ = Interaction of Working Capital Efficiency and Firm Size of firm *i* at time *t*

β_0 = constant term

β_1- β_3 = Beta Coefficients

ε_{it} = Error term firm *i* at time *t*

The decision criterion was based on the p-value of the beta coefficient of the interaction term in model 3.5. If p-value of Beta coefficient of interaction term in model 3.5 was statistically significant ($p \leq 0.05$) then H_0 was to be rejected and moderating effect was to be inferred.

3.4.3 Joint Effect Relationship

The study sought to establish the joint effect of the working capital efficiency, liquidity, and firm size on firm value of selected firms listed at Nairobi Securities Exchange in Kenya. The model was as indicated below:

To establish the combined effect of the drivers of firm value, the study expected that working capital efficiency, liquidity, and firm size would have a significant joint effect on firm value. The expectation was that the findings of the hypothesis testing would provide empirical evidence on the need for optimal balance of the various drivers of firm value.

$$FV_{it} = \beta_0 + \beta_1 WCE_{it} + \beta_2 LIQ_{it} + \beta_3 FS_{it} + \varepsilon_{it} \quad \text{.....3.6}$$

Where:

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

LIQ_{it} = Liquidity (measured by Current ratio) of firm *i* at time *t*

FS_{it} = Firm Size (measured by natural log of total assets) of firm *i* at time *t*

β_0 = constant term

β_1- β_3 = Beta Coefficients

ε_{it} = Error term firm *i* at time *t*

The decision criterion was based on the overall significance of the 3.6 model. If the model was statistically significant ($p \leq 0.05$) then the null hypothesis was to be rejected and joint effect was inferred.

3.5 Target Population

Target population involves particular subjects that a scholar is interested in and has access to in order to conduct a study and draw conclusions from (Casteel & Bridier, 2021). The target population consisted of 41 selected firms quoted at NSE, Kenya. The target population comprised of 10 sectors whose working capital and liquidity requirements were not controlled by regulatory agencies since the research objective was to assess the effect of working capital efficiency on firm value. The firms listed under banking, investment and insurance sectors have unique aspects of working capital accounting regulations (Deloof, 2003; Alsulayhim, 2019; Siraj et al., 2019) hence they were not be considered in this study. The target population was as indicated in appendix II.

3.6 Sampling Design

A sampling design is a technique that is adopted in order to obtain operationalized representation of the target population (Casteel & Bridier, 2021). Since the target population of 41 selected firms was fairly manageable, the study adopted census method. Sampling was based on the criteria that they were listed under sectors whose working capital is not under regulatory bodies. Financial firms listed under banking, insurance and investment have their working capital requirements regulated and therefore, they were not part of the target population. Census method is greatly commended since it eradicates errors that are connected to sampling (Kothari, 2004). The census approach enhances the validity of data by accepting specific cases with considerable information (Saunders et al., 2009). Further, in a census approach, data is collected from all the subjects of the target population (Wilis & Nurwulandari, 2020). Pratama (2021) contends that the census technique has a scientific level that is superior to sampling techniques since all the subjects of a target population are involved hence promoting accuracy of the findings. Therefore, to enhance efficiency, the technique is most applicable when the target population is not too high hence, it was adopted by the study.

3.7 Data Collection Instrument

Secondary data was used in this study and was obtained from published annual reports of the 41 firms in the target population and NSE handbooks. A document review guide was used in collection of data covering the period of study 2012-2021 as shown in appendix I. The review guide was designed to capture data of the firm value which was the dependent variable that was measured using price to book value ratio and all research variables:

working capital efficiency, liquidity, and firm size. Therefore, the document review guide enabled collection of the relevant data and measurement of each study variable.

3.8 Data Collection Procedure

For purposes of this study, ethical clearance was obtained from St. Paul's Institutional Scientific and Ethical Review Committee (ISERC). Thereafter, research authorisation from National Commission for Science, Technology and Innovation (NACOSTI) was obtained in order to permit collection of data and use of the audited and published annual reports and NSE handbooks of selected firms listed at NSE in Kenya. Relevant data comprising of working capital efficiency, firm size, liquidity and firm value was collected using the document review guide as indicated in Appendix I.

The secondary data was collected via downloading various audited financial statements from every firm's website and those of regulatory agencies. The secondary data collected was made up of panel data that was used for analysis. According to Baltagi et al. (2013), panel data allows control for distinct heterogeneity, exploit superior variability for more effectual estimation, study modification dynamics, recognize effects one could not discover from cross-section data, advance measurement accuracy (micro-data instead of aggregated), and use one dimension to infer about the other. The data was then imported to a STATA program for analysis.

3.9 Data Analysis and Presentation

Secondary data of the study was analyzed by use of panel data capture rate, descriptive statistics, trend analysis, Pearson's correlations and panel data regression analysis. The panel data capture rate was used to indicate the target observations of the study per year

and the actual observations that were made. The descriptive statistics helps to understand the variables of study by giving an overview of standard deviation, maximum value, the mean, and minimum value (Pandiangan et al., 2022). This study adopted descriptive statistics to give an understanding concerning the distribution of the panel data in relation to mean, standard deviation, and percentages which were presented in form of a table. The trend analysis was used in the study to indicate the movement and direction of various variables of study in the period 2012-2021. On the other hand, Pearson's correlation measures the degree of association among two variables for jointly normally distributed data (Schober et al., 2018). This study adopted Pearson's correlation coefficients to evaluate the correlation between two variables over time and across individual objects.

The study employed panel data regression analysis because the secondary data had both cross sectional and time series elements. The data is best analyzed using panel data regression analysis (Stefko et al., 2021). Panel data regression analysis is beneficial to determine if the relationship between every explanatory variable is symbolized as variable X with outcome variable as approximation result and symbolized as variable Y and the effect of variable X partly or together to variable Y, and define the correct regression model (Endri, 2020). Therefore, the ability to observe the same elements over time made panel data regression analysis relevant in this study. Panel regression is a statistical regression linking cross-section and time-series data (Fajar et al., 2020). Additionally, the panel data regression analysis is valuable since it provides superior flexibility modeling the variances in responses through the research objects (Dayag & Trinidad, 2019).

The STATA 17 software was used to carry out the analysis since it was able to support analysis of the panel data to produce accurate results. An excel worksheet was however

used to carry out the ratio calculations and arrange it to fit the STATA format for ease of importation. In comparison to other programs, STATA is utmost dominant instrument for panel data analysis (Ullah et al., 2020). The quantitative data was presented in form of tables and figures. Interpretation of the findings was based on the results presented after the analysis. The mean, percentages and standard deviations were interpreted based on the descriptive analysis findings. To test the hypothesis, the confidence level was at 95% leading to a significance level of 0.05. To interpret, if the p-value was less than 0.05, the null hypothesis would be rejected and if the p-value was greater than 0.05, the hypothesis would fail to be rejected.

3.10 Diagnostic Tests

Tests of key assumptions of panel data regression model were done to establish the suitability of the data and model that was adopted for causal analysis. Therefore, the study carried out tests of multicolinearity, normality, heteroscedasticity, autocorrelation, stationarity and random or fixed effects test. The tests have been indicated to be relevant for any panel data (Mukhibad et al., 2020; Khraief et al., 2020).

3.10.1 Multicollinearity Test

The occurrence of multicollinearity in panel data refers to when independent variables are related to each other thus affecting the effectiveness of the parameter estimation (Ismaeel et al., 2021). The problem of multicollinearity results to two or more independent variables being correlated and its occurrence creates inflation of estimated variances and covariances (Morales-Oñate & Morales-Oñate, 2021). For purposes of this study, multicollinearity test was not relevant since the study had only one independent variable.

3.10.2 Normality Test

Normality test is done to establish whether there is statistical distribution of data which could be violated due to presence of outliers (Rana et al., 2021). Normality assumption is key and is a commonly enforced assumption in most of the statistical processes which include regression analysis, Analysis of Variance (ANOVA), and t-tests (Razali & Wah, 2011). When the supposition of normality is violated, explanation and implication may not be reliable (Huang et al., 2019). The study adopted the Jarque-Bera test for normality assumption in panel data. Furthermore, the test was also recommended by Alejo et al. (2015) for panel data models since it enables scholars to discover skewness and excess kurtosis in the regression of error term. Empirically, various scholars such as Eladly (2021) and Suhendra et al. (2020) adopted Jarque-Bera test to establish whether data was normally distributed. The null hypothesis of the test was that the data is normally distributed. According to Gujarati and Porter (2009) the decision criteria is that if the P-value is greater than 0.05, then the null hypothesis would fail to be rejected and the finding would be that data is normally distributed.

3.10.3 Heteroscedasticity Test

Heteroscedasticity occurs when there is violation of the assumption that the variance of error terms should be equal (Greene, 2018). This study employed Breusch–Pagan test to detect whether there was presence of heteroscedasticity. Grozdić et al. (2020) notes that Breusch–Pagan test is appropriate for test of heteroscedasticity on panel data. The test has also been adopted by various scholars such as Kryeziu and Durguti (2019), Rustomo and Falianty (2021), and Yu et al. (2022). According to Uyanto (2019) the Breusch–Pagan test investigates if the discrepancy of errors is reliant on the values of the explanatory

variables. The null hypothesis of the test is that there is constant variance. Therefore, if the P-value was less or equal to 0.05, the null hypothesis should be rejected and if P-value is greater than 0.05, the null hypothesis should fail to be rejected and the finding would be that there is constant variance or heteroscedasticity is absent from the data.

3.10.4 Autocorrelation Test

Autocorrelation occurs when there is association of the error terms in research data (Greene, 2018). The study adopted Wooldridge test to establish whether autocorrelation of error terms was present. According to Oroud (2019), the test is recommended since it is more effective and superior when testing for serial correlation in panel data compared to other tests such as Durbin-Watson. The test was initially suggested by Wooldridge (2002) and was tested and recommended by Drukker (2003) as a relevant test for panel data to examine for serial relationship in random or fixed effects models. The test has also been used by various scholars to assess the autocorrelation in panel data analysis such as Doan (2020), Khazaei et al. (2021) and Gautam et al. (2022). The null hypothesis of the test is that there is no first order autocorrelation. Therefore, if the P-value is less than 0.05, the null hypothesis should be rejected, and if p-value was greater than 0.05, the null hypothesis should fail to be rejected and the finding would be there is no first order autocorrelation.

3.10.5 Stationarity Test

Stationarity test examines the null hypothesis of stationarity in contrast to the unit root wherever time element is fixed (Misra et al., 2020). The study adopted Fisher-type unit root test to examine the presence of stationarity. According to Jahanger et al. (2022), Fisher-type unit root test recommended by Maddala and Wu (1999) is able to handle unbalanced panel data and produce reliable results. The test has also been used by various

scholars to determine the presence of stationarity in panel data such as Hanif et al. (2019), Akadiri and Akadiri (2021) and Heo et al. (2021). The null hypothesis of the test was that all panels contain unit roots. If P-value is greater than 0.05, the null hypothesis should be fail to be rejected and if P-value is less than .0.05, the null hypothesis should be rejected and the finding would be that panels do not contain unit roots or there is stationarity.

3.10.6 Model Specification Test

Fixed effects (FE) and random effects (RE) models are frequently employed in the social sciences for studies with longitudinal or panel data (Kim & Steiner, 2021). According to Waithima (2020) Hausman's specification test is a common method that assists in making a choice on the type of a model and estimation of parameter approximations to adopt. This study adopted Hausman's specification test to test for model specification. The test is used to evaluate whether the distinctive errors are connected to the regressors (Waithima, 2020).

The null hypothesis of the test is that the difference in coefficients is not systematic. If P-value was greater than 0.05, the null hypothesis should fail to be rejected and if P-value is less than 0.05, the null hypothesis should be rejected, and the finding would be that random effects model is the appropriate model for the study. According to Saputri et al. (2023) a further test of Breusch-Pagan Langrangian Multiplier (LM) is required in order to conclude on the appropriate model between random and Pooled OLS.

3.11 Operationalization and Measurement of Variables

Table 2 shows the list of variables that this study adopted and the operationalization and measurement of every variable. The outcome variable was firm value which was measured by price to book value ratio. The independent variable was working capital efficiency.

The moderating variable of the study was firm size, while liquidity was a mediating variable.

Table 2: Operationalization and Measurement of Variables

Name of variable	Type of variable	Operationalization	Measurement	Scale of measurement
Firm value	Dependent variable	Maximization of shareholders' wealth which is reflected by market capitalization and stock indices in relation to book value within a given period.	Price to Book Value ratio = Market capitalization / book value of equity	Ratio
Working capital efficiency	Independent variable	The capability that a firm has in effort to maintain ideal operating capital that can be able to meet the short-term obligations and minimize the risk that is linked to liquidity while simultaneously a firm has the capacity to enhance productivity.	Working capital turnover ratio = Net sales / Net working capital	Ratio
Liquidity	Mediating variable	The ability that a firm has to manage the day-to-day obligations promptly and within the expected timelines.	Current ratio = Current assets / Current liabilities	Ratio
Firm size	Moderating variable	Measure of a firm in relation to its total assets.	natural log of Total Assets	Ratio

Source: Author, 2023

3.12 Test of Hypotheses

This study tested the hypotheses as summarized in Table 3:

Table 3: Test of Hypotheses

Objective	Hypothesis	Statistical test	Interpretation
To assess the effect of working capital efficiency on firm	Working capital efficiency has no significant effect on	$FV_{it} = \beta_0 + \beta_1 WCE_{it} + \varepsilon_{it}$	Level of significance = 0.05 $P \leq 0.05$ reject the null hypothesis

value of selected firms listed at Nairobi Securities Exchange in Kenya.	firm value of selected firms listed at Nairobi Securities Exchange in Kenya.		
To examine the mediating effect of liquidity on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.	Liquidity has no significant mediating effect on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange in Kenya.	**Step 1:** $FV_{it} = \beta_0 + \beta_1 WCE_{it} + \varepsilon_{it}$ **Step 2:** $LIQ_{it} = \beta_0 + \beta_1 WCE_{it} + \varepsilon_{it}$ **Step 3 and 4:** $FV_{it} = \beta_0 + \beta_1 WCE_{it} + \beta_2 LIQ_{it} + \varepsilon_{it}$	If p-value of β_1 in model 1,2 and 3 was statistically significant ($p \leq 0.05$) and if the p-value of β_1 in step 4 was not statistically significant ($p \geq 0.05$) then there was full mediation. If p-value of β_1 in steps 1,2 and 3 would be statistically significant ($p \leq 0.05$), then there was partial mediation. However, if p-value of β_1 in steps 1, and 2 was not statistically significant ($p \geq 0.05$), then there was no mediation.
To establish the moderating effect of firm size on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.	Firm size has no significant moderating effect on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.	$FV_{it} = \beta_0 + \beta_1 WCE_{it} + \beta_2 FS_{it} + \beta_3 WCE FS_{it} + \varepsilon_{it}$	Level of significance = 0.05 $P \leq 0.05$ reject the null hypothesis
To determine the joint effect of working capital efficiency, liquidity and firm size on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.	Working capital efficiency, firm liquidity and firm size have no significant joint effect on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.	$FV_{it} = \beta_0 + \beta_1 WCE_{it} + \beta_2 LIQ_{it} + \beta_3 FS_{it} + \varepsilon_{it}$	Overall level of significance of the model at 0.05 $P \leq 0.05$ reject the null hypothesis

Source: Author (2023)

3.13 Ethical Considerations

Ethics is the common principles or values of behaviour that guide the association between individuals and their behaviour (Saunders et al., 2015). While ethics is critical in business operations, it also forms a significant element of a scientific research. This study practiced due diligence throughout the research period and the primary step was to obtain ethical clearance from ISERC and then acquire data collection permit from NACOSTI. This gave authorization to collect and use the data to present the results. The study enhanced data privacy by ensuring that the results were anonymized in order to avoid recognition of individual firms during interpretation of the findings. Furthermore, the study upheld integrity and validity by ensuring that there was accurate information on the findings since the data was collected from the published and audited annual reports of the individual firms under consideration available on the firm's websites and NSE handbooks. Overall, the collected data was used incognito and for scholarly reasons only.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the study, findings, interpretation of the findings and discussion by comparing and contrasting the same with literature. The main objective of the study was to evaluate the effect of working capital efficiency on firm value of selected firms listed at NSE, Kenya. First, the panel data capture rate, descriptive statistics, trend analysis and correlation analysis are documented and thereafter the preliminary statistical tests. Lastly, the chapter documents hypotheses testing results, interpretation and discussion.

4.2 Panel Data Capture Rate

The target population of the study was 41 selected firms listed at NSE, Kenya, whose liquidity requirements are not controlled by the regulatory institutions. Based on data collection review guide, the study gathered unbalanced panel data of the 41 selected firms listed at NSE and the number of data points per year for the four study variables (working capital efficiency, liquidity, firm size, and firm value) were as indicated in Table 4.

Table 4: Panel Data Capture Rate

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Obs.	%
T	164	164	164	164	164	164	164	164	164	164	1,640	100
M	0	0	0	0	4	8	16	24	24	36	112	6.83
C	164	164	164	164	160	156	148	140	140	128	1,528	93.17

Source: Research Data (2023)
Key: T: Targeted, M: Missing, C: Collected, Obs.: Observations

The panel data capture rate results in Table 4 indicate the targeted observations for all the four study variables, those that were excluded or missing, and the collected observations

per year: 2012-2021. From the results, the study targeted a total of 1,640 observations from the 41 selected firms listed at NSE, Kenya. However, 112 observations were excluded due to missing published annual reports in the year 2016 to year 2021 translating to 6.83 percent missing observations. The missing annual reports may be attributed to various factors ranging from financial distress that the firms may have been facing during the periods, to non-compliance with the requirement of voluntary disclosure and avoidance to disclose poor financial performance or insolvency.

Based on the data collected, the study successfully collected 1,528 data points from the 41 selected firms listed at NSE, Kenya indicating 93.17 percent panel data capture rate. The rate was found to be high and excellent for data analysis and hypothesis testing as suggested by Singleton and Straits (2010) that a panel data capture rate of 75 percent and above is deemed adequate for panel data regression analysis and reporting.

4.3 Descriptive Statistics

The results in table 5 indicate an outline of the descriptive statistics of the study variables in relation to their means, standard deviations, and the minimum and maximum values.

Table 5: Descriptive Statistics

Variable	M	SD	Min	Max
FV	1.68	2.43	-7.12	10.89
WCE	1.20	5.45	-30.29	17.49
LIQ	2.39	2.54	-0.83	13.59
FS	6.83	0.94	3.84	8.76

Source: Research Data (2023)

Key; FV: Firm value, LIQ: Liquidity, WCE: Working capital efficiency, FS: Firm size

The mean, standard deviation, and the maximum and minimum values of firm value were as indicated in Table 5. From the results, the study finds that firm value as measured by price to book value ratio had (M = 1.68, SD = 2.43). The mean is an indication that the stocks of the various firms were trading at an average of 1.68 times in relation to their book value. This means that the investors were willing to pay 1.68 times the net asset value for each share of a firm. Further, the stocks were overvalued compared to the assets of the selected firms listed at NSE, Kenya during the period 2012-2021. The standard deviation indicated that the PBV ratio had a high variability among the selected firms during the period under study. This means that firm value had a high level of volatility over the period under investigation across the firms in various sectors. The highest value for the firm value was Max = 10.89 while the lowest value was Min = -7.12. This means that the market view for some of the firms was positive while there was a pessimistic view for others on their future earnings potential.

The working capital efficiency (WCE) results documented in Table 5 indicate the mean, standard deviation, minimum and maximum values for the selected firms listed at NSE. In view of this study, WCE was measured using working capital turnover (WCT) ratio. Based on the results, the study finds that WCE has (M = 1.20, SD = 5.45). The mean indicates that on average, the selected firms invested in working capital and had enough current assets to handle the current liabilities and to generate sales demonstrating a moderate level of working capital efficiency. The standard deviation indicated a high degree of variability of the WCT ratio among the selected firms quoted at NSE during the period under study. The high disparity indicates that some firms had a high degree of WCE over the period while others had relatively low level. This means that there are

specific factors or industry dynamics leading to this variability. The maximum value for WCE over the period was Max = 17.49 while minimum value was Min = -30.29 indicating that some firms were able to generate sales using net working capital while others had low short-term assets that could not meet their day to day obligations, hence low sales.

In relation to liquidity, the results in Table 5 indicate its mean, standard deviation, minimum and maximum values as was measured using current ratio (CR) in the study. The study found that liquidity had (M = 2.39, SD = 2.54). The mean indicated that the firms had an average of 2.39 of the short-term assets in relation to short term liabilities. A current ratio of 2 indicates that a firm has only two times the maximum volume of short-term assets to operate the day-to-day obligations. The current ratio is significant to investors and experts since it indicates how a firm is able to make best use of short-term assets to fulfil day to day obligations as and when they fall due. The standard deviation documented that the dispersion from the mean was high. This means that the level of liquidity for the different firms deviated from the mean by around 2.54 units. The maximum value for current ratio was Max = 13.59 while the minimum value was Min = -.83 indicating that while some firms had high current assets in relation to current liabilities, others had a negative liquidity level over the period under investigation.

Firm size was measured by natural log of total assets and the results of its mean, standard deviation, maximum and minimum values were as indicated in Table 5. From the results, the study found that firm size had (M. = 6.83, SD = 0.94). The mean indicated that the average of total assets was e raised to power 6.8. Firms with high level of assets indicate that they have attained the maturity level and may be well thought-out to have ideal

projections in comparatively constant duration. The standard deviation indicated that the variation from the mean was low among the selected firms listed at NSE, Kenya during the period under investigation. This means that the variation in maturity level of the firms was relatively low over the period. The maximum value for firm size was Max = 8.76 while the minimum value was Min = 3.84 indicating that, even if the variation was low, some firms had higher maturity level compared to others that had a lower level in relation to total assets.

4.4 Trend Analysis

The study adopted line graphs to present the trend and movement of variables across the 41 selected firms listed at NSE, Kenya during the period 2012-2021. The variables of the study were firm value, working capital efficiency, liquidity and firm size.

4.4.1 Working Capital Efficiency, Liquidity, Firm Size and Firm Value

The trend analysis for the various variables was as indicated in Figure 3. The results indicate the movement that the variables depicted over the given period of investigation in the study.

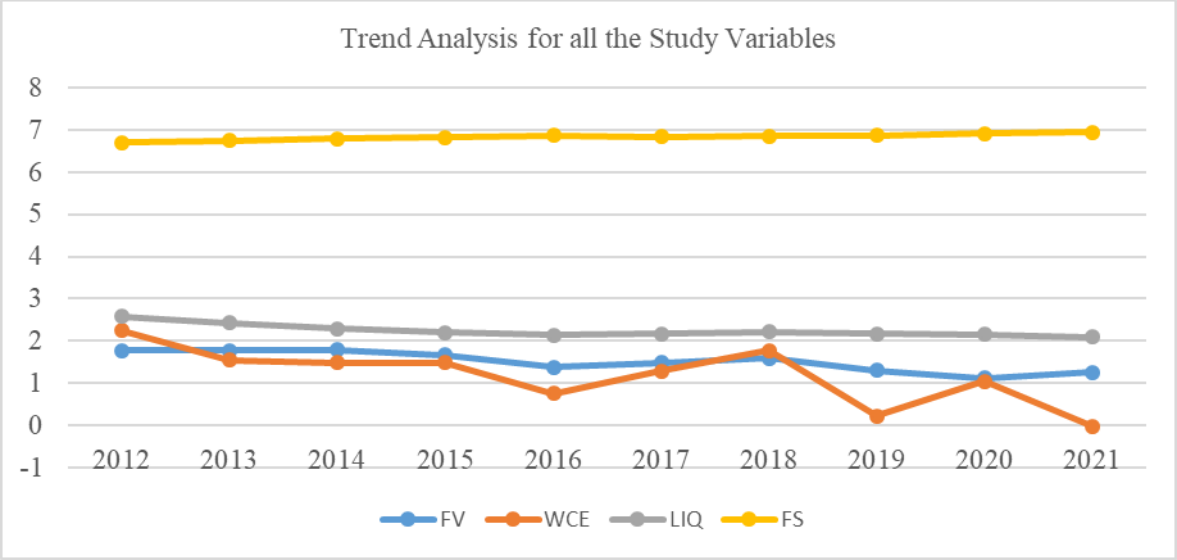


Figure 3: Working Capital Efficiency, Liquidity, Firm Size and Firm Value

Source: Research Data (2023)

The movement and trend of all the study variables was as presented in Figure 3 on average basis. From the results, the study finds that there was a downward and volatile trend of working capital efficiency, liquidity and firm value for the selected firms listed at NSE, Kenya in the period 2012-2021. In comparison, the study observes that firm size had a constant and an upward trend through the period of 2012 to 2021. In the year 2012, firm size as was measured using natural log of overall assets, was at 6.7 points and increased to 6.94 points by the year 2021 while the firm value was decreasing. This means that the selected firms continually increased their assets over the period.

The study finds that the movements of liquidity and working capital efficiency were closely related with the movement of firm value. Comparatively, liquidity constantly decreased from 2.24 points in the year 2012 to 2.08 points in the year 2021 while firm value also decreased within the same period. The results further indicate that working capital efficiency (WCE) and firm value had a similar trend except in the period between

year 2019 and year 2021. WCE decreased in the year 2019 to 0.23 points from 1.77 in the year 2018. However, there was an increase in the year 2020 to 1.03 points and thereafter, a decline in the year 2021. The high volatility of WCE in the period 2019 to 2021 indicate that there were inconsistent changes in net sales in relation to the net working capital of the selected firms listed at NSE, Kenya.

4.4.2 Sectoral Firm Value, Working Capital Efficiency, Liquidity and Firm Size

Based on the findings of the descriptive statistics in Table 5 on standard deviations and trend analysis of various variables in Figure 3, which indicated that the results may have been attributed to dynamics in the industry or sectors, the study further carried out a sectoral analysis to indicate their trends.

4.4.2.1 Firm Value

The trend analysis for firm value for various sectors investigated by the study was as indicated in Figure 4.

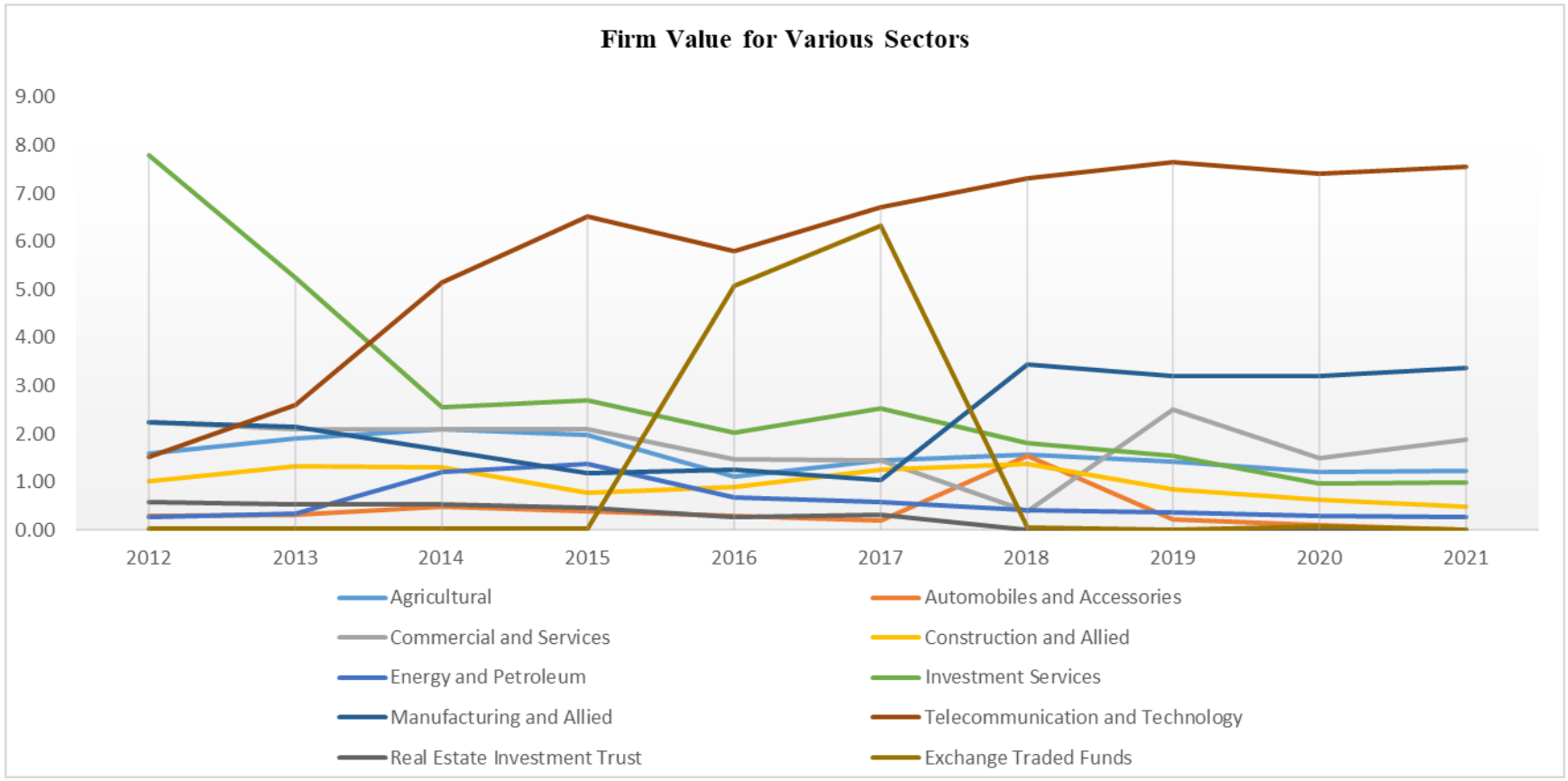


Figure 4: Sectoral Firm Value
Source: Research Data

The results in Figure 4 indicate that the trend of firm value for the various sectors using the data set for 2012-2021. From the results, the study finds that firm value for telecommunication and technology sector increased from 1.52 in the year 2012 to 7.55 in the year 2021. This means that the market perception on the sector has continued to increase. This may be attributed to technological advancements since the sector is highly dependent on technology, brand and reputation that has impact on market sentiment and investor perception. However, firm value for investment services sector declined from a high of 7.78 points in the year 2012 to a low of 1.00 points by the end of the year 2021. This means that the market perception of the sector has been declining over time which could be attributed by high volatility of market capitalization hence investors unable to predict their returns.

Based on the results, the study further finds that the firm value for exchange traded funds sector was high in the period between year 2016 and year 2017 and decreased from the year 2018. This means that the fluctuations in the sector was influenced by various macroeconomic factors such as supply and demand dynamics. Overall, the firm value for the various sectors was operating below the level of 2.00 points and highly volatile over the period under investigation. This indicates that the market value of the stocks was trading at a relatively low multiple compared to its book value signifying the investor perceptions for the various sectors. Hapsoro and Falih (2020) indicates that firm value is critical because it reflects the performance and has effect on perception of investors of a firm. On the other hand, according to Reschiwati et al. (2020) increase in stock prices indicate market confidence and future potential prospects of a firm.

4.4.2.2 Working Capital Efficiency

The results of the WCE trend analysis for various sectors were as indicated in Figure 5.

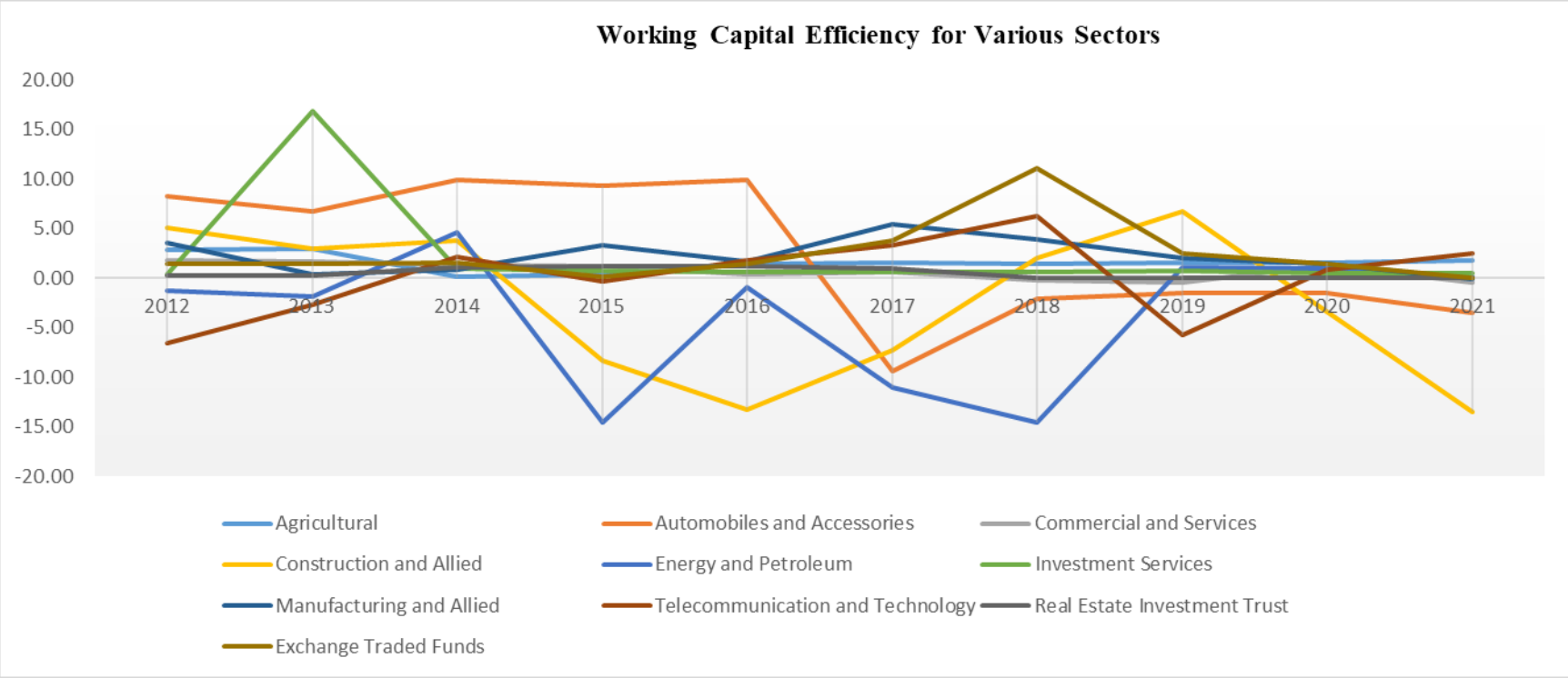


Figure 5: Sectoral Working Capital Efficiency
Source: Research Data

The results in Figure 5 indicate the average trend of working capital efficiency of the various sectors in the period 2012-2021. The study finds that WCE of the sectors had a high fluctuation level throughout the period. This means that the sectors ability to generate sales in relation to the net working capital varied with regard to changes in the macroeconomic conditions, industry-specific characteristics, and cash conversion cycle across the sectors. Further, the study finds that some sectors that operated on a negative working turnover indicating that on average, some sectors had lower current assets to meet current liabilities in a given period.

4.4.2.3 Liquidity

In relation to liquidity, the study analyzed the trend of various sectors on average basis in regard to the period under investigation. The results were as indicated in Figure 6.

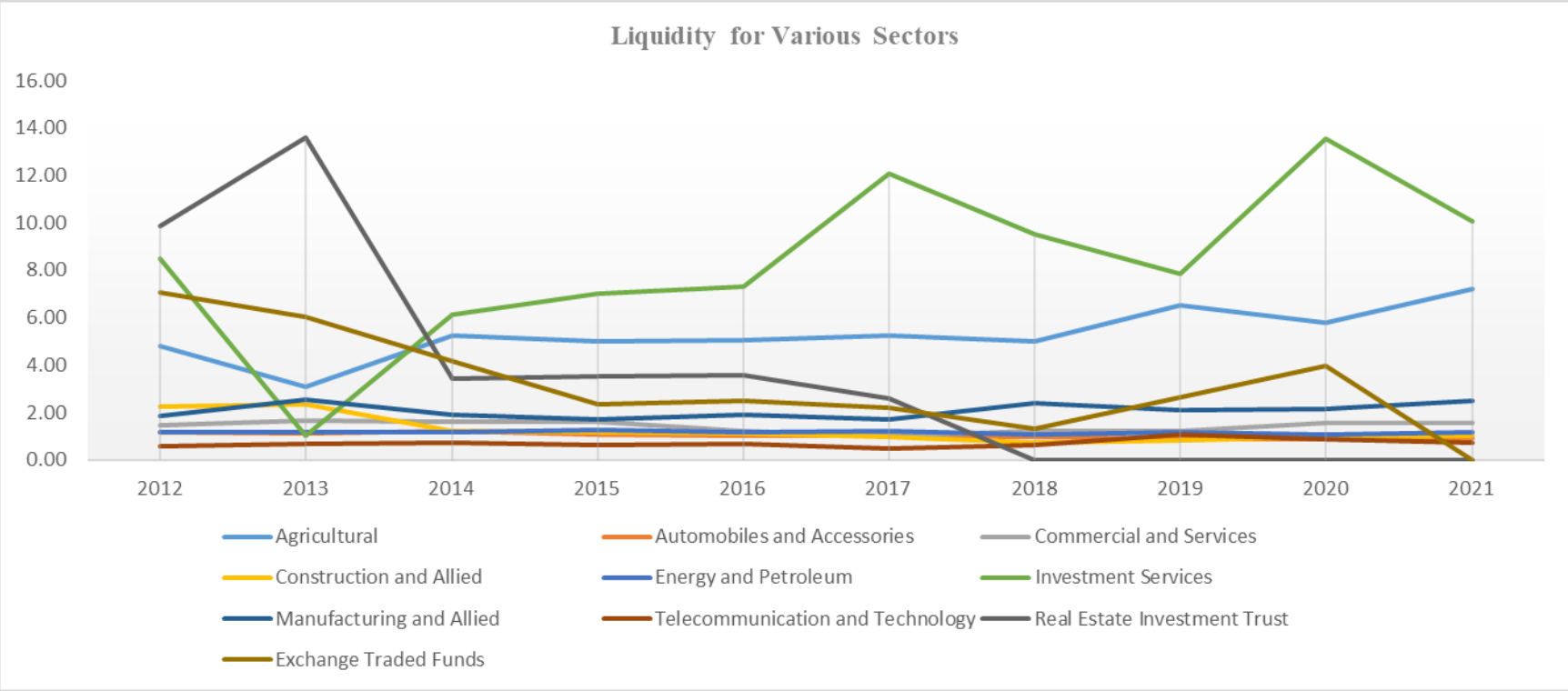


Figure 6: Sectoral Liquidity
Source: Research Data (2023)

The results in Figure 6 indicate the average trend of liquidity of various sectors that were considered by the study. The study finds that there were fluctuations in liquidity level of various sectors throughout the period 2012-2021. This indicates that the ability to settle the short-term liabilities as and when they fall due varied with the sector dynamics and economic conditions that a sector was experiencing in a given period. Further, the study finds that the Agricultural and Investment Services sectors had a high liquidity level compared to other sectors. This means that throughout the period, the sectors had sufficient current assets to meet their short-term liabilities and therefore, they were not exposed to bankruptcy and insolvency risks while at the same time, the high level may be a signal that there were idle assets in the sectors that were not utilized to generate revenue.

In relation to the empirical literature the level of liquidity in a firm and its implication has various views. Afinindy et al. (2021) indicates that too high liquidity demonstrates that there are huge idle assets that were not utilized to create revenue for a firm which may pose a negative signal to the investors. However, Sari and Sedana (2020) finds that high level of liquidity has a positive influence on investors decisions since it indicates the ability of a firm to meet the short-term obligations when and as they fall due. According to Jasmani (2019), the higher the level of liquidity, the higher the credit rating by suppliers that the firm is able to timely settle its day-to-day obligations, however, it presents a substantial opportunity cost.

4.4.2.4 Firm Size

The study analyzed the trend of firm size for various sectors on average basis for the period 2012-2021. The results were as indicated in Figure 7.

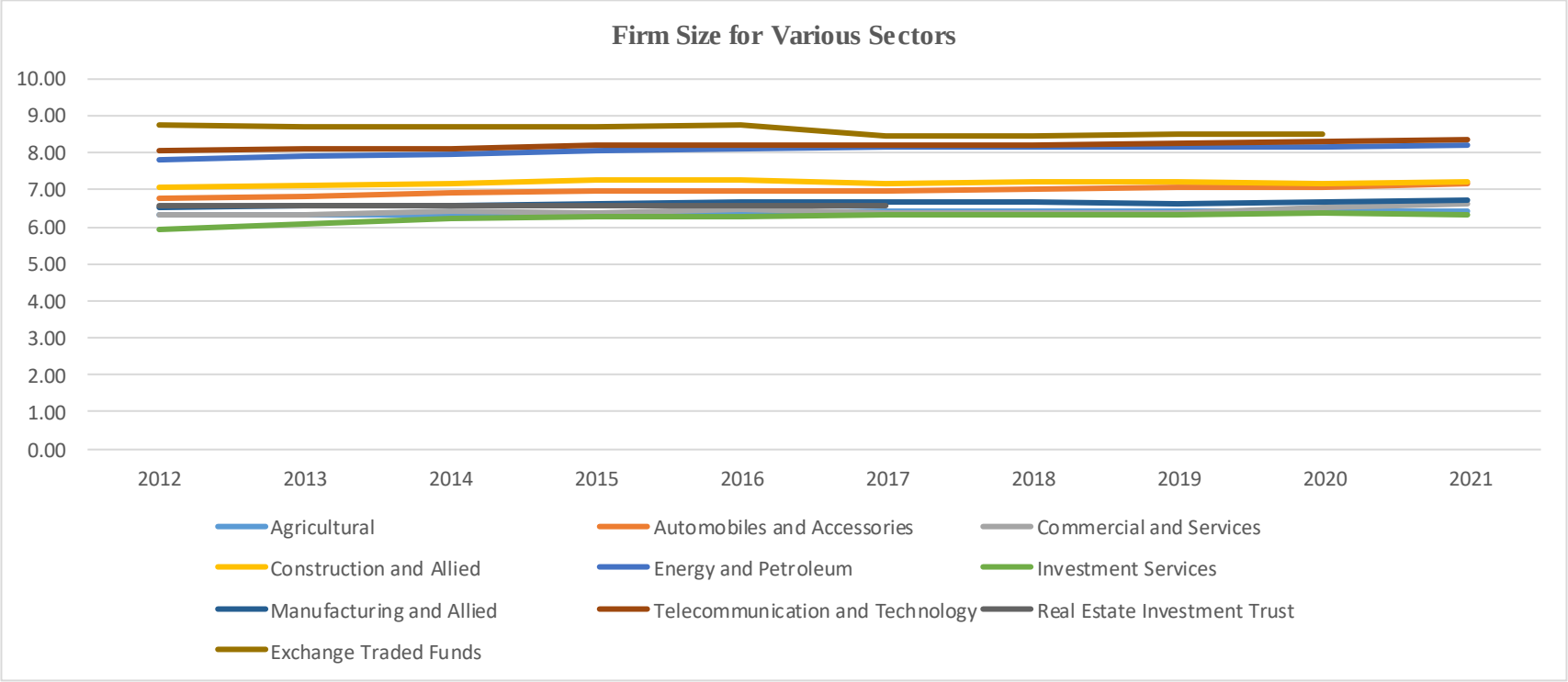


Figure 7: Average Firm Size for Various Sectors
Source: Research Data (2023)

The results in Figure 7 indicate the trend of firm size for various sectors for the period under investigation. Based on the results, the study finds that Exchange Traded Funds and Telecommunication and Technology sectors had the highest size in relation to overall assets from year 2012 to year 2021 compared to other sectors. This means that the sectors have relatively higher market dominance hence, a significant scale in the overall Kenyan economy compared to other sectors whose firms are listed at NSE, Kenya. This may be attributed to various factors such as diversification which leads to acquisition of new assets, investing in technological advancements and upgrading of infrastructure due to the nature of the sectors, and it is an indication that the sectors have significant competitive advantage. Generally, the study finds that firm size for the various sectors was increasing over the period. This is an indication that the sectors have continued to enlarge their market scope leading to new assets over time.

4.5 Correlation Analysis

The study adopted Pearson correlation coefficients to evaluate the strength and direction of relationship between the variables of the study. Generally, the correlation coefficient, r (Pearson product moment correlation coefficient), falls in the middle of negative 1 to positive 1 (Waithima, 2020). The rule of the thumb is that a correlation coefficient of positive 1 means that there is a positive relationship among the variables, and a correlation coefficient of negative 1 indicates a negative relationship while a correlation coefficient of 0 is an indication that there is no relationship. According to Schober et al. (2018), the Pearson correlation is vital since it helps to determine whether the relationship among variables is positive or negative and the strength of the association whether it is weak or strong. The results of the analysis were as indicated in Table 6.

Table 6: Correlation Analysis

Variable	WCE	LIQ	FS	FV
WCE	1			
LIQ	0.8448*	1		
FS	-0.0503	-0.1521*	1	
FV	0.7495*	0.5155*	-0.2332*	1

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

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

Source: Research Data (2023)

The results in Table 6 indicate the strength and direction of the relationship among the variables of the study. From the results, the study finds that working capital efficiency and firm value had a strong positive relationship since the correlation coefficient was 0.7495. Further, the results indicate that liquidity and firm value had a moderate positive relationship as indicated by the correlation coefficient of 0.5155. The correlation coefficient of -0.2332 indicate that firm value and firm size had a moderate negative relationship. Additionally, the study finds that WCE and liquidity had a correlation coefficient of 0.8448 indicating a strong positive relationship. On the other hand, WCE and firm size had a weak negative relationship as indicated by the correlation coefficient of -0.0503. Finally, the correlation of -0.1521 indicates that liquidity and firm size had a moderate negative relationship.

The findings of the study were consistent with the indications of various scholars in the empirical literature. Kundu et al. (2022) finds that WCE has a positive relationship with firm value. Similarly, Shah and Arif (2018) found that WCE has a positive relationship with firm value and documents that firms facing financial constraints enhance their firm value by ensuring that there is an adequate level of working capital. On the other hand, the findings contradicted those of Vijayakumaran (2019) who documented a negative

relationship between efficient working capital and firm value while the inventory days and receivable days had a negative effect.

The findings on the relationship between liquidity and firm value were similar to those of Hapsoro and Falih (2020) who found a positive relationship between liquidity and firm value. Similarly, Sondakh (2019) observes that there was a positive relationship between liquidity and firm value. However, Afinindy et al. (2021) found that high and low levels of liquidity had no effect on the value of firms and that increase in liquidity may not automatically translate to high firm value. On the relationship between firm size and firm value, James (2020) found similar findings to the ones in Table 6 that firm size had a negative relationship with firm value. Similarly, Afinindy et al. (2021) found that large size of a firm does not inevitably increase firm value.

The possible causes for the weak correlation indicated in Table 6, could be the missing data for some firms or that the variables are not strongly correlated with each other. For instance, the correlation between firm size and working capital efficiency indicated a weak negative relationship. The indication is that a positive change in firm size does not automatically lead to a positive change in working capital efficiency. Therefore, further analysis of the association through hypothesis testing was critical.

4.6 Diagnostic Tests

Statistical tests were done to assess the assumptions underlying panel data regression analysis of the study. According to Mukhibad et al. (2020) tests of multicollinearity, normality, heteroscedasticity, autocorrelation, stationarity, and model specification are

relevant for panel data. Therefore, this section presents the tests as they were carried out in the study.

4.6.1 Normality Test

The Jarque-Bera test was adopted to determine the distribution of data among the variables of the study. The test was relevant to assess the distribution of panel data since it had more than 200 observations as recommended by Alejo et al. (2015). To establish the findings, the study used the recommendations by Gujarati and Porter (2009) which indicated that data is normally distributed if the significance level is above 0.05. The results of the test were as indicated in Table 7.

Table 7: Jarque Bera Normality Test Results

Ho: Normality

Variable	N	Chi (2)	P-Value	Findings
FV	382	2.266	0.322	Normally distributed
WCE	382	2.095	0.3508	Normally distributed
LIQ	382	0.659	0.7193	Normally distributed
FS	382	3.282	0.1938	Normally distributed

Source: Research Data (2023)

The results in Table 7 indicate that the panel data of all the study variables was normally distributed. The p-values for all the research variables had significance levels greater than 0.05. Based on the recommendations by Gujarati and Porter (2009) that data is determined to have a normal distribution if the significant level exceeds 0.05, this study found that there was normal distribution of data for all the variables.

4.6.2 Heteroscedasticity Test

The Breusch–Pagan test was adopted to assess the existence of heteroscedasticity in the research data. Grozdić et al. (2020) recommended Breusch–Pagan test by indicating that it is relevant for assessing whether heteroscedasticity exists in panel data. The findings of the test were based on the criteria that there exists heteroscedasticity in data if the significance level is less or equal to 0.05. The results of the study were as presented in Table 8.

Table 8: Breusch-Pagan/Cook-Weisberg Test Results
Ho: Constant variance

Model	Chi2(1)	Prob > chi2	Findings
FV	1.51	0.2197	Constant variance

Source: Research Data (2023)

The heteroscedasticity test whose results are in Table 8, was based on the null hypothesis that the panel data of the study had a constant variance which translates to homoscedasticity. In relation to the results, the study finds that the p-value of the regression model was 0.2197 greater than 0.05 indicating that heteroscedasticity was absent from the data and hence the study would fail to reject the null hypothesis. Therefore, the study finds that the error terms of research data had constant variance since the p-value was greater than 0.05.

4.6.3 Autocorrelation Test

The Wooldridge test was adopted in the study to assess autocorrelation of the error terms. Wooldridge test was proposed by Wooldridge (2002) and was later recommended by a seminal scholar, Drukker (2003) as relevant for panel data where the regression model is either fixed effect model or random effect model. The findings of the test were based on

the criteria that if the p-value was greater than 0.05, then there was no autocorrelation of error terms in the research data. The results of the test were as indicated in Table 9.

Table 9: Wooldridge Test Results
Ho: No first order autocorrelation

F(1, 40)	Prob > F	Findings
0.222	0.6399	No first order autocorrelation

Source: Research Data (2023)

The null hypothesis of the Wooldridge test was that there was no first order autocorrelation of error terms in the research data. The results in Table 9 indicate that the p-value was 0.6399 greater than 0.05. Based on the criteria that a p-value greater than 0.05 would translate to no autocorrelation, the study finds that there was no first order autocorrelation of error terms in the research data.

4.6.4 Stationarity Test

The fisher type unit-root test was adopted in the study to assess the assumption that panel data should not contain unit roots but rather study variables should have stationarity since when time component is fixed, elimination of estimation problems is enhanced. The fisher type unit-root test was recommended by Maddala and Wu (1999) that it is able to test for stationarity in an unbalanced panel data and produce reliable outcome (Jahanger et al., 2022). Therefore, the test was found relevant in the study since the panel data was unbalanced as a result of missing of some of the financial audited annual reports for various firms. The results of the test of the study variables which included firm value, working capital efficiency, liquidity and firm size were as indicated in Table 10.

Table 10: Fisher Type Unit-Root Stationarity Test Results

Ho: All panels contain unit roots Number of panels = 41
Ha: At least one panel is stationary Avg. number of periods = 9.32

FV	**Statistic**	**P-Value**	**Findings**
Inverse chi-squared(82) P	276.4276	0.0000	**Stationarity**
Inverse normal Z	-9.2944	0.0000	
Inverse logit t(209) L*	-10.9346	0.0000	
Modified inv. chi-squared Pm	15.1822	0.0000	
WCE	**Statistic**	**P-Value**	**Findings**
Inverse chi-squared(82) P	367.6266	0.0000	**Stationarity**
Inverse normal Z	-11.7573	0.0000	
Inverse logit t(209) L*	-15.1377	0.0000	
Modified inv. chi-squared Pm	22.3037	0.0000	
LIQ	**Statistic**	**P-Value**	**Findings**
Inverse chi-squared(82) P	186.0243	0.0000	**Stationarity**
Inverse normal Z	-5.8572	0.0000	
Inverse logit t(209) L*	-6.3893	0.0000	
Modified inv. chi-squared Pm	8.1229	0.0000	
FS	**Statistic**	**P-Value**	**Findings**
Inverse chi-squared(82) P	343.8648	0.0000	**Stationarity**
Inverse normal Z	-11.1197	0.0000	
Inverse logit t(209) L*	-13.9262	0.0000	
Modified inv. chi-squared Pm	20.4482	0.0000	

Source: Research Data (2023)

The results in Table 10 indicate that the p-values for all the variables were 0.0000 less than 0.05 hence the study rejected the null hypothesis that all panels contain unit roots. Based on the results, the study finds that variables had no unit roots hence stationarity was present.

4.6.5 Model Specification Test

The Hausman test was used to determine the model specification that was appropriate for the study between the commonly used estimation techniques of panel data which include fixed effect (FE) model and random effect (RE) model. Collischon and Eberl (2020) indicates that the fixed effect model is able to handle unobserved heterogeneity and also it is superior to Ordinary Least Square model. On the other hand, RE estimator is based on

the assumption that the constant features are distinct to the rest of model covariates (Andersen, 2022). The results of the Hausman specification test to determine the appropriate estimation model for the data are captured in Table 11.

Table 11: Hausman Specification Test Results

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
Variable	**Fixed Effect**	**Random Effect**	**Difference**	**S.E.**
WCE	0.0548759	0.0557614	-0.0008855	0.0006421
LIQ	0.1112328	0.1058372	0.0053956	0.0134591
FS	-0.6940023	-0.5884898	-0.1055125	0.0721856
b = consistent under Ho and Ha;				
B = inconsistent under Ha, efficient under Ho;				
Test: Ho: difference in coefficients not systematic				
chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 3.24				
Prob>chi2 = 0.3560				

Source: Research Data (2023)

The results of the model specification test in Table 11 were based on the null hypothesis that the variance in coefficients was not systematic. Based on the results, the study finds that the null hypothesis should fail to be rejected since the p-value of 0.3560 is greater than 0.05. Therefore, the random effect model was found to be the most appropriate for the study. However, according to Saputri et al. (2023) a further test to make a choice between random effect and pooled ordinary least square method is required in order to choose between RE and Pooled OLS. The results of the additional test for random effects were as indicated in Table 12.

Table 12: Breusch and Pagan Lagrangian Multiplier Test Results for Random Effects

	Var	sd = sqrt(Var)
FV |	0.0824125	0.2870757
e |	0.0294385	0.1715766
u |	0.0059009	
Test	Var(u) = 0	

Prob > chibar2	0.0000

Source: Research Data (2023)

The results in Table 12 indicates that the appropriate model to estimate the panel data regression analysis was random effect since the p-value was 0.0000 less than 0.05.

4.7 Hypotheses Testing

The overall objective of the study was to evaluate the effect of working capital efficiency on firm value of selected firms listed at NSE, Kenya. Firstly, the study assessed the effect of WCE on firm value using H_{01} which stated that WCE has no significant effect on firm value. Secondly, the study sought to examine the mediating effect of liquidity on the relationship between WCE and firm value. The H_{02} was that liquidity has no significant mediating effect on the relationship between WCE and firm value. Thirdly, the study sought to determine the moderating effect of firm size on the relationship between WCE and firm value. To achieve this, H_{03} was tested which indicated that firm size has no significant moderating effect on the relationship between WCE and firm value. Lastly, the objective was to determine the joint effect of WCE, liquidity and firm size on firm value. Consequently, H_{04} was tested which stated that WCE, liquidity and firm size have no significant joint effect on firm value.

The criteria for hypotheses testing and interpretation of empirical findings are discussed in this sub-section. The decision to reject or fail to reject the null hypothesis was based on P-values of the Beta coefficients of the hypothesis testing using 95% confidence level or significant value of 0.05. The P-value of less than 0.05 translated to rejection of the null hypothesis, while a P-value of greater indicated failure to reject the null hypothesis. The

findings of the study hypotheses were interpreted based on the overall R-squared (R-sq overall), Wald Chi2 (χ^2), Beta Statistic (β), and z-values (z).

The results of the diagnostic tests that were carried out by the study indicate that the research data met the main assumptions underlying the panel data regression analysis. The study finds that there was no excessive multicollinearity of variables, the data was normally distributed, there was no presence of heteroscedasticity, no autocorrelation of error terms was present, and that there was stationarity of the study variables. Therefore, the results are found to be reliable and that the estimations are accurate. Furthermore, the model specification test indicates that the random effects model was the relevant estimator of the panel data regressions of the study. The benefit is that it is able to handle unobserved heterogeneity which is common in unbalanced panel data hence reliable and gives unbiased estimations compared to other conventional Ordinary Least Square techniques.

4.7.1 Working Capital Efficiency and Firm Value

The first objective was to evaluate the effect of WCE on firm value of selected firms quoted at NSE, Kenya. WCE was measured using working capital turnover ratio while price to book value ratio was adopted to measure FV. Therefore, the H_{01} was tested as indicated below:

H_{01} Working capital efficiency has no significant effect on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

The results of the model regression analysis were as indicated in Table 13.

Table 13: Working Capital Efficiency and Firm Value
Random-effects GLS regression
Group variable: ID

FV	β	SE	z	P>|z|	[95% Conf. Interval]	
Constant	-0.0617642	0.0174645	-3.54	0.000	-0.0959939	-0.0275345
WCE	0.0605118	0.0025556	23.68	0.000	0.0555029	0.0655207
R-sq	**Within**	0.611				
	between	0.4049				
	Overall	0.5618				
Wald chi2(1)		560.64				
Number of obs		382				
Number of groups		41				
Obs per group:	**Min**	4				
	Avg	9.3				
	Max	10				
Prob > chi2		0.0000				

Source: Research Data (2023)
Key: FV: Firm Value, WCE: Working Capital Efficiency

From the results in Table 13, the estimated random effects regression panel data model was as summarized below:

$$FV_{it} = -0.0617642 + 0.0605118\ WCE_{it}$$

Where

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

The null hypothesis indicated that working capital efficiency has no statistically significant effect on firm value of selected firms listed at NSE, Kenya. The results in Table 13 indicated that the null hypothesis should be rejected as documented by (χ^2 = 560.64, R^2 = .56, z = 23.68, β = .061, SE =. 002, p = .000). Based on the results, the Wald test (χ^2) and p < 0.05 indicates that the overall random effect model was statistically significant. The

study found that if all factors affecting firm value would be held constant, the firm value would be -.062. Further, the results indicate that a unit increase in working capital efficiency would increase firm value by .061 if all other factors are held constant. Additionally, the $p < 0.05$ indicates that there is a statistically significant effect of WCE on firm value. In relation to predictability, the overall R^2 indicated that 56.18% of all the variations in firm value is explained by WCE while the other 43.82% of the variations is predicted by factors that were not included in the model.

The general findings of the study were similar to those of various scholars and also contradicted other outcomes. Kundu et al. (2022) finds that WCE has a positive and statistically significant effect on firm value. Similarly, Shah and Arif (2018) find that WCE is critical for firms since it has a significant effect on firm value and it increases effectiveness of a firm by minimizing investment in working capital. Additionally, Högerle et al. (2020) finds that decline of WCE over a period of time affects the maximization of the value of shareholders. The findings of the study are also supported by the principle of agency theory that efficient working capital translates to enhanced firm value. On the contrary, Vijayakumaran (2019) finds that working capital efficiency as measured by receivables days and inventory days as indicators, negatively affect firm value while the study further indicates that working capital gives opportunity to finance managers to issue cash and enhance firm value.

4.7.2 Working Capital Efficiency, Liquidity and Firm Value

The second objective was to examine the mediating effect of liquidity on the relationship between WCE and firm value of selected firms listed at NSE, Kenya. Current ratio was

adopted to measure liquidity, while working capital turnover ratio measured WCE, and PBV ratio measured FV. The H_{02} that was tested to achieve the objective was as indicated below:

H_{02} Liquidity has no significant mediating effect on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.

To test H_{02}, four causal steps commended by Baron and Kenny (1986) were adopted in the study. In step one, firm value was regressed on working capital efficiency and the panel data regression model in relation to the results in Table 13, was as indicated below:

$$FV_{it} = -0.0617642 + 0.0605118\ WCE_{it}$$

Where,

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

The results of mediation step one regression analysis were as indicated in Table (χ^2 = 560.64, R^2 = .56, z = 23.68, β = .061, SE = .002, p = .000). The study finds that Wald test (χ^2) and $p < 0.05$ indicated that the overall random effect model was statistically significant. In addition, if all factors affecting firm value are held constant, the firm value of would be -.062. Further, the results indicate that a unit increase in working capital efficiency would increase firm value by .061 if all other factors are held constant. The $p < 0.05$ indicates that there was a statistically significant effect of WCE on firm value. In

relation to predictability, the overall R^2 indicated that 56.18% of all the variations in firm value is explained by WCE while the other 43.82% of the variations is predicted by other factors that were not included in the model.

The second step of the mediation process was tested by regressing liquidity (mediator) on working capital efficiency (independent variable) and the results of mediation step two were as indicated in Table 14.

Table 14: Working Capital Efficiency and Liquidity (Mediation Step II)
Random-effects GLS regression
Group variable: ID

LIQ	β	SE	z	P>|z|	[95% Conf. Interval]	
Constant	-0.1502976	0.0344634	-4.36	0.0000	-0.2178447	-0.0827506
WCE	0.1373137	0.0044632	30.77	0.0000	0.128566	0.1460613
R-sq	**Within**	0.7167				
	between	0.6912				
	Overall	0.7137				
Wald chi2(1)		946.54				
Number of obs		382				
Number of groups		41				
Obs per group:	**Min**	4				
	Avg	9.3				
	Max	10				
Prob > chi2		0.0000				

Source: Research Data (2023)

The model regression model results were as summarized below:

$$LIQ_{it} = -0.1502976 + 0.1373137\ WCE_{it}$$

Where,

LIQ_{it} = Liquidity (measured by Current ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

The results of mediation step two in Table 14 document (χ^2 = 946.54, R^2 = .71, z = 30.77, β = .137, SE = .004, p = .000). The Wald test (χ^2) p < 0.05 indicated that the overall random effect model was statistically significant. The study also finds that a unit increase in WCE would increase liquidity by .137 holding other factors constant. The p < 0.05 indicates that WCE has a statistically significant effect on liquidity. Further, the overall R^2 indicates that 71.37% of all the variations of liquidity were predicted by working capital efficiency while the other 28.63% of the variations were not included in the model.

The third and fourth steps of the mediation process were tested using a single panel data regression model as documented below. In step three, firm value (dependent variable) was regressed on liquidity (mediator) while controlling for the WCE (independent variable). In the fourth step, firm value was regressed on working capital efficiency (independent variable) while controlling for liquidity (mediator). The results of steps three and four were as indicated in Table 15.

Table 15: Working Capital Efficiency, Liquidity and Firm Value (Mediation Step III)
Random-effects GLS regression
Group variable: ID

FV	**β**	**SE**	**z**	**P>|z|**	**[95% Conf. Interval]**	
Constant	-0.061065	0.0169174	-3.61	0.0000	-0.0942224	-0.0279076
WCE	0.0385141	0.0281993	1.37	0.1720	-0.0167555	0.0937836
LIQ	0.0601992	0.0025673	23.45	0.0000	0.0551674	0.0652309
R-sq	**Within**	0.6108				
	between	0.433				
	Overall	0.5682				
Wald chi2(2)		561.36				
Number of obs		382				
Number of groups		41				
Obs per group:	**Min**	4				
	Avg	9.3				
	Max	10				
Prob > chi2		0.0000				

Source: Research Data (2023)

The results of the panel data regression model were as indicated below:

$$FV_{it} = -0.061065 + 0.0385141\ WCE_{it} + 0.0601992\ LIQ_{it}$$

Where,

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

LIQ_{it} = Liquidity (measured by Current ratio) of firm *i* at time *t*

The results in Table 15 of mediation step three indicates the (χ^2 = 561.36, R^2 = .57, z = 1.37, β = .060, SE = .002, p = .000). From the results, the study finds that the Wald test (χ^2) and p < 0.05 indicated that the overall random effect model was statistically significant. Further, a unit increase in liquidity increases firm value by .060 holding other factors constant. The p < 0.05 indicated that liquidity (mediator) has a statistically significant effect on firm value (dependent variable) while controlling for working capital efficiency (independent variable).

The results of mediation step four were as indicated in Table 15 (χ^2 = 561.36, R^2 = .57, z = 23.45, β = .039, SE = .028, p =. 172). From the results, the study finds that a unit increase in WCE increased firm value by .039 while holding other factors constant. The p > 0.05 which indicates that WCE (independent variable) has no statistically significant effect on firm value while controlling for liquidity (mediator). The overall results of R^2 indicate that 56.82% of all the variations of firm value were predicted by WCE and liquidity while the remaining 43.18% of the variations were not included in the model.

Generally, the results of all the four causal steps indicates that there was full mediation of liquidity on the relationship between WCE and firm value. According to Baron and Kenny (1986), the decision criteria is based on the p-values of the beta coefficients in the particular steps. Therefore, since β1 was statistically significant in steps one, two and three, while β1 in step four was statistically insignificant, the study finds that H_{02} should be rejected, hence, liquidity has a full statistically significant mediating effect on the relationship between WCE and FV of selected firms listed at the NSE, Kenya.

The findings of the study compare and contrast with various outcomes of scholars that sought to determine the mediating role of liquidity. Abo El-ata et al. (2023) finds that market liquidity has a statistically significant effect on the relationship between shareholder sentiment and market volatility. Alsufy et al. (2020) found that liquidity has a statistically significant mediating effect on the relationship between value of market and quality of income. Tahir et al. (2020) found that liquidity has a significant mediating effect on the relationship between corporate governance and performance of firms. Also, in view of this study, the findings are supported by the trade-off theory that posits that optimal liquidity stimulates the relationship between WCE and firm value. However, the findings of the study contradict the outcomes by Paramita and Andika (2021), Bawono and Falakh (2019), and Purnama et al. (2021) that indicate that liquidity has no mediating effect.

4.7.3 Working Capital Efficiency, Firm Size and Firm Value

The third objective of the study was to establish the moderating effect of firm size on the relationship between WCE and FV of selected firms listed at NSE, Kenya. Natural log of

assets was used as the measurement for firm size, while WCT and PBV were adopted as the measures of WCE and FV respectively where the H_{03} was as indicated below:

H_{03} ***Firm size has no significant moderating effect on the relationship between working capital efficiency and firm value of selected firms listed at Nairobi Securities Exchange, Kenya.***

The moderation procedure proposed by Baron and Kenny (1986) was used to test H_{03} and the results of the moderation process were as presented in Table 16.

Table 16: Working Capital Efficiency, Firm Size and Firm Value

Random-effects GLS regression
Group variable: ID

FV	**β**	**SE**	**z**	**P>|z|**	**[95% Conf. Interval]**	
Constant	0.4715702	0.1420063	3.32	0.0010	0.193243	0.7498974
WCE	0.1334608	0.0211335	6.32	0.0000	0.0920398	0.1748817
FS	-0.663267	0.1729744	-3.83	0.0000	-1.002291	-0.3242434
WCEFS	-0.0912673	0.0259275	-3.52	0.0000	-0.1420843	-0.0404503
R-sq	**Within**	0.6361				
	between	0.4556				
	Overall	0.5958				
Wald chi2(3)		623.69				
Number of obs		382				
Number of groups		41				
Obs per group:	**Min**	4				
	Avg	9.3				
	Max	10				
Prob > chi2		0.0000				

Source: Research Data (2023)

The random effects panel data regression model was as summarized below:

$$FV_{it} = 0.4715702 + 0.1334608\ WCE_{it} + -0.663267\ FS_{it} + -0.0912673\ WCEFS_{it}$$

Where,

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

FS_{it} = Firm Size (measured by Natural log of Total assets) of firm *i* at time *t*

WCEFS = Interaction of Working Capital Efficiency and Firm Size of firm *i* at time *t*

The null hypothesis indicated that firm size has no statistically significant moderating effect on the relationship between working capital efficiency and firm value of selected firms listed at NSE, Kenya. The null hypothesis was rejected as documented in Table 16 ($\chi^2 = 623.69$, $R^2 = .60$, $z = -3.52$, $\beta = -.091$, $SE = .025$, $p = .000$). The study finds that the Wald test (χ^2) and the $p < 0.05$ indicated that the overall random effect model was statistically significant. Further, a unit increase in WCE would increase firm value by .133 holding other factors constant. The $p < 0.05$ indicated that WCE has a statistically significant effect on FV. The Beta coefficient of FS indicates that a unit increase in firm size would decrease FV by .663 holding other factors constant. The $p < 0.05$ indicates that firm size has a statistically significant effect on FV. On the interaction term (WCEFS), the Beta coefficient indicates that increasing a unit of WCEFS would decrease FV by .091while holding other factors constant. The $p < 0.05$ indicates a negative and a statistically significant effect of the interactive term on firm value.

The overall R-squared results of the random effects model are as indicated in Table 16. The study finds that the R^2 indicates that 59.58% of all the variations of firm value were predicted by WCE, firm size and interactive term while the remaining 40.42% of the variations were not included in the model. Generally, the moderating decision criteria was

based on the p-value of the beta coefficient of the interactive term. Therefore, since the p-value of the interactive term was 0.000 < 0.05, while the beta coefficient -0.091, the study rejected the null hypothesis H_{03} and finds that firm size has a negative statistically significant moderating effect on the relationship between WCE and FV. This indicates a buffering type of interaction effect of firm size on the link between WCE and FV.

The empirical findings of the current literature in relation to the moderating effect of firm size compares while others contradict the findings of the study. Pervaiz and Akram (2019) finds a buffering type of statistically significant interaction effect of firm size on the relationship between WCM and profitability. Obaje and Abdullahi (2021) found a negative statistically significant moderating effect of firm size on the relationship between board structure and financial profitability. Additionally, the findings are consistent with the postulation of pecking order theory that indicate that as size of a firm increases, the sensitivity on the relationship between WCE and firm value decreases since large firms have access to external funding compared to smaller firms. On the other hand, Mahmood et al. (2019) found a positive statistically and significantly moderating effect on the relationship between WCF and profitability. Ssendagire (2020) finds that firm size has no statistically significant effect on the relationship between level of working capital and profitability.

4.7.4 Working Capital Efficiency, Liquidity, Firm Size and Firm Value

The fourth objective was to determine the joint effect of working capital efficiency, liquidity, and firm size on firm value of selected firms listed at NSE, Kenya which was achieved by testing the following $H_{04:}$

H_{04} ***Working capital efficiency, liquidity and firm size have no significant joint effect on firm value of selected firms listed at Nairobi Securities Exchange, Kenya.***

The results of the random effect estimation model were as indicated in Table 17.

Table 17: Working Capital Efficiency, Liquidity, Firm Size and Firm Value

Random-effects GLS regression
Group variable: ID

FV	**B**	**SE**	**z**	**P>|z|**	**[95% Conf. Interval]**	
Constant	0.4638115	0.1426752	3.25	0.0010	0.1841732	0.7434499
WCE	0.0557614	0.0026105	21.36	0.0000	0.050645	0.0608778
LIQ	0.1058372	0.0274034	3.86	0.0000	0.0521275	0.1595469
FS	-0.5884898	0.1744059	-3.37	0.0010	-0.9303191	-0.2466604
R-sq	**Within**	0.5925				
	between	0.4936				
	Overall	0.5715				
Wald chi2(3)		530.41				
Number of obs		382				
Number of groups		41				
Obs per group:	**Min**	4				
	Avg	9				
	Max	10				
Prob > chi2		0.0000				

Source: Research Data (2023)
Key: FV: Firm Value, WCE: Working Capital Efficiency, LIQ: Liquidity, FS: Firm Size

The panel data effects on regression model were as indicated below:

$$FV_{it} = 0.4638115 + 0.0557614\ WCE_{it} + 0.1058372\ LIQ_{it} + -0.5884898\ FS_{it}$$

Where,

FV_{it} = Firm Value (measured by Price to Book Value ratio) of firm *i* at time *t*

WCE_{it} = Working Capital Efficiency (measured by Working Capital Turnover ratio) of firm *i* at time *t*

$\boldsymbol{LIQ_{it}}$ = Liquidity (measured by Current ratio) of firm *i* at time *t*

$\boldsymbol{FS_{it}}$ = Firm Size (measured by Natural log of Total assets) of firm *i* at time *t*

The null hypothesis indicated that working capital efficiency, liquidity, and firm size have no statistically significant joint effect on firm value of selected firms listed at NSE, Kenya. The null hypothesis was rejected as indicated by the results in Table 18 ($\chi^2 = 530.41$, $R^2 = .57$, $p = .000$). The study finds that Wald test (χ^2) and $p < 0.05$ indicates that the overall random effect model was statistically significant. The overall R^2 indicate that 57.15% of all the variations of FV is predicted by WCE, LIQ, and FS while the other 42.85% is predicted by other factors other than those included in the model. Generally, the H_{04} decision criteria was to be determined by the overall p-value of the random effect regression model. Therefore, the null hypothesis was rejected, and a decision was made that WCE, LIQ, and FS have a statistically significant joint effect on FV of selected firms listed at NSE, Kenya.

In relation to the empirical literature that relates to the study, various findings emerged. Chabachib et al. (2020) finds that there is a statistically significant joint effect of liquidity and firm size on firm value. On the other hand, Oktaputri and Setyorini (2022) found a negative statistically significant joint effect of WCE, liquidity and firm size on profitability. Simbolon et al. (2022) finds that working capital and liquidity have no significant effect on profitability while firm size has a significant effect. Further, Bintara (2020) finds that working capital turnover and liquidity have no statistically significant effect on profitability.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presents an overview of the study outcome. First, a summary of study objectives is captured followed by specific conclusions on key findings of the study. The chapter then documents recommendations to policy, practice and theory besides the key contributions to the body of knowledge as well as highlighting limitations of the study. Lastly, the chapter makes recommendations of the study on areas for further research.

5.2 Summary

Based on the objectives of the study, various findings were drawn from testing of the research hypotheses. The first objective was to assess the effect of working capital efficiency on firm value of selected firms listed at NSE, Kenya. The second objective sought to examine the effect of liquidity as a mediator on the relationship between WCE and FV of selected firms listed at the NSE, Kenya. Thirdly, the study sought to establish the moderating effect of firm size on the relationship between working capital efficiency and firm value of selected listed firms at NSE, Kenya. Finally, the fourth objective sought to determine the joint effect of working capital efficiency, liquidity, and firm size on firm value of selected firms listed at NSE, Kenya.

The null hypothesis (H_{01}) indicated that WCE has no statistically significant effect on firm value of selected firms listed at NSE, Kenya. The results indicate that the null hypothesis was to be rejected and the study found that WCE has a positive and statistically significant effect on FV indicating that increase in WCE positively enhances firm value. The null

hypothesis (H_{02}) investigated the mediating effect of liquidity on the relationship between working capital efficiency and firm value of selected firms listed at NSE, Kenya. The study found that the null hypothesis should be rejected indicating that liquidity has positive and a statistically significant mediating effect on the relationship between WCE and FV.

The null hypothesis (H_{03}) sought to investigate the moderating effect of firm size on the relationship between working capital efficiency and firm value of selected firms listed at NSE, Kenya. The results of the study indicate that the null hypothesis should be rejected finding that firm size has a negative statistically significant effect on the relationship between WCE and FV. Finally, the null hypothesis (H_{04}) examined the joint effect of WCE, liquidity, and firm size on the FV of selected firms listed at NSE, Kenya. The study finds that WCE, liquidity, and firm size have a statistically significant joint effect on FV translating to rejection of the null hypothesis since the overall model was statistically significant.

5.3 Conclusions

The results and findings led to various conclusions that were drawn from the hypothesis testing. Seemingly, the findings are similar to various studies in the existing empirical literature that relate to the link between WCE, liquidity, firm size and FV. Further, the findings are consistent with prepositions of various theories that were adopted to anchor the variables of the study including, agency, trade-off, pecking order, and cash conversion cycle theories.

Firstly, the study established that WCE has a positive significant effect on FV. The elucidation of this is that a firm optimizing the balance between current assets and current

liabilities can free up cash that can be invested in growth opportunities or used to service debt, thereby boosting the overall value. Venturing in ideal level of working capital is key since it affects the operations of a firm both in the short term and long-term basis of value creation. Therefore, the study concludes that the selected listed firms have invested in working capital, and they can further create value for their firms by enhancing its efficiency.

The findings of the study indicated that liquidity statistically mediates the relationship between WCE and firm value. Firms should balance their working capital practices with ideal level of liquidity considerations to achieve the best outcomes for their value. This is because an ideal level of liquidity in firms directly and positively stimulates the relationship between WCE and firm value hence maximization of shareholders' wealth. The study concludes that the method in which firms invest in optimal liquidity is primarily anchored on efficient working capital to positively affect the value of firms.

The study established that firm size negatively moderates the relationship between WCE and firm value. The inference is that as firms increase in relation to the overall assets, their ability to access external financing and credit worthiness increases compared to smaller firms. Therefore, their sensitivity to optimal working capital to generate revenue decreases thus negatively affecting the link between WCE and firm value. In addition, increase in total assets may be attributed to diversification, mergers and acquisitions, or venturing into advanced innovations. The study concludes that since large firms are able to manage their working capital requirements through external funding, thus, reducing the sensitivity of firm value to efficient working capital.

Finally, the study found a significant joint effect of WCE, liquidity and firm size on firm value. Optimal balance of the main drivers of firm value is critical in realization of the overall goal of a firm. Too much focus on WCE at the cost of liquidity could lead to difficulties in meeting financial obligations, while excessive liquidity might indicate underutilized resources. The ideal balance could depend on factors such as industry dynamics and growth prospects. Therefore, the study concludes that engagement of firms to maintain adequate and efficient WC while enhancing optimal liquidity and utilize resources adequately enhances the overall goal of value creation.

5.4 Recommendations

Based on the study conclusions, the study makes various recommendations to policy, practice and theory. The study established that investment in ideal level of working capital by firm managers is essential for creating value for the selected firms listed at NSE. Consequently, the study recommends that there is need for collaborative efforts towards promoting the efficiency of the key components of working capital in order to positively affect firm value.

5.4.1 Recommendations to Policy

In view of the first study objective, the study concluded that investing in efficient working capital is critical for survival and for the overall goal of value maximization in a firm. Therefore, the study recommends that policy makers should play a critical role in facilitating efficient practice of working capital in order to increase firm value. The regulator (CMA) and NSE should work closely with the finance managers of the listed firms to develop credit policies, institute flawless payment conditions and enhance well-

organized billing and assortment schemes in order to speed up cash flows and promote efficiency.

Secondly, based on the conclusion that an ideal level of liquidity in firms directly and positively stimulates the relationship between WCE and firm value hence maximization of shareholders' wealth, the study recommends that regulatory bodies should develop standard guidelines that would be suitable for firms across the different sectors. For instance, since financial firms listed at NSE have a regulation on cash reserves or liquidity by regulatory agencies such as central bank, the CMA can also develop policies that regulate ideal level of liquidity for selected listed firms. As a result, these measures would promote optimal liquidity and positively boost or strengthen the relationship between WCE and FV.

Based on the third objective of the study, it was found that since large firms, in terms of total assets, have access to funding and external financing compared to smaller firms they are able to manage their working capital requirements through external funding, thus, minimizing the sensitivity of firm value to working capital efficiency. Therefore, this study recommends that initiatives in policy formulation should take cognizance of the variations in sizes of firms. In this regard, associations that regulate various sectors such as Kenya Manufacturer's Association (KMA) regulator for manufacturing firms, the National Construction Authority (NCA) regulator for construction firms, and Agriculture and Food Authority (AFA) regulator for agricultural firms, need to evaluate the sizes of firms in their respective sectors and come up with standards of maintaining optimal working capital that will enhance firm value.

Fourthly, the study established that engagement of firms to maintain adequate and efficient WC, enhanced optimal liquidity, and size of firms in terms of assets would lead to significant effect on firm value. Therefore, the study recommends that regulations should take into consideration the combined elements of working capital efficiency, liquidity, and firm size in order to maximize on firm value. This can be achieved by maintaining optimal working capital, and liquidity reserves based on the size of a given firm. For instance, firms that are large require policies that promote disclosure methods or practices that concern administration of working capital and those that allow shareholders to evaluate the firms' efficiency. This can be done by developing policies that focus on voluntary disclosure thus allowing constant evaluation of firms by investors on the status of working capital, since it gives them signals on efficiency position and therefore make informed investment decisions.

5.4.2 Recommendations to Practice

The findings and conclusions of the study should be of significance to firm managers and experts on various measures that would be taken to enhance the relationship between working capital efficiency and firm value given its significance. Finance managers, in respective firms, should work towards cultivating efficient working capital practice that enhances firm value and hence shareholder wealth maximization. This could be achieved through effective measures of the components of working capital. For instance, procurement managers should augment administration of inventory level in firms using advanced systems such as just-in-time stock structures, frequent stock audits, and demand projections, that would ensure that there is no inventory wastage, and an ideal level is sustained within a given period of time. Furthermore, minimizing the receivables cycle

would positively increase the effect of efficient working capital if restructuring receivables procedures are enhanced whereby repayment period is not stretched out at the expense of firms.

Secondly, the study also makes recommendations to procurement managers in order to enhance efficient working capital. The study recommends that they should nurture parties' relationships when handling payables. This can be achieved by negotiating positive compensation terms with suppliers through making longer payment terms with them without compromising the relationship between parties. As a matter of policy, drafting a payables structure policy which considers the interests of the firm as well as suppliers, is critical. On the other hand, finance managers should maintain optimal amount of cash reserves, observe and handle cash flows, and adopt liquidity projections systems with an aim of enhancing FV.

In relation to firm size, the study recommends that firm managers have a key role due to its moderation effect on the relationship between WCE and firm value. For instance, large firms should invest more in technology in order to automate and modernize all the processes that relate to working capital by using such systems as enterprise resource planning (ERP), automated billing, and adoption of data analytics techniques. Based on the foregoing recommendations, optimization of working capital through efficient administration of the key components such as receivables, payables, cash, and inventory by finance managers while considering the size of a firm is critical in enhancing firm value. This is considering that, while maximizing the value of shareholders is important,

combination of cultivating proper and efficient relationship between firms and other stakeholders such as suppliers, employees, and customers is equally significant.

5.4.3 Recommendations to Theory

The study makes further recommendations to the theory in view of the conclusions of the study. The first conclusion was that the selected listed firms have invested in working capital, and they can further create value for their firms by enhancing its efficiency. The findings enhance the Agency theory by establishing that the agents (firm managers) can create value for their firms and maximize value for the principals (shareholders) through efficient WCE. The study recommends that scholars should investigate further on the ideal investment techniques that various firms can adopt to enhance firm value.

Secondly, the study concluded that the method in which firms invest in optimal liquidity is primarily anchored on efficient working capital to positively affect the value of firms. The empirical evidence strengthens the existing trade-off theory by providing a new dimension in relation to the significance of ideal liquidity to positively affect the link between WCE and FV. In this regard, the study recommends that further investigations on the efficiency of individual components of working capital and how they enhance ideal level of liquidity in order to firm value is key.

The conclusion of the study is that since large firms are able to manage their working capital requirements through external funding, thus, reducing the sensitivity of firm value to efficient working capital enhances the pecking order theory. This is because, the theory postulates that large firms are not keen on the hierarchical source of financing proposed by the theory since they are not constrained in acquisition of external financing compared to

smaller firms. Consequently, the study recommends to theory on the need to comparatively explore further on the bases of the variations in effect of WCE on FV for firms with different sizes in relation to aggregate assets.

Finally, the fourth conclusion was that an ideal level of working capital, firm liquidity, and size in terms of assets has combined vital and significant role in overall achievement of firm value. In this regard, the study recommends that investing and creating awareness on the combined effect of WCE, liquidity, and firm size on firm value is essential. Broadening the finance theory into creation of awareness to firm managers and other stakeholders on growth and application of advanced financial systems and tools that constantly monitor the optimal level of working capital, liquidity and increase firm size in firms would significantly enhance firm value.

5.5 Contributions to Knowledge

The study presents various contributions to the body of knowledge. The main contribution is founded on the conceptual framework that demonstrates an empirical model which is appropriate for selected firms listed at NSE, Kenya in enhancing firm value and thus maximization of shareholders' wealth. The framework defines the relationships between working capital efficiency, liquidity, firm size and firm value and therefore additional knowledge to researchers. Secondly, the reviewed empirical literature presented various research gaps in relation to methodology, conceptualization of variables, empirical and contextual limitations. The study sought to address the gaps by focusing on the effect of working capital efficiency on firm value and contributes empirically on the mediating and moderating effects of liquidity and firm size respectively.

From the empirical testing, the study found a moderate relationship between working capital efficiency and firm value and a statistically significant positive effect. These insights contribute to the existing knowledge that firms can enhance their firm value which is the main goal of a firm by having efficient working capital. Further, the understanding that the liquidity of a firm has a significant mediating effect on the relationship between working capital efficiency and firm value is crucial to the body of knowledge. Additionally, significant contribution on the moderating effect of firm size indicating that it has a bearing on the direction of the relationship between working capital efficiency and firm value is vital to scholars. Finally, additional knowledge is presented in relation to the joint effect of working capital efficiency, liquidity, and firm size on firm value that all these elements have a combined effect on firm value.

5.6 Limitations of the Study

The study encountered some limitations which are noteworthy. Firstly, the findings of the study were based on the secondary data that was obtained from the financial annual reports and NSE handbooks for selected firms listed at NSE, Kenya. Therefore, the results may not be inferred to financial firms such as those listed under banking, insurance, and investment since they have regulations on working capital and liquidity. However, if the selected firms and policy makers would embrace the recommendations made in the study, there would be significant improvement on firm value.

During data collection, it was observed that various firms had missing annual reports for some periods especially during the 2020-2021 period. This means that the panel data was unbalanced due to the absent data. However, this study overcame the limitation by

adopting random effect estimation technique that is able to handle unobserved heterogeneity and unbalanced panel data. The panel data set contained various extreme values across the variables of the study which could have led to biased results and incorrect interpretations. To overcome this limitation, the study adopted the scientific statistical techniques of eliminating the outliers in order to enhance accuracy of the empirical findings.

The study adopted panel data that was for specific time period: 2012 to 2021, group of firms, and context. This poses a limitation on generalization of results to other contexts, periods, and category of firms. Further, the focus was on working capital efficiency in relation to the working capital turnover ratio. Additionally, firm value was measured using the price to book value ratio while liquidity and firm size were measured using current ratio and natural log of assets. Therefore, the findings of the study are true to the extent to which the variables of the study were measured.

5.7 Areas for Further Research

The study makes some specific recommendations for further research in view of the study outcomes. Firstly, based on the trend analysis, the study found that while working capital efficiency, liquidity and firm value were all moving to the same direction except for exceptional years, firm size on the other hand moved the opposite direction. For instance, WCE, liquidity, and firm value had a downward trend in the period 2012-2021. However, on the other hand, firm size had an upward trend. Therefore, this study recommends further investigation on the cause of the diverse trends and comparative studies on WCE, liquidity, and FV for various sectors.

Secondly, results of the descriptive statistics indicate that the standard deviations for working capital efficiency and liquidity were high. In this regard, the study recommends further research on the causes of high variations across the firms in various sectors. Thirdly, based on results of the correlation analysis that firm size had a moderate negative relationship with firm value, while firm size and working capital efficiency had a weak relationship, further research on the causes and implications of the low correlation would be critical.

References

Abeyrathna, S., & Priyadarshana, A. J. M. (2019). Effect of firm size on profitability. *International Journal of Scientific and Research Publications*, *9*(6), 561–564.

Abo El-ata, G. M. S. E., Kerdawy, A., Ahmed, M. M., & Shabana, M. M. M. (2023). The mediating role of stock market liquidity on the relationship between investor sentiment and stock market volatility: An applied study on listed companies in Egyptian Stock Exchange. *The Scientific Journal of Financial and Commercial Studies and Research*, *4*(2), 289–332.

Abu-Alhaija, A. S. (2019). From epistemology to structural equation modeling: An essential guide in understanding the principles of research philosophy in selecting the appropriate methodology. *Australian Journal of Basic and Applied Sciences*, *13*(9), 122–128.

Adair, P., & Adaskou, M. (2015). Trade-off-theory vs. pecking order theory and the determinants of corporate leverage: Evidence from a panel data analysis upon French SMEs (2002–2010). *Cogent Economics & Finance*, *3*(1), 1006477.

Adebiyi, O. C. (2021). Effect of capital structure, liquidity on performance: Evidence from deposit money banks in Nigeria. *Research Journal of Finance and Accounting, 12*(14), 1-11.

Adhikari, H. P., Krolikowski, M. W., Malm, J., & Sah, N. B. (2021). Working capital (mis) management–effect of executive age. *Accounting & Finance*, *61*(1), 727–761.

Adiputra, I. G., & Hermawan, A. (2020). The effect of corporate social responsibility, firm size, dividend policy and liquidity on firm value: Evidence from manufacturing companies in Indonesia. *International Journal of Innovation, Creativity and Change*, *11*(6), 325–338.

Afiezan, A., Wijaya, G., & Claudia, C. (2020). The effect of free cash flow, company size, profitability and liquidity on debt policy for manufacturing companies listed on IDX in 2016-2019 periods. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal) Vol*, *3*(4), 4005-4018.

Afinindy, I., Salim, U., & Ratnawati, K. (2021). The effect of profitability, firm size, liquidity, sales growth on firm value mediated capital structure. *International Journal of Business, Economics and Law, 24*(4), 15-22.

African Development Bank Group. (2020). *East Africa Economy Outlook 2020*.

Afrifa, G. A., Tingbani, I., & Adesina, O. O. (2022). Stochastic frontier modelling of working capital efficiency across Europe. *Technological Forecasting and Social Change*, *184*, 122012.

Agyei, J., Sun, S., & Abrokwah, E. (2020). Trade-off theory versus pecking order theory: Ghanaian evidence. *SAGE Open*, *10*(3), 2158244020940987.

Agung, G., Hasnawati, S., & Huzaimah, R. F. (2021). The effect of investment decision, financing decision, dividend policy on firm value. *Jurnal Bisnis Dan Manajemen*, *17*(1), 1-12

Ahangar, N. (2020). Working capital efficiency and firm profitability: Narrative literature review. *Library Philosophy and Practice (e-journal)*. 3811.

Ahkam, S. N., & Alom, K. (2019). Liquidity, level of working capital investment, and performance in an emerging economy. *International Journal of Business & Economics*, *18*(3), 307-328.

Ahmadimousaabad, A., Bajuri, N., Jahanzeb, A., Karami, M., & Rehman, S. (2013). Trade-off theory, pecking order theory and market timing theory: A comprehensive review of capital structure theories. *International Journal of Management and Commerce Innovations*, *1*(1), 11-18.

Ahmed, A., Olayinka, L. Q., Abdullahi, A. R., & Yayaji, M. A. (2019). Effect of working capital management of the profitability of listed pharmaceutical firms in Nigeria. *Scholars Middle East Publishers, Dubai, United Arab Emirates*, *5*(12), 796-801.

Ai, H., Frank, M. Z., & Sanati, A. (2020). The Trade-Off Theory of Corporate Capital Structure.

Ajibolade, S. O., & Sankay, O. C. (2013). Working capital management and financing decision: Synergetic effect on corporate profitability. *International Journal of Management, Economics and Social Sciences*, *2*(4), 233–251.

Akadiri, S. S., & Akadiri, A. C. (2021). Examining the causal relationship between tourism, exchange rate, and economic growth in tourism island states: Evidence from second-generation panel. *International Journal of Hospitality & Tourism Administration*, *22*(3), 235–250.

Akbar, M., Akbar, A., & Draz, M. U. (2021). Global financial crisis, working capital management, and firm performance: evidence from an Islamic market index. *Sage Open*, *11*(2), 21582440211015705.

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.

Akben-Selcuk, E. (2016). Factors affecting firm competitiveness: Evidence from an emerging market. *International Journal of Financial Studies*, *4*(2), 9.

Akenga, G. (2017). Effect of liquidity on financial performance of firms listed at the Nairobi Securities Exchange, Kenya. *International Journal of Science and Research*, *6*(7), 279–285.

Alejo, J., Galvao, A., Montes-Rojas, G., & Sosa-Escudero, W. (2015). Tests for normality in linear panel-data models. *The Stata Journal*, *15*(3), 822–832.

Ali, J., Din, M. U., Waris, A., Tahir, M., & Khan, S. (2020). Working capital management and firms' profitability: Dynamic panel data analysis of manufactured firms. *Journal of Financial Risk Management*, *9*(04), 494.

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

Almomani, T. M., Almomani, M. A., & Obeidat, M. I. (2021). The relationship between working capital management and financial performance: Evidence from Jordan. *The Journal of Asian Finance, Economics and Business*, *8*(6), 713–720.

Alsufy, F., Afifa, M. A., & Zakaria, M. (2020). mediating effects of liquidity in the relationship between earnings quality and market value of the share price: Evidence from Jordan. *Review of Applied Socio-Economic Research*, *19*(1), 17–32.

Alsulayhim, N. (2019). The relationship between working capital management and profitability. *International Business Research, 12*(8), 142-152.

Amanda, R. I. (2019). The impact of cash turnover, receivable turnover, inventory turnover, current ratio and debt to equity ratio on profitability. *Journal of Research in Management*, *2*(2), 14-22.

Aminu, Y., & Zainudin, N. (2015). A review of anatomy of working capital management theories and the relevant linkages to working capital components: A theoretical building approach. *European Journal of Business and Management*, *7*(2), 10–18.

Amponsah-Kwatiah, K., & Asiamah, M. (2021). Working capital management and profitability of listed manufacturing firms in Ghana. *International Journal of Productivity and Performance Management*, *70*(7), 1751–1771.

Andersen, H. K. (2022). A closer look at random and fixed effects panel regression in structural equation modeling using Lavaan. *Structural Equation Modeling: A Multidisciplinary Journal*, *29*(3), 476-486.

Anjum, S., & Malik, Q. A. (2013). Determinants of corporate liquidity-an analysis of cash holdings. *Journal of Business and Management, 7*(2), 94-100.

Arango-Morales, A. J., Delgado-Cruz, A., & Tamayo-Salcedo, A. L. (2019). Digital competence of tourism students: Explanatory power of professional training. *European Journal of Investigation in Health, Psychology and Education*, *10*(1), 310–326.

Arilyn, E. J. (2020, June). The Effects of Profitability, Liquidity, Tangibility, Firm Size, and Asset Turnover on Capital Structure in Chemical Industry Listed on Indonesia Stock Exchange from 2014 to 2018. In *8th International Conference of Entrepreneurship and Business Management Untar (ICEBM 2019)* (pp. 399-404). Atlantis Press.

Arnaldi, A., Novak, B., Roscigno, R., & Zhang, W. J. I. J. O. B. M. (2021). Working capital management and profitability: Empirical evidence. *International Journal of Business Management and Economic Research*, *12*(2), 1911-1917.

Arsyad, M., Haeruddin, S. H., Muslim, M., & Pelu, M. F. A. (2021). The effect of activity ratios, liquidity, and profitability on the dividend payout ratio. *Indonesia Accounting Journal*, *3*(1), 36-44.

Ashraf, C. K. (2012). The relationship between working capital efficiency and profitability. *Journal of Accounting and Management*, *2*(3).

Assalahi, H. (2015). The philosophical foundations of educational research: A beginner's guide. *American Journal of Educational Research*, *3*(3), 312–317.

Ayunku, P. E., & Ekokeme, T. T. (2020). Working capital management firm liquidity and stock market seasonality: Evidence from Nigeria. *European Journal of Accounting, Auditing and Finance Research, 8*(1), 30-51.

Azhar, K. A., & Ahmed, N. (2019). Relationship between firm size and profitability: investigation from textile sector of Pakistan. *International Journal of Information, Business and Management*, *11*(2), 62–73.

Bahraini, S., Endri, E., Santoso, S., Hartati, L., & Pramudena, S. M. (2021). Determinants of firm value: A case study of the food and beverage sector of Indonesia. *The Journal of Asian Finance, Economics and Business*, *8*(6), 839–847.

Baltagi, B. H., Egger, P., & Pfaffermayr, M. (2013). A generalized spatial panel data model with random effects. *Econometric Reviews*, *32*(5–6), 650–685.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173.

Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2020). Net operating working capital and firm value: A cross-country analysis. *BRQ Business Research Quarterly*, *23*(3), 234-251.

Battisti, E., Bollani, L., Miglietta, N., & Salvi, A. (2020). The effect of leverage on the cost of capital and market value: Evidence from Sharīʿah-compliant firms. *Management Research Review, 43*(9), 1081-1096.

Bawono, A., & Falakh, F. (2019). An analysis of financial ratio effect with liquidity and profitability as intervening on Sharia banking performance in Indonesia for the years 2015-2018. *HUMAN FALAH: Jurnal Studi Ekonomi dan Bisnis Islam*, *6*(2), 264-280.

Bell, A., & Jones, K. (2015). Explaining fixed effects: Random effects modeling of time-series cross-sectional and panel data. *Political Science Research and Methods, 3*(1), 133–153.

Bhuiyan, M. B. U., & Hooks, J. (2019). Cash holding and over-investment behavior in firms with problem directors. *International Review of Economics & Finance*, *61*, 35-51.

Bintara, R. (2020). The effect of working capital, liquidity and leverage on profitability. *Saudi Journal of Economics and Finance Abbreviated, 4*(1), 28-35.

Blumberg, B., Cooper, D., & Schindler, P. (2014). *Business Research Methods*. Mcgraw Hill.

Botzen, W. W., Deschenes, O., & Sanders, M. (2019). The economic effects of natural disasters: A review of models and empirical studies. *Review of Environmental Economics and Policy*, *13*(2), 167-341.

Buallay, A., & Hamdan, A. (2019). The relationship between corporate governance and intellectual capital: The moderating role of firm size. *International Journal of Law and Management*, *61*(2), 384-401.

Calhoun, G. (2020). *Price and Value: A Guide to Equity Market Valuation Metrics*. Apress.

Capital Markets Authority. (2021). *Launch of Revised Capital Market Master Plan December 2021*.

Capital Markets Authority. (2022). *Quarterly Statistical Bulletin (QSB)* (Issue 53/2022, pp. 1–71).

Capital Markets Authority. (2023). *Quarterly Statistical Bulletin (QSB)* (Issue 54/2023, pp. 1–71).

Casteel, A., & Bridier, N. L. (2021). Describing populations and samples in doctoral student research. *International Journal of Doctoral Studies*, *16*(1), 339-362.

Chabachib, M., Hersugondo, H., Ardiana, E., & Pamungkas, I. D. (2020). Analysis of company characteristics of firm values: Profitability as intervening variables. *International Journal of Financial Research*, *11*(1), 60-70.

Chaklader, B., & Padmapriya, B. (2021). Impact of cash surplus on firm's capital structure: Validation of pecking order theory. *Managerial Finance*, *47*(12), 1801-1816.

Charles, G. (2009). *Financial Reporting &Analysis Using Financial Accounting Information*. USA: South-Western Cengage Learning.

Chen, L.-J., & Chen, S.-Y. (2011). How the pecking-order theory explain capital structure. *Journal of International Management Studies*, *6*(3), 92–100.

Chen, Y., Smith, T. J., York, C. S., & Mayall, H. J. (2020). Google earth virtual reality and expository writing for young English learners from a funds of knowledge perspective. *Computer Assisted Language Learning*, *33*(1–2), 1–25.

Christopher, F. M., Njuguna, A., & Kiriri, P. (2021). Early results on depth of the nascent Kenyan derivative market. *International Journal of Financial Research*, *12*(3), 345–355.

Collischon, M., & Eberl, A. (2020). Let's talk about fixed effects: Let's talk about all the good things and the bad things. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *72*(2), 289-299.

Creswell, J. W. (2009). *Research designs: Qualitative, quantitative, and mixed methods approaches*. Callifornia: Sage.

Dalci, I., Tanova, C., Ozyapici, H., & Bein, M. A. (2019). The moderating effect of firm size on the relationship between working capital management and profitability. *Prague Economic Papers*, *28*(3), 296–312.

Dallmeyer, S., Wicker, P., & Breuer, C. (2023). The Relationship between leisure-time physical activity and job satisfaction: A dynamic panel data approach. *Journal of Occupational Health*, *65*(1), e12382.

D'Amato, A., & Falivena, C. (2020). Corporate social responsibility and firm value: Do firm size and age matter? Empirical evidence from European listed companies. *Corporate Social Responsibility and Environmental Management*, *27*(2), 909-924.

Dang, H. N., Nguyen, T. T. C., & Tran, D. M. (2020). The effect of earnings quality on firm value: The case of Vietnam. *The Journal of Asian Finance, Economics and Business*, *7*(3), 63–72.

Daniya, A. A. (2018). Working capital management and financial performance of listed conglomerate companies in Nigeria. *The Journal of Accounting, Finance and Auditing Studies, 4*(2), 49-66.

Das, A. K., Mandal, T., Kuiry, N. P., (2018). Interaction with liquidity and working capital management efficiency: A study on Indian pharmaceutical firms. *International Journal for Research Trends and Innovation, 3*(7), 123-131.

Dayag, A. J., & Trinidad, F. (2019). Assessment of the correlation between price-earnings ratio and stock market returns of universal banks in the Philippines. *International Journal of Research in Business and Social Science (2147-4478), 8*(5), 172-181.

Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business Finance & Accounting*, *30*(3-4), 573–588.

Demmou, L., Franco, G., Calligaris, S., & Dlugosch, D. (2021). *Liquidity shortfalls during the COVID-19 outbreak: Assessment and policy responses*.

Dewi, M., Foanto, G. N., & Christiawan, Y. J. (2021, November). Profitability, Liquidity, And Firm Value: Does Financial Distress Have a Mediating Effect? In *6th International Conference on Tourism, Economics, Accounting, Management, and Social Science (TEAMS 2021)* (pp. 437-445). Atlantis Press.

Diantoro, F. A., Roziq, A., & Winarno, W. A. (2022). Determinants of firm value in banking companies in Indonesia. *Wiga: Jurnal Penelitian Ilmu Ekonomi*, *12*(3), 158-166.

Doan, T. (2020). The effect of cash holdings on firm performance: Evidence from Vietnam listed firms. *Accounting*, *6*(5), 721–726.

Drukker, D. M. (2003). Testing for serial correlation in linear panel-data models. *The Stata Journal*, *3*(2), 168–177.

Egbunike, P. A., & Uyanne, C. B. (2021) Effects of cash conversion cycle on cash flow of quoted consumer goods manufacturing firms in Nigeria. *Research Journal of Management Practice*, *1*(7), 56-76.

Eladly, S. M. (2021). The financial performance on asset quality of insurance industry in Egypt (panel data analysis). *International Business Research*, *14*(6), 1–24.

Endri, E. (2020). Long-term analysis banking share price: Application of data panel regression model. *Available at SSRN 3670225*. https://ssrn.com/abstract=3670225 or http://dx.doi.org/10.2139/ssrn.3670225.

Etim, E. O., Umoffong, N. J., Enang, E. R., & Agatevure, G. (2022). Liquidity management and firm value of quoted manufacturing companies in Nigeria. *Indo-Asian Journal of Finance and Accounting 3*(1), 47-66.

Fajar, M., Nurfalah, Z., & Nonalisa, S. (2020). Modeling of poverty determinants in Sumatera island (panel regression approach). *Int. J. Sci. Res. in Multidisciplinary Studies Vol*, *6*(12), 35-41.

Farhan, N. H., Alhomidi, E., Almaqtari, F. A., & Tabash, M. I. (2019). Does corporate governance moderate the relationship between liquidity ratios and financial performance? Evidence from Indian pharmaceutical companies. *Academic Journal of Interdisciplinary Studies*, *8*(3), 144–144.

Gautam, R. S., Rastogi, D. S., & Rawal, A. (2022). Study of financial literacy and its effect on rural development in India: Evidence using panel data analysis. *Iconic Research and Engineering Journals*, *5*(9), 483–492.

Ghosh, D. S. K., & Maji, S. G. (2004). Working capital management efficiency: A study on the Indian cement industry. *Management Accountant-Calcutta-*, *39*, 363–372.

Gitman, L. J. (2003). *Principles of managerial finance* (10th ed.). Addison Wesley.

Gitman, L. J. (2009). *Introduction to Managerial Finance*. Prentice Hall, A Division of Pearson Education, Inc.

Greene, W. H. (2018). *Econometric Analysis/Limdep User's Manual*. Prentice Hall, Englewood Cliffs, NJ.

Grozdić, V., Marić, B., Radišić, M., Šebestová, J., & Lis, M. (2020). Capital investments and manufacturing firms' performance: Panel-data analysis. *Sustainability, 12*(4), 1-18.

Gujarati, D. N., & Porter, D. (2009). *Basic Econometrics Mc Graw-Hill International Edition*.

Gunay, F., & Cokins, G. (2021). Comparative measurement of working capital efficiency for Borsa Istanbul restaurants and hotels for the covid-19 period and previous quarters. *University of South Florida M3 Center Publishing*, *5*(2021), 1-17.

Gupta, V. (2019). Evaluating the accuracy of valuation multiples on Indian firms using regularization techniques of penalized regression. *Theoretical Economics Letters*, *9*(01), 180-209.

Gworo, C. O. (2019). Earnings volatility and market value of companies listed at the Nairobi Securities Exchange market. *The Strategic Journal of Business & Change Management*, *6*(1), 17–26.

Hameer, N. A. B. A., Ramakrishnan, S., & Gillani, S. M. A. H. (2021). The effect of working capital management on firm performance across Bumiputera and non

bumiputera manufacturing firms in Malaysia. *Studies of Applied Economics*, *39*(4), 1-8.

Hamiye Beyaztas, B., & Bandyopadhyay, S. (2020). Robust estimation for linear panel data models. *Statistics in Medicine*, *39*(29), 4421–4438.

Hamzah, K. D. (2022). Use financial ratios as a tool to evaluate performance efficiency. *Iraqi Journal of Humanitarian, Social and Scientific Research*, *2*(4), 210-228.

Hanif, I., Aziz, B., & Chaudhry, I. S. (2019). Carbon emissions across the spectrum of renewable and nonrenewable energy use in developing economies of Asia. *Renewable Energy*, *143*, 586–595.

Hapsoro, D., & Falih, Z. N. (2020). The effect of firm size, profitability, and liquidity on the firm value moderated by carbon emission disclosure. *Journal of Accounting and Investment*, *21*(2), 240-257.

Hendry, H. B. (2021). Activity ratio analysis to working capital with liquidity as a moderating variable. *Glob Acad J Humanit Soc Sci*, *3*(4), 175-181.

Heo, Y., Thanh Huyen, N. T., & Doanh, N. K. (2021). Effect of the institutional quality on NAFTA's international trade: A System GMM Approach. *Journal of Economic Studies*, *48*(3), 537–556.

Hidayah, N. E. F., & Rahmawati, R. (2019). The effect of capital structure, profitability, institutional ownership, and liquidity on firm value. *Indonesian Journal of Contemporary Management Research*, *1*(1), 55–64.

Hirdinis, M. (2019). Capital structure and firm size on firm value moderated by profitability. *International Journal of Economics and Business Administration*, *7*(1), 174-191.

Högerle, B., Charifzadeh, M., Ferencz, M., & Kostin, K. B. (2020). The development of working capital management and its effect on profitability and shareholder value: evidence from Germany. *Strategic management*, *25*(2), 27-39.

Hsu, C.-H., Chiang, Y.-C., & Liao, T. L. (2013). Testing pecking order behaviors from the viewpoint of multinational and domestic corporations. *Investment Management and Financial Innovations*, *10, Iss. 2 (contin.)*, 158–165.

Huang, K.-W., Qiao, M., Liu, X., Liu, S., & Dai, M. (2019). Computer vision and metrics learning for hypothesis testing: An application of QQ plot for normality test. *ArXiv Preprint ArXiv:1901.07851*, 1-14.

Husna, A., & Satria, I. (2019). Effects of return on asset, debt to asset ratio, current ratio, firm size, and dividend payout ratio on firm value. *International Journal of Economics and Financial Issues*, *9*(5), 50–54.

Husnan, S. (2002). *Financial Management: Theory and Decision (Decision Short Term)*. Yogyakarta: BPFE.

Hussain, S., Quddus, A., Pham, P. T., Rafiq, M., & Pavelková, D. (2020). The moderating role of firm size and interest rate in capital structure of the firms: selected sample from sugar sector of Pakistan. *Investment Management and Financial Innovations*, *17*(4), 341-355.

Ibrahim, U. A., & Isiaka, A. (2021). Working capital management and financial performance of non-financial quoted companies in Nigeria. *International Journal of Research in Business and Social Science (2147-4478)*, *10*(3), 241-258.

Ilham, R. N., Irawati, H., Nurhasanah, N., Inuzula, L., Sinta, I., & Saputra, J. (2022). Relationship of working capital management and leverage on firm value: An evidence from the Indonesia stock exchange. *Journal of Madani Society*, *1*(2), 64-71.

Ikram, M., & Kenayathulla, H. B. (2022). Out of touch: Comparing and contrasting positivism and interpretivism in social science. *Asian Journal of Research in Education and Social Sciences*, *4*(2), 39–49.

Ismaeel, S. S., Midi, H., & Sani, M. (2021). Robust multicollinearity diagnostic measure for fixed effect panel data model. *Malaysian J. Fundam. Appl. Sci.*, *17*(5), 636–646.

Jackson, P. R., Thorpe, R., & Easterby-Smith, M. (2015). Management and business research. *Management and Business Research*, 1–400.

Jafar, H., Muda, I., Zainal, A., & Yasin, W. (2010). Profit maximization theory, survival-based theory and contingency theory: A review on several underlying research theories of corporate turnaround. *Jurnal Ekonom*, *13*(4), 136-143.

Jahanger, A., Usman, M., & Balsalobre-Lorente, D. (2022). Autocracy, democracy, globalization, and environmental pollution in developing world: fresh evidence from STIRPAT model. *Journal of Public Affairs*, *22*(4), e2753.

James, S. (2020). Liquidity, size and firm value: Evidence from Nigeria economy. *World Journal of Finance and Investment Research*, *5*(1), 13-20.

Jasmani, J. (2019). The effect of liquidity and working capital turnover on profitability at PT. Sumber Cipta Multiniaga, South Jakarta. *PINISI Discretion Review*, *3*(1), 29-38.

Jaworski, J., & Czerwonka, L. (2022). Profitability and working capital management: Evidence from the Warsaw Stock Exchange. *Journal of Business Economics and Management*, *23*(1), 180-198.

Jensen, M. (2001). Value maximisation, stakeholder theory, and the corporate objective function. *European Financial Management*, *7*(3), 297–317.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

Jihadi, M., Vilantika, E., Hashemi, S. M., Arifin, Z., Bachtiar, Y., & Sholichah, F. (2021). The effect of liquidity, leverage, and profitability on firm value: Empirical evidence from Indonesia. *The Journal of Asian Finance, Economics and Business*, *8*(3), 423–431.

Kabir, M. A., Lahlimi, A. E., Junaidu, A. M., Sham-Una, I., & Ahmad, M. (2020). Working capital relationship with firm profitability and size. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, *4*(03), 107-113.

Kahfi, F. (2022). Analysis of the effect of working capital efficiency, liquidity, and solvency on profitability in manufacturing companies in the consumer goods industry sector on the Indonesia Stock Exchange. *Journal La Bisecoman*, *3*(1), 1–11.

Kangea, S. T., Nasieku, T., & Muturi, W. (2022). Effect of board size on earnings quality of non-financial firms listed at the Nairobi Securities Exchange. *Finance & Economics Review*, *4*(1), 41–54.

Kenya National Bureau of Statistics. (2022). *Economic Survey 2022* (pp. 1–482).

Khazaei, M., Azizi, M., & Zali, M. (2021). How performance of top companies are related on Global Competitiveness Index? *Journal of Global Entrepreneurship Research*, *11*(1), 129-139.

Khraief, N., Shahbaz, M., Heshmati, A., & Azam, M. (2020). Are unemployment rates in OECD countries stationary? Evidence from univariate and panel unit root tests. *The North American Journal of Economics and Finance*, *51*, 100838.

Kijkasiwat, P., & Phuensane, P. (2020). Innovation and firm performance: The moderating and mediating roles of firm size and small and medium enterprise finance. *Journal of Risk and Financial Management*, *13*(5), 1-15.

Kim, Y., & Steiner, P. M. (2021). Causal graphical views of fixed effects and random effects models. *British Journal of Mathematical and Statistical Psychology*, *74*(2), 165–183.

Kipkemoi, P., Kiru, K., & Koima, J. K. (2018). Effect of inventory and cash conversion cycles on financial performance of listed commercial and service firms in Nairobi Securities Exchange Kenya. *Scholars Journal of Economics Business and Management (SJEBM)*, *1*(1), 997-1002

Kothari, C. R. (2004). *Research methodology*. New Age International (P) Ltd., Publishers

Kraus, A., & Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. *The journal of finance*, *28*(4), 911-922.

Kryeziu, N., & Durguti, E. A. (2019). The effect of inflation on economic growth: The case of Eurozone. *International Journal of Finance & Banking Studies (2147-4486)*, *8*(1), 01–09.

Kundu, S., Quddus, K., & Jagannath S. N. (2022). Does halo effect of innovative firms moderate the effect of working capital efficiency on firm value? Evidence from India. *Cogent Economics & Finance*, *10*(1), 1-22.

La Rocca, M. (2010). *Is Ownership a Complement to Debt in Affecting Firm's Value. A Meta-Analysis*. Rende CS, Italy: University of Calabria. https://www. researchgate. net.

Lan, J. (2012). 16 Financial ratios for analysing a company's strengths and weaknesses. *AAII Journal*, *September*. 18-22.

Lawrence, G. J., & Zutter, C. J. (2012). Principles of Managerial Finance. *The British Accounting Review*.

Lazaridis, I., & Tryfonidis, D. (2006). Relationship between working capital management and profitability of listed companies in the Athens stock exchange. *Journal of financial management and analysis*, *19*(1), 1-12.

Levitt, S. D. (2016). Bagels and Donuts for Sale: A case study in profit maximization. *Research in Economics*, *70*(4), 518–535.

Ling, S., Ali, S. A. bin, Yie, S., & Ling. (2018). *A Conceptual Paper on Working Capital Management Theories*. *8*(4), 13–28.

Lin, Y. H., Hu, S. Y., & Chen, M. S. (2005). Managerial optimism and corporate investment: Some empirical evidence from Taiwan. *Pacific-Basin Finance Journal*, *13*(5), 523-546.

Lyroudi, K., & McCarty, D. (1993). An empirical investigation of the cash conversion cycle of small business firms. *Journal of Small Business Finance*, *2*(2), 139-161.

Maddala, G. S., & Wu, S. (1999). A Comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, *61*(S1), 631–652.

Maheshwari, M. (2014). Measuring efficiency and performance of selected Indian steel companies in the context of working capital management. *Pacific Business Review International*, *6*(11), 18–23.

Mahmood, F., Han, D., Ali, N., Mubeen, R., & Shahzad, U. (2019). Moderating effects of firm size and leverage on the working capital finance–profitability relationship: evidence from China. *Sustainability*, *11*(7), 2029.

Mahmood, J., & Mahmood, I. (2019). Comprehensive income disclosure (the case of US companies). *Cogent Economics & Finance*, *7*(1), 1674587.

Mahmood, F., Shahzad, U., Nazakat, A., Ahmed, Z., Rjoub, H., & Wong, W. K. (2022). The nexus between cash conversion cycle, working capital finance, and firm performance: Evidence from novel machine learning approaches. *Annals of Financial Economics*, *17*(02), 2250014.

Matthias, C., & Eberl, A. (2020). Let's talk about fixed effects: Let's Talk about all the good things and the bad things. *Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*, *72*(2), 289–299.

Mihalca, G., & Antal, R. (2009). An Empirical Investigation of the Trade-off and Pecking Order Hypotheses on Romanian Market. In ASMDA. *Proceedings of the International Conference Applied Stochastic Models and Data Analysis*, *13*(109). Vilnius Gediminas Technical University, Department of Construction Economics & Property.

Misra, B. S., Kar, M., Nazlioglu, S., & Karul, C. (2020). Income convergence in Indian districts: New evidence from panel stationarity test with finite time dimension. *Journal of International Development*, *32*(8), 1256–1272.

Mootian, A. W., & Mukoma, K. F. (2020). Firm specific factors and financial performance of real estate firms listed at the Nairobi Securities Exchange in Kenya. *Research Journal of Finance and Accounting*, *11*(14), 164-178.

Morales-Oñate, V., & Morales-Oñate, B. (2021). *MTest: A Bootstrap Test for Multicollinearity*. MPRA_paper.

Muigai, R. G., & Nasieku, T. (2021). Working capital management and financial distress of non-financial companies listed at The Nairobi Securities Exchange. *European Journal of Economic and Financial Research*, *5*(1).

Mukhibad, H., Subowo, S., Maharin, D. O., & Mukhtar, S. (2020). Determinants of debt policy for public companies in Indonesia. *The Journal of Asian Finance, Economics and Business*, *7*(6), 29–37.

Musembi, M. M. (2020). Symmetric and asymmetric effect of investor sentiment on performance of equity market in Nairobi Securities Exchange, Kenya. *International Journal of Management and Commerce Innovations 8*(1), 438-447.

Muthoni, K. G., Jagongo, A., & Muniu, J. (2019). Effect of equity financing on shareholder value creation of non-financial firms quoted at the Nairobi Securities Exchange. *Journal of Finance and Accounting*, *3*(5), 32–52.

Myers, S. C. (1984). Capital Structure Puzzle. *NBER Working Paper*, *w1393*.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221.

Nairobi Securities Exchange. (2021). *A Promising Future: Integrated Reports & Financial Statements* (pp. 1–176).

Najaf, K., Schinckus, C., & Yoong, L. C. (2020). Var and market value of fintech companies: An analysis and evidence from global data. *Managerial Finance*. *47*(7) 915-936.

Neher, A., & Miles, M. P. (2020). SMEs and the relationship between firm size and the enactment of espoused managerial values. *Small Enterprise Research*, *27*(1), 1–22.

Nguyen, N. P. A., & Dao, T. T. B. (2022). Liquidity, corporate governance and firm performance: A meta-analysis. *Cogent Business & Management*, *9*(1), 2137960.

Ningsih, S., & Sari, S. P. (2019). Analysis of the effect of liquidity ratios, solvability ratios and profitability ratios on firm value in go public companies in the automotive and component sectors. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, *3*(04).

Nugroho, A. C., Firdaus, M., Andati, T., & Irawan, T. (2018). Investment decision in the agency theory framework. *Mix: Jurnal Ilmiah Manajemen*, *8*(1), 16-32.

Nurwulandari, A. (2021). Effect of liquidity, profitability, firm size on firm value with capital structure as intervening variable. *ATESTASI: Jurnal Ilmiah Akuntansi*, *4*(2), 257-271.

Nuryani, Y., & Sunarsi, D. (2020). The effect of current ratio and debt to equity ratio on deviding growth. *JASa (Jurnal Akuntansi, Audit Dan Sistem Informasi Akuntansi)*, *4*(2), 304–312.

Obaje, F. O., & Abdullahi, S. R. (2021). Moderating effect of firm size on the relationship between board structure and firm financial performance. *Journal of Good Governance and Sustainable Development in Africa*, *6*(3), 97-117.

OECD Capital Market Series. (2019). *OECD Equity Market Review Asia 2019* (pp. 1–100).

Oktaputri, S. T., & Setyorini, H. (2022). The effect of working capital efficiency, liquidity and firm size on profitability in the infrastructure sector listed on the Indonesian Stock Exchange. *APLIKATIF: Journal of Research Trends in Social Sciences and Humanities*, *1*(1), 39-51.

Olalere, O. E., Kes, M. S., Islam, M. A., & Rahman, S. (2021). The effect of financial innovation and bank competition on firm value: A comparative study of Malaysian and Nigerian banks. *The Journal of Asian Finance, Economics and Business, 8*(6), 245-253.

Omagwa, J., & Muathe, S. (2019). Corporate governance, financial performance and firm value: Empirical evidence from commercial banks in Kenya. *International Journal of Finance & Banking Studies (2147-4486)*, *8*(4), 41–48.

Omanga, D. K., & Oluoch, O. (2019). Effect of working capital management on tax efficiency of non-financial listed firms at Nairobi Securities Exchange. *International Journal of Social Sciences and Information Technology*, *5*, 336-47.

Onsongo, S. K., Muathe, S. M., & Mwangi, L. W. (2020). Financial risk and financial performance: Evidence and insights from commercial and services listed companies in Nairobi Securities Exchange, Kenya. *International Journal of Financial Studies*, *8*(3), 51.

Onyuma, S. O. (2020). Exchange automation and adaptive efficiency at the Kenyan Securities Market. *Exchange*, *12*(15).

Oroud, Y. (2019). The effect of audit committee characteristics on the profitability: Panel data evidence. *International journal of economics and finance*, *11*(4), 104-113.

Orumie, U. C., & Bartholomew, D. C. (2022). Respiratory syncytial virus infection in infants: A comparative study using discriminant, probit and logistic regression Analysis. *Asian Journal of Probability and Statistics, 18*(2), 18-31.

Oseifuah, E. K., Gyekye, A. (2016). Cash conversion cycle theory and corporate profitability: Evidence from non-financial firms listed on the Johannesburg stock Exchange. *Journal of Accounting and Management, 6(*3), 37-51.

Otekunrin, A., Nwanji, T., & Fagboro, D. (2021). Does working capital management effect an enterprise's profitability? Evidence from selected Nigerian firms. *Problems and Perspectives in Management, 19*(1), 477-486.

Panda, B., & Leepsa, N. M. (2017). Agency theory: Review of theory and evidence on problems and perspectives. *Indian Journal of Corporate Governance*, *10*(1), 74–95.

Pandiangan, S. M. T., Oktafiani, F., Panjaitan, S. R., Shifa, M., & Jefri, R. (2022). Analysis of public ownership and management ownership on the implementation of the triple bottom line in the plantation sector listed on the Indonesia Stock Exchange. *Budapest*

International Research and Critics Institute-Journal (BIRCI-Journal), *5*(1), 3489–3497.

Panigrahi, C. M. A. (2018). Liquidity-profitability trade-off: A game of survival and growth. *NMIMS Management Review, 36*(1).

Paramita, P. D., & Andika, A. D. (2021). Effect of working capital turnover, receivable turnover and firm size on profitability with liquidity as a mediation variable at Pt. Rahma Furniture and Pt. Cakrawana Furnindo Semarang 2016-2020 period. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, *5*(4).

Pervaiz, A., & Akram, S. (2019). Firm size: As a moderator between working capital management and firm profitability. *Journal of Economics and Sustainable Development*, *10*(13), 18–26.

Pham, K. X., Nguyen, Q. N., & Nguyen, C. V. (2020). Effect of working capital management on the profitability of steel companies on Vietnam Stock Exchanges. *The Journal of Asian Finance, Economics and Business, 7*(10), 741-750.

Pitt, L. J. (2014). Working capital efficiency and firm profitability–Nigeria and Kenya. *International Journal of Economics and Management Engineering*, *8*(6), 1670–1675.

Prasad, P., Sivasankaran, N., Paul, S., & Kannadhasan, M. (2019). Measuring effect of working capital efficiency on financial performance of a firm: An alternative approach. *Journal of Indian Business Research*, *11*(1), 75-94.

Pratama, A. (2021). The influence of transformational leadership, job satisfaction, motivation and compensation on mathematics school teacher performance. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, *12*(3), 3679–3684.

Priya, P. V., & Mohanasundari, M. (2016). Dividend policy and its effect on firm value: A review of theories and empirical evidence. *Journal of Management Sciences and Technology*, *3*(3), 59–69.

Pujiati, D., & Averina, M. (2022). Determinants of firm value in Indonesia: Financial factors or non-financial factors? *International Journal of Multidisciplinary: Applied Business and Education Research*, *3*(2), 162–169.

Purnama, S. A. A. M., Made, S. N., & Wahyu, L. N. L. P. R. (2021). Effect of credit risk and market risk on financial performance with liquidity as a mediation on LPD in Badung Regency, Indonesia. *RJOAS, 9*(117), 55-63.

Putra, I. G. W. R., & Sedana, I. B. P. (2019). Capital structure as a mediation variable: Profitability and liquidity on company value in real estate companies in Indonesia Stock Exchange. *International Research Journal of Management, IT and Social Sciences*, *6*(4), 62–72.

Putri, C. N., & Trisnawati, R. (2023). Analysis of the effect of firm size, leverage, liquidity, sales growth, and covid-19 on company performance. *The International Journal of Business Management and Technology*, *7*(1), 570-579.

PwC report. (2022). *The Africa Capital Markets Watch 2021*.

Raheman, A., & Nasr, M. (2007). Working capital management and profitability–case of Pakistani firms. *International review of business research papers*, *3*(1), 279-300.

Rahim, A. N. (2021). The effect of cost control effectiveness and working capital turnover on firm value in the food and beverage sector listed on the Indonesia Stock Exchange. *Journal of Management, Accounting, General Finance and International Economic Issues (Marginal)*, *1*(1), 47–55.

Rahman, M. M., & Howlader, M. S. (2022). The effect of research and development expenditure on firm performance and firm value: Evidence from a South Asian emerging economy. *Journal of Applied Accounting Research*, (ahead-of-print).

Rahmawati, I. Y. (2020). The Effect of Profitability Ratio, Liquidity Ratio, Leverage Ratio, and Company Size on Sukuk Rating Corporation during 2014-2017 periods. *SHS Web of Conferences*, *86*, 01027.

Rana, S., Eshita, N. N., & Al Mamun, A. S. M. (2021). Robust normality test in the presence of outliers. *Journal of Physics: Conference Series*, *1863*(1), 012009.

Rashid, A., Nasimi, A. N., & Nasimi, R. N. (2022). The uncertainty–investment relationship: Scrutinizing the role of firm size. *International Journal of Emerging Markets*, *17*(10), 2605-2635.

Rasyid, R. (2020, December). The Effect of Profitability, Liquidity, Firm Size and Leverage on Cash Holding. In *The 2nd Tarumanagara International Conference on the Applications of Social Sciences and Humanities (TICASH 2020)* (pp. 405-409). Atlantis Press.

Rata, M. A., & Amtiran, P. Y. (2021). Working capital efficiency towards profitability in the Sami Jaya Credit Cooperative in Kupang. *Jurnal Ekobis: Ekonomi Bisnis & Manajemen*, *11*(1), 30–39.

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of shapiro-wilk, kolmogorov-smirnov, lilliefors and anderson-darling tests. *Journal of Statistical Modeling and Analytics*, *2*(1), 21–33.

Reschiwati, R., Syahdina, A., & Handayani, S. (2020). Effect of liquidity, profitability, and size of companies on firm value. *Utopia y Praxis Latinoamericana*, *25*(6), 325-332.

Richards, V. D., & Laughlin, E. J. (1980). A cash conversion cycle approach to liquidity analysis. *Financial Management*, 32–38.

Rustomo, A. U., & Falianty, T. A. (2021). Testing for semi-strong efficient market hypotheses and macroeconomic condition in a consumption-driven emerging market: Evidence from Indonesia. *ITTPCOVID19*, *1*(1), 1–1.

Salim, M. N., & Firdaus, Z. (2020). Determinants of firm value and its effect on stock prices (study in consumer good public companies in IDX 2014-2018). *Dinasti International Journal of Education Management and Social Science*, *2*(1), 41–54.

Samiloglu, F., & Demirgunes, K. (2008). The effect of working capital management on firm profitability: Evidence from Turkey. *The International Journal of Applied Economics and Finance*, *2*(1), 44-50.

Santosa, P. W. (2020). The moderating role of firm size on financial characteristics and Islamic firm value at Indonesian equity market. *Verslas: Teorija Ir Praktika/Business: Theory and Practice*, *21*(1), 391–401.

Saputri, I. J., Dur, S., & Husein, I. (2023). Analysis of the Factors that affect the original regional income of the province of north Sumatera using panel data regression. *Zero: Jurnal Sains, Matematika Dan Terapan*, *6*(2), 194–201.

Sari, I. A. G. D. M., & Sedana, I. B. P. (2020). Profitability and liquidity on firm value and capital structure as intervening variable. *International Research Journal of Management, IT and Social Sciences*, *7*(1), 116-127.

Saunders, M. N., Lewis, P., Thornhill, A., & Bristow, A. (2015). *Understanding Research Philosophy and Approaches to Theory Development*. 122-161.

Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: Appropriate use and interpretation. *Anesthesia & analgesia*, *126*(5), 1763-1768.

Segrestin, B., & Hatchuel, A. (2011). Beyond agency theory, a post-crisis view of corporate law. *British Journal of Management*, *22*(3), 484–499.

Senan, N. A. M., Anagreh, S., Al-Dalaien, B. O. A., Almugari, F., Khaled, A. S., & Al-Homaidi, E. A. (2021). Working capital management and banks' performance: Evidence from India. *The Journal of Asian Finance, Economics and Business*, *8*(6), 747-758.

Seth, H., Chadha, S., & Sharma, S. (2021). Benchmarking the efficiency model for working capital management: Data envelopment analysis approach. *International Journal of Productivity and Performance Management*, *70*(7), 1528–1560.

Setiawan, C., & de Jesus Pereira, N. F. (2022, February). Capital Structure, Liquidity, and Firm Size Effect on Profitability of Mining Industry in Indonesia. In *Proceeding of*

the International Conference on Family Business and Entrepreneurship (Vol. 2, No. 1).

Shah, B., & Arif, M. (2018). Working capital efficiency and firm value: Evidence from Pakistani firms. *Journal of Business & Financial Affairs*, *7*(1), 1–10.

Shaheen, S., & Malik, Q. A. (2012). The effect of capital intensity, size of firm and profitability on debt financing in textile industry of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, *3*(10), 1061–1066.

Shaik, A. R. (2021). Components of working capital and profitability in Saudi Arabian companies. *Investment Management and Financial Innovations*, *18*(3), 52-62.

Shubita, M. F. (2019). The effect of working capital management on cash holdings of large and small firms: Evidence from Jordan. *Investment Management and Financial Innovations*, *16*(3), 76-86.

Singh, J. P., & Pandey, S. (2008). Effect of working capital management in the profitability of Hindalco Industries Limited. *ICFAI journal of financial Economics*, *6*(4).

Singleton, R. A, & Straits, B. C. (2010). *Experimental Designs. In Approaches to Social Research* (5th ed.). New York: Oxford University Press.

Silveira, D., & Vasconcelos, S. (2020). Essays on duopoly competition with asymmetric firms: Is profit maximization always an evolutionary stable strategy? *International Journal of Production Economics*, *225*, 107592.

Simbolon, K. V., Salindeho, J. K., & Karinda, A. F. (2022). Working capital, firm size, solvability, and liquidity towards profitability of the consumer goods industry. *Klabat Journal of Management*, *3*(1), 34-45.

Simorangkir, R. T. M. C. (2019). The effect of working capital turnover, total asset turnover, debt to equity ratio, audit committee, and board of directors on Tobins Q. *Saudi Journal of Business and Management Studies*, *4*(7), 619-628.

Siraj, M., Mubeen, M., & Sarwat, S. (2019). Working capital management and firm performance: Evidence from non-financial firms in Pakistan. *Asian Journal of Empirical Research*, *9*(2), 27–37.

Sondakh, R. (2019). The effect of dividend policy, liquidity, profitability and firm size on firm value in financial service sector industries listed in Indonesia Stock Exchange 2015-2018 Period. *Accountability*, *8*(2), 91–101.

Soukhakian, I., & Khodakarami, M. (2019). Working capital management, firm performance and macroeconomic factors: Evidence from Iran. *Cogent Business & Management*, *6*(1), 1684227.

Ssendagire, L. D. (2020). Does firm size moderate the relationship between working capital level and firm profitability? *African Journal of Education, Science and Technology*, *5*(4), 64–71.

Stefko, R., Gavurova, B., Kelemen, M., Rigelsky, M., & Ivankova, V. (2021). Relationships between renewable energy and the prevalence of morbidity in the countries of the European union: A panel regression approach. *International Journal of Environmental Research and Public Health*, *18*(12), 6548.

Subramanyam, K. R. (2014). *Financial statement analysis*. Không nhà xuất bản.

Sudiyatno, B., Puspitasari, E., Suwarti, T., & Asyif, M. M. (2020). Determinants of firm value and profitability: Evidence from Indonesia. *The Journal of Asian Finance, Economics, and Business*, *7*(11), 769–778.

Suhendra, I., Istikomah, N., Ginanjar, R. A. F., & Anwar, C. J. (2020). Human capital, income inequality and economic variables: A panel data estimation from a region in Indonesia. *The Journal of Asian Finance, Economics and Business*, *7*(10), 571–579.

Sutriono, S., Sari, E. N., & Rambe, M. F. (2021). Role of debt to equity ratio mediating effect return on assets and current ratio against firm value. *International Journal of Business Economics (IJBE)*, *3*(1), 47–58.

Tahir, S. H., Sadique, M. A. B., Syed, N., Rehman, F., & Ullah, M. R. (2020). Mediating role of liquidity policy on the corporate governance-performance link: Evidence from Pakistan. *The Journal of Asian Finance, Economics, and Business*, *7*(8), 15–23.

Teimet, P., Lishenga, J., Mwangi, I., & Duncan, E. (2020). The mediating effect of technical efficiency on the relationship between revenue diversification and financial performance of commercial banks in Kenya. *European Scientific Journal*, *16*(19), 385–405.

Tekin, H., & Polat, A. Y. (2020). Agency theory: A review in finance. *Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, *8*(4), 1323-1329.

Udenwa, T., Abdullahi, O. I., & Okoli, T. (2020). Effect of working capital management on market value of quoted food and beverages manufacturing firms in Nigeria. *Bingham International Journal of Accounting and Finance (BIJAF)*. 28-40.

Ullah, M. A., Uddin, I., & Ahmad, M. (2020). Determinants of profitability of Islamic banks of Pakistan-A case study on Pakistan's Islamic banking sector. *Al-Azhār*, *6*(1).

Uyanto, S. S. (2019). Monte carlo power comparison of seven most commonly used heteroscedasticity tests. *Communications in Statistics-Simulation and Computation*, 1–18.

Van, Ha Thi Thuy, Dang Ngoc Hung, Vu Thi Thuy Van, and Ngo Thanh Xuan. "Managing optimal working capital and corporate performance: Evidence from Vietnam." *Asian Economic and Financial Review* 9, no. 9 (2019): 977.

Vijayakumaran, R. (2019). Efficiency of working capital management and firm value: Evidence from Chinese listed firms. *International Journal of Financial Research*, *10*(6), 133–144.

Vu Thi, A. H., & Phung, T. D. (2021). Capital structure, working capital, and governance quality affect the financial performance of small and medium enterprises in Taiwan. *Journal of Risk and Financial Management*, *14*(8), 381.

Waithima, A. K. (2020). Introduction to inferential statistics and data analysis for decision making. *CCL Kenya Authors Collaboration*.

Wibowo, S. S. A., & Rohyati, E. (2018). The effect of working capital turnover and profitability of inventory turnover manufacturing companies listed in Indonesia Stock Exchange. *Journal of Applied Accounting and Taxation*, *3*(1), 95–98.

Widhiastuti, S. (2021). The effect of company size as a mediating variable on the relationship of working capital to profitability. *Journal of Hunan University Natural Sciences*, *48*(6).

Wilis, R. A., & Nurwulandari, A. (2020). The effect of e-service quality, e-trust, price and brand image towards e-satisfaction and its impact on e-loyalty of traveloka's customer. *Jurnal Ilmiah MEA (Manajemen, Ekonomi, & Akuntansi)*, *4*(3), 1061–1099.

Wooldridge, J. M. (2002). Econometric analysis of cross section and panel data MIT Press. *Cambridge, Ma*, *108*(2), 245–254.

World Bank. (2021). *World Bank Report*.

Yadav, I. S., Pahi, D., & Gangakhedkar, R. (2022). The nexus between firm size, growth and profitability: New panel data evidence from Asia–pacific markets. *European Journal of Management and Business Economics*, *31*(1), 115–140.

Yazdanfar, D., & Öhman, P. (2014). The effect of cash conversion cycle on firm profitability: An empirical study based on Swedish data. *International Journal of Managerial Finance*, *10*(4), 442-452.

Yıldırım, D., & Çelik, A. K. (2021). Testing the pecking order theory of capital structure: evidence from turkey using panel quantile regression approach. *Borsa Istanbul Review*, *21*(4), 317–331.

Yilmaz, I., & Nobanee, H. (2022). Determinants of cash conversion cycle in MENA countries. *Managerial Finance*, (ahead-of-print).

Yu, Y., Clark, J. S., Tian, Q., & Yan, F. (2022). Rice yield response to climate and price policy in high-latitude regions of China. *Food Security*, 1–15.

Yu, Z., Liu, H., Peng, H., Xia, Q., & Dong, X. (2023). Production efficiency of raw milk and its determinants: Application of combining data envelopment analysis and stochastic frontier analysis. *Agriculture*, *13*(2), 370.

Zuhroh, I. (2019). The effects of liquidity, firm size, and profitability on the firm value with mediating leverage. *KnE Social Sciences*, 203-230.

Zutter, C. J., & Smart, S. B. (2019). *Principles of Managerial Finance: Brief*. Pearson Harlow, UK.

Appendices

Appendix I: Document Review Guide

Sector……

Name of the firm ……..…..

Variable	**Measurement**	**Ratio**	**Year** 2012 (Ksh. '000')	**Year** 2013 (Ksh. '000')	**Year** 2014 (Ksh. '000')	**Year** 2015 (Ksh. '000')	**Year** 2016 (Ksh. '000')	**Year** 2017 (Ksh. '000')	**Year** 2018 (Ksh. '000')	**Year** 2019 (Ksh. '000')	**Year** 2020 (Ksh. '000')	**Year** 2021 (Ksh. '000')
Firm Value	**Price to Book ratio**	Market capitalization										
		Total Assets										
		Total Liabilities										
		Book Value of Equity (Total Assets – Total Liabilities)										
		Market capitalization / Book value of equity										
Working Capital Efficiency	**Working capital turnover ratio**	Net sales										
		Current Assets										
		Current Liabilities										
		Net working capital (Current Assets – Current Liabilities)										
		Net sales / Net working capital										
Liquidity	**Current ratio**	Current assets										
		Current liabilities										

		Current assets / Current liabilities										
Firm size	**Natural log of assets**	Total assets										
		Natural log of assets										

Source: Author, 2023

Appendix II: Target population

AGRICULTURAL SECTOR	
1.	Eaagads Ltd Ord 1.25 AIM
2.	Kakuzi Plc Ord.5.00
3.	Kapchorua Tea Co. Ltd Ord Ord 5.00 AIM
4.	The Limuru Tea Co. Plc Ord 20.00AIMS
5.	Sasini Plc Ord 1.00
6.	Williamson Tea Kenya Ltd Ord 5.00 AIM
AUTOMOBILES & ACCESSORIES	
1.	Car & General (K) Ltd Ord 5.00
COMMERCIAL AND SERVICES	
1.	Deacons (East Africa) Plc Ord 2.50AIMS
2.	Eveready East Africa Ltd Ord.1.00
3.	Express Kenya Ltd Ord 5.00 AIMS
4.	Homeboyz Entertainment Plc 0.50GEMS
5.	Kenya Airways Ltd Ord 5.00
6.	Longhorn Publishers Plc Ord 1.00AIMS
7.	Nairobi Business Ventures Ltd Ord. 1.00 GEMS
8.	Nation Media Group Ltd Ord. 2.50
9.	Sameer Africa Plc Ord 5.00
10.	Standard Group Plc Ord 5.00
11.	TPS Eastern Africa Ltd Ord 1.00
12.	Uchumi Supermarket Plc Ord 5.00
13.	WPP Scangroup Plc Ord 1.00
CONSTRUCTION & ALLIED	
1.	ARM Cement Plc Ord 1.00
2.	Bamburi Cement Ltd Ord 5.00
3.	Crown Paints Kenya Plc Ord 5.00
4.	E.A.Cables Ltd Ord 0.50
5.	E.A.Portland Cement Co. Ltd Ord 5.00
ENERGY & PETROLEUM	
1.	KenGen Co. Plc Ord. 2.50
2.	Kenya Power & Lighting Co Ltd Ord 2.50
3.	TotalEnergies Marketing Kenya Plc Ord 5.00
4.	Umeme Ltd Ord 0.50
INVESTMENT SERVICES	
1.	Nairobi Securities Exchange Plc Ord 4.00
MANUFACTURING & ALLIED	
1.	B.O.C Kenya Plc Ord 5.00
2.	British American Tobacco Kenya Plc Ord 10.00
3.	Carbacid Investments Ltd Ord 1.00
4.	East African Breweries Ltd Ord 2.00
5.	Flame Tree Group Holdings Ltd Ord 0.825
6.	Kenya Orchards Ltd Ord 5.00 AIM
7.	Mumias Sugar Co. Ltd Ord 2.00
8.	Unga Group Ltd Ord 5.00
TELECOMMUNICATION & TECHNOLOGY	

1.	Safaricom Plc Ord 0.05
REAL ESTATE INVESTMENT TRUST	
1.	STANLIB FAHARI I-REIT
EXCHANGE TRADED FUNDS	
1.	NEW GOLD ETF

Source: Capital Markets Authority (2023)

Appendix III: Approval Letter SPU-Institutional Scientific Ethics Review Committee

ST. PAUL'S UNIVERSITY

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REF: SPU/28/2023 **Date: 5th June 2023**

TO: Mutua Lisy Marigu
St. Paul's University

Dear Lisy,

RE: Working Capital Efficiency and Firm Value of Selected Firms Listed at Nairobi Securities Exchange, Kenya

Greetings,

This is to inform you that SPU- Institutional Scientific Ethics Review Committee has reviewed the above-named research proposal. **Your ERB approval number is 37, for the period between 5th June 2023 – 5th July, 2024.**

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SPU- Institutional Scientific Ethics Review Committee.
iii. Death and life-threatening problems and serious negative events or unexpected negative events whether related or unrelated to the study must be reported to SPU- Institutional Scientific Ethics Review Committee within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to *SPU- Institutional Scientific Ethics Review Committee* within 72 hours
v. Clearance for export of biological specimens must be obtained from

relevant institutions.

vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to SPU- Institutional Scientific Ethics Review Committee.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,



Dr. Daniel Nzengya, PhD
Chairperson
SPU- Institutional Scientific & Ethics Review Committee



Appendix IV: Introduction Letter

ST. PAUL'S UNIVERSITY

Private Bag 00217 LIMURU, KENYA
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BOARD OF POSTGRADUATE STUDIES

9th June, 2023

National Commission for Science and Technology,
P.O. BOX 30623-00100,
Nairobi.

Dear Sir/Madam,

RE: RECOMMENDATION FOR LISY MARIGU MUTUA PBAMLMR603321–TO CONDUCT RESEARCH

This letter confirms the above-named person is a student in the Doctor of Philosophy of Business Administration at St. Paul's University.

The second year consists of a major research work leading to a Thesis. The student's selected topic is:

" Working Capital Efficiency and Firm Value of Selected Firms Listed at Nairobi Securities Exchange, Kenya."

Kindly grant this student the required permit.

Yours Faithfully,

DIRECTOR POSTGRADUATE STUDIES ST. PAUL'S UNIVERSITY
09 JUN 2023

Dr. Joan Muhoho
Director, Board of Postgraduate Studies

Appendix V: Research License

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: **116735** Date of Issue: **29/June/2023**

RESEARCH LICENSE



This is to Certify that Ms. Lisy Marigu Mutua of St. Paul's University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: Working Capital Efficiency and Firm Value of Selected Firms Listed at Nairobi Securities Exchange, Kenya for the period ending: 29/June/2024.

License No**: NACOSTI/P/23/27040**

116735
Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code

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See overleaf for conditions

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
   i. Endanger national security
   ii. Negatively affect the lives of Kenyans
   iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
   iv. Result in exploitation of intellectual property rights of communities in Kenya
   v. Negatively affect the environment
   vi. Negatively affect the rights of communities
   vii. Endanger public safety and national cohesion
   viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and
Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020 4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix VI: Summary of Document Review

Serial	Firm Value	Working Capital Efficiency	Liquidity	Firm Size
1	1.04	-0.03	4.71	5.89
2	1.13	1.57	7.49	6.69
3	0.33	2.41	3.92	6.31
4	6.07	0.85	6.72	5.43
5	0.36	2.76	4.26	7.10
6	0.41	1.71	4.65	6.92
7	0.38	2.60	1.02	6.97
8	0.07	-0.44	2.06	6.31
9	1.96	2.34	1.38	5.77
10	1.05	0.00	1.08	5.73
11	6.85	-5.36	0.54	5.05
12	-0.67	-1.90	0.23	8.10
13	2.20	2.90	1.35	6.15
14	2.59	1.57	1.82	4.86
15	2.92	1.75	1.76	6.92
16	2.45	2.11	2.34	6.39
17	1.08	-0.01	1.63	6.62
18	0.42	0.26	0.92	7.22
19	1.04	5.02	0.81	6.70
20	1.47	0.89	2.44	7.07
21	1.28	-0.09	0.72	7.58
22	1.36	5.29	2.06	7.66
23	1.73	3.88	1.21	6.67
24	0.53	0.68	0.81	6.83
25	0.23	-1.15	1.37	7.40
26	0.13	4.04	1.35	8.50
27	1.42	-5.12	0.80	8.42
28	0.60	6.68	1.70	7.58
29	0.18	-3.29	0.81	7.81
30	2.82	2.25	8.30	6.25
31	1.07	1.08	1.81	6.34
32	2.10	4.54	1.08	7.07
33	1.24	0.91	6.49	6.48
34	7.55	-5.56	0.84	7.85
35	1.81	8.80	1.30	6.22
36	2.57	2.46	1.95	4.97
37	0.27	-0.22	0.43	7.37
38	0.55	6.32	2.05	6.97

39	5.82	-8.58	0.71	8.21
40	0.45	0.82	6.10	6.58
41	1.29	2.74	3.59	8.63

Appendix VII: Stationarity Test

Fisher-type unit-root test for FV

Based on augmented Dickey-Fuller tests

Ho: All panels contain unit roots — Number of panels = 41
Ha: At least one panel is stationary — Avg. number of periods = 9.32

AR parameter: Panel-specific — Asymptotics: T -> Infinity
Panel means: Included
Time trend: Not included
Drift term: Not included — ADF regressions: 0 lags

	Statistic	p-value
Inverse chi-squared(82) P	276.4276	0.0000
Inverse normal Z	-9.2944	0.0000
Inverse logit t(209) L*	-10.9346	0.0000
Modified inv. chi-squared Pm	15.1822	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Fisher-type unit-root test for WCE

Based on augmented Dickey-Fuller tests

Ho: All panels contain unit roots — Number of panels = 41
Ha: At least one panel is stationary — Avg. number of periods = 9.32

AR parameter: Panel-specific — Asymptotics: T -> Infinity
Panel means: Included
Time trend: Not included
Drift term: Not included — ADF regressions: 0 lags

	Statistic	p-value
Inverse chi-squared(82) P	367.6266	0.0000
Inverse normal Z	-11.7573	0.0000
Inverse logit t(209) L*	-15.1377	0.0000
Modified inv. chi-squared Pm	22.3037	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Fisher-type unit-root test for LIQ

Based on augmented Dickey-Fuller tests

Ho: All panels contain unit roots Number of panels = 41
Ha: At least one panel is stationary Avg. number of periods = 9.32

AR parameter: Panel-specific Asymptotics: T -> Infinity
Panel means: Included
Time trend: Not included
Drift term: Not included ADF regressions: 0 lags

	Statistic	p-value
Inverse chi-squared(82) P	186.0243	0.0000
Inverse normal Z	-5.8572	0.0000
Inverse logit t(209) L*	-6.3893	0.0000
Modified inv. chi-squared Pm	8.1229	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Fisher-type unit-root test for FS

Based on augmented Dickey-Fuller tests

Ho: All panels contain unit roots Number of panels = 41
Ha: At least one panel is stationary Avg. number of periods = 9.32

AR parameter: Panel-specific Asymptotics: T -> Infinity
Panel means: Included
Time trend: Not included
Drift term: Not included ADF regressions: 0 lags

	Statistic	p-value
Inverse chi-squared(82) P	343.8648	0.0000
Inverse normal Z	-11.1197	0.0000
Inverse logit t(209) L*	-13.9262	0.0000
Modified inv. chi-squared Pm	20.4482	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Appendix VIII: Model Specification

Fixed-effects (within) regression **Number of obs = 382**
Group variable: ID Number of groups = 41
R-sq: within = 0.5930 Obs per group: min = 4
between = 0.4802 avg = 9.3
overall = 0.5695 max = 10

F(3,338) = 164.18
corr(u_i, Xb) = 0.0165 Prob > F = 0.0000

FV	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
_cons	.5513514	.1539096	3.58	0.000	.24861	.8540928
WCE	.0548759	.0026883	20.41	0.000	.049588	.0601638
LIQ	.1112328	.0305302	3.64	0.000	.0511796	.171286
FS	-.6940023	.1887543	-3.68	0.000	-1.065283	-.3227212
sigma_u	.09681834					
sigma_e	.17157661					
rho	.24151584	(fraction of variance due to u_i)				

F test that all u_i=0: F(40, 338) = 2.95 Prob > F = 0.0000

Random-effects GLS regression **Number of obs = 382**
Group variable: ID Number of groups = 41

R-sq: within = 0.5925 Obs per group: min = 4
between = 0.4936 avg = 9.3
overall = 0.5715 max = 10

Wald chi2(3) = 530.41
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

FV	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
_cons	.4638115	.1426752	3.25	0.001	.1841732	.7434499
WCE	.0557614	.0026105	21.36	0.000	.050645	.0608778
LIQ	.1058372	.0274034	3.86	0.000	.0521275	.1595469
FS	-.5884898	.1744059	-3.37	0.001	-.9303191	-.2466604
sigma_u	.07681707					
sigma_e	.17157661					
rho	.1669769	(fraction of variance due to u_i)				

Hausman Test

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
WCE	.0548759	.0557614	-.0008855	.0006421
LIQ	.1112328	.1058372	.0053956	.0134591
FS	-.6940023	-.5884898	-.1055125	.0721856

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 3.24
Prob>chi2 = 0.3560

Breusch and Pagan Lagrangian multiplier test for random effects

FV[ID,t] = Xb + u[ID] + e[ID,t]

Estimated results:

	Var	sd = sqrt(Var)
FV	.0824125	.2870757
e	.0294385	.1715766
u	.0059009	.0768171

Test: Var(u) = 0
chibar2(01) = 48.23
Prob > chibar2 = 0.0000