

**AN ANALYSIS OF THE RELATIONSHIP BETWEEN WORKING
CAPITAL MANAGEMENT AND FINANCIAL PERFORMANCE OF
JSE-LISTED CONSTRUCTION COMPANIES IN SOUTH AFRICA**



by

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DEDICATION

This research project is dedicated to:

Ms Mariam Mantsekiseng Sejake, my late grandmother, who always believed in me and taught me more than I can remember. She played the roles of a father and a mother to me. Even though she is gone, the memories live with me forever.

My late friend, Mr Selejeng Tloonyane, I have learnt so many things from you my friend and heaven has gained a great man. Even though you are gone, you are not forgotten. May your precious soul continue to rest in peace.

My accounting teacher, Mr Mzimkhulu Masiteng, thank you for making me love accounting. May your soul rest in peace.

DECLARATION

I Letshaba Abiel Sejake, hereby declare that this dissertation, submitted at Vaal University of Technology, South Africa, is my own work and that all sources I have used have been cited and referenced. This dissertation has not previously been submitted for a degree or examination in any other institution of higher learning. It is submitted in fulfilment of the requirement for the degree Magister Technologiae in Cost and Management Accounting.

LETSHABA ABIEL SEJAKE

DATE

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ABSTRACT

Working capital management is an important aspect in the business in order to meet its daily activities. Permanent working capital, temporary working capital, gross working capital and net working capital are four types of working capital. The construction industry, as compared to any other industry, plays an important role in the economic growth of the country. The construction industry is regarded as the largest employer in the labour market and appropriate management of liquidity is essential. Construction contracts are divided into lump sum contracts, unit price contracts and cost plus a fee contracts and have the following role players: employer, employer's representative, professional team, contractor, sub-contractor and adjudicator.

This study analysed the relationship between working capital management and financial performance of JSE listed construction companies during the period 2009-2019. Annual financial statements, which included statement of financial position and statement of financial performance of all listed construction companies during the period 2009-2019 were extracted from the external database (IRESS) to obtain the data needed for statistical analysis.

This study used a quantitative research method to analyse the relationship between working capital management and financial performance. Multiple linear regression and correlation analysis were used in this study with inventory conversion period (ICP), average collection period (ACP) and average payment period (APP) as independent variables and return on assets (ROA), return on equity (ROE) and gross operating profit (GOP) as dependent variables, in order to analyse the relationship between working capital management and financial performance of JSE-listed construction companies during the period 2009-2019.

Results of this study indicated that working capital management has little or no influence on the financial performance of JSE-listed construction companies, therefore, this indicates that listed construction companies in South Africa need to manage their working capital properly by putting some new policies in place on their accounts payables and receivables, in order to have a relationship between working capital management and financial performance.

Keywords: cash conversion cycle (CCC), inventory conversion period (ICP), average collection period (ACP), average payment period (APP), construction companies, current assets, current liabilities, working capital management (WCM), financial performance, Johannesburg Stock Exchange, liquidity

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LIST OF ACRONYMS

ABC	Activity-based costing
ACP	Average collection period
APP	Average payment period
AP	Accounts payable
AR	Accounts receivable
CCC	Cash conversion cycle
CFO	Chief financial officer
CIDB	Construction industry development board
CR	Current ratio
EOQ	Economic order quantity
GFCFC	Gross fixed capital formation in construction
GDP	Gross domestic product
GOP	Gross operating profit
GWC	Gross working capital
ICP	Inventory conversion period
JIT	Just in time
JSE	Johannesburg Stock Exchange
MTO	Make-to-order
NS	Not significant
NWC	Net working capital
PWC	Permanent working capital
QR	Quick ratio
ROA	Return on assets
ROE	Return on equity
S	Significant
TWC	Temporary working capital
WCM	Working capital management

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Many companies aim to generate income or profits to be financially sustainable (Almaleer 2019:124). For a business to succeed or fail, it is influenced mostly by its capability to make thorough financial management decisions (Kwenda & Holman 2013:531). Kwenda and Holman (2013:531) add that management decisions can be debated under three groups, namely working capital management (WCM), capital budgeting and capital structure. WCM is known as the supervision of short-term assets and short-term liabilities and funding of these assets of the company (Gill, Biger & Mathur 2010:2). For a company to be sustainable in the long term, it must be sustainable in the short term. Loo and Lau (2019:1955) define WCM as the short-term assets required by a company to back up its normal business activities. According to Tuovila (2019:1), WCM is explained as a company approach intended to guarantee that a company functions well by checking its current assets and liabilities to produce the greatest financial outcomes. In the daily activities of the company, WCM plays an important part, and effective WCM results in good financial performance (Siraj, Mubeen & Sarwat 2019:28). Adebowale, Salleh and Rohani (2015:64) report that companies need to consider WCM because it influences the financial performance of the organisation. A well-managed working capital enables the business in paying its short-term debts when they occur during the financial period. WCM is also explained as the funding that a company needs to fund daily activities and indicates whether adequate funds are obtainable to pay for the company's debts (Khan, Tashfeen & Saghir 2019:72).

Construction companies are involved in activities such as building construction, road construction, earthwork services and developing infrastructure (Simiyu 2019:3). In managing the company's finances, WCM plays an important role because it can influence the profitability of the company (Karim, AL-Mamum & Miah 2017:121). Munyoro and Shaningwa (2019:62) state that profitability is a measure of profit produced by the business and it is expressed in percentage terms. Companies generate their income by selling goods for cash, that is, they give customers the product and customers pay immediately, or credit sales, where they sell the product to the customer and the customer pays at a later stage (O'Brien 2015:2).

Louw (2014:9) explains that in order to manage working capital, companies need to be careful as to when they are able to collect money from customers and when to pay creditors. The period it takes for inventory to be sold is referred to as inventory turnover time; goods are sold on credit to

customers and money will be recovered at a later stage, which is trade receivable turnover time. When the company buys on credit from suppliers and pays later it is trading under payable turnover time. The whole process is called a cash conversion cycle (CCC) (Louw 2014:9). Companies that control their sales policies can generate enough cash flow for their daily operations and, in the end, increase their revenue (Nastiti, Atahau & Supramono 2019:61). Two basic components of the company's working capital are current assets and current liabilities (Sudiyatno, Puspitasari & Sudarsi 2017: 444). Al-Slehat and Al-Sharif (2019:12) state that the process of taking out current liabilities from current assets is known as the networking capital – the difference of the two components. In South Africa and across the world on the relationship between working capital management and financial performance, several studies have been conducted in other industries; however, to date in South Africa, no study has been done in the construction sector. The research could assist the construction industry in managing its working capital. In many developing countries, the construction sector is the backbone for economic growth; however, due to high funding into infrastructure projects, mismanagement of funds is highly likely to occur (Colonnelli & Haas 2016:1). Gundes, Atakul and Buyukyoran (2019:3) explain that effective management of a construction company largely depends on sound financial management.

1.2 THEORETICAL FRAMEWORK

In this section, the contingency theory of WCM is discussed as well as the concepts associated with this study. In the literature review process, several sources were referred to, including books, internet sources, journal articles and published theses.

1.2.1 Contingency theory of working capital management

To analyse the relationship between management of working capital and financial performance of construction companies in South Africa listed at JSE, a conceptual model was developed. Saxberg (1979) developed a contingency theory of working capital management, and it was used in the study. Islam and Hu (2012:5159) state that the theory studies organisational behaviour and clarifies how the functioning of the organisation can be influenced by factors such as the organisational culture, technology and the outside atmosphere. The authors add that no type of organisational structure is equally appropriate to all organisations. The term organisational structure fits the contingencies and is regarded as the heart of this theory (Tingbani 2015:90). Tingbani (2015:90) further explains that the organisation is considered fit when it is designed and positioned to do better in its daily operations. Companies need to adopt systems and structures that will be suitable for several contingencies for their outside environment to improve their profit (Nurein, Din & Halim 2017:10). The theory further explained that working capital has no level

that is supposed to be continuously the best in any sector (Lalah 2018:17). To ensure competence, the theory also states that financial managers must continuously adapt their company's stages and methods of the management of working capital to the new conditions (Lalah 2018:17).

In the daily activities, effective management of working capital plays an important role, and hands-on management of daily activities is vital to a successful company (Siraj *et al.* 2019:28). The authors go deeper and add that well-organised working capital management addresses many aspects of a company, such as payments to creditors, collecting money from debtors and ordering of stock – all these parts add towards improved financial performance (Siraj *et al.* 2019:28). Yogendrarajah and Thanabalasingam (2011:5) report that the financial performance of a company depends on regular ACP, regular APP, ICP in days and CCC. The CCC ratios enable the management of a company to recognise parts that will need more attention in the future, such as the management of inventory, creditors, debtors and cash (Anojan, Arulalan & Nimalathan 2013:15). Companies have to handle their working capital efficiently to achieve liquidity and profitability (Adediran, Josiah, Bosun-Fakunle & Imuzeze 2012:62). Vartak and Hotchandani (2019:915) state that the manner that working capital is handled is a concern as it can have an impact on the overall well-being of a company. Financial statements should be taken into consideration when measuring the company's financial performance and are reported on a yearly and quarterly basis (Fatihudin, Jusni & Mochklas 2018:555). Parrino, Kidwell and Bates (2011:97) explain that shareholders, creditors and financial managers use profitability ratios as the best ratios in evaluating the company's financial performance.

1.3 PROBLEM STATEMENT

In South Africa, the construction sector consists of large companies that are listed on the JSE, such as Group Five and Murray & Roberts, as well as the small and medium black-owned enterprises (Mafundu & Mafini 2019:1). According to a report by Research and Markets (2020:1), in the year 2024, the South African building construction sector is expected to reach R100 billion.

Working capital management has been studied on JSE-listed companies. Garg and Gumbochuma (2015:127) conducted a study on JSE-listed retail companies on the relationship between working capital management and profitability and they concluded that there was a negative relationship between working capital and profitability. Research was conducted on internal constraints to business performance in black-owned small to medium enterprises in the construction industry (Mafundu & Mafini 2019:1). However, to date, no official research has been undertaken on the analysis of the relationship between working capital management and financial performance of JSE-listed construction companies in South Africa, to the best of the researcher's knowledge. This

shows a gap in the information concerning the management of working capital of listed JSE construction companies in South Africa.

According to Meintjies (2019:1), in the current depressed economy, listed South African construction companies are faced with the challenge of continued existence. Several South African companies were under financial distress in 2019: Group Five failed to be rescued business-wise; followed by Probuild Construction Group as it could not pay all its obligations, and Lenco Construction applied for its debts to be frozen but has since been liquidated (Meintjies 2019:1). In a company, if there is inadequate working capital to pay for the debts, it could lead to a company being declared bankrupt or liquidated (Hawley 2019:5). According to Weyulu (2015:7), bankruptcy denotes the end of freedom of the debtor to enter any credit-related deals due to failure to make payments on their debts; whereas, liquidation is the dissolution of a company.

In the construction industry, companies take long periods to pay their suppliers because they can only pay suppliers after sales are realised; this results in a breakdown of goodwill between the construction company and its suppliers (Viswanath, Surendra, Shveta & Neeru 2018:3). The average payment period is 93.97 days in the construction industry (Viswanath *et al.* 2018:3). According to Meszek and Polewski (2006:225), in the construction industry, a negative cash conversion cycle is proof that payments are overdue. To convert inventory to accounts receivable can take a long time due to the slow movement of stock and it is, therefore, advisable that construction companies handle their stock more carefully when making deliveries of materials and should insist on early payment from customers (Louw, Hall & Pradman 2019:15). The authors add that debtors, creditors and inventory in the construction companies must show 5 percent confidence level of significance to improve their profits or financial performance (Louw *et al.* 2019:15).

In the construction industry, it is important to handle working capital well, as the companies employ many people in South Africa. Should some companies close, many people stand to lose their jobs (Meintjies 2019:1). According to Statistics South Africa (Stats SA) (2018:2), there were 609 000 people employed in the construction industry in Quarter 1, 2018, 60 percent from civil engineering, 34 percent from building, 1 percent from site preparation and 4 percent from the renting of construction equipment. In the second quarter of 2019, in the construction industry, the gross domestic product (GDP) declined with 1.6 percent (Statistics South Africa 2019:1). According to Chappelow (2019:1), GDP is explained as the overall monetary or market price of entire, complete goods and services that are manufactured within the borders of a country in a particular period and works as a complete tally of the nation's economic health.

1.4 RESEARCH QUESTIONS

The following questions in this research study were addressed:

- Is there a relationship that exists between the financial performance of the construction companies that were listed at JSE during the period 2009-2019 and inventory conversion period?
- Is there a relationship that exists between the financial performance of the construction companies that were listed at JSE during the period 2009-2019 and average collection period?
- Is there a relationship that exists between the financial performance of the construction companies that were listed at JSE during the period 2009-2019 and average payment period?

1.5 OBJECTIVES OF THE STUDY

1.5.1 Primary objective

The main purpose of this research study was to analyse the relationship between working capital management and financial performance of JSE-listed construction companies in South Africa during the period 2009-2019.

1.5.2 Theoretical objectives

The following theoretical objectives were established for this study:

- To analyse theoretical literature on working capital management;
- To review theoretical literature on current assets and current liabilities of the company;
- To review theoretical literature on the ICP;
- To review theoretical literature on ACP, APP and cash management.

1.5.3 Empirical objectives

For this study, the following empirical objectives were established:

- To evaluate the association between ICP period and profitability of JSE-listed construction companies during the period 2009-2019;
- To explore the association between the ACP and profitability of JSE-listed construction companies during the period 2009-2019;

- To investigate the association between the APP and profitability of JSE-listed construction companies during the period 2009-2019.

1.6 SIGNIFICANCE OF THE STUDY

In many countries across the world, research has been conducted and written about the financial performance and working capital management in different industries; nevertheless, the knowledge about working capital management of JSE-listed companies was improved through this research study. The researcher believes that the study will advantage the construction sector in South Africa. The research outcomes helped understand the ways to improve companies' working capital management in order to improve the financial performance of the company. The results of the study offer simple strategies to financial managers who were in the construction industry. The results of this study highlighted more areas of research in the future for researchers and new knowledge concerning the researched problem, elucidating information about the construction field.

1.7 CONCEPTUAL MODEL

Figure 1.1 illustrates the research framework for this study. Dependent variable: ROA and independent variables: ICP, ACP and APP of the listed JSE construction companies in South Africa.

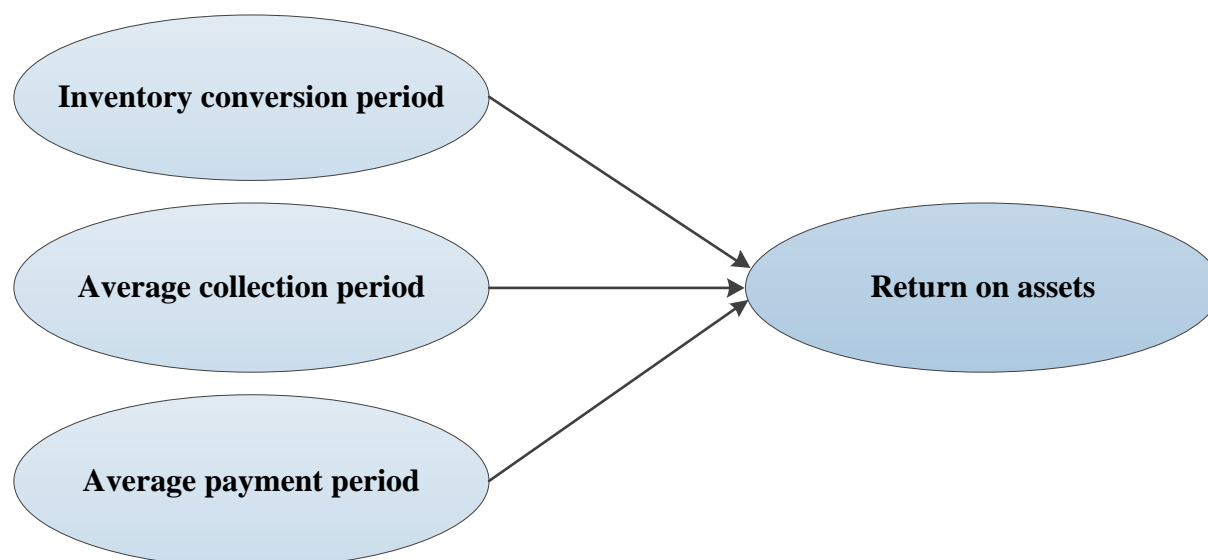


Figure 1.1: Conceptual model 1

Figure 1.2 illustrates the research framework for this study. Dependent variable: ROE and independent variables: ICP, ACP and APP of the listed JSE construction companies in South Africa.

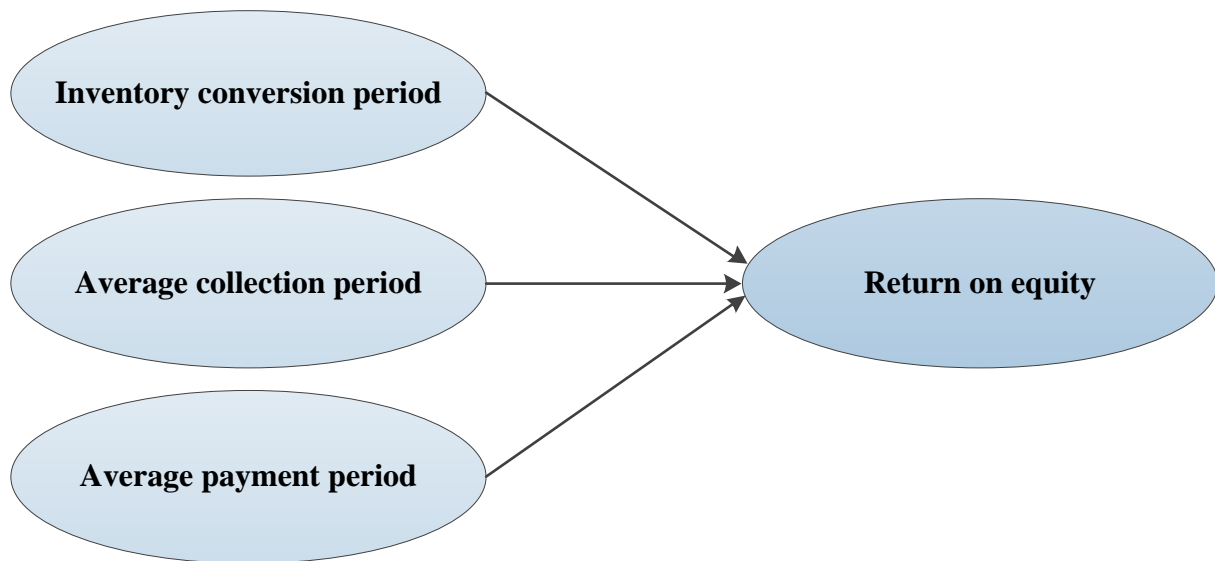


Figure 1.2: Conceptual model 2

Figure 1.3 illustrates the research framework for this study. Dependent variable: GOP and independent variables: ICP, ACP and APP of the listed JSE construction companies in South Africa.

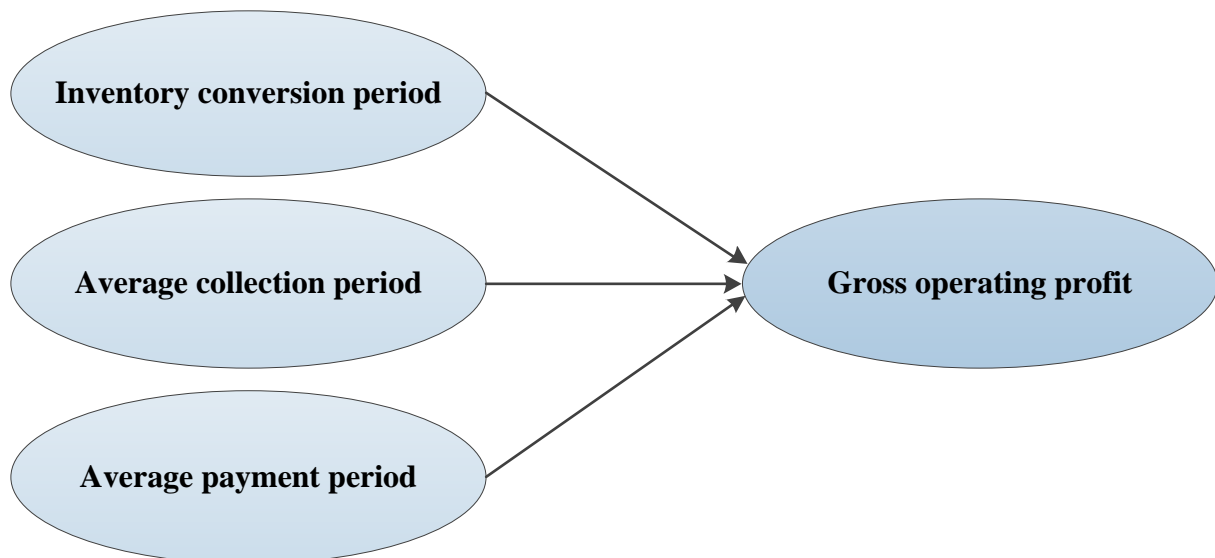


Figure 1.3: Conceptual model 3

A clarification of different concepts is briefly defined in the section below to observe possible relationships that have been reported in the literature.

1.8 RESEARCH DESIGN AND METHODOLOGY

There are three research methods, namely qualitative research, quantitative research and mixed research that are used in a research study. In qualitative research, the data collected are descriptive in nature in the form of interviews and observation records (Mohajan 2018:7). According to Hafsa (2019:45), mixed method is a method in which the researcher uses both the qualitative and quantitative research approach to collect and analyse data. This study used quantitative research, which is defined by Mehrad and Zangener (2019:2) as a method that can either be descriptive or experimental; descriptive focuses on the association between variables, while experimental entails interconnection among variables. To achieve the outcomes, variables are analysed and quantified through the quantitative research method (Apuke 2017:41). This method is constructed on the opinion that something is important when it can be witnessed or calculated (Blair 2016:52). According to Streefkerk (2019:1), the following are some of the features of the quantitative research method:

- The research is stated in figures and graphs
- Theories and assumptions can be tested
- It is used to create generalisable evidence around a researched topic.

Quantitative research comprises surveys with closed-ended questions, observations or experiments. The researcher used the quantitative research method, because through this method, objectives can be clearly communicated through statistics.

1.8.1 Literature review

Sachdev (2018:1) defines the literature review as the information collected for a specific research field. The literature review discovers areas where more research needs to be conducted and it is a good method of developing research findings to display evidence on a meta-level (Snyder 2019:333).

1.8.2 Empirical study

To examine and acquire an understanding of the analysis of the relationship between financial performance of JSE-listed construction companies during the period 2009-2019 and working capital management, an empirical investigation was conducted. Enough information was obtained over the 11-year period about the construction companies' working capital that could help construction companies to manage their working capital. The researcher chose to start with year 2009 because several projects were completed in the construction industry prior to the 2010 FIFA

World Cup, which include the building of stadiums, the erection of the Gautrain and upgrading major freeways.

Stadiums like Moses Mabhida, Cape Town Stadium and Nelson Mandela Bay Stadium were built and Soccer City, formerly known as FNB, was also upgraded. On 21 December 2009, Cape Town Stadium was completed by Murray and Roberts (Murray and Roberts Group Magazine 2010:6) and according to Graumann (2010:1), in December 2009, Moses Mabhida Stadium was completed by Group Five and Welson Bayly Holmes-Ovcon (WBHO).

1.8.3 Target population

The target population is the population of interest that the researcher is intending to study; researchers take a sample from the population of interest to conduct the research (Majid 2018:3). Kumar (2010:398) defines target population as a large group of people like families residing in the same region or people belonging to a certain company on which you intend to conduct research. The target population in this study will consist of all JSE-listed construction companies during the period 2009-2019.

1.8.4 Sampling

Sampling is when you use a certain number, from the entire population, to conduct a research study. The number of cases used is reduced in sampling, since the researcher will not have time and sufficient resources to analyse the whole population (Taherdoost 2016:18). In this study, the researcher will use all the JSE-listed construction companies, because the researcher has access to all the companies' information and as a result, no sampling method will be used. In a study conducted by Popoola (2016:5) of JSE-listed industrial companies in South Africa, in analysing their capital structure, all the listed industrial companies were used in the study. Another study by Moses (2014:14) on non-financial firms listed in the Nairobi Security Exchange on how working capital management can affect the company's financial performance, all non-financial listed companies were used.

1.8.5 Method of data collection

Streefkerk (2018:1) distinguishes between the two kinds of data collection, which are primary and secondary, the author Streefkerk (2018:1) further explained that primary data are defined as data that are gathered for the first time by the researcher and they also have direct access to the topic investigated, while secondary data are the second-hand information and interpretations from other researchers. In this research study, secondary data were used to interpret financial statements of

JSE-listed construction companies between the years 2009-2019 to investigate whether there is a positive relationship amongst variables. According to Bowen (2009:27), the analysis of documents is an efficient method for revising or assessing data that are on the computer and hard copy. Document analysis offers ways of making a follow-up on changes and developments where documents can be accessed; the researcher can make comparisons to identify the changes that took place (Bowen 2009:30). The IRESS database was used to collect standardised annual financial statements for statistical purposes. To conduct the research of JSE-listed construction companies in South Africa for the period 2009-2019, standardised financial statements were extracted, which included the statement of financial position and statement of financial performance.

1.8.6 Data analysis

Financial statements of JSE-listed construction companies for the period 2009-2019 were extracted from IRESS. Data collected were recorded and coded in an Excel spreadsheet to enable the researcher to establish the relationship between financial performance and working capital management. Cooper and Schindler (2008:93) explain data analysis as a procedure where the information gathered is summarised to a manageable and suitable size. This study investigated if there is any association that exists between the management of working capital of construction companies that were JSE listed during the years 2009-2019 and financial performance. To investigate the association amongst the variables, in this research study, multiple linear regression and correlation analysis were used to examine the management of working capital of JSE-listed construction companies in South Africa during the period 2009-2019.

Multiple linear regression focusses on the relationship that exists between dependent variables and a set of independent variables (Schmidheiny 2019:1). The effect of working capital management on the financial performance was determined using multiple linear regression and correlation analysis in this study. Results from the output table were analysed year by year; the researcher then analysed if any trends in the various measures existed. Multiple linear regression and correlation analysis were used in research conducted by Nduta (2015:27) on the influence of working capital management on a manufacturing company's financial performance. In a study by Ajanthan (2013:13) on how the management of working capital can influence corporate profitability on listed companies in Sri Lanka, multiple linear regression and correlation analysis were used. Another study by Sudiyatno *et al.* (2017:448) on manufacturing companies listed on the Indonesia Stock Exchange (ISE) also used multiple linear regression and correlation analysis.

1.9 RELIABILITY AND VALIDITY

Reliability and validity are the most significant concepts in a research study. Reliability shows that research must be error free and guarantees reliable results through different items in the instruments (Mohajan 2017:10). According to Middleton (2019:1), reliability refers to the consistency of a method in measuring something; the same results should be achieved using the same method under the same conditions.

Validity is explained in the quantitative study as the degree to which the concept is accurately measured (Heale & Twycross 2015:66). Bolarinwa (2015:195) reports that validity is defined as the measurement that measures what it is supposed to measure. In this research study, the following types of validity will be discussed in detail: content validity and predictive validity. Content validity is the concern with the scale that it covers all the aspects that are being measured and predictive validity is the concern with the current measurement scale that will be used to measure the future level of a criterion variable. The findings from this study can be used to predict what influence working capital management could have on a company's future profitability.

1.10 ETHICAL ISSUES

Ethics considerations are crucial to ensure the success of a research project. Ethics is explained as acknowledged morals of right or wrong conduct (Cant, Gerber-Nel, Nel & Kotze 2011:301). Thakur and Lahiry (2019:351) report that ethics contains the concepts and values of the right conduct that will not intentionally cause harm to other people.

The study adhered to the following ethical issues:

- The researcher complied with all VUTs ethical requirements.
- Secondary data and published data of companies in this study were honestly and legally processed and only used for this study.
- Published financial results that were in the public domain were used in this study.
- Professional competence was maintained in analysing and collecting of data.

1.11 CHAPTER CLASSIFICATION

Chapter 1: Introduction and background to the study: This chapter provided an overview and background to the study. A brief description of the problem statement, research methodology, statistical analysis, reliability, validity and ethical issues for this study were emphasised in this chapter.

Chapter 2: Literature review: This chapter reviewed the literature on financial performance and working capital management of the company. The theories regarding this study were discussed in detail. The gap in the existing literature was identified and methods to close the gap were discussed.

Chapter 3: Research methodology: In this study, the design and research methods used were emphasised. The relationship between working capital management and financial performance in the empirical study was explored; in addition, reliability and validity were addressed.

Chapter 4: Analysis and interpretation of the research findings: All the research findings were interpreted, evaluated and analysed in this chapter.

Chapter 5: Conclusion and recommendations: An overview of the study was provided in this chapter. The need for future research and limitations were highlighted. Concluding remarks were discussed.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The background of the study was provided in Chapter 1 by discussing the problem statement, research questions, research objectives, research design and methodology for the study to be structured in a logical manner. In this chapter, previous studies on construction companies and working capital management will be consulted in order to have a detailed understanding and knowledge on the working capital management in the construction companies in South Africa. In this chapter all the theoretical objectives as stated in paragraph 1.5.2 of chapter one are addressed. The chapter starts by discussing the overview of the South African construction sector, operations of the construction companies as well as the factors influencing their profitability. It also provides a detailed discussion on theories of working capital management. Furthermore, definitions and types of current assets and liabilities are addressed and in conclusion, the components of working capital management are discussed. In this chapter the researcher addressed all the theoretical objectives as stated in paragraph 1.5.2.

2.2 OVERVIEW OF THE SOUTH AFRICAN CONSTRUCTION SECTOR

Unemployment reduction is the first priority of any government in the world to decrease poverty and maintain high levels of economic growth; the construction sector is aiming at bridging the inequality in the economy (Olawajaju & Ibrahim 2020:509). Olawajaju and Ibrahim (2020:509) add that challenges, such as unemployment, are faced by South Africa as a developing country, with an increase in unemployment to 29 percent in the second quarter of 2019 moving from 27.6 percent in quarter one of 2019. According to Haupt and Harinarain (2016:80), in any country, the construction industry plays an important part in the country's economy and it contributes significantly to the South African economy. In the South African economy, the construction industry plays an important role and contributes significantly to the economic growth, compared to any other industry in the world (Windapo & Cattell 2013:65). According to Statistics South Africa (2017:3), the construction industry's total income in South Africa in 2017 was R495.5 billion, which shows a growth of 7.8 percent per annum over the income in the corresponding survey of 2014 (R395.1 billion). The increase of income in the construction industry comprised of civil engineering structures (+35, R9 billion), construction of buildings (+33, R5 billion) and other building installation (+13, R9 billion) (Statistics South Africa 2017:3).

Table 2.1 represents income in the construction industry between the years 2007-2017; the income in 2007 was R169 249 million for different types of services in the construction industry, R268 966 million in 2011, R395 081 million in 2014 and R495 459 million in 2017.

Table 2.1: Income in the construction industry, 2007-2017

Type of service	Year 2007		Year 2011		Year 2014		Year 2017	
	R Million	% Contribution	R Million	% Contribution	R Million	% Contribution	R Million	% Contribution
Site preparation	3130	1,8	6376	2,4	6024	1,5	7187	1,5
Construction of buildings	60 199	35,6	61 860	23,0	84 354	21,4	117 851	23,8
Construction of civil engineering structures	46 386	27,4	116 651	43,4	162 466	41,1	198 363	40,0
Construction of other structures	3079	1,8	3146	1,2	7878	2,0	7894	1,6
Construction by specialist trade contractors	8294	4,9	10 131	3,8	20 199	5,1	22 714	4,6
Plumbing	3055	1,8	3419	1,3	5957	1,5	6724	1,4
Electrical contractors	10 252	6,1	18 272	6,8	24 017	6,1	23 812	4,8
Shop fitting	1290	0,8	1320	0,5	2111	0,5	3095	0,6
Other building installation	12 010	7,1	19 799	7,4	27 114	6,9	40 965	8,3
Painting and decorating	1937	1,1	2464	0,9	4073	1,0	4078	0,8
Other building completion	15 943	9,4	14 432	5,4	33 076	8,4	40 370	8,1
Renting of construction or demolition equipment with operators	3674	2,2	11 096	4,1	17 892	4,5	22 406	4,5
Totals	169 249	100,0	268 966	100,0	395 081	100,0	495 459	100,0

Source: Statistics South Africa (2017:3)

The construction industry's profit margin in 2017 was 2.9 percent (Statistics South Africa 2017:5). The construction industry employed 597 006 employees as at the end of June 2017, with 210 808 employees or 35 percent people employed in civil engineering, followed by buildings construction with 124 176 employees or 20.8 percent people employed, other buildings completion with 72 535

employees or 12.1 percent people and electrical contractors with 43 060 employees or 7.2 percent people (Statistics South Africa 2017:6).

From 2005 to 2018, the construction sector in South Africa played a vital role in terms of its capital formation; the average contribution to gross fixed capital formation by the construction industry was around 43 percent (Construction Industry Development Board (CIDB) 2019:3).

Below is an analysis of gross fixed capital formation in construction (GFCFC) for 2018 financial year. Investment by the general government was included at R113 293 million, public corporations at R121 658 million and private sector at R185 496 million.

In 2018, the total GFCFC spending amounted to around R430 billion, as follows:

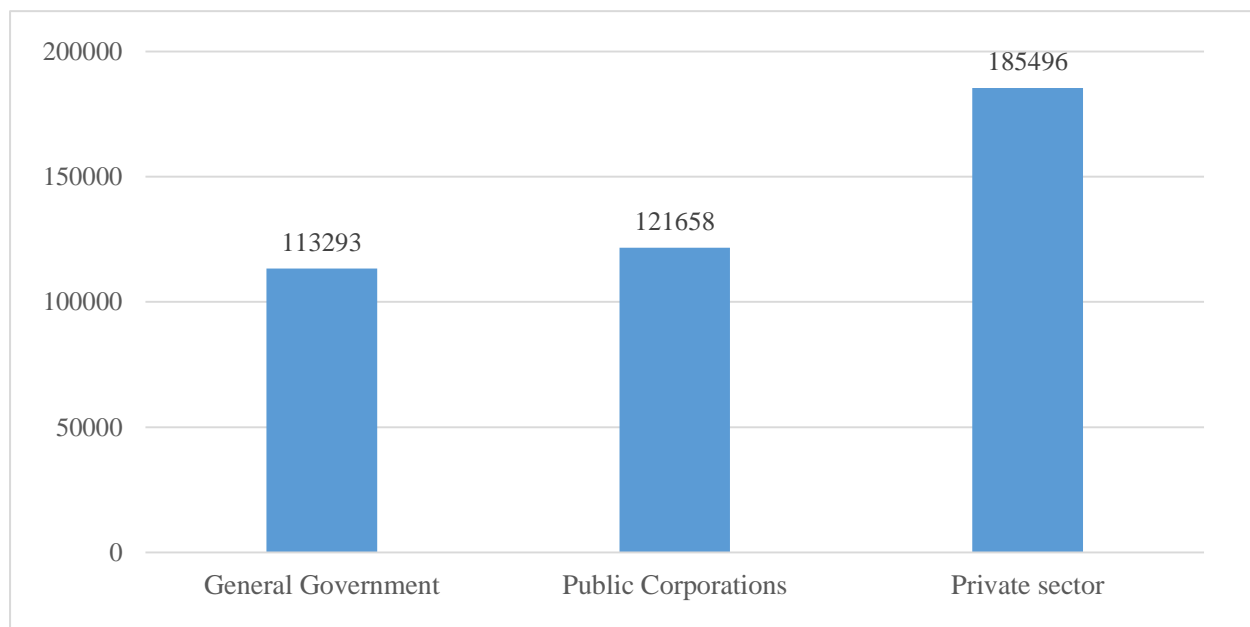


Figure 2.1: Analysis of gross fixed formation in construction

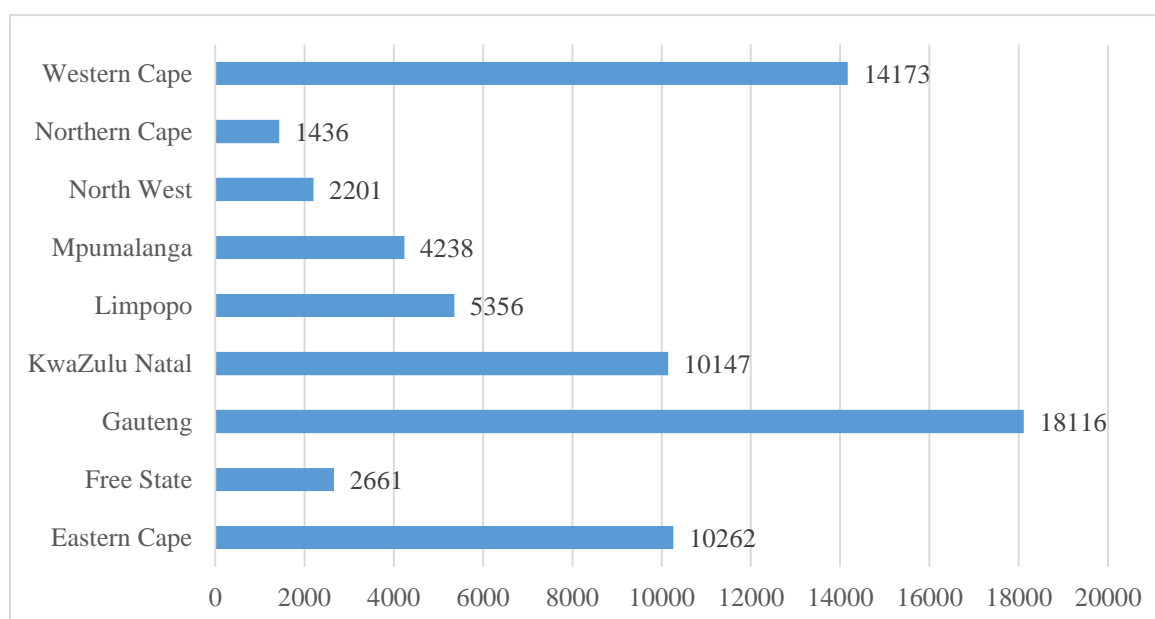
Source: CIDB (2019:3)

Table 2.2 provides a more detailed breakdown; the general government's investment in construction industry was on the following sectors: civil with R77 325 million, non-residential with R32 010 million, residential with R1 785 million, followed by public corporations with R90 433 million in civil construction, non-residential with R3 260 million and residential with R65 million. Lastly, the private sector with civil construction standing at R91 974 million, non-residential at R49 118 million and residential at R84 236 million.

Table 2.2: Construction breakdown

	General government	Public corporations	Private sector	Total
	R'million	R' million	R' million	R' million
Civil construction	77 325	90 433	91 974	259 732
Non-residential	32 010	3260	49 118	84 388
Residential	1785	65	84 236	86 086
Total	111 120	93 758	225 238	430 206

JSE all-share index remained fairly flat in 2016; on the other hand, the construction and material index continued its decline. Since September 2009, the construction industry has shown a decrease of 68 percent; in the same period, the JSE all-share index grew by 129 percent and since June 2016, the marginal recovery in the construction and material is encouraging (South African Construction 2016:6). In the construction industry, a provincial overview shows output added, which consists of the following provinces; Eastern Cape, Gauteng, KwaZulu Natal and Western Cape; in Gauteng the construction activities accounted for 26 percent (R18 billion); Western Cape accounted for 21 percent (R14 billion), KwaZulu Natal accounted for 15 percent (R10 billion) and Eastern Cape accounted for 15 percent (R10 billion) (CIDB 2019:9). The construction industry's provisional overview is shown in Figure 2.2:

**Figure 2.2: Provisional overview in construction industry**

Source: CIDB (2019:9)

2.3 THE CONSTRUCTION SECTOR

2.3.1 Operations of the construction companies

Construction companies complete the buildings and infrastructure work; the projects are completed on the amount and time agreed prior with the client (Praveen 2017:1). For work to be carried out, the construction companies have to bid for a tender and the best company will be awarded a tender. A tender is defined by Thomas (2019:1) as a negotiable price bid from a client who requires goods and services from the suppliers of those goods and services. In the construction company, employees from the tender division will estimate the manpower, materials in quantity, equipment and machinery needed to complete the project (Praveen 2017:1). According to Patil, Wangmare and Gawande (2016:492), the aims and procedures in the tendering process are as follows:

- A contractor has to be selected for a construction project.
- The current market has to be tested, especially in the case where the nature of existing contracts is long term.
- The companies bidding must comply with regulations regarding free and open competition.

According to Fango (2019:13-14), the following are the types of tendering:

- **Open or public tenders:** Contractors are invited to bid for a tender by the client by means of a public advertisement; the contractors will have to present a proposal (Fango 2019:13). The tender offer is advertised in the local newspaper by the client indicating the detail information about the proposed work and interested contractors will apply (Jayakumar 2016:1).
- **Selected tenders:** Selected numbers of contractors are invited by the client for a certain project and contractors must have certain capabilities to be approved (Fango 2019:13). Contractors who are suitable to carry out the work are selected from a short list by the client (Hansen 2012:2).
- **Direct negotiation tenders:** Negotiations are carried out with a single contractor; it is used for highly specialised projects (Fango 2019:14). According to Hansen (2012:3), this type of tender employs specialist contractors.
- **Two-stage tendering:** This type of tender has two stages, namely evaluating the capabilities of the contractor and the financial offer to the contractor (Fango 2019:14). The contractor is appointed at the initial stage of the project to do the work pre-construction services; eventually the employer and the contractor can enter into a lump sum contract (Piper 2017:1).

According to Bowmans (2019:4), construction contract is explained as an agreement between two parties: an employer, which is the client and the employee, that is the contractor, to construct, repair and renovate a building. According to Darwish (2017:2-10), they are three basic types of contracts:

- **Lump sum contracts:** A specific amount of work is provided by the contractor for a specific cost. Terms of the contract cannot be changed once both parties have signed the contract (Darwish 2017:2). Bills of quantities and a lump price are expected to be submitted by the contractor instead of bidding on individual items and the contractor has the responsibility of carrying out the work shown in the bills of quantities for a fixed price (Zainordin, Rahman, Sahamir & Khalid 2019:1)
- **Unit price contracts:** Prices are charged per unit for major elements of the project that will be agreed upon by the owner and the contractor (Darwish 2017:6). The bidder in a contract can win a bid at a certain amount of money only to find out later that they were some arithmetic errors; as a result, the price will have to change to the correct amount (Zhang, Liu, & Gao 2016:277)
- **Cost plus a fee contracts:** In this type of contract, the contractor works on the project and costs are covered by the employer and the contractor will be paid an additional agreed upon fee (Darwish 2017:10). All the audited costs are to be paid to the contractor by the employer for the services rendered (Antoniou, Aretoulis, Konstantinidis & Kalfakakou 2013:450).

According to Wicks (2019:1-2), the following are the advantages and disadvantages of lump sum contracts:

Advantages of lump sum contracts:

- The building process may be facilitated by completing drawings and specifications before going out to tender.
- Before commencement of the project, the employer has the advantage of a fixed building cost.
- In lump sum contracts, quantity surveyer's fees may be avoided.
- No bills of quantities have to be prepared, as a result, time may be saved.
- In the case where variations occur, there is some basis for adjustments.

Disadvantages of lump sum contracts:

- The price is fixed and it gives greater risk to the contractor as opposed to other contract types.

- In lump sum contract, calculations of payment certificate have no basis.
- Every tenderer must “take off” his own quantities.
- Schedule of rates bears no relation to the basis of calculation of the contract sum in many cases.

According to Darwish (2017:7-8), the following are the advantages and disadvantages of unit price contracts:

Advantages of unit price contracts:

- Allows a fair price for the work and provides the client with a competitive bid situation.
- Because of different site conditions, it eliminates the risk of getting a fixed cost and having to re-negotiate it at later stages of the project.
- It allows the work to begin before the completion of the designs; as a result, it speeds up the project completion.

Disadvantages of unit price contracts:

- The financial commitment of the client may be greater than planned if estimated quantities are different from the real situation.
- Client’s project costs may increase due to mistakes in cost estimation.
- Clients must be on site to work with contractors, because actual quantities are measured in the field.
- The validation and checking of delivery tickets and other invoices must be done.
- The last item of work is measured and invoiced by the contractor; as a result, final contract price is not known.

According to Hayes (2020:1), the following are the advantages and disadvantages of cost plus a fee contracts:

Advantages of cost plus fee contract:

- Some risk is removed for the contractor.
- No surprises as they cover all expenses linked to the project.
- They provide quality work.

Disadvantages of cost plus fee contract:

- Final costs may be unknown as they cannot be predetermined.
- The project may take longer.
- There may be disputes when trying to recover construction costs.
- Additional resources may be required to justify all costs linked to the project.

Although the client (employer) and the contractor (employee) are the two main parties in the construction contract, there are other role-players in the construction process (Bowmans 2019:5).

Figure 2.3 represents the role-players in a construction contract:

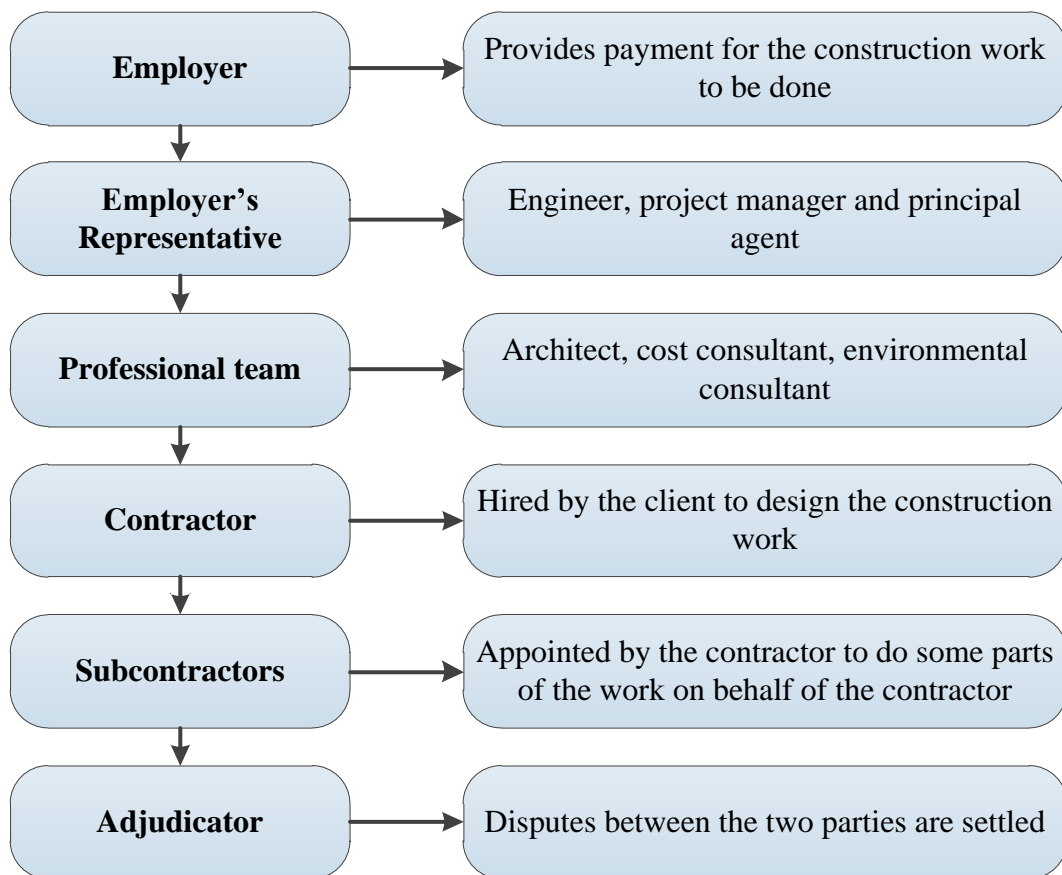


Figure 2.3: Summary of role players

Source: Bowmans (2019:5)

2.3.1.1 Employer/Client

An employer in a contract is referred to a client or a person who needs the construction services from the contractor. Ryd (2014:135) explains the construction client is a company that sets clear an organisation's needs and expectations to the contractor to set requirements and conditions in

the construction project. According to Chigangacha and Haupt (2017:252-253), construction clients are categorised into:

- **Public clients:** Construction projects are financed using public finance either from local or provincial government. In the construction industry, public clients are considered as essential actors because they impact on the construction process (Hermans & Eisma 2015:391).
- **Private clients:** Construction projects are financed by private individuals or by financial institutions. Private clients consist of individuals and companies who are motivated by profit from their investments (Umeokafor 2018:802)
- **Primary clients:** Primary clients are referred to as clients that receive the product or service directly from the contractor (Tohidi & Jabbari 2012:434).
- **Secondary clients:** These are the businesses, such as manufacturing companies, that use the buildings to house their business. According to Mascarenhas (2011:41) and Leino (2017:765), secondary clients consist of individuals, groups and institutions from the target market that are served by an enterprise formally and directly. Examples of secondary clients include creditors, suppliers, retailers and local and provisional government.
- **Experienced clients:** The knowledge and skills they have in the construction industry is at the higher level than the inexperienced clients. Companies must know and profile their potential clients in order to improve their profits (David, Kibe and Katende 2015:195). According to Kolyesnikova, Laverie, Duhan, Wilcox and Dodd (2010:30), the knowledge that clients have about the product make them know exactly what they want to purchase.
- **Inexperienced clients:** They have a low level of knowledge and skills in the construction industry. Clients with little knowledge about the product are referred to as neophytes, meaning they just started to learn about the product (Robertson, Ferreira and Botha 2018:162).
- **Once-off client:** They are not familiar with the construction sector and fully depend on advice from qualified consultants. Once-off clients have weak behaviour and attitude towards a certain company and such clients cannot use a certain product or service because they are more concerned with the price than the product quality (Ranabhat 2018:6).

2.3.1.2 Engineer

The role of the engineer in the construction projects is to help in the overall design of the project in their specialised fields and engineers such as structural-, geotechnical-, mechanical-, and electrical engineers will carry out various analyses before arriving at an optimal design solution for a certain building (Anyanwu 2013:32). According to Shadan and Fleming (2012:49), engineers

are the design team that take a project from conceptual design to the design that defines all elements that will show more accurate construction project costs. According to Pegu (2020), engineers in the construction project can be divided into the following:

- **Site engineer:** Is involved in the planning, coordinating and supervision of technical aspects of the construction project (Pegu 2020:2). Site engineers in the construction project must be able to work under pressure, be team oriented, self-motivated and must also be results oriented (Bhuruk, Rao & Gankar 2018:6).
- **Quality engineer:** Ensures that construction projects are conducted in the quality guaranteed to the client (Pegu 2020:3). Quality engineers ensure that elements of the project are accurate, prepared properly, checked properly and finished on time (Salvi & Kerkar 2020:27).
- **Structural engineer:** They are responsible for report preparation, designs, drawings, selecting the construction materials and offering technical advice (Pegu 2020:4). Structural engineers play an important part in effective design and construction and also have to produce a set of working design documents (Chaudhary & Piracha 2013:219).
- **Building control surveyor:** Ensures that regulations pertaining to building and extending the building are followed (Pegu 2020:5). According to Murtagh, Achkar and Roberts (2018:364), the building control surveyor inspects the groundworks, floor slab and the structure before construction work can start.
- **Quantity surveyor:** All costs associated with the construction projects and civil engineering are managed by the quantity surveyor (Pegu 2020:6). Quantity surveyors are involved in cost management, procurement and also provide advice on cost implications of the client's requirements (Olanrewaju & Anahve 2015:353).
- **Planning engineer:** Assets at site are handled by the planning engineer, who and acts as a middleman between the site and company's management (Pegu 2020:8). A planning engineer ensures that equipment, material and labour are used efficiently and the project team works together for a successful project (Bhuruk *et al.* 2018:5).
- **Billing engineer:** Is responsible for managing, balancing cash flows and the workforce of the construction project (Pegu 2020:9). Billing engineers are involved in determining the costs for the project and cost planning (Razali, Tajudin, Fadzli & Tajuddin 2016:32).

2.3.1.3 Project manager

Project managers are responsible for preparation of a deliverable schedule in agreement with the client's specifications, allocation of resources and setting of goals (Shibani & Sukumar 2015:301).

According to Devi (2013:28), project managers set up the construction team, plan the project, monitor, negotiate contract conditions and must also have the leadership skills to motivate employees. In order to achieve the business strategic objective project performance, it is essential to rely on the capability of the project manager (Oh & Choi 2020:1).

2.3.1.4 Principal agent

The responsibility of the principal agent is setting out the legal agreement between the client and contractor (Richards 2017:1). According to Samakhona (2017:1), the principal agent issues contract guidelines to the contractor concerning the construction project on behalf of the client. Principle agents are appointed on behalf of the employer to manage the contract and look after the employer's interest (Binnington 2010:39).

2.3.1.5 Architect

According to Latiffi, Brahim and Fathi (2015:175), an architect's responsibility is to interpret and develop the design concept according to the employer's specifications. Any statutory conditions that may apply are explained by the architect to the client in an understandable form (Anyanwu 2013:31). During the construction phases, the architect supervises the work at periodic times and reports on the progress and quality of work completed to the employer (Hussein 2013:2).

2.3.1.6 Contractor

A contractor is explained as a company that is awarded a construction project by the client to carry out specific project activities (Lian, Hassim, Muniandy & Hau 2012:442). According to Lee, Ismail and Hussain (2014:131), in the construction industry, the performance of the contractor is measured by the quality of projects delivered to the employer and they normally select the contractor with the lowest cost bidder to do the job; it is important for construction projects to be delivered on time. In a construction contract, all parties must understand the requirements and obligations for a project to be a success (Dmaidi, Dwaikat & Shweiki 2013:15). According to Mzyece, Ndekugri Ankrah and Hammond (2012:468), the contractor is responsible for the following:

- Monitoring, managing and planning the construction projects.
- Preparation of the construction phase plan.
- Rules suitable to the construction site activities are drawn up by the contractor.
- Give information about the construction project where necessary.

2.3.1.7 Subcontractor

Under a contract, certain responsibilities are outsourced to other parties, known as subcontractors, who are usually used in complicated projects such as the construction projects (Hayes 2019:1). According to Construction Industry Development Board (2013:9), the main contractor selects the subcontractors based on the following:

- **Single sourcing:** For a specific trade that is the main contractor's line of business, the main contractor has only one subcontractor. The subcontractor uses one supplier and it is less expensive to manage one contract (Costantino & Pellegrino 2010:28).
- **Preferred subcontractor:** The main contractor selects three or four subcontractors for a particular trade. Main contractors choose less expensive subcontractors and as a result, they end up selecting unqualified, incompetent and inexperienced subcontractors; therefore, in the long run, the contractor loses a huge amount of money (Polat 2016:1043).
- **Specialist subcontractor:** Subcontractors who are known to the main contractor are selected and undertake specialised work. Specialist subcontractors are used in building contracts, as the work may be outside the capability of the main contractor (Yik, Lai, Chan & Yiu 2006:4).
- **Long lists subcontractors:** The main contractor selects a number of subcontractors to complete; the main contractor will choose the subcontractor with lowest prices. For the project to be completed successfully and the contractor's business to continue, it is important for the main contractor to select a suitable subcontractor (El-Khalek, Aziz & Morgan 2019:217).
- **Open tender:** New subcontractors are selected through open bidding by the main contractor. Contractors who are selected without the required competencies as tender qualification may affect the quality of construction work (Kusumarukmi & Adi 2019:6).

2.3.1.8 Adjudicator

According to Cope (2017:4), adjudicators should have knowledge of standard form contracts and the construction act; they must also have enough knowledge of the overall matter of the dispute in order to come up with a decision that is fair to all parties concern. An adjudicator resolves the complaint that is lodged by complainant and makes a decision based on the contract that is binding on both the complainant and the respondent (Nevondwe & Odeku 2013:818). According to Massey and Baird (2017:42), it is essential to take note of the following before an adjudicator is appointed:

- The appointment of the adjudicator is a joint decision by the client and the contractor in the contract.
- Adjudicators can only be appointed where there is a conflict between the two parties, until then, an adjudicator cannot be appointed.
- No time period is given to parties to complete their joint act of appointment.
- In a case where the adjudicator is not yet appointed, either party may ask the adjudicator nominating body to choose one for them, within four days of the request, the adjudicator nominating body chooses the adjudicator.

According to Oliver (2020:4), the code of conduct requires adjudicators to:

- Avoid conflict of interest and maintain confidentiality at all times.
- Adjudication costs and time required are proportionate to the value of the claim and it is to the expectations of the parties.

2.3.2 Factors influencing the profitability of construction companies

2.3.2.1 Economic factors

The construction sector plays an important role in the country's GDP; it is a large and complex industry; workers in this sector build roads, houses and maintain national physical infrastructure (Hanif & Khattak 2017:1). According to Gundes *et al.* (2019:3), in the construction industry, successful management of construction projects relies largely on sound management of financial resources. In the construction industry, building material, labour and machinery costs increase every year due to inflation, which could result negatively on the construction company's profitability (Musarat, Alaloul & Liew 2019:4). According to Musarat *et al.* (2019:4), inflation is defined as an increase in the price of material and machinery costs in the construction project. According to Pettinger (2019:1), the following are the main causes of inflation:

- **Demand-pull inflation:** If the demand in construction materials is higher than the supply it means demand in aggregate is growing faster than aggregate supply and occurs in a situation where within the economy the demand for goods and services exceeds the capacity to produce goods and services (Congressional Research Service 2019:1).
- **Cost-push inflation:** Higher prices of construction materials could result in higher project costs. The increase in price level is compensated by one-on-one fall of income (Schwarzer 2018:201).

- **Devaluation:** This is a situation where the cost of imported products/construction materials increases. The value of the country's currency is reduced against the value of other countries and devalued by the government to reduce the cost of exports (Ojuolape, Yusuf, Alabi & Oladipupo 2015:1144).
- **Rising wages:** An increase in wages could result in higher project costs. The increase in minimum wage could result in a higher unemployment rate (Marginean & Chenic 2013:96).
- **Expectations of inflation:** It causes demand of wage increase from construction workers and the construction company will push up project prices. When people are expecting inflation it influences their economic decisions, such as saving, investment and wage negotiations (Armantier, De Bruin, Potter, Topa, Van der Klaauw & Zafar 2013:274).

Construction projects are financed with both long and short term loans with variable interest rates. Changes in interest rate could also affect the construction company's profitability (Hasani 2018:455). According to Faure (2014:1), interest rate is explained as the prize that the borrower pays to the lender for using borrowed money over a certain given period and it is expressed in percentages; an example would be 10% p.a. According to O'Connell (2019:1), the following are types of interest rates:

- **Fixed interest rate:** For the entire borrowing period, the interest rate remains fixed. According to Fisher and Kampl (2018:6), the initial interest rate remains unchanged and instalments are paid monthly.
- **Variable interest rate:** The interest rate changes with the ongoing movements of the base interest rate or prime rate that is used by lenders to set their interest rate. Variable interest rates are loan contracts that can be adjusted concurrently with an open market index (Edmister, 2011:49).
- **Annual percentage rate:** It is charged on the total cost of the loan; the amount of the total interest is expressed annually. The annual percentage rate annualises the periodic effective rate without recognising the impact of intra-period compounding (Vicknair & Wright 2015:208).
- **Prime rate:** It is offered to favoured clients for loans as it is relatively low compared to other types of interest. It is viewed as a compensation received for lending money to the borrower by the financial institutions (Bean 2017:3).
- **The discount rate:** The interest rate used to borrow money to the financial institutions is not for the public at large. The discount rate is applied to cash flows in estimating the present value

of an asset and it is used as the rate of return for an investment (Nhleko & Musingwini 2016:216).

- **Simple interest:** To calculate the interest rate banks charge to their client's, simple interest rate is used, which is quick and simple method of calculating the interest on the money borrowed (Chen 2020:1). According to Lewin (2019:1), simple interest is used when loan repayments are less than a year.
- **Compound interest:** On regular basis, banks use compound interest to calculate interest for the borrowers, the interest on loans is calculated on an annual basis. The interest is compounded into the principal amount until the money borrowed is fully paid up (Lewin 2019:1).

2.3.2.2 Technological changes

Changes that take place in technology can affect the financial performance of construction companies, as most construction projects depend on the modern technology. According to Dithebe *et al.* (2018:1186), the South African construction sector is faced by several difficulties that influence the financial performance of construction companies and include issues such as technological changes. Technological changes in the construction industry will have a negative impact on the labour market, the nature of work in future, required skills in the future. Tertiary institutions have to equip the next generation to take full advantage of new technology in the construction world (Pistorius 2017:9). Pistorius (2017:4) adds that large and small projects in the construction industry can have an impact on productivity and reduction in cost. According to Magaba, Cowden and Karodia (2015:8-9), lack of suitable technology in the construction industry is associated with the risk of collapsing of many projects and lack of job opportunities due to slow economic growth. According to Magaba *et al.* (2015:9), the reasons construction companies should adapt to new technology are as follows:

- Existing systems are different from the new systems.
- Some machines require a large number of people to work on, for which the company has no budget.
- Workers are resistant to change and are not willing to change their working strategies or methods.
- Current system developers not offering enough technical support to the construction employees.
- Lack of needed training of the system administrators.

2.3.2.3 Political factors

Political officials are regularly involved in corruption in projects and contractors with strong political connections will often be awarded the tender, while the ones with fewer connections may not be awarded projects, which will affect their financial performance (Bekr 2017:5392). The financial performance of the South African construction sector is affected by incapacity of the government to effectively fund the construction projects (Dithebe *et al.* 2018:1189). Onana (2018:2) explains that for a project to be a success it requires good project management, strong project design and no interference from the government or political parties.

2.3.2.4 Management style

The growth and performance of the construction company could be negatively influenced by poor management style and lead to a company not accomplishing its desired goals (Ismail & Fathi 2018:24). According to Buba and Tanko (2017:63), there is a need for effective leadership in the construction industry in developing countries because it is evident that there is poor project performance, such as cost, work quality and poor durability. Liphadzi, Aigbavboa and Thwala (2015:285) state that project managers should encourage construction employees in the construction industry to ensure a better project performance. According to Alkhamali (2014:15), in different phases of a project's lifecycle, disputes and conflicts arise in the construction project and are referred to as unpleasant events, as they impact negatively on the costs and the project's performance. According to Purcell (2019:1), the following are types of management style:

- **Authoritarian management style:** This management style comprises of managing through perfect direction and control. In inspiring employees to deliver in their work, authoritarian management style is considered outdated and inefficient because it relies on giving commands and one-way communication (Todorova & Vasiley 2016:4).
- **Visionary management style:** Managers are not involved in the daily affairs of the company, instead they motivate the team for everyone to be on the same page. They share their vision with other employees that they develop on their own personal vision and can empower employees to do better on their jobs (Taylor, Cornelius & Colvin 2014:567).
- **Transactional management style:** Employees are motivated to improve on their performance by rewarding them with bonuses and incentives. Transactional leaders motivate their employees with rewards such as promotions and increases in their salaries and also do not interfere with the current systems in the company (Şirin, Aydın & Bilir 2018:2010).

- **Servant leadership management style:** In this management style, managers support the workers and spend their time mentoring and coaching the team. According to Kantharia (2012:3), in servant leadership, the employees are rewarded with money for their efforts.
- **Pacesetting management style:** Managers lead by example by providing instructions and set a work pace. The moral of most employees drops because they feel overwhelmed by the pacesetter's demand for good results (Abubakari 2017:39).
- **Democratic management style:** Employee participation and sharing of ideas is encouraged by managers who use this management style. Guidance is offered to a group of employees by the democratic leader and allows input and participation from colleagues (Sharma and Singh 2013:54).
- **Laissez-faire management style:** Employee's freedom is emphasised in this type of management style. According to Chaudhry and Javed (2012:259), Laissez management style leaders allow employees to do their work on their own and make their decisions; leaders give employees complete freedom to take decisions.

2.3.2.5 Ecological factors

Bad weather conditions could result in a project being delayed, which impacts negatively on the construction company's financial performance. According to Akanni, Oke and Akpomiemie (2014:4), geographical area, ground conditions and weather conditions could have a negative influence on the construction company's performance. Construction projects could also be delayed due to hot weather conditions (Alshebani & Wedawatta 2014:636). According to Perez, Smith, Papworth and Cooke (2018:666), bad weather conditions can cause planned completion dates to not be met in the construction project.

2.4 PROFITABILITY, LIQUIDITY AND WORKING CAPITAL MANAGEMENT IN THE CONSTRUCTION INDUSTRY

2.4.1 Profitability in construction companies

According to Babalola and Anifowose (2018:61), profitability is explained as a construction company's operations that reflect the final outcome and a well-designed strategic alliance can have a contribution on the maximisation of the construction company's profitability. Babalola and Anifowose (2018:63) distinguish between profit and profitability as follows:

Profit: During a specified accounting period, profit is the total income earned by the construction company. According to Tulsian (2014:19), profit is defined as the capability of a company to earn

money. From an accounting perspective, profit is a long term objective of a company and does not only measure product success, but also the development of a product in the market (Nishanthini & Nimalathan 2013:1).

Profitability: Is referred to as the company's ability to earn profit on sales or construction projects. According to Ponsian, Chrispina, Tago & Mkiibi (2014:348), profitability is defined as the rate of return on the company's investment.

A company's profitability is referred to as one of the utmost suitable measures of the company's perspective. The company cannot grow without profitability and it can grow in the future if it shows a positive profit rate (Škuflić, Mlinarić & Družić 2018:338). According to Bolek and Wilinski (2012:41-42), the following formula is used to measure the construction company's profitability:

$$ROA = \frac{\text{Net income}}{\text{Average total assets}} \quad (2.1)$$

When using financial ratios, ROA is one of the most popular (Jewell & Mankin 2011:81). According to Jewell and Mankin (2011:82), the following formula is used to measure the construction company's profitability:

$$ROA = \frac{\text{Net income} + \text{interest expense}}{\text{Average total assets}} \quad (2.2)$$

According to White (2020:1), ROA is a profitability ratio that refers to the profit that a company can make from the assets it owns. ROA is expressed as a percentage; a higher number is an indication of well-organised management at handling its statement of financial position to produce a profit. ROE provides shareholders with a clear picture of how effective the company is managing the money that investors have contributed to it; the profitability of the company is measured in relation to shareholders' equity (Fuhrmann 2019:1). According to Fuhrmann (2019:1), construction company's profitability is measured using the following formula:

$$ROE = \frac{\text{Net income}}{\text{Shareholder equity}} \quad (2.3)$$

The shareholder's rate of return on their investment in the company is measured using ROE (Kabajeh, AL NU'aimat & Dahmash 2012:116). According to Kabajeh, *et al.* (2012:116), the following formula is used to measure the construction company's profitability:

$$ROE = \frac{\text{Net profit after taxes}}{\text{Total shareholders equity}} \quad (2.4)$$

Gross operating profit (GOP) is referred to as a measure of company's profitability and it is defined as sales less cost of goods sold and divided by total assets less financial assets (Dong & Su 2010:62). According to Alipour (2011:1095), the following formula is used to calculate GOP:

$$GOP = \frac{\text{Sales} - \text{cost of goods sold}}{\text{Total assets} - \text{financial assets}} \quad (2.5)$$

2.4.2 Liquidity in construction companies

Appropriate management of liquidity in the construction companies may ensure stable employment, as the sector is regarded as one of the largest employers in the labour market (Bolek & Wiliński 2012:38). Liquidity is the capability of the company to pay for their short-term debts as they arise and the capability of the company to produce money from its working capital (Cloete & Marimuthu 2019:120). According to Mwaura (2015:1-2), liquidity is the ability of the company to make essential payments and ensure daily operations continue by having enough cash. In a construction company, if the working capital is not managed well it could lead to insolvency. The civil engineering construction industry in South Africa is unfavourably affected by financial failures (Rwelamila & Lobelo 2011:1). According to Rwelamila and Lobelo (2011:1), insolvency is explained as the company not being able to meet its pending financial obligations. Management of liquidity is a vital tool in managing a company (Durrah, Rahman, Jamil & Ghafeer 2016:435). According to Durrah, *et al.* (2016:436), the following are the liquidity formulae:

Current ratio: The ability of the company to pay short-term liabilities; accounts payable is measured by this ratio. According to Cloete and Marimuthu (2015:88), the formula is as follows:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} \quad (2.6)$$

Quick ratio: It only includes the current assets and current liabilities and the higher the value of this ratio the higher the liquidity of the company. According to Fachri, Salam, Suryanegara and Sapari (2020:39), the formula is as follows:

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory} \times 100}{\text{Current liabilities}} \quad (2.7)$$

2.4.3 Working capital management in construction companies

The construction sector plays a great role in economic growth, capital formation, creation of employment and technological development (Mbakara 2017:20). According to Vismanath, Surendra, Singh and Chaudhry (2018:1), in order to carry out daily activities in the construction company, both short- and long-term liabilities have to be managed; the daily activities comprise of short-term obligations and operational expenses. The company's profitability and market expectation may be influenced negatively by poor management of working capital (Bolek 2013:1). Working capital management might have a huge influence on the company's profitability measures (Sohail, Rasul & Fatima 2016:42). Working capital is divided into permanent working capital (PWC), temporary working capital (TWC), gross working capital (GWC) and net working capital (NWC).

- **Temporary working capital:** According to Skae and Vigario (2011:443), temporary working capital is the additional current assets needed to meet differences in sales. Temporary working capital changes as the situation changes in the accounting period (Herdinata 2017:31).
- **Permanent working capital:** Is defined by Gitman (2006:633) as the fixed investment in operating assets resulting from constant sales. According to Herdinata (2017:31), for any business to function smoothly in the accounting period, permanent working capital is required.

According to Jamil, Al Ani and Shubiri (2015:897), GWC and NWC are defined as follows:

- **Gross working capital:** Current assets of a company are used in operations such as cash, accounts receivable and inventory.
- **Net working capital:** Is the association between current assets and current liabilities; the net is calculated by current assets minus current liabilities. The difference between current assets and current liabilities is net working capital and it determines how well companies can manage their short-term obligations (Rimo & Panbunyuen 2010:14). According to Jamil *et al.* (2015:897), the formula for NWC is as follows:

$$\text{Net working capital} = (\text{Current assets} - \text{Current liabilities}) \quad (2.8)$$

According to Turaboglu and Topaloglu (2017:16), working capital is divided into conservative financing policy, aggressive financing policy and moderate or balanced financing policy. According to Sohail, *et al.* (2016:42), conservative financing policies, aggressive financing policy and moderate or balanced financing policy are defined as follows:

- **Conservative financing policy:** Managers of a company maintain high levels of current assets to sustain high investment in short term assets and current assets and the company's profitability is negatively affected by this policy. In the conservative financing policy, the risk in investing is lower and as a result, the return is minimum (Nabi, Yousaf, Ali & Najaf 2016:61).
- **Aggressive financing policy:** Through minimum capital investment, company managers wish to achieve higher returns. It is considered a risky type of policy because the company depends on bank's credit terms and interest rates. The aggressive financing policy refers to the maximum return associated with high risk (Nabi *et al.* 2016:61). A company can use the aggressive financing policy as it results in higher profit at a higher risk to the company (Rasyid 2017:208).
- **Moderate or balanced financing policy:** According to Turaboglu and Topaloglu (2017:16), to finance fixed assets and continuous working capital, long-term liabilities or the shareholder's equity are used.

2.5 CURRENT ASSETS AND LIABILITIES

2.5.1 Definition of current assets

Current assets are defined as assets that have a lifespan of less than one year and they can be easily converted to cash (Cloete & Marimuthu 2015:17). According to Nobanee and Abraham (2015:3), current assets consist of cash, accounts receivable, raw materials, work-in-progress and inventory.

2.5.2 Definition of current liabilities

In the construction industry, clients have debts and current liabilities to contractors (Podolanchuk, Plakhtii & Gudzenko 2019:160). According to Cloete and Marimuthu (2015:17), current liabilities are the responsibilities of a company and are payable within a period of a year. Current liabilities consist of accounts payable and accruals (Nobanee & Abraham 2015:3).

2.5.3 Types of current assets and current liabilities

2.5.3.1 Types of current assets

According to Fadiyah (2019:1), the following are types of current assets:

- **Bank:** It is the bank balance of the company, which can be used by the company to pay for expenses or finance other company assets. Bank consists of money kept in the cash box or a safe and cash deposited at the bank that may be withdrawn when needed (Patel 2019:2).
- **Accounts receivable:** Refers to the money owed to the company by debtors and it must be collected by the company. According to Kharabadze and Jikia (2018:237), in order for companies to increase their sales, they must extend the customer's period of payment, which might increase the risk of return and could cause loss of solvency.
- **Inventory:** It is regarded as the heart of every company; the flow of cash depends on the availability of inventory and it consists of raw material, work-in-progress and finished goods. According to Patel (2019:8), inventory refers to the goods held for manufacture or for resale. Inventory has to be controlled by the company by monitoring and controlling inventory levels and making sure that there is enough inventory to meet the customer's demand. It is important to set appropriate inventory levels because inventory can affect the company's performance (Priniotakis & Argyropoulos 2018:1). According to Kawai, Sugiyama, Kobayashi and Sano (2005:438), the inventory that can be used on environmental evaluation performance and concrete structure construction is Portland cement, blast furnace slag and fly ash cement. Machinery such as breakers, welding machines and crawler cranes use inventory such as light oil and acetylene gas to run the machinery in demolishing projects and in disposal and recycling projects inventory such as electric power, light oil, heavy oil and kerosene are used to run the machinery (Kawai, *et al.* 2005:439).

2.5.3.2 Types of current liabilities

According to Beers (2019:1), the following is a type of current liability:

- **Accounts payable:** It is a commitment by the company to its suppliers and it represents the total amount that the company owes to its suppliers. To minimise late payment costs such as penalties and interest on overdue accounts, companies must put in place effective accounts payable practices (Enow & Kamala 2016:77).

2.6 THEORIES OF WORKING CAPITAL MANAGEMENT

2.6.1 Contingency theory

Contingency theory was developed in the mid-60s to the 70s and was taken from the system theory and it is concerned with system design (Bakar, Said, Razak, Yusof & Awang 2008:1228). According to Nurein *et al.* (2017:10), in order for companies to make a profit, they need to put in

place systems and structures that will be suitable for several contingencies for their external environment. Applying a contingency theory to management accounting is based on the fact that there is no suitable accounting system that can be applied similarly to all the companies in all conditions; rather, an accounting system depends on the circumstances the company finds itself in (Grötsch, Blome & Schleper 2013:2843-2845). The contingency theory argues that companies that have a suitable organisational structure could have a higher financial performance than the ones with a misfit structure (Oyewobi & Windapo 2014:2067). According to Tingbani (2015:90), a suitable organisational structure is considered the heart of the contingency theory and it recommends that a company is considered fit when it is designed and positioned to do well in its daily activities. Figure 2.4 represents the theoretical relationship of the contingency theory.

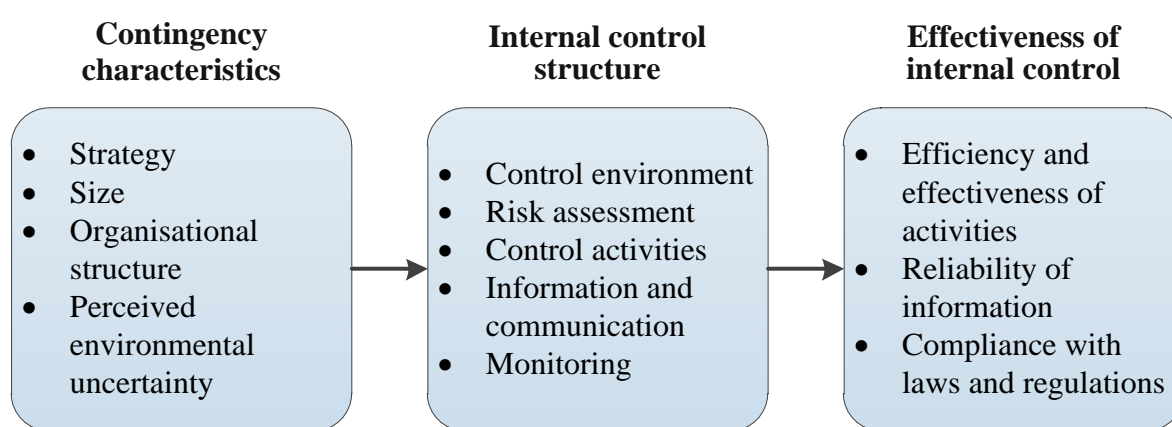


Figure 2.4: Summary of theoretical relationship

Source: Jokipii (2010:118)

Contingency variables are discussed below.

2.6.1.1 Management strategy

The development of strategic concepts is encouraged and provided by strategic management; however, the development of those strategies does not provide assurance that the company's employees will focus on developing strategic concepts (Chinowsky & Meredith 2014:5). Chinowsky and Meredith (2014:5) add that strategic management in a construction industry gives direction for a particular planning period. Buys and Van Rooyen (2014:4) note that with the increase in competition, technological changes and changes in customer's needs, strategic management is the key to keep the business going for future business success.

2.6.1.2 Company size

The size of the company is regarded as a very important variable for an enterprise to perform well financially (Groda 2017:1). Groda (2017:1-2) adds that growth in revenue, profits, company size and number of workers is important for almost all companies. According to Sedera (2016:2), the most used criteria to determine the company's size, whether it is a small, medium or large organisation, is through the number of workers it employs.

2.6.1.3 Organisational structure

Many organisations over the past decades have changed the manner in which they are structured and managed because the traditional way of doing business may not respond to the flexibility in the changing technology (Gaspary, Moura & Wegner 2018:134). According to Nedović and Božinović (2013:4), organisational structure refers to the relationship amongst the factors of production and it is regarded as the most important part of an organisation for the smooth running of the company.

2.6.1.4 Perceived environmental uncertainty

According to Akpolat, Soliman and Schweitzer (2013:2), perceived environmental uncertainty is the unexpected conditions that can happen in the business due to natural causes, which cannot be predicted; therefore, managers of a company cannot predict future environment due to lack of information (Widyaningdyah & Aryani 2016:124).

2.6.2 Configurational theory

The configurational theory was first developed by Shortell in 1977. The theory introduced methods that list different context variables and internal design forms and the theory states that the optimal level to working capital is an outcome of alignment of different design parameters in the company (Nduta 2015:11). In connection with the working capital management, the configurational theory states that companies have to set available parameters in accordance with the company's variables, such as the industry structure, economic situation, supplier variables and demand behaviour (Lalah 2018:18). According to Kulins, Leonardy and Weber (2016:1437), the integration of configurational theory with the management studies is to narrow down huge amounts of data into tangible theory. Configurational theory focuses on the volume; it goes beyond introducing new methods to management sciences. It provides an understanding of the field of organisation studies by offering different ways to theorise complicated associations that characterise the organisational life (Fiss, Marx & Cambre 2013:4). According to Meyer, Tsui and

Hinings (1993:1177), the past gains of contingency theory may be consolidated through the configurational theory.

2.7 COMPONENTS OF WORKING CAPITAL MANAGEMENT

2.7.1 Cash management

The most important tool in the construction companies is liquidity and cash management evaluates the project's distribution of expenditure and revenue; poor cash flow management could have a negative influence on the company's profitability (Adjei, Fugar, Adinyiral, Edwards & Parn 2018:35). According to Mutti and Hughes (2002:23), in the construction industry, the level of insolvency is very high as opposed to other sectors, however, good cash management could be a solution to this problem. Al-Joburi, Al-Aomar and Bahri (2012:1) state that when construction companies are faced with financial problems they must secure enough cash flow at all project phases and that is still a challenge facing many contractors. Enough cash flow is important to pay for overheads, labour and material expenses, therefore, cash flow is important to run a profitable construction company. According to Adjei, *et al.* the following are the factors that influence cash flow management:

- **Financial risk:** Lack of cash flow management structure could result in liquidity and also have an impact on working capital (Adjei *et al.*, 2018:37). According to Labović and Damnjanović (2008:482), financial risk management could lead to the company's reducing chances of bankruptcy. Bankruptcy is a costly process to the company as the legal system can claim some money based on the company's value.
- **Retention:** Retention refers to the money that the construction company borrows from the bank to complete the project and it is paid back with the interest that could have a negative impact on cash flow management (Adjei *et al.*, 2018:37). Retention bond provides protection to the contractor and the client in the event of faulty work, but without disadvantaging the contractor (Oke & Ogunmola 2014:783).
- **Sectional completion:** The contractor and client cannot predict cash flow because of milestone payment dates (Adjei *et al.*, 2018:38).
- **Delayed payments:** It impacts negatively on the construction company's cash flow due to insufficient working capital to carry on with the project and the work would not be delivered on time (Adjei *et al.*, 2018:38). According to Akinsiku and Ajayi (2016:2), delayed payments could be caused by contractors omitting some important documents required to process

payments. The delay in payments could be avoided by making sure that the needed documentation is complete.

- **Project claims:** Claims in the construction company could be due to when real project circumstances are different from those documented (Adjei *et al.*, 2018:38). Any additional changes that occurred related to the conditions defined by the contract will require additional compensation in time and/or costs (Stojadinović 2018:83). According to Hadikusumo and Tobgay (2015:49), a claim may be submitted by the party that feels that contractual obligations were not met by the other party or expectations and they deserve monetary and/or time compensation.
- **Pricing strategies:** An alternative way to improve cash flow of projects to contractors through front-end and back-end rates loading (Adjei *et al.*, 2018:38). Pricing in the construction industry is one of the most important aspects of marketing as the construction industry is considered, in most countries, as one of the most competitive industries (Mochtar & Arditi 2000:56).
- **Over-measurement and under-measurement:** At the early stages of the contract over-measurement is employed whereby certified work are valued more than the executed work and on the other hand under-measurement, certified work are valued less than the work executed (Adjei *et al.*, 2018:39).

2.7.1.1 Cash conversion cycle

The number of days between the expenditure of the company's cash for the buying of raw material to manufacture the goods and the collection of money for final goods and it can also measure the effectiveness of working capital, is referred to as cash conversion cycle (Cristea & Cristea 2018:1). A company's effective working capital is measured by cash conversion cycle and it is considered a valuable measure (Ikechukwu & Nwakaego 2016:62). According to Al-Mohareb (2019:82), cash conversion cycle is the payment of material purchased from suppliers and collection of cash from debtors for sales on credit. CCC is when you add inventory period to accounts receivable and subtract accounts payable. According to Dikov (2019:1), Figure 2.5 represents the cash conversion cycle:

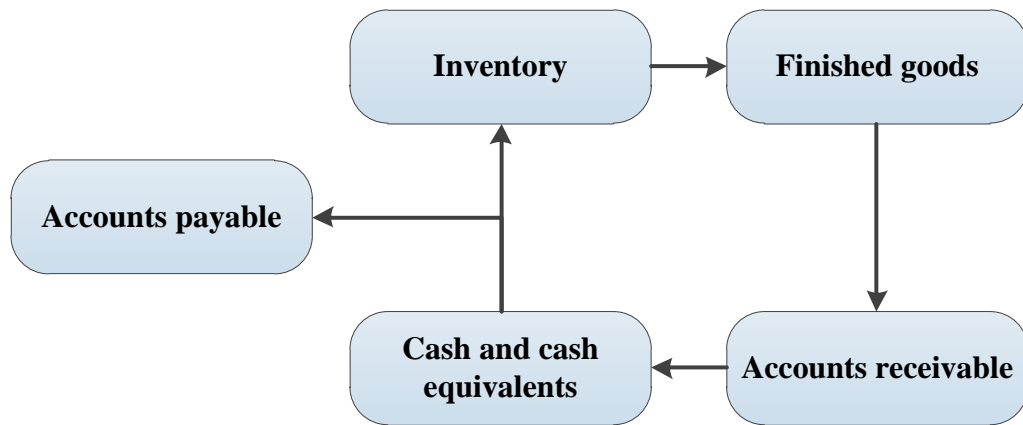


Figure 2.5: Summary of cash conversion cycle

Source: Dikov (2019:1)

2.7.2 Inventory management

Inventory comprises of finished goods, plant and machineries, and in-process products which are recorded and stored at the construction site. Inventory storage and hiring would cost the company money (Chua 2019:1). According to RathinaKumar, Lalithapriya, Kumar and Ravekumar (2018:899), construction projects are influenced by material management as it amounts to 55-60 percent of the total construction cost; therefore, for successful construction projects, effective material planning is crucial. To reach anticipated profit, it is important to control the material costs (Jakkraphobyothin, Srifa & Chinda 2018:1). According to Islam, Pulungan and Rochim (2018:1), to maintain material at optimal costs, good inventory management is essential and better internal control needs to be implemented by companies by establishing policies to increase inventory cost efficiently. During the material receiving process, poor inventory management as well as the traditional material tracking method has made it challenging to track the location of the materials in the construction jobsite when they are needed most (Kasim, Liwan, Shamsuddin, Zainal, Naadira & Kamaruddin 2012:447-448). According to Mohopadkar and Patil (2017:229) inventory management is explained as the procedure to deliver correct material at the correct place, time and quantity so that the cost of the project could be low. According to Mohopadkar and Patil (2017:229), the principal items of inventory are as follows:

- **Raw materials:** Basic materials that are manufactured by the company. The construction industry consumes more raw material globally than any other sectors in the world economy (Torgal & Labrincha 2013:730). According to Singh (2012:59), inputs that are converted to final outputs are referred to as raw material inventories. According to Marin, Gomez and

Martinez (2016:17), material such as fired clay brick walls, concrete block walls and stabilised soil block walls are used in construction projects.

- **Finished Parts:** From basic raw materials, these parts are manufactured by the company.
- **Work in Progress:** Refers to the materials that are partially completed and materials become a work in progress at the end of the first operation. According to Tan, Jamaludin and Hamzah (2018:181), work in progress is a process of producing a finished product.
- **Finished goods:** Goods that are complete and are ready to be used by the final users of the product; the customers of the company. Finished goods can be divided into make-to-stock (MTS), which refers to finished goods produced based on planning and forecasts and make-to-order (MTO) goods, which are produced when the customer's order reaches the company's premises (Posazhennikova & Kravchenkova 2012:14).

According to Atnafu and Balda, the following are the inventory management techniques in the company:

- **Economic order quantity:** Companies must know when they can order inventory and how much should be ordered (Atnafu & Balda 2018:5). Economic order quantity involves planning, such as what quantity of goods to order and when to order those goods (Agarwal 2014:233).
- **Just in time technique:** It refers to having the right inventory at the right time in the right quantity (Atnafu & Balda 2018:5). JIT involves having right items at the right quality and right quantity at the right place (Kootanaee, Babu & Talari 2013:8).
- **Vendor-managed inventory:** The inventory that is sold to the retailers so that they can sell the materials to the customers (Atnafu and Balda 2018:5). According to Radzuan, Omar, Nawi, Rahim and Yaakob (2018:196), the customer gives permission to the vendor or supplier to create orders based on the information shared by the customer such as production schedule, forecast and point of sales data.
- **ABC analysis:** It is concerned with the management of inventory and inventories are classified under three classes which is A, B and C; most attention is given to product A followed by product B and product C gets the least attention (Ravinder & Misra 2014:257). According to Kampf, Lorincova, Hitka and Caha (2016:121), costs with regard to different calculation objective such as distribution routes, customers and services are determined in the ABC analysis.

2.7.2.1 Inventory conversion period

The inventory holding period is given by finished goods conversion period, material conversion period, work-in-progress and finished goods; the efficiency and effectiveness of the manufacturing process and the selling process influence the inventory conversion period and the time it takes to produce a product depends on the nature of the product (Muturi, Wachira & Lyria 2015:368). According to Vinasithamby (2018:19), the inventory conversion period can influence the performance of the business in the case where there is a shortage of stock in the company, which could result in the business losing sales and poor financial performance. Vinasithamby (2018:19) adds that a higher profit is shown by a higher inventory conversion period, however, it is a normal profit. Average number of days in inventories represents the period that inventories are kept by the companies before they are sold to customers (Sugathadasa 2018:40). According to Sugathadasa (2018:40), the formula for calculating the inventory conversion period is:

$$\text{Inventory conversion period (ICP)} = (\text{Inventory} \div \text{Cost of goods sold}) \times 365 \quad (2.9)$$

2.7.3 Accounts receivable management

Profits are narrow in the construction industry and they need to deal with any level of uncertainties that would include the project, parties involved, kind of contract and the method of financing the project. It can cost contractors a lot of money when such uncertainties take place, which in most cases take contractors out of business. As a result, they need to consider asking for advance payments from customers or delay payments to suppliers (Chen & Chen 2012:227-228). Accounts receivable management is a process of making right choices regarding trade debtors and making sure that the company gets positive results in collecting the company's debts from its debtors (Ogundare & Olatunji 2018:401). Accounts receivable are considered an important resource for the business and it is important to understand them and how they can affect the business (Wallvik & Viklund 2014:16). According to Ogundare and Olatunji (2018:401), companies are aiming at two objectives: increasing of sales in a case where customers have little or no interest at all, and to reduce the money that is owed to the company. According to Viklund (2014:26-31), the following are factors influencing accounts receivable management:

- **Invoices:** It is considered a way of reaching out to customers; companies send out invoices to customers and they can either be forwarded by mail or by post that is managed by an external company in order to manage information on the invoices more efficiently. Companies use IT systems to extract and digitise the relevant information contained in the invoices. Previously, humans use to manually extract related information and enter it on the IT system (Palm,

Winther & Laws 2017:406). According to Bayar (2016:1), e-Archive invoices is an application which permits the issuing of invoices on an electronic platform.

- **Management of late payments:** The manner in which companies handle late payments differs from one company to the other. The normal practice is to send out reminders to customers about the overdue account. Suppliers can manage late payments by giving their customers discount for early payments and offer higher discount rates to the chosen customers or even by giving the discounts on normal payment dates (Paul & Boden 2011:735).
- **Reasons for late payments:** Reasons may be customers have financial difficulties or they did not receive the invoice on time. In order to manage their cash flow to other projects, clients postpone payments to contractors and subcontractors (Djokoto 2017:47).
- **Customers:** Companies normally send a limited number of reminders before the account is handed over to the legal team, however, some customers may complain that they did not receive enough reminders. According to Ilieska (2013:327), customers are referred to as people who buy goods and services to satisfy their needs; the behaviour of the customer arises from making a decision as to what, when, where and how to buy goods and services.
- **Disputes:** Any disputes between the company and the customers are handled by the company's accounts manager. Customers' complaints may be handled by improving the service delivery as well as the internal and external reviews systems (Ateke, Asiegbu & Nwulu 2015:19).
- **Internal issues in managing the accounts receivable:** Employees of a company may put the blame on the company's new accounts receivable systems as most people are resist to change.

Figure 2.6 represents receivable management cycle:

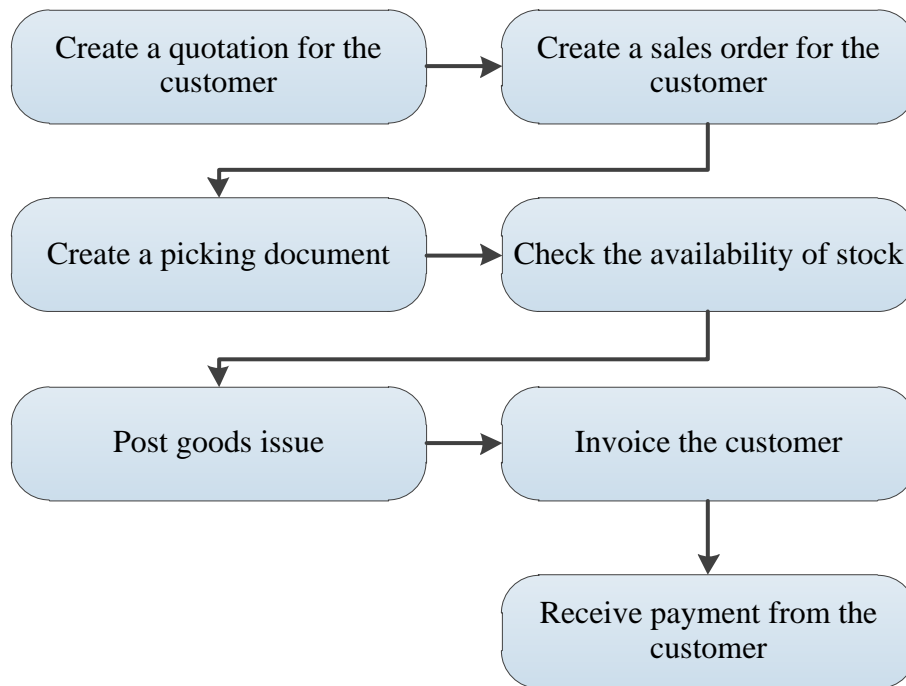


Figure 2.6: Receivable management cycle

Source: Created by the researcher

2.7.3.1 Average collection period

In the construction industry, the average collection period is 45 days; anything more than that suggests that collection methods are poorly managed and a higher collection period might have a negative effect on the cash flow and the construction company would have to borrow money from a financial institution to finance the project (Killingsworth & Mehany 2018:331). According to Zainudin (2009:78), credit means selling goods on credit, the customer will then promise to make a payment in the future (specified date) and outstanding amounts are recorded under the seller's balance sheet as accounts receivable. According to Zainudin and Regupathi (2010:90), the formula to measure average collection period is given below:

$$ACP = (AR \div S) \times 365 \text{ days} \quad (2.10)$$

Where:

- ACP = Average collection period,
- AR = Accounts receivable (or trade debtors),
- S = Total annual sales (turnover or revenue)

2.7.4 Accounts payable management

Accounts payable are regarded as a main source of short-term financing for companies (Enow & Kamala 2016:77). Information that is needed in the accounts payable process are purchase orders used by the company and invoices from the supplier (Agbo & Nwankwo 2018:26). According to Enow and Kamala (2016:77), it is important to manage accounts payable effectively in a company as it contributes positively to cash flow and promotes a healthy relationship between the company and their suppliers. According to Schaeffer (2014:1-2), the following areas are possible internal control problems regarding accounts payable management:

- **Fraud:** Poor accounts payable management makes it easy for employees to steal from the company they work for, as they know what the company's internal control processes are (Schaeffer 2014:1). To add value and improve the operations of the company, internal audit is required as an independent activity that provides objective assurance (Suryanto & Ridwansyah 2016:144).
- **Duplicate payment:** It goes hand-in-hand with fraud; a situation where an invoice is paid more than once (Schaeffer 2014:1).
- **Regulatory non-compliance:** For companies with a poor accounts payable management, it becomes difficult to provide auditors with the information they need to conduct their audit during the audit period (Schaeffer 2014:2). In order to be knowledgeable, workers need to be trained and will be able to comply with the company's requirements (Windapo and Oladapo 2012:435).

According to Khurana (2013:1), the following are five tips for successfully managing of accounts payable:

- **Simplify your accounts payable process:** Before an invoice can be processed by the creditors' clerk it should have a signature of a person in the department responsible for the invoice, as proof that services were provided or goods were delivered.
- **Use technology:** Systems that are used by companies minimises error in processing the information; without technology, you might end up paying creditors more or less.
- **Reduce accounts payable fraud:** System should be designed in a manner that the person processing the invoice for final payment does not have access to add suppliers on the system. To reduce the risk of fraud to a minimum, companies may make use of fraud proofing (Chersan 2009:36).

- **Vendor terms may be negotiable:** In the case where you know you are going to make payment late, it is advisable to call the supplier and tell them. In order for the company to secure the best possible terms with the suppliers, the procurement manager will then be tasked to negotiate with the supplier (Rogers & Fells 2018:3).
- **Reduce CFO impact to verification and signature:** Invoices should be approved by employees in the finance department before they reach the Chief Financial Officer's (CFOs) office, who only confirms the amounts. CFOs are more involved in the strategic role and they are expected to have knowledge of finance in order to carry out their responsibilities (Hiebl, Neubauer & Duller 2013:1).

2.7.4.1 Average payment period

Average payment period is referred to as the number of days the company takes to pay their suppliers; in the construction industry these payments are mainly for materials and subcontractors (Killingsworth & Mehany 2018:331). In the construction industry, payment cycles differ from payment being due upon the receipt of an invoice; normally payment cycle could be between 15 and 30 days (Tether, Serafino, Dany & Lincoln 2015:1). According to Agbo and Nwankwo (2018:26), the formula for average payment period is:

$$\text{Average payment period (APP)} = (\text{Accounts payable} \div \text{Cost of goods sold}) \times 365 \quad (2.11)$$

2.8 SUMMARY OF LITERATURE REVIEW

In this chapter the following theoretical objectives were achieved:

- To analyse theoretical literature on working capital management (discussed in paragraph 2.4.3);
- To review theoretical literature on current assets and current liabilities of the company (discussed in paragraph 2.5);
- To review theoretical literature on the ICP (discussed in paragraph 2.7.2.1);
- To review theoretical literature on ACP, APP and cash management (discussed in paragraph 2.7.3.1, 2.7.4.1 and 2.7.1 respectively).

Good management of working capital ensures that the company maintains its liquidity in order to improve profitability and promote the firm's growth. Working capital management deals with cash

and cash equivalents, inventories, accounts receivable and accounts payable; it is important for companies to properly manage these components of working capital for success of the business. The management of cash ensures that the company has enough money on hand to be able to meet its day-to-day activities. The management of inventories ensures that the company has enough inventories to meet the customer's demands; the company should have the right inventories at the right time. Accounts receivable management refers to the number of debtors a company may have and involves evaluating the credit policies with an idea of putting in place policies that will benefit the company. Accounts payable refers to the company buying goods on credit and ensuring that the company is able to pay on time what is due to creditors. It is important for construction companies to manage their working capital properly in order to be financially prepared for next projects and avoid solvency problems. It is important to analyse the working capital management of JSE-listed construction companies as it could give managers new strategies to manage their working capital.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the research methodology used to analyse the influence of working capital management on financial performance of listed JSE construction companies in South Africa during the duration 2009-2019. Objectives of the research, design of the research, methodology, quantitative research, target population, techniques of data collection, data preparation and handling, and the chapter summary will be discussed in this chapter.

3.2 OBJECTIVES OF THE STUDY

3.2.1 Primary objective

The main purpose of this research study is to analyse the relationship between working capital management and financial performance of JSE-listed construction companies in South Africa during the period 2009-2019.

3.2.2 Theoretical objectives

The below-mentioned theoretical objectives were established for this study to be carried out:

- To analyse the theoretical literature on working capital management;
- To review the theoretical literature on current assets and current liabilities of the company;
- To review the theoretical literature on the ICP;
- To review the theoretical literature on ACP, the APP and cash management.

3.2.3 Empirical objectives

For this study, the below-mentioned empirical objectives were established:

- To evaluate the association between ICP and profitability of JSE-listed construction companies during the period 2009-2019;
- To explore the association between the ACP and profitability of JSE-listed construction companies during the period 2009-2019;

- To investigate the association between the APP and profitability of JSE-listed construction companies during the period 2009-2019.

3.3 RESEARCH DESIGN AND METHODOLOGY

Research is explained by Jongbo (2014:87) as a planned investigation intended to provide solutions to an identified problem. A research study is recognised as research if it is systematic and methodical in its approach and it must also be reliable in nature. Jongbo (2014:88) further explains that for the study to qualify as research, it must meet the following important conditions:

- It must address the research problem and must also have good research questions;
- It must be supported by relevant theories and concepts;
- Data collection has to be appropriate, organised and analysing techniques must be applied;
- Findings must be consistent with the research questions and informed interpretation of results must be offered by the research study.

According to Patel and Patel (2019:48), research is regarded as search of knowledge and it is also explained as an art of scientific investigation.

Research design is explained as a structure of the research that organises all elements of a research study; it is referred to as a plan of the research work (Akhtar 2016:68). According to Akhtar (2016:70), the following are the phases of the research design:

- Stating the problem to be researched;
- Outlining the research design;
- Planning a sample (probability or non-probability);
- Data collection;
- Data analysing; and
- Report preparation.

Research design is explained by Boru (2018:1) as a plan that connects the theoretical research problems with the empirical research. Research design serves as a guideline to the research process, setting out how the research will move from research objectives to the findings (Abutabenjeh & Jaradat 2018:238).

A research project needs to be conducted through the path of research methodology and can assist researchers in showing them the path through which they formulate their problem and objectives and interpret their findings from the data collected during the duration of the study (Sileyew 2019:1). Research methodology refers to the frameworks that are fundamentally related to the whole research process (Opoku, Ahmed & Akotia 2016:33). According to Creswell (2014:45), in a research project, the type of method to be chosen is dependent on the type of data to be collected. Creswell (2014:45) distinguishes between the three types of research methods as presented in Table 3.1:

Table 3.1: Quantitative, qualitative and mixed methods

Quantitative methods	Qualitative methods	Mixed methods
Pre-determined	Emerging methods	Both predetermined and emerging methods
Questions are instrument based	Questions are open-ended	Both open- and closed-ended questions
Observational data, attitude data, census data and performance data.	Interview data, document data, audio-visual data and observation data	Multiple forms of data drawing on all possibilities
Analysis of statistics.	Analysis of text and image.	Text and statistical analysis
Interpretation of statistics	Patterns and theme interpretation	Across database interpretation

Source: Creswell (2014:46)

A quantitative research method will be discussed in detail in Section 3.4 for the purpose of this study.

3.4 QUANTITATIVE METHOD

In order to obtain results in quantitative research, variables have to be quantified and analysed, which involves utilising and analysing the numerical data by making use of statistical techniques to answer the research questions (Apuke 2017:41). According to Abutabenjeh and Jaradat (2018:247), quantitative methods such as close-ended questions or numerical data may be used by the researcher to collect data, using statistical analysis to get overall outcomes. The use of statistical data saves time and resources for the researcher (Daniel 2016:94). Objective theories are tested by examining the relationship between the variables in quantitative research (Creswell 2014:32). The researcher in the quantitative research method try to be as precise as possible by

developing a framework in their field of study (Kumar 2011:67). According to Bhandari (2020:1), quantitative research is a procedure that involves the collection and analysis of numerical data and can be used to make predictions and test relationships between variables. Bhandari (2020:1) further explains that quantitative research can be used in the following researches:

- **In descriptive research:** The researcher seeks a complete summary of the variables in their research project. In descriptive research the desired characteristics of the sample that is being studied is simply described (Omair 2015:153).
- **In correlational research:** The researcher investigates the relationship between variables in their study. Without the researcher controlling either of the variables the relationship between the variables can be measured (McCombes 2019:1).
- **In experimental research:** The researcher determines whether there is a cause-and-effect relationship between the variables. According to Mehrad and Zangener (2019:2), interconnection between variables is entailed in experimental research.
- **In survey research:** The researcher can ask the respondents questions using questionnaires, phones and online. Participants are recruited and data are collected using a variety of methods in survey research (Ponto 2015:168).

3.5 TARGET POPULATION

Target population is explained as selecting participants from the general population under the most convenient conditions so that they can share their experiences and thoughts (Asiamah, Mensah & Abayie 2017:1614). According to Majid (2018:3), target population is also known as the population of interest that the research study intends to study. The target population in this study consisted of all construction companies listed at JSE in South Africa, from 2009-2019 over a period of 11 years. The researcher chose to start with year 2009, because several projects were completed in the construction industry prior to 2010 FIFA World Cup, which include the building of stadiums, the erection of the Gautrain and upgrading major freeways. Stadiums like Moses Mabhida, Cape Town Stadium and Nelson Mandela Bay Stadium were built and Soccer City, formerly known as FNB, were also upgraded. On 21 December 2009, Cape Town Stadium was completed by Murray and Roberts (Murray and Roberts Group Magazine 2010:6) and according Graumann (2010:1), in December 2009, Moses Mabhida Stadium was completed by Group Five and Welson Bayly Holmes-Ovcon (WBHO). Standardised annual financial statements of JSE-listed construction companies were collected using the IRESS database.

3.6 DATA COLLECTION

According to Osang, Udoimuk, Etta, Ushie and Offiong (2013:59), data collection is stated as the gathering of facts, such as value or measurement. A process of collecting information, which will be analysed thoroughly to provide answers to the research questions and assess the research results is known as data collection (Parveen & Showkat 2017:1). According to Parveen and Showkat (2017:1), there are two types of data collection, namely:

- **Primary data:** First-hand data that are gathered by the researcher; no previous records of the data existed for the public to access them. Primary data are conducted by the decision maker, researcher, university or the marketing company to specifically address the problem in question (Curtis 2008:2).
- **Secondary data:** Data that have been compiled by someone previously and can be accessed by the public; this includes data such as government records, census data and departmental records and such data are less expensive and a quicker method of retrieval, as compared to primary data. According to Ajayi (2017:2), secondary data are defined as data that are already in existence or produced by other researchers.

This study made use of secondary data because of the reliability of the standardised financial statements of JSE-listed construction companies in South Africa. Reliability in quantitative research is the consistency and stability of results; the same results have to be obtained in same situations but in different conditions (Haradhan 2017:10). Standardised annual financial statements of all JSE-listed construction companies were collected using the IRESS database in order to calculate the financial ratios. The information obtained from standardised financial statements of listed construction companies for the period 2009-2019 was used to calculate financial ratios such as ROA, ROE, GOP, ICP, ACP and APP.

3.7 DATA PREPARATION AND HANDLING

It is important in a research study to first prepare data before they can be analysed in order to obtain the final results (Abdallah, Du & Webb 2017:1). Data analysis is a process of inspecting, rearranging, modifying and transforming raw data to take out important information from them (Chapman 2018:1). According to Abdallah *et al.* (2017:1), data preparation is a process of converting raw data that are, in most cases, unstructured, into more structured and useful forms that are ready to be analysed further. The data obtained from IRESS database between the years 2009-2019 were in a raw form and in order to be analysed needed to be converted into financial ratios, such as ROA, ROE, GOP, ICP, ACP and APP, which was done using Microsoft Excel

(2013). The calculated ratios were used to prepare a multiple linear regression and correlation model from 2009-2019. The results of the models were used to interpret if there is any significant (S) or nonsignificant relationship (NS) between the independent variables (ROA, ROE and GOP) and dependent variables (ICP, ACP and APP). To conduct the research of JSE-listed construction companies in South Africa between the periods 2009-2019, standardised financial statements were extracted, which include the statement of financial position and statement of financial performance. Linear regression and correlation analysis were used to analyse the relationship between working capital management and financial performance of JSE-listed construction companies and are discussed in Sections 3.7.1 and 3.7.2 respectively.

3.7.1 Multiple linear regression

Regression analysis makes predictions by determining the correlations among two or more variables (Uyanik & Guler 2013:234). According to Koloğlu, Birinci, Kanalmaz and Özyılmaz (2018:1), linear regression demonstrates the relationship between two variables, which are dependent and independent variables, by making use of statistical analysis. In this study, the dependent variables are ROA, ROE and GOP and independent variables are ICP, ACP and APP. The influence of working capital management on the financial performance of JSE-listed construction companies was determined using the multiple linear regression in this study. According to Uyanik and Guler (2013:235), regression analysis is formulated as follows:

$$y = \beta_0 + \beta_1x_1 + \dots + \beta_nX_n + \varepsilon \quad (3.1)$$

Where:

y = dependent variable, are measured or tested in an experiment

X_1 = independent variables, can not be influenced by any other variables

β_0 = y intercept, the value of y when both x_1 and x_2 are 0

β_1 = parameter, are the coefficients representing the changes in y

ε = error, is the model random error

3.7.2 Correlation research

Correlation research is used to determine if there is any relationship that exists between two or more variables. Creswell (2010:338) reports that correlation research is research that allows a researcher to explain the relationship between variables. According to Siegle (2015:1), correlation research has a direction that can either be positive or negative, positive correlation refer/s to individuals who score above the average and negative correlation refers to individuals who score

below the average. Siegle (2015:1) further explains that correlation research also has a degree of strength of relationship of which zero indicates no relationship between the variable and 1 indicates a perfect relationship. According to Senthilnathan (2019:3), the following is the model for correlation research:

$$R = \frac{n(\sum XY) - (\sum X) \cdot (\sum Y)}{\sqrt{n(\sum X^2) - (\sum X)^2} \sqrt{n(\sum Y^2) - (\sum Y)^2}} \quad (3.2)$$

Where:

n = Number of observations

X = Measures of variable 1

Y = Measures of variable 2

$\sum xy$ = Sum of the product of respective variable measures

$\sum x$ = Sum of the measures of variable 1

$\sum y$ = Sum of the measures of variable 2

$\sum x^2$ = Sum of squared values of the measures of variable 1

$\sum y^2$ = Sum of squared values of the measures of variable 2

3.8 RELIABILITY AND VALIDITY

3.8.1 Reliability

Reliability was ensured in this study by level of significance, which was shown using the p-value of 0.05. According to Dorazio (2017:1) the value of 0.05 represent a significance level in a hypothesis test. The value of R^2 was used to determine the contribution it made to dependent variables, which were ROA, ROE and GOP, the value of R^2 was calculated by inserting the values of independent and dependent variables on the regression table for each year on the Excel spreadsheet . A higher value of R^2 provides much more precise estimation than a lower R^2 value. According to Ghazali (2016:149), for the instrument to be more reliable, the correlation value has to be high.

3.8.2 Validity

Validity was ensured by using the correct instruments that measure what they were supposed to measure, it was applied in chapter four when analysing the data. According to Drost (2011:114), validity is explained as research that measures what it is supposed to measure. The researcher used

linear regression and correlation model to measure the relationship between working capital management and financial performance.

3.9 SUMMARY

The research design and methods used to analyse the relationship between working capital management and financial performance of JSE-listed construction companies in South Africa during the period 2009-2019 were described in this chapter. To determine the relationship between two or more variables, multiple linear regression and correlational research were discussed in this chapter. Quantitative research, target population, data collection, data preparation, reliability and validity were also discussed in this chapter.

CHAPTER 4

DATA ANALYSIS

4.1 INTRODUCTION

The main purpose of this research study is to analyse the relationship between working capital management and financial performance of JSE-listed construction companies in South Africa during the period 2009-2019. Financial statements, which are available on the public domain of all construction companies who were listed on the JSE from 2009 to 2019, were extracted from IRESS. Raw data were used to calculate the ratios in Excel spread sheet, multiple linear regression and correlation model were used to determine the relationship between the variables. Linear regression and correlation were used in the study by Koloko (2016:61) who investigated working capital management's effect on the profitability of small retail businesses within the Emfuleni local municipality and a study by Nduta (2015:35) on working capital management's effect on financial performance of manufacturing companies listed in Nairobi Security Exchange and Popoola (2016:36) on the analysis of capital structure of JSE-listed industrial companies in South Africa.

Three phases were used to undertake data analysis; first, dependent variable ROA, independent variables are ICP, ACP and APP. Secondly, dependent variable ROE, independent variables are ICP, ACP and APP. Thirdly, dependent variable GOP, independent variables are ICP, ACP and APP. In order to answer the research questions and empirical objectives in this chapter, the research findings on this study are discussed in detail.

4.2 ANALYSIS AND OVERVIEW OF THE DATA COLLECTED

The relationship between working capital management and financial performance of listed JSE construction companies during the years 2009 to 2019 was established using linear regression and correlation analysis. Linear regression and correlation analysis were used to establish if there is any association between dependent variables: ROE, ROE and GOP and independent variables: ICP, ACP and APP.

4.2.1 Linear regression model 1 results

Multiple linear regression was conducted to determine the relationship between the dependent variable: ROA and independent variables: ICP, ACP and APP of the listed JSE construction companies in South Africa. As illustrated in Figure 4.1.

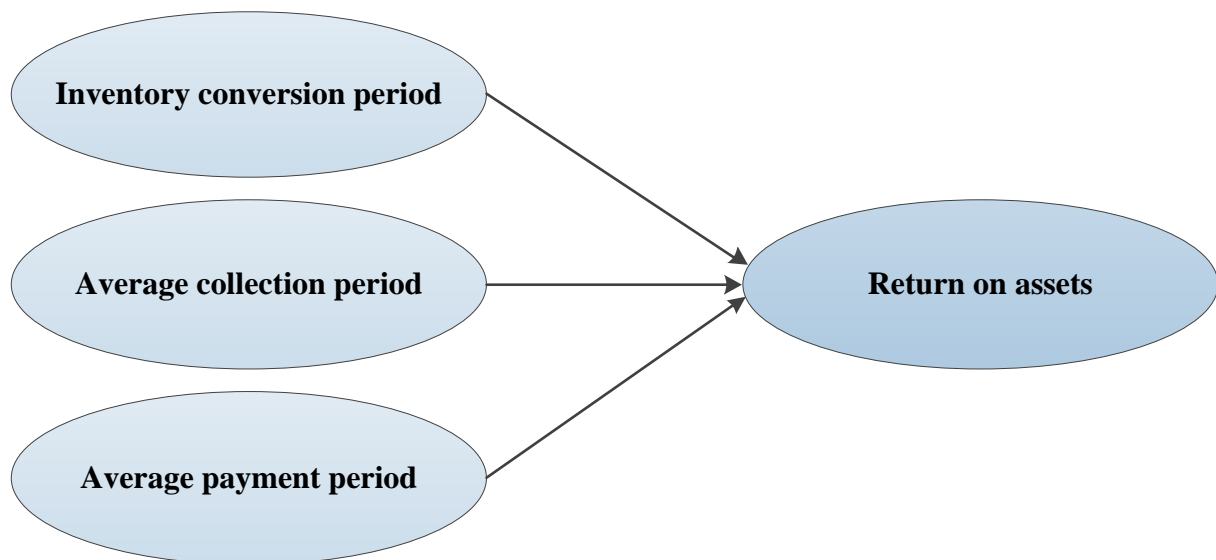


Figure 4.1: Conceptual model 1

Level of significance is shown by p-value. In a case where the p-value is less than 0.05 (≤ 0.05) it is an indication that independent variables have a significant (S) influence on the dependent variables and if the p-value is more than 0.05 (>0.05) is an indication that independent variables do not have a significant (NS) influence on the dependent variables of JSE-listed construction companies in South Africa. Table 4.1 provides the results of the regression analysis conducted for 2009.

Table 4.1: Regression analysis for dependent variable ROA for year 2009

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.112	0.046	-	2.447	0.040
Inventory conversion period (ICP)	-0.000	0.000	-0.458	-0.961	0.364	NS
Average collection period (ACP)	0.001	0.001	0.504	0.549	0.598	NS
Average payment period (APP)	-0.001	0.001	-0.674	-0.790	0.452	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.158		

The R² of 0.158 indicates that the model explained only 15.8 percent of the total variance in the dependent variable. The value of R² is low, which indicates that it did not contribute substantially to the dependent variable (ROA) and it may not provide much more precise estimation as a higher R² value would. In 2009, the results of the model give an indication that none of the independent variables contributed significantly to return on assets, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.2: Regression analysis for dependent variable ROA for year 2010

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.106	0.015	-	7.299	8.397
Inventory conversion period (ICP)	-9.620	7.439	-0.201	-1.293	0.232	NS
Average collection period (ACP)	-5.943	8.901	-0.144	-0.668	0.523	NS
Average payment period (APP)	-1.693	4.597	-0.799	-3.682	0.006	S
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.811		

The R^2 of 0.811 indicates that the model explained 81.1 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (ROA) and it may provide much more precise estimation as a lower R^2 value would. In 2010, amongst the independent variables, the results of the model reveal that APP has an effect on the ROA ($\beta = -0.799$, $p = 0.006$). This resulted to 0.799 days' decrease in APP and a decrease in number of days in APP could lead to increase in profitability. This finding agrees with the study by Agbo and Nwankwo (2018:32) who found that a decrease in APP leads to an increase in profitability. On the other hand, ICP and ACP have no significant effect on ROA.

Table 4.3: Regression analysis for dependent variable ROA for year 2011

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.081	0.028	-	2.850	0.021
Inventory conversion period (ICP)	-0.000	0.000	-0.095	-0.937	0.376	NS
Average collection period (ACP)	0.000	9.065	1.341	3.115	0.014	S
Average payment period (APP)	-0.000	0.000	-0.407	-0.923	0.383	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.936$		

The R^2 of 0.936 indicates that the model explained 93.6 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (ROA) and it may provide much more precise estimation as a lower R^2 value would. In 2011, amongst the independent variables the results of the model reveal that ACP has an effect on the ROA ($\beta = 1.341$, $p = 0.014$). This resulted to 1.341 days' increase in ACP an increase in number of days in ACP could lead to a company been profitable. A study by Deloof (2003:58) found that a positive ACP could improve the company's financial performance. On the other hand, ICP and APP have no significant effect on ROA.

Table 4.4: Regression analysis for dependent variable ROA for year 2012

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.019	0.032	-	0.596	0.568
Inventory conversion period (ICP)	0.000	0.000	0.505	1.826	0.105	NS
Average collection period (ACP)	-0.000	0.000	-0.268	-0.742	0.479	NS
Average payment period (APP)	0.000	0.000	0.523	1.449	0.185	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.394		

The R² of 0.394 indicates that the model explained only 39.4 percent of the total variance in the dependent variable. The value of R² is low, which indicates that it did not contribute substantially to the dependent variable (ROA) and it may not provide much more precise estimation as a higher R² value would. In 2012, the results of the model give an indication that none of the independent variables contributed significantly to return on assets, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.5: Regression analysis for dependent variable ROA for year 2013

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.048	0.015	-	3.261	0.012
Inventory conversion period (ICP)	0.001	0.000	0.648	2.735	0.026	S
Average collection period (ACP)	-5.952	0.000	-0.024	-0.024	0.982	NS
Average payment period (APP)	-0.000	0.000	-0.709	-0.708	0.499	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.614		

The R^2 of 0.614 indicates that the model explained 61.4 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (ROA) and it may provide much more precise estimation as a lower R^2 value would. In 2013, amongst the independent variables the results of the model reveal that inventory collection period has an effect on the return on assets ($\beta = 0.648$, $P = 0.026$). This resulted to 0.648 days' increase in ICP and an increase in ICP could improve the financial performance of construction companies. A study by Panigrahi (2013:118) disagrees with this finding and found that a decrease in ICP could improve the profitability. On the other hand, ACP and APP have no significant effect on ROA.

Table 4.6: Regression analysis for dependent variable ROA for year 2014

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		-0.053	0.056	-	-0.947	0.371
Inventory conversion period (ICP)	0.000	0.000	0.156	0.491	0.637	NS
Average collection period (ACP)	-7.98	0.001	-0.056	-0.159	0.877	NS
Average payment period (APP)	0.001	0.001	0.508	1.512	0.169	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.272$		

The R^2 of 0.272 indicates that the model explained only 27.2 percent of the total variance in the dependent variable. The value of R^2 is low, which indicates that it did not contribute substantially to the dependent variable (ROA) and it may not provide much more precise estimation as a higher value of R^2 would. In 2014, the results of the model give an indication that none of the independent variables contributed significantly to return on assets, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.7: Regression analysis for dependent variable ROA for year 2015

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.030	0.043	-	0.683	0.514
Inventory conversion period (ICP)	-2.153	0.000	-0.023	-0.066	0.949	NS
Average collection period (ACP)	0.000	0.000	0.191	0.414	0.690	NS
Average payment period (APP)	-3.775	0.001	-0.032	-0.070	0.946	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.029		

The R² of 0.029 indicates that the model explained only 2.9 percent of the total variance in the dependent variable. The value of R² is extremely low, which indicates that it did not contribute substantially to the dependent variable (ROA) and it may not provide much more precise estimation as a higher of R² value would. In 2015, the results of the model give an indication that none of the independent variables contributed significantly to return on assets, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.8: Regression analysis for dependent variable ROA for year 2016

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.072	0.0451	-	1.587	0.146
Inventory conversion period (ICP)	0.000	0.0004	0.322	0.961	0.361	NS
Average collection period (ACP)	-3.206	0.000	-0.051	-0.122	0.906	NS
Average payment period (APP)	-0.000	0.000	-0.152	-0.374	0.716	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.106		

The R^2 of 0.106 indicates that the model explained only 10.6 percent of the total variance in the dependent variable. The value of R^2 is extremely low, which indicates that it did not contribute substantially to the dependent variable (ROA) and it may not provide much more precise estimation as a higher R^2 value would. In 2016, the results of the model give an indication that none of the independent variables contributed significantly to return on assets, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.9: Regression analysis for dependent variable ROA for year 2017

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.020	0.094	-	0.216	0.834
Inventory conversion period (ICP)	0.002	0.001	0.589	1.904	0.089	NS
Average collection period (ACP)	0.000	0.001	0.210	0.425	0.681	NS
Average payment period (APP)	-0.001	0.001	-0.592	-1.170	0.272	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.320$		

The R^2 of 0.320 indicates that the model explained only 32.0 percent of the total variance in the dependent variable. The value of R^2 is low, which indicates that it did not contribute substantially to the dependent variable (ROA) and it may not provide much more precise estimation as a higher R^2 value would. In 2017, the results of the model give an indication that none of the independent variables contributed significantly to return on assets, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.10: Regression analysis for dependent variable ROA for year 2018

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		-0.041	0.077	-	-0.527	0.612
Inventory conversion period (ICP)	0.002	0.001	0.594	2.150	0.064	NS
Average collection period (ACP)	-0.000	0.000	-0.478	-1.021	0.337	NS
Average payment period (APP)	-0.000	0.001	-0.079	-0.172	0.868	NS
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.448		

The R² of 0.448 indicates that the model explained only 44.8 percent of the total variance in the dependent variable. The value of R² is low, which indicates that it did not contribute substantially to the dependent variable (ROA) and it may not provide much more precise estimation as a higher R² value would. In 2018, the results of the model give an indication that none of the independent variables contributed significantly to return on assets, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.11: Regression analysis for dependent variable ROA for year 2019

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		-0.094	0.045	-	-2.077	0.0715
Inventory conversion period (ICP)	0.001	0.001	0.286	0.777	0.460	NS
Average collection period (ACP)	-0.001	0.000	-1.567	-2.873	0.021	S
Average payment period (APP)	0.002	0.001	1.453	2.409	0.043	S
NS = Not significant; S = Significant Dependent variable: ROA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.552		

The R^2 of 0.552 indicates that the model explained 55.2 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (ROA) and it may provide much more precise estimation as a lower R^2 value would. In 2019, amongst the independent variables the results of the model reveal that ACP has an effect on the ROA ($\beta = -1.567$, $P = 0.021$). This resulted to 1.567 days' decrease in ACP the findings show that a decrease in ACP could improve the profitability. This finding agrees with the study by Wafula, Tibbs and Ondiek (2019:278), which found that a decrease in ACP could improve the financial performance. APP has an effect on the ROA ($\beta = 1.453$, $P = 0.043$). This resulted to 1.453 days' increase in APP and an increase could result in improved profitability. On the other hand, ICP has no significant effect on ROA.

4.2.2 Linear regression model 2 results

Multiple linear regression was conducted to determine the relationship between the dependent variable: ROE and independent variables: ICP, ACP and APP of the listed JSE construction companies in South Africa, as illustrated in Figure 4.2.

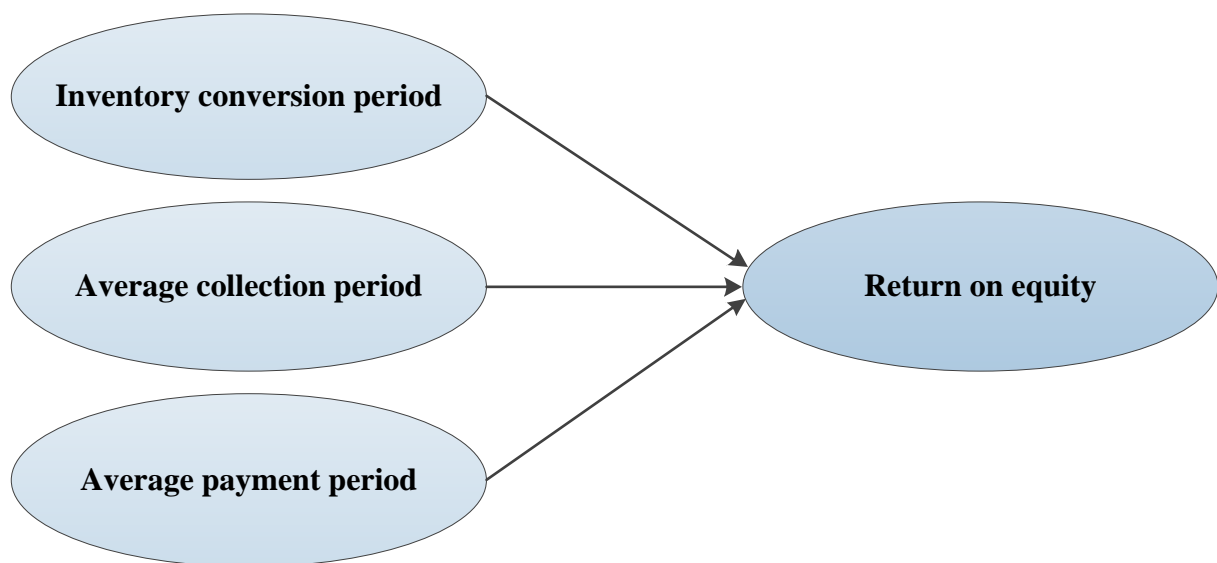


Figure 4.2: Conceptual model 2

Table 4.12: Regression analysis for dependent variable ROE for year 2009

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.378	0.202	-	1.867	0.099
Inventory conversion period (ICP)	6.382	0.001	0.028	0.056	0.957	NS
Average collection period (ACP)	-0.003	0.006	-0.497	-0.520	0.617	NS
Average payment period (APP)	0.001	0.003	0.266	0.298	0.773	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.083		

The R² of 0.083 indicates that the model explained only 8.3 percent of the total variance in the dependent variable. The value of R² is extremely low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R² value would. In 2009, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.13: Regression analysis for dependent variable ROE for year 2010

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.301	0.121	-	2.490	0.038
Inventory conversion period (ICP)	-0.000	0.001	-0.128	-0.399	0.700	NS
Average collection period (ACP)	-3.227	7.392	-0.195	-0.436	0.674	NS
Average payment period (APP)	-2.418	3.818	-0.283	-0.633	0.544	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.197		

The R^2 of 0.197 indicates that the model explained only 19.7 percent of the total variance in the dependent variable. The value of R^2 is low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R^2 value would. In 2010, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.14: Regression analysis for dependent variable ROE for year 2011

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.275	0.213	-	1.289	0.233
Inventory conversion period (ICP)	0.000	0.001	-0.128	-0.342	0.741	NS
Average collection period (ACP)	0.000	0.001	0.953	0.596	0.568	NS
Average payment period (APP)	-0.001	0.002	-0.677	-0.413	0.690	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.124$		

The R^2 of 0.124 indicates that the model explained only 12.4 percent of the total variance in the dependent variable. The value of R^2 is extremely low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R^2 value would. In 2011, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.15: Regression analysis for dependent variable ROE for year 2012

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.136	0.137	-	0.988	0.352
Inventory conversion period (ICP)	0.001	0.001	0.387	1.313	0.226	NS
Average collection period (ACP)	-0.002	0.002	-0.523	-1.358	0.211	NS
Average payment period (APP)	0.002	0.001	0.518	1.347	0.215	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.312		

The R² of 0.312 indicates that the model explained only 31.2 percent of the total variance in the dependent variable. The value of R² is low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R² value would. In 2012, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.16: Regression analysis for dependent variable ROE for year 2013

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.105	0.057	-	1.834	0.104
Inventory conversion period (ICP)	0.001	0.001	0.522	1.767	0.115	NS
Average collection period (ACP)	-0.001	0.001	-0.798	-0.646	0.536	NS
Average payment period (APP)	0.000	0.001	0.254	0.204	0.844	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.399		

The R^2 of 0.399 indicates that the model explained only 39.9 percent of the total variance in the dependent variable. The value of R^2 is low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R^2 value would. In 2013, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.17: Regression analysis for dependent variable ROE for year 2014

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		-0.206	0.164	-	-1.254	0.245
Inventory conversion period (ICP)	0.001	0.001	0.281	0.967	0.362	NS
Average collection period (ACP)	-0.001	0.001	-0.255	-0.794	0.450	NS
Average payment period (APP)	0.004	0.002	0.633	2.069	0.072	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.395$		

The R^2 of 0.395 indicates that the model explained only 39.5 percent of the total variance in the dependent variable. The value of R^2 is low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R^2 value would. In 2014, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.18: Regression analysis for dependent variable ROE for year 2015

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.088	0.078	-	1.126	0.293
Inventory conversion period (ICP)	0.000	0.001	0.102	0.289	0.780	NS
Average collection period (ACP)	0.000	0.001	0.153	0.331	0.749	NS
Average payment period (APP)	0.000	0.001	-0.066	-0.143	0.890	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.026		

The R² of 0.026 indicates that the model explained only 2.6 percent of the total variance in the dependent variable. The value of R² is extremely low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R² value would. In 2015, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.19: Regression analysis for dependent variable ROE for year 2016

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.109	0.063	-	1.727	0.118
Inventory conversion period (ICP)	0.001	0.001	0.452	1.434	0.185	NS
Average collection period (ACP)	0.000	0.000	0.052	0.131	0.898	NS
Average payment period (APP)	0.000	0.001	-0.142	-0.372	0.718	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.204		

The R^2 of 0.204 indicates that the model explained only 20.4 percent of the total variance in the dependent variable. The value of R^2 is low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R^2 value would. In 2016, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.20: Regression analysis for dependent variable ROE for year 2017

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		-0.014	1.554	-	-0.009	0.993
Inventory conversion period (ICP)	0.023	0.016	0.451	1.390	0.198	NS
Average collection period (ACP)	0.011	0.013	0.436	0.841	0.422	NS
Average payment period (APP)	-0.031	0.023	-0.705	-1.331	0.216	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.253$		

The R^2 of 0.025 indicates that the model explained only 2.5 percent of the total variance in the dependent variable. The value of R^2 is extremely low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R^2 value would. In 2017, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.21: Regression analysis for dependent variable ROE for year 2018

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		-0.299	0.315	-	-0.950	0.370
Inventory conversion period (ICP)	0.006	0.003	0.552	1.801	0.109	NS
Average collection period (ACP)	-0.001	0.002	-0.346	-0.665	0.524	NS
Average payment period (APP)	0.000	0.004	-0.047	-0.091	0.929	NS
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.321		

The R² of 0.321 indicates that the model explained only 32.1 percent of the total variance in the dependent variable. The value of R² is low, which indicates that it did not contribute substantially to the dependent variable (ROE) and it may not provide much more precise estimation as a higher R² value would. In 2018, the results of the model give an indication that none of the independent variables contributed significantly to return on equity, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.22: Regression analysis for dependent variable ROE for year 2019

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		-1.679	0.708	-	-2.372	0.045
Inventory conversion period (ICP)	0.006	0.011	0.214	0.547	0.599	NS
Average collection period (ACP)	-0.017	0.007	-1.463	-2.524	0.036	S
Average payment period (APP)	0.030	0.013	1.439	2.245	0.055	S
NS = Not significant; S = Significant Dependent variable: ROE; Independent variable: (constant), ICP, ACP and APP				R ² = 0.495		

The R^2 of 0.495 indicates that the model explained 49.5 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (ROA) and it may provide much more precise estimation as a lower R^2 value would. In 2019, amongst the independent variables the results of the model reveal that ACP has an effect on the ROE ($\beta = -1.463$, $P = 0.036$). This resulted to 1.463 days' decrease in ACP and it could improve the company's financial performance. APP has an effect on the ROA ($\beta = 1.439$, $P = 0.055$). This resulted to 1.439 days' increase in APP which could increase the company's profitability. On the other hand, ICP has no significant effect on ROE.

4.2.3 Linear regression model 3 results

Multiple linear regression was conducted to determine the relationship between the dependent variable GOP and independent variables ICP, ACP and APP of the listed JSE construction companies in South Africa, as illustrated in Figure 4.3.

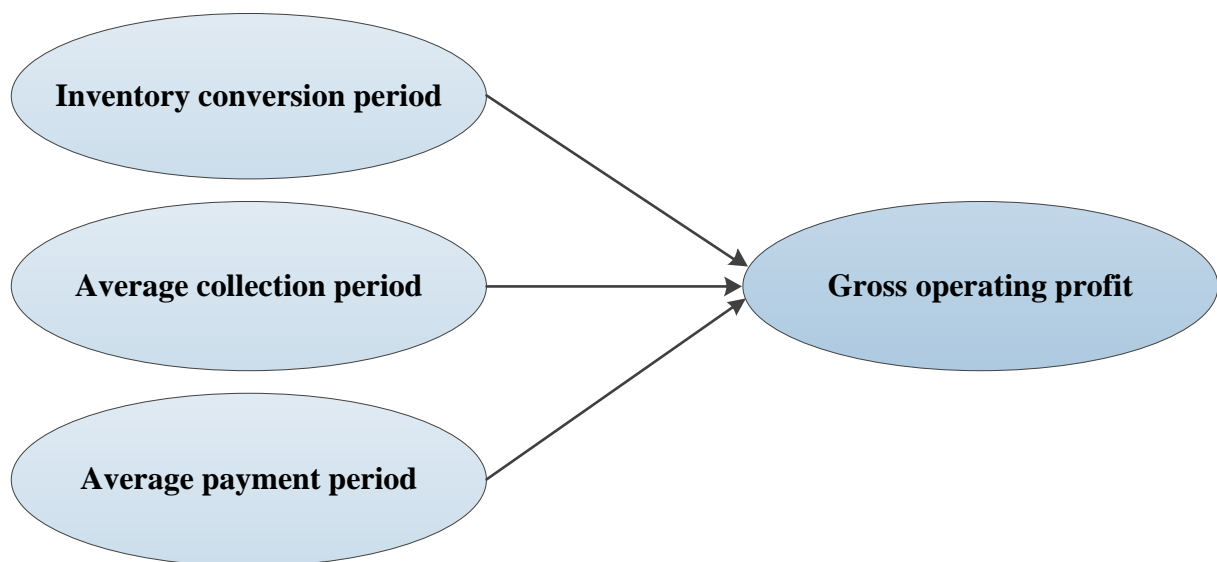


Figure 4.3: Conceptual model 3

Table 4.23: Regression analysis for dependent variable GOP for year 2009

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.929	0.468	-	1.987	0.082
Inventory conversion period (ICP)	-0.001	0.003	-0.179	-0.357	0.730	NS
Average collection period (ACP)	0.004	0.013	0.276	0.286	0.782	NS
Average payment period (APP)	-0.004	0.008	-0.476	-0.531	0.610	NS
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				R ² = 0.071		

The R² of 0.071 indicates that the model explained only 7.1 percent of the total variance in the dependent variable. The value of R² is extremely low, which indicates that it did not contribute substantially to the dependent variable (GOP) and it may not provide much more precise estimation as a higher R² value would. In 2009, the results of the model give an indication that none of the independent variables contributed significantly to gross operating profit, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.24: Regression analysis for dependent variable GOP for year 2010

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.625	0.094	-	6.652	0.000
Inventory conversion period (ICP)	0.000	0.000	-0.083	-0.720	0.492	NS
Average collection period (ACP)	0.000	0.000	1.241	7.749	0.000	S
Average payment period (APP)	0.000	0.000	-1.216	-7.563	0.000	S
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				R ² = 0.896		

The R^2 of 0.896 indicates that the model explained 89.6 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (GOP) and it may provide much more precise estimation as a lower R^2 value would. In 2010, amongst the independent variables, the results of the model reveal that ACP has an effect on the GOP ($\beta = 1.241$, $P = 0.000$). This resulted to 1.241 days' increase in ACP, which could improve the profitability. APP has an effect on the return on assets ($\beta = -1.216$, $P = 0.000$). This resulted to 1.216 days' decrease in APP and by decreasing the days they make payment to creditors could improve the profitability. On the other hand, ICP has no significant effect on GOP.

Table 4.25: Regression analysis for dependent variable GOP for year 2011

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.707	0.448	-	1.580	0.153
Inventory conversion period (ICP)	0.000	0.002	-0.006	-0.016	0.988	NS
Average collection period (ACP)	0.000	0.001	0.338	0.212	0.837	NS
Average payment period (APP)	-0.002	0.004	-0.680	-0.416	0.688	NS
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.127$		

The R^2 of 0.127 indicates that the model explained only 12.7 percent of the total variance in the dependent variable. The value of R^2 is extremely low, which indicates that it did not contribute substantially to the dependent variable (GOP) and it may not provide much more precise estimation as a higher R^2 value would. In 2011, the results of the model give an indication that none of the independent variables contributed significantly to gross operating profit, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.26: Regression analysis for dependent variable GOP for year 2012

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		1.264	0.716	-	1.766	0.115
Inventory conversion period (ICP)	-0.002	0.005	-0.120	-0.357	0.731	NS
Average collection period (ACP)	-0.004	0.009	-0.182	-0.412	0.691	NS
Average payment period (APP)	-0.002	0.008	-0.129	-0.292	0.778	NS
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				R ² = 0.096		

The R² of 0.096 indicates that the model explained only 9.6 percent of the total variance in the dependent variable. The value of R² is extremely low, which indicates that it did not contribute substantially to the dependent variable (GOP) and it may not provide much more precise estimation as a higher R² value would. In 2012, the results of the model give an indication that none of the independent variables contributed significantly to gross operating profit, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.27: Regression analysis for dependent variable GOP for year 2013

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		0.988	0.418	-	2.363	0.046
Inventory conversion period (ICP)	0.003	0.006	0.122	0.410	0.692	NS
Average collection period (ACP)	0.011	0.007	1.983	1.593	0.150	NS
Average payment period (APP)	-0.013	0.007	-2.412	-1.915	0.092	NS
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				R ² = 0.388		

The R^2 of 0.388 indicates that the model explained only 38.8 percent of the total variance in the dependent variable. The value of R^2 is low, which indicates that it did not contribute substantially to the dependent variable (GOP) and it may not provide much more precise estimation as a higher R^2 value would. In 2013, the results of the model give an indication that none of the independent variables contributed significantly to gross operating profit, consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.28: Regression analysis for dependent variable GOP for year 2014

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		2.630	0.524	-	5.016	0.001
Inventory conversion period (ICP)	-0.006	0.004	-0.265	-1.370	0.208	NS
Average collection period (ACP)	0.009	0.005	0.388	1.816	0.107	NS
Average payment period (APP)	-0.028	0.006	-0.915	-4.486	0.002	S
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.732$		

The R^2 of 0.732 indicates that the model explained 73.2 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (GOP) and it may provide much more precise estimation as a lower R^2 value would. In 2014, amongst the independent variables, the results of the model reveal that APP has an effect on the GOP ($\beta = -0.915$, $P = 0.002$). This resulted to 0.915 days' decrease in APP and could increase the company's profitability. On the other hand, ICP and ACP had no significant effect on GOP.

Table 4.29: Regression analysis for dependent variable GOP for year 2015

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		2.207	0.550	-	4.009	0.004
Inventory conversion period (ICP)	-0.002	0.004	-0.129	-0.600	0.565	NS
Average collection period (ACP)	0.011	0.005	0.581	2.055	0.074	NS
Average payment period (APP)	-0.025	0.007	-1.017	-3.581	0.007	S
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				R ² = 0.634		

The R² of 0.634 indicates that the model explained 63.4 percent of the total variance in the dependent variable. The value of R² is high, which indicates that it contributed significantly to the dependent variable (GOP) and it may provide much more precise estimation as a lower R² value would. In 2015, amongst the independent variables, the results of the model reveal that APP has an effect on the GOP ($\beta = -1.017$, $P = 0.007$). This resulted to 1.017 days' decrease in APP and it could improve the company's financial performance if the company decreases the number of days they pay creditors. On the other hand, ICP and ACP has no significant effect on GOP.

Table 4.30: Regression analysis for dependent variable GOP for year 2016

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		2.193	0.694	-	3.161	0.012
Inventory conversion period (ICP)	0.005	0.006	0.210	0.756	0.469	NS
Average collection period (ACP)	0.003	0.004	0.280	0.806	0.441	NS
Average payment period (APP)	-0.017	0.008	-0.745	-2.217	0.054	S
NS = Not significant; S = Significant Dependent variable: GOPA; Independent variable: (constant), ICP, ACP and APP				R ² = 0.384		

The R^2 of 0.384 indicates that the model explained 38.4 percent of the total variance in the dependent variable. The value of R^2 is acceptable, which indicates that it may be considered however, it may not provide much more precise estimation as a higher R^2 value would. In 2016, amongst the independent variables, the results of the model reveal that APP has an effect on the GOP ($\beta = -0.745$, $P = 0.054$). This resulted to 0.745 days' decrease in APP and by decreasing the number of days they make payment to suppliers could improve the profitability. On the other hand, ICP and ACP has no significant effect on GOP.

Table 4.31: Regression analysis for dependent variable GOP for year 2017

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		1.799	0.418	-	4.305	0.002
Inventory conversion period (ICP)	0.012	0.004	0.577	2.803	0.021	S
Average collection period (ACP)	0.010	0.003	0.939	2.856	0.019	S
Average payment period (APP)	-0.026	0.006	-1.393	-4.144	0.003	S
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				$R^2 = 0.699$		

The R^2 of 0.699 indicates that the model explained 69.9 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (GOP) and it may provide much more precise estimation as a lower R^2 value would. In 2017, the results of the model reveal that inventory conversion period has an effect on the gross operating profit ($\beta = 0.577$, $P = 0.021$). This resulted to 0.577 days' increase in ICP. ACP has an effect on the gross operating profit ($\beta = 0.939$, $P = 0.019$). This resulted to 0.019 days' increase in ACP and lastly, APP has an effect on the gross operating profit ($\beta = -1.393$, $P = 0.003$). This resulted to 1.393 days' decrease in APP, as a result, these findings could improve the company's profitability.

Table 4.32: Regression analysis for dependent variable GOP for year 2018

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		2.416	0.661	-	3.656	0.006
Inventory conversion period (ICP)	0.001	0.007	0.045	0.177	0.864	NS
Average collection period (ACP)	0.009	0.004	0.938	2.190	0.060	NS
Average payment period (APP)	-0.025	0.008	-1.277	-3.023	0.016	S
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				R ² = 0.538		

The R² of 0.384 indicates that the model explained 38.4 percent of the total variance in the dependent variable. The value of R² is high, which indicates that it contributed significantly to the dependent variable (GOP) and it may provide much more precise estimation as a lower R² value would. In 2018, amongst the independent variables the results of the model reveal that APP has an effect on the GOP ($\beta = -1.277$, $P = 0.016$). This resulted to 1.277 days' decrease in APP and this is an indication that the profitability of a company could be improved. On the other hand, ICP and ACP has no significant effect on GOP.

Table 4.33: Regression analysis for dependent variable GOP for year 2019

Independent variables	Unstandardised Coefficients		Standardised Coefficients	t	p	Outcome
	B	Std. error	Beta			
		1.700	0.385	-	4.417	0.002
Inventory conversion period (ICP)	0.003	0.006	0.213	0.587	0.573	NS
Average collection period (ACP)	0.009	0.004	1.399	2.604	0.031	S
Average payment period (APP)	-0.022	0.007	-1.836	-3.090	0.015	S
NS = Not significant; S = Significant Dependent variable: GOP; Independent variable: (constant), ICP, ACP and APP				R ² = 0.566		

The R^2 of 0.566 indicates that the model explained 56.6 percent of the total variance in the dependent variable. The value of R^2 is high, which indicates that it contributed significantly to the dependent variable (GOP) and it may provide much more precise estimation as a lower R^2 value would. In 2010, amongst the independent variables the results of the model reveal that ACP has an effect on the GOP ($\beta = 1.399$, $P = 0.031$). This resulted to 1.399 days' increase in ACP and the financial performance could be improved. APP has an effect on the GOP ($\beta = -1.836$, $P = 0.015$). This resulted to 1.836 days' decrease in APP which could better the company's profitability, on the other hand ICP has no significant effect on GOP.

4.2.4 Correlation Model 1 results

To quantify the degree to which two variables are related, correlation analysis was conducted to determine the correlation between the dependent variable: ROA and independent variables: ICP, ACP period and APP of the listed JSE construction companies in South Africa.

Below are the results of the correlation analysis conducted from 2009 to 2019.

Table 4.34: Correlation between ROA and predictors for year 2009

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.263	0.410	NS
Average collection period (ACP)	-0.240	0.452	NS
Average payment period (APP)	-0.236	0.460	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2009, none of the independent variables contributed to return on assets (ROA), as ICP ($r = -0.263$, $p = 0.410$), ACP ($r = -0.240$, $p = 0.452$) and APP ($r = -0.236$, $p = 0.460$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.35: Correlation between ROA and predictors for year 2010

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.074	0.820	NS
Average collection period (ACP)	-0.685	0.014**	S
Average payment period (APP)	-0.873	0.000**	S
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2010 ACP and APP have significant relationship with return on assets (ROA) and ICP do not, as ICP ($r = -0.074$, $p = 0.820$), ACP ($r = -0.685$, $p = 0.014$) and APP ($r = -0.873$, $p = 0.000$). ICP have a level greater than the acceptable level of less than or equal to 0.05, and ACP and APP had an acceptable level. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.36: Correlation between ROA and predictors for year 2011

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.239	0.455	NS
Average collection period (ACP)	0.963	5.307	NS
Average payment period (APP)	0.927	1.476	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2011 none of the independent variables contributed to return on assets (ROA), as ICP ($r = -0.239$, $p = 0.455$), ACP ($r = 0.963$, $p = 5.307$) and APP ($r = 0.927$, $p = 1.476$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little to no influence on financial performance.

Table 4.37: Correlation between ROA and predictors for year 2012

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.479	0.115	NS
Average collection period (ACP)	0.095	0.768	NS
Average payment period (APP)	0.339	0.281	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2012 none of the independent variables contributed to return on assets (ROA), as ICP ($r = 0.479$, $p = 0.115$), ACP ($r = 0.095$, $p = 0.768$) and APP ($r = 0.339$, $p = 0.281$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.38: Correlation between ROA and predictors for year 2013

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.384	0.218	NS
Average collection period (ACP)	-0.500	0.098	NS
Average payment period (APP)	-0.498	0.100	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2013, none of the independent variables contributed to return on assets (ROA), as ICP ($r = -0.384$, $p = 0.218$), ACP ($r = -0.500$, $p = 0.098$) and APP ($r = -0.498$, $p = 0.100$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.39: Correlation between ROA and predictors for year 2014

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.192	0.550	NS
Average collection period (ACP)	0.216	0.499	NS
Average payment period (APP)	0.500	0.098	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2014, none of the independent variables contributed to return on assets (ROA), as ICP ($r = 0.192$, $p = 0.550$), ACP ($r = 0.216$, $p = 0.499$) and APP ($r = 0.500$, $p = 0.098$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.40: Correlation between ROA and predictors for year 2015

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.010	0.976	NS
Average collection period (ACP)	0.168	0.603	NS
Average payment period (APP)	0.090	0.781	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2015, none of the independent variables contributed to return on assets (ROA), as ICP ($r = -0.010$, $p = 0.976$), ACP ($r = 0.168$, $p = 0.603$) and APP ($r = 0.090$, $p = 0.781$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.41: Correlation between ROA and predictors for year 2016

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.270	0.372	NS
Average collection period (ACP)	-0.039	0.899	NS
Average payment period (APP)	-0.110	0.720	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2016, none of the independent variables contributed to return on assets (ROA), as ICP ($r = -0.270$, $p = 0.372$), ACP ($r = -0.039$, $p = 0.899$) and APP ($r = -0.110$, $p = 0.720$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.42: Correlation between ROA and predictors for year 2017

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.407	0.168	NS
Average collection period (ACP)	-0.038	0.168	NS
Average payment period (APP)	-0.149	0.626	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2017, none of the independent variables contributed to return on assets (ROA), as ICP ($r = 0.407$, $p = 0.168$), ACP ($r = -0.038$, $p = 0.168$) and APP ($r = -0.149$, $p = 0.626$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.43: Correlation between ROA and predictors for year 2018

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.424	0.169	NS
Average collection period (ACP)	-0.358	0.169	NS
Average payment period (APP)	-0.313	0.322	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2018, none of the independent variables contributed to return on assets (ROA), as ICP ($r = 0.424$, $p = 0.169$), ACP ($r = -0.358$, $p = 0.169$) and APP ($r = -0.313$, $p = 0.322$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.44: Correlation between ROA and predictors for year 2019

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.297	0.349	NS
Average collection period (ACP)	-0.057	0.860	NS
Average payment period (APP)	0.260	0.414	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2019, none of the independent variables contributed to return on assets (ROA), as ICP ($r = 0.297$, $p = 0.349$), ACP ($r = -0.057$, $p = 0.860$) and APP ($r = 0.260$, $p = 0.414$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

4.2.5 Correlation Model 2 results

Correlation analysis was conducted to determine the correlation between the dependent variable ROE and independent variables ICP, ACP and APP of the listed JSE construction companies in South Africa.

Table 4.45: Correlation between ROE and predictors for year 2009

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.159	0.622	NS
Average collection period (ACP)	-0.260	0.414	NS
Average payment period (APP)	-0.160	0.620	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2009, none of the independent variables contributed to return on equity (ROE), as ICP ($r = -0.159$, $p = 0.622$), ACP ($r = -0.260$, $p = 0.414$) and APP ($r = -0.160$, $p = 0.620$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.46: Correlation between ROE and predictors for year 2010

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.067	0.837	NS
Average collection period (ACP)	-0.380	0.223	NS
Average payment period (APP)	-0.403	0.194	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2010, none of the independent variables contributed to return on equity (ROE), as ICP ($r = -0.067$, $p = 0.837$), ACP ($r = -0.380$, $p = 0.223$) and APP ($r = -0.403$, $p = 0.194$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little to no influence on financial performance.

Table 4.47: Correlation between ROE and predictors for year 2011

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.120	0.710	NS
Average collection period (ACP)	0.318	0.313	NS
Average payment period (APP)	0.288	0.363	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2011, none of the independent variables contributed to return on equity (ROE), as ICP ($r = -0.120$, $p = 0.710$), ACP ($r = 0.318$, $p = 0.313$) and APP ($r = 0.288$, $p = 0.363$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.48: Correlation between ROE and predictors for year 2012

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.348	0.268	NS
Average collection period (ACP)	-0.169	0.600	NS
Average payment period (APP)	0.173	0.592	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2012, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.348$, $p = 0.268$), ACP ($r = -0.169$, $p = 0.600$) and APP ($r = 0.173$, $p = 0.592$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.49: Correlation between ROE and predictors for year 2013

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.350	0.264	NS
Average collection period (ACP)	-0.377	0.227	NS
Average payment period (APP)	-0.335	0.288	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2013, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.350$, $p = 0.264$), ACP ($r = -0.377$, $p = 0.227$) and APP ($r = -0.335$, $p = 0.288$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.50: Correlation between ROE and predictors for year 2014

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.266	0.403	NS
Average collection period (ACP)	0.112	0.728	NS
Average payment period (APP)	0.551	0.063	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2014, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.266$, $p = 0.403$), ACP ($r = 0.112$, $p = 0.728$) and APP ($r = 0.551$, $p = 0.063$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.51: Correlation between ROE and predictors for year 2015

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.107	0.740	NS
Average collection period (ACP)	0.119	0.713	NS
Average payment period (APP)	0.047	0.885	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2015, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.107$, $p = 0.740$), ACP ($r = 0.119$, $p = 0.713$) and APP ($r = 0.047$, $p = 0.885$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.52: Correlation between ROE and predictors for year 2016

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.437	0.135	NS
Average collection period (ACP)	0.113	0.713	NS
Average payment period (APP)	-0.006	0.984	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2016, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.437$, $p = 0.135$), ACP ($r = 0.113$, $p = 0.713$) and APP ($r = -0.006$, $p = 0.984$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.53: Correlation between ROE and predictors for year 2017

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.309	0.304	NS
Average collection period (ACP)	0.036	0.908	NS
Average payment period (APP)	-0.139	0.651	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2017, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.309$, $p = 0.304$), ACP ($r = 0.036$, $p = 0.908$) and APP ($r = -0.139$, $p = 0.651$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.54: Correlation between ROE and predictors for year 2018

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.432	0.160	NS
Average collection period (ACP)	-0.212	0.508	NS
Average payment period (APP)	-0.183	0.570	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2018, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.432$, $p = 0.160$), ACP ($r = -0.212$, $p = 0.508$) and APP ($r = -0.183$, $p = 0.570$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.55: Correlation between ROE and predictors for year 2019

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.287	0.366	NS
Average collection period (ACP)	-0.016	0.960	NS
Average payment period (APP)	0.285	0.370	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2019, none of the independent variables contributed to return on equity (ROE), as ICP ($r = 0.287$, $p = 0.366$), ACP ($r = -0.016$, $p = 0.960$) and APP ($r = 0.285$, $p = 0.370$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

4.2.6 Correlation Model 3 results

Correlation analysis was conducted to determine the correlation between the dependent variable: GOP and independent variables: ICP, ACP and APP of the listed JSE construction companies in South Africa.

Table 4.56: Correlation between GOP and predictors for year 2009

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.070	0.829	NS
Average collection period (ACP)	-0.197	0.540	NS
Average payment period (APP)	-0.238	0.457	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2009, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = -0.070$, $p = 0.829$), ACP ($r = -0.197$, $p = 0.540$) and APP ($r = -0.238$, $p = 0.457$) they have a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.57: Correlation between GOP and predictors for year 2010

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.052	0.871	NS
Average collection period (ACP)	0.395	0.204	NS
Average payment period (APP)	-0.331	0.294	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2010, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = -0.052$, $p = 0.871$), ACP ($r = 0.395$, $p = 0.204$) and APP ($r = -0.331$, $p = 0.294$) they have a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.58: Correlation between GOP and predictors for year 2011

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.122	0.705	NS
Average collection period (ACP)	-0.323	0.305	NS
Average payment period (APP)	-0.349	0.266	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2011, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = 0.122$, $p = 0.705$), ACP ($r = -0.323$, $p = 0.305$) and APP ($r = -0.349$, $p = 0.266$) they have a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.59: Correlation between GOP and predictors for year 2012

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.127	0.694	NS
Average collection period (ACP)	-0.271	0.394	NS
Average payment period (APP)	-0.243	0.446	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2012, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = -0.127$, $p = 0.694$), ACP ($r = -0.271$, $p = 0.394$) and APP ($r = -0.243$, $p = 0.446$) they have a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.60: Correlation between GOP and predictors for year 2013

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.093	0.774	NS
Average collection period (ACP)	-0.328	0.298	NS
Average payment period (APP)	-0.435	0.157	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2013, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = -0.093$, $p = 0.774$), ACP ($r = -0.328$, $p = 0.298$) and APP ($r = -0.435$, $p = 0.157$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.61: Correlation between GOP and predictors for year 2014

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.237	0.458	NS
Average collection period (ACP)	-0.097	0.764	NS
Average payment period (APP)	-0.772	0.003**	S
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2015, APP had a significant relationship with gross operating profit (GOP) and ICP and ACP did not, as ICP ($r = -0.070$, $p = 0.829$), ACP ($r = -0.197$, $p = 0.540$) and APP ($r = -0.238$, $p = 0.457$) ICP and ACP had a level greater than the acceptable level of less than or equal to 0.05 and APP had an acceptable level. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.62: Correlation between GOP and predictors for year 2015

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.205	0.524	NS
Average collection period (ACP)	-0.097	0.765	NS
Average payment period (APP)	-0.653	0.021*	S
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2015, APP had a significant relationship with gross operating profit (GOP) and ICP and ACP did not, as ICP ($r = -0.205$, $p = 0.524$), ACP ($r = -0.097$, $p = 0.765$) and APP ($r = -0.653$, $p = 0.021$) ICP and ACP had a level greater than the acceptable level of less than or equal to 0.05 and APP had an acceptable level. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.63: Correlation between GOP and predictors for year 2016

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.133	0.666	NS
Average collection period (ACP)	-0.118	0.701	NS
Average payment period (APP)	-0.522	0.067	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2016, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = -0.133$, $p = 0.666$), ACP ($r = -0.118$, $p = 0.701$) and APP ($r = -0.522$, $p = 0.067$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.64: Correlation between GOP and predictors for year 2017

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	0.330	0.271	NS
Average collection period (ACP)	0.020	0.949	NS
Average payment period (APP)	-0.352	0.239	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2017, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = 0.330$, $p = 0.271$), ACP ($r = 0.020$, $p = 0.949$) and APP ($r = -0.352$, $p = 0.239$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.65: Correlation between GOP and predictors for year 2018

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.007	0.983	NS
Average collection period (ACP)	-0.099	0.760	NS
Average payment period (APP)	-0.494	0.103	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2018, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = -0.007$, $p = 0.983$), ACP ($r = -0.099$, $p = 0.760$) and APP ($r = -0.494$, $p = 0.103$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little or no influence on financial performance.

Table 4.66: Correlation between GOP and predictors for year 2019

Variables	Correlation coefficients	p	Outcome
Inventory conversion period (ICP)	-0.209	0.515	NS
Average collection period (ACP)	-0.105	0.746	NS
Average payment period (APP)	-0.412	0.183	NS
** Correlation is significant at 0.01 * Correlation is significant at 0.05			

In 2019, none of the independent variables contributed to gross operating profit (GOP), as ICP ($r = -0.209$, $p = 0.515$), ACP ($r = -0.105$, $p = 0.746$) and APP ($r = -0.412$, $p = 0.183$) had a level greater than the acceptable level of less than or equal to 0.05. Consequently, on listed construction companies in South Africa, working capital management had little to no influence on financial performance.

4.3 CONCLUSION

Financial statements of listed construction companies at JSE during the period 2009 to 2019 were obtained on IRESS database. Tables, figures and descriptive statistics were used to analyse the data. The researcher was able to determine the influence of working capital management on the financial performance of listed construction companies through the results compiled. To determine the relationship between the independent variables (ICP, ACP and APP) and dependent variables

(ROA, ROE and GOP), linear regression and correlation analysis were used. The recommendations and conclusion of the study are discussed in the next chapter, as well as the limitations and implications for future research.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This study analysed the relationship between working capital management and financial performance of JSE-listed construction companies during the period 2009 to 2019. In Chapter 1, the background of the study was addressed; in Chapter 2, previous studies on working capital management were consulted; in Chapter 3, the research method used in this study was discussed and data analysis methods; and in Chapter 4, data were analysed to see if there was any relationship between the independent and dependent variables in this study. This chapter assesses the research findings to draw conclusions and recommendations are discussed. Research limitations, recommendations and future research opportunities of the research study are also discussed in this chapter.

5.2 SUMMARY OF KEY FINDINGS

The following theoretical objectives were addressed by the study:

- **To analyse the theoretical literature on working capital management:** This objective was addressed by discussing how working capital management can influence the company's financial performance. Types of working capital and financing policies were also discussed in Chapter 2, Section 2.4.5.
- **To review the theoretical literature on current assets and current liabilities of the company:** This theoretical objective was addressed by discussing the different definitions of current assets and current liabilities and also by discussing different types of current assets and liabilities in Chapter 2, Section 2.5.
- **To review the theoretical literature on the inventory conversion period:** This theoretical objective was addressed by discussing inventory management, inventory conversion period and the formulae to calculate the inventory conversation period in days in Chapter 2, sections 2.7.2 and 2.7.2.1.
- **To review the theoretical literature on average collection period:** This theoretical objective was addressed by discussing accounts receivable management, average collection period and the formulae to calculate the average collection period in days in Chapter 2, sections 2.7.3 and 2.7.3.1.

- **Average payment period:** This theoretical objective was addressed by discussing accounts payable management, average payment period and the formulae to calculate average payment period in days in Chapter 2, sections 2.7.4 and 2.7.4.1.
- **Cash management:** This theoretical objective was addressed by discussing cash management in construction companies and cash conversion cycle in Chapter 2, sections 2.7.1 and 2.7.1.1.

The following empirical objectives were addressed by the study:

- To evaluate the association between ICP period and profitability of JSE-listed construction companies during the period 2009 to 2019: This empirical objective was addressed by extracting financial statements of listed JSE construction companies from IRESS database to calculate financial ratios such as ROA, ROE, GOP and ICP. ICP was used as an independent variable and ROA, ROE and GOP were used as dependent variables. The results of the study showed that ICP had little or no influence on the financial performance of listed construction companies in South Africa.
- To explore the association between the ACP and profitability of JSE-listed construction companies during the period 2009 to 2019: This empirical objective was addressed by extracting financial statements of listed JSE construction companies from IRESS database to calculate financial ratios such as ROA, ROE, GOP and ACP. ACP was used as an independent variable and ROA, ROE and GOP were used as dependent variables. The results of the study showed that ACP had little or no influence on the financial performance of listed construction companies in South Africa.
- To investigate the association between the APP and profitability of JSE-listed construction companies during the period 2009 to 2019: This empirical objective was addressed by extracting financial statements of listed JSE construction companies from IRESS database to calculate financial ratios such as ROA, ROE, GOP and APP. APP was used as an independent variable and ROA, ROE and GOP were used as dependent variables. The results of the study showed that APP had little or no influence on the financial performance of listed construction companies in South Africa.

A summary of key findings of the regression model based on ROA is provided in Figure 5.1:

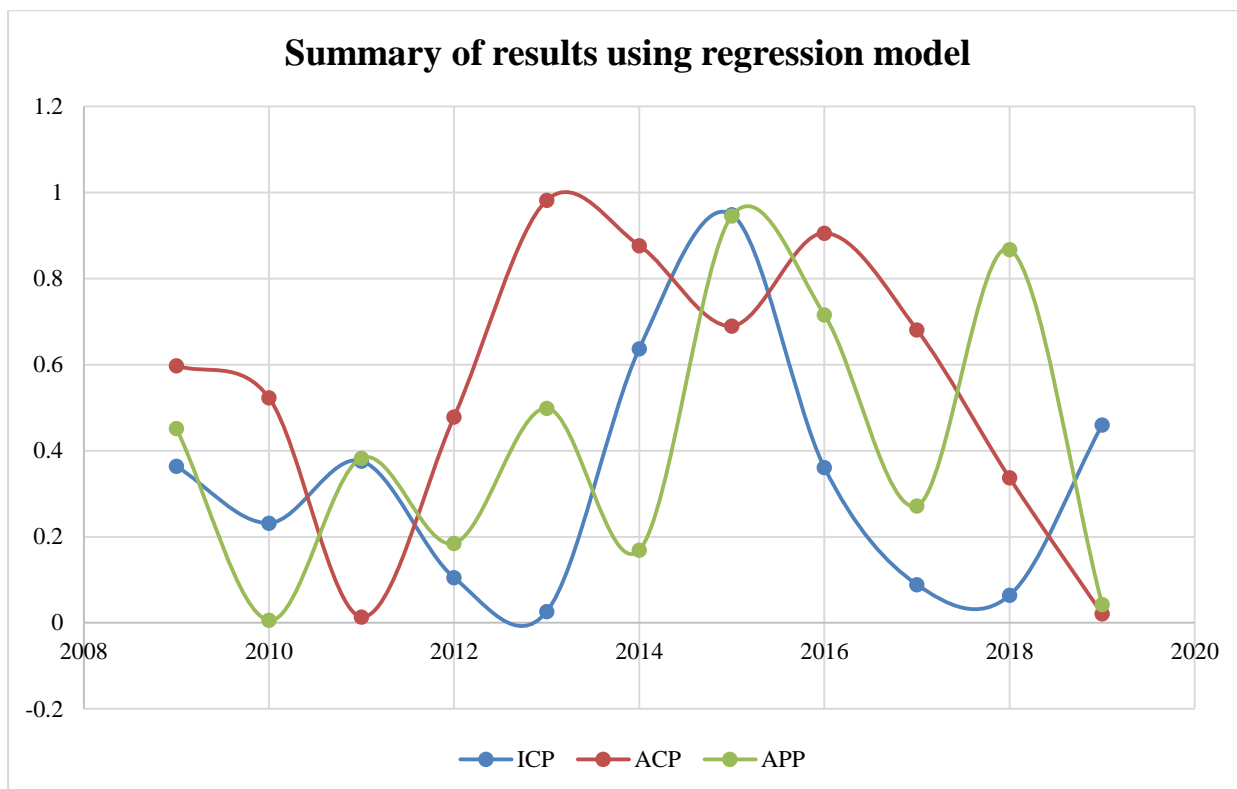


Figure 5.1: Summary of results using regression model based on ROA

The summary of the research results reveals that in 2010, APP had a significant effect on ROA and ICP and ACP had no significant effect on ROA. In 2011, ACP had a significant relationship and ICP and APP had no significant effect on ROA, in 2013 ICP had a significant influence on ROA and ACP and APP had no significant influence on ROA and in 2019 ACP and APP had a significant relationship on ROA. In years 2009, 2011, 2012, 2014, 2015, 2016, 2017 and 2018 none of the independent variables had a significant effect on ROA, therefore, on the financial performance of listed construction companies in South Africa, working capital management had little or no influence due to the fact that construction companies have higher inventory, accounts receivable and accounts payable than any other industry. Real estate and construction companies have higher inventory and accounts receivable (Ghazali 2019:5). A study by Alsulayhim (2019:1) found that there is a positive relationship between working capital management and company's profitability.

A summary of key findings of the regression model based on ROE is provided in Figure 5.2.

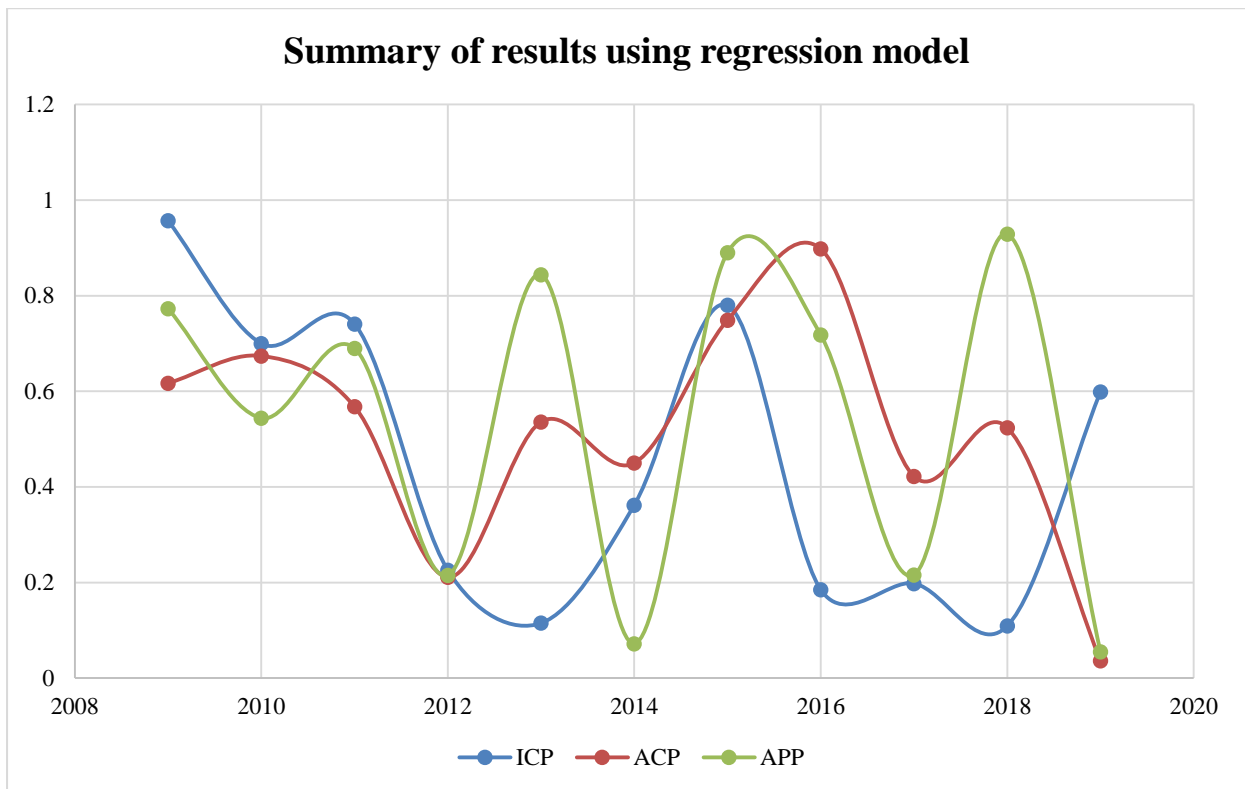


Figure 5.2: Summary of results using regression model based on ROE

The summary of the research results reveals that in 2019, ICP had a significant effect on ROE and ACP and APP had no significant effect on ROE. In years 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017 and 2018, none of the independent variables had a significant effect on ROE, therefore, on the financial performance of listed construction companies in South Africa, working capital management had little or no influence due to contractors under-calculating the total contract amount. A well-calculated total contract amount can help the company in improving their profits (Campbell 2019:1). A study by Tangbani (2015:3) found a positive relationship between WCM and ACP and APP. On the other hand, the study also found a negative relationship between WCM and ICP.

A summary of key findings of the regression model based on GOP is provided in Figure 5.3.

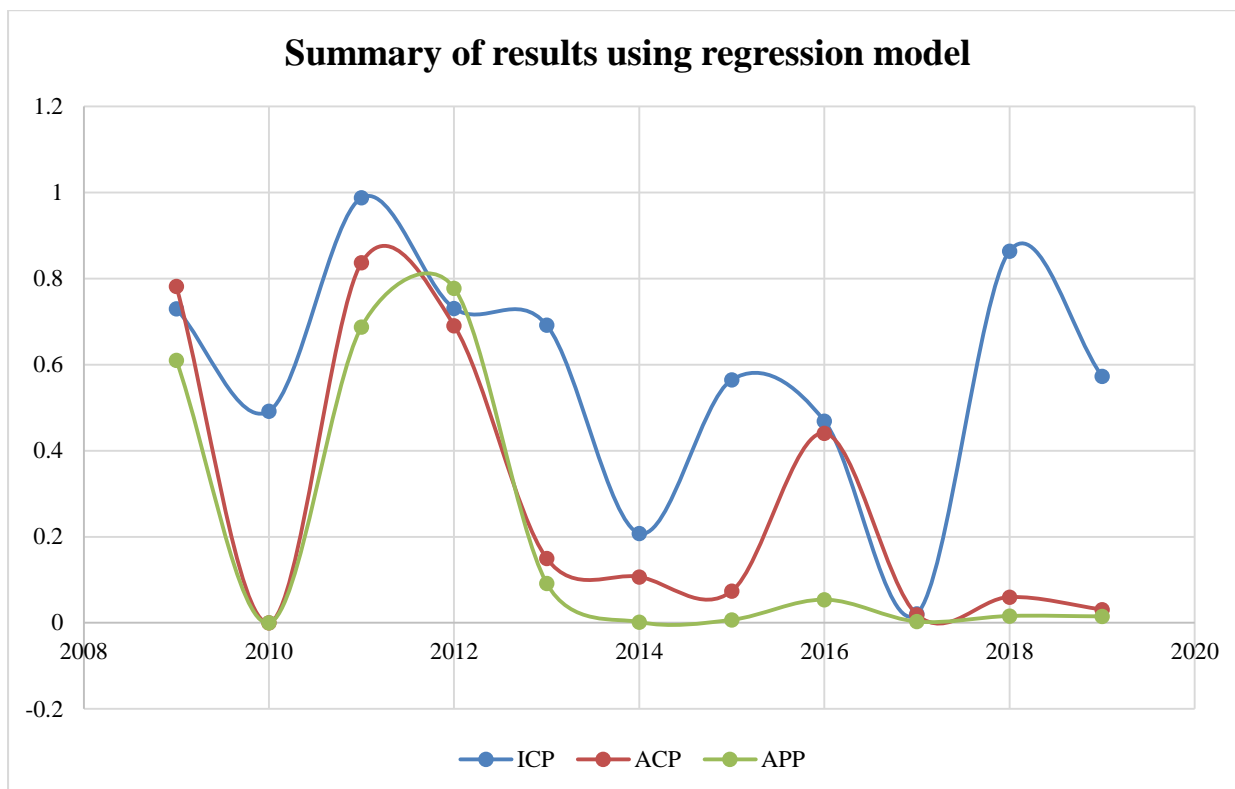


Figure 5.3: Summary of results using regression model based on GOP

The summary of the research results reveals that in 2010 ACP and APP had a significant effect on GOP and ICP had no significant effect on GOP. In 2014, APP had a significant effect on GOP and ICP, ACP had no significant effect on GOP. In 2015 APP had a significant effect on GOP and ICP, ACP had no significant effect on GOP, in 2016 APP had a significant effect on GOP and ICP, ACP had no significant effect on ROA. In 2017 ICP, ACP and APP had a significant effect on GOP, in 2018 APP had a significant effect on GOP and ICP, ACP had no significant effect on GOP and in 2019 ACP and APP had a significant effect on GOP and ICP had no significant effect on GOP. In years 2009, 2011, 2012 and 2013, none of the independent variables had a significant effect on GOP, therefore, on the financial performance of listed construction companies in South Africa, working capital management had little or no influence. Construction companies lose money due to injuries of employees on site (Newell 2017:1). A study by Moses (2014:4) on non-financial firms found a positive relationship between WCM and company profitability in other sectors, except for the construction and telecommunication industries.

A summary of key findings of the correlation model based on ROA is provided in Figure 5.4:

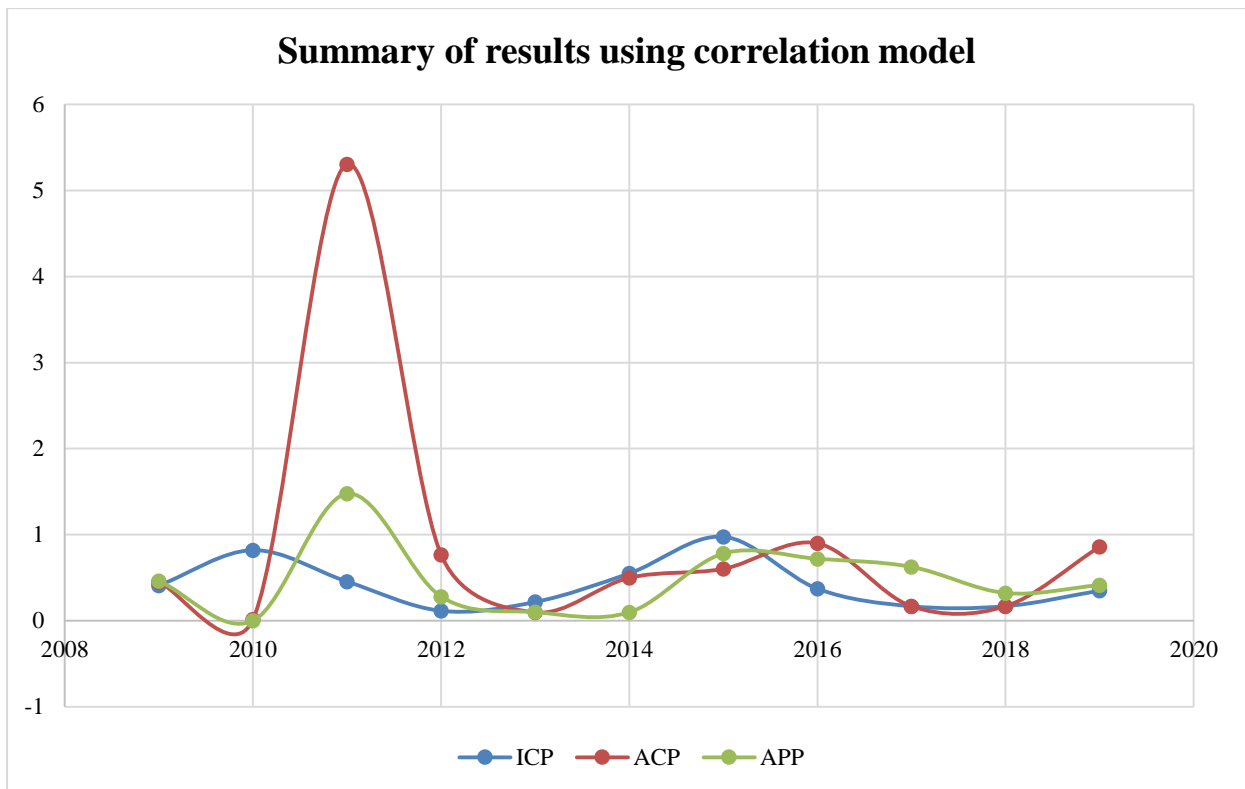


Figure 5.4: Summary of results using correlation model based on ROA

The summary of the research results reveals that in 2010 ACP and APP had a significant effect on ROA, with both displaying a decline in the number of days indicating a negative effect. In years 2009, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018 and 2019 none of the independent variables had a significant effect on ROA, therefore, on the financial performance of listed construction companies in South Africa, working capital management had little or no influence due to supply chain departments not handling tender processes well. Companies can increase their profits if their supply chain department functions well (Newell 2017:1). A study on retail companies by Louw (2014:4) found a negative relationship between WCM and the company’s profitability.

A summary of key findings of the correlation model based on ROE is provided in Figure 5.5:

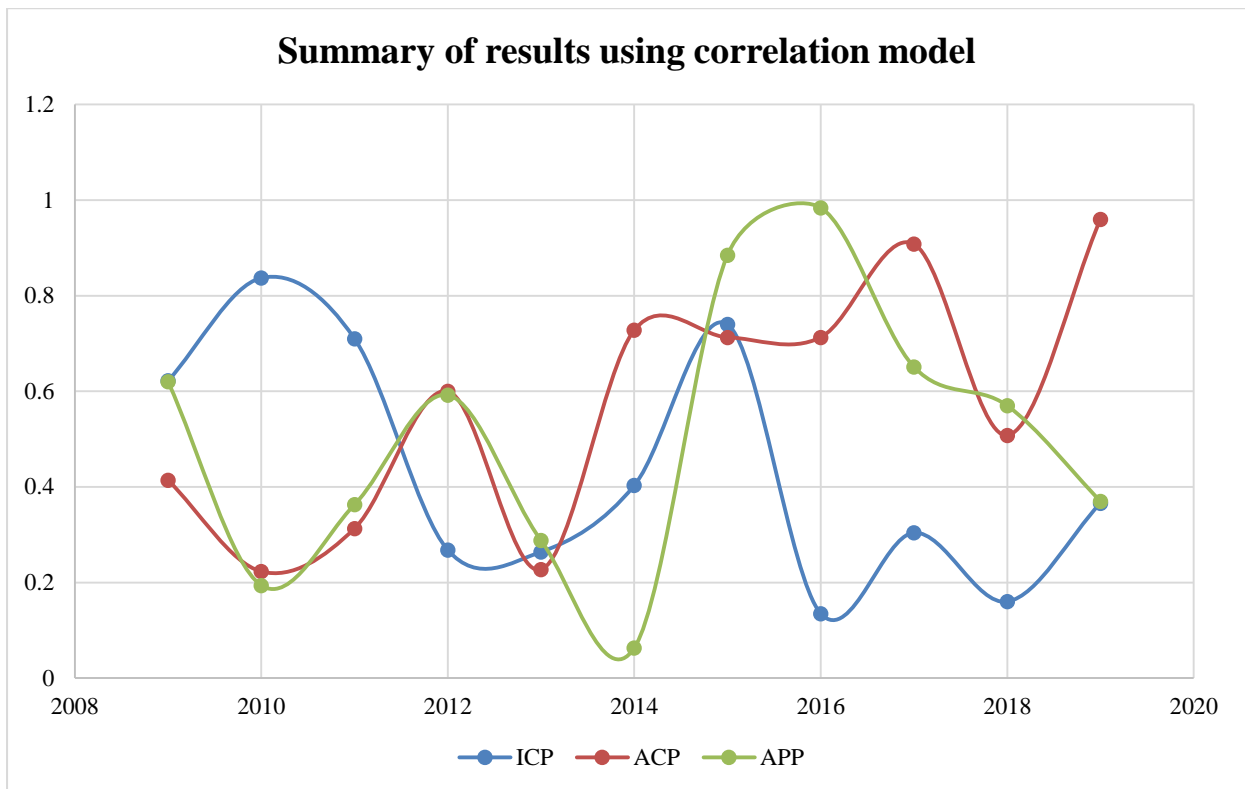


Figure 5.5: Summary of results using correlation model based on ROE

The summary of the research results reveals that in years 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018 and 2019, none of the independent variables had a significant effect on ROE, therefore, on the financial performance of listed construction companies in South Africa, working capital management had little or no influence due to unpredictable weather conditions that may delay the completion of the project. According to Perez, Smith, Papworth and Cooke (2018:666), construction projects may be delayed due to bad weather conditions and the company might be expected to pay contractual penalties. A positive relationship between WCM and profitability on accounting and finance was found in a study by Morshed (2020:257).

A summary of key findings of the correlation model based on GOP is provided in Figure 5.6:

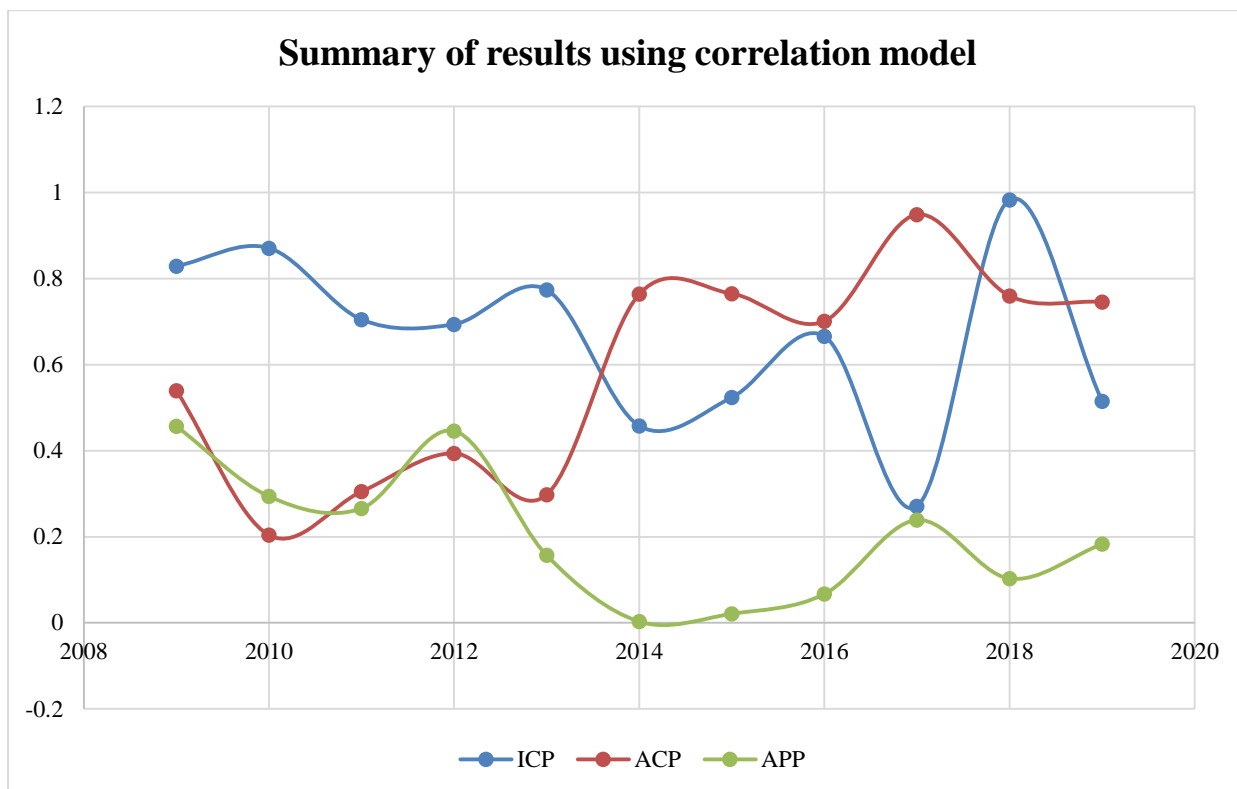


Figure 5.6: Summary of results using correlation model based on GOP

The summary of the research results reveals that in 2014, APP had a significant effect on GOP, displaying a decline in the number of days, indicating a negative effect. In 2015, APP had a significant effect on GOP, displaying a decline in the number of days, indicating a negative effect. In years 2009, 2010, 2011, 2012, 2013, 2016, 2017, 2018 and 2019, none of the independent variables had a significant effect on GOP; therefore, on the financial performance of listed construction companies in South Africa, working capital management had little or no influence due to damaged materials that need to be replaced. Construction material wastage can be due to employees stealing the material, poor site conditions and vandalism (Bekr 2014:3). A study by Anton and Nucu (2021:1) on Polish firms, found a positive relationship between WCM and profitability.

5.3 LIMITATIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This study intended to improve and advance knowledge on working capital management of listed JSE construction companies in South Africa during the period 2009 to 2019. Limitations, recommendations and suggestions for future research are discussed below:

5.3.1 Limitations

- Some of the JSE-listed construction companies were not listed for the entire period from 2009 to 2019.
- This study was only limited to JSE-listed construction companies in South Africa and covered only the period from 2009 to 2019.
- This study was only limited to quantitative research method.
- In understanding working capital management the results of the study might not be generally applicable, because the study was specifically for JSE-listed construction companies.

5.3.2 Recommendations

- Financial managers of the construction companies should manage their working capital properly in order to have a significant relationship with the financial performance. Poor working capital management could decrease the company's profitability and lead to financial crises (Yahaya & Bala 2015:57). According to Jones (2019:1), construction companies should maximise their productivity in order to improve their profitability. Construction companies need to manage their working capital well in order to pay its employees, suppliers and make a profit (Danilochkina, Lukmanova, Roshchina & Voytolovski 2018:6).

5.3.3 Suggestions for future research

- This study is quantitative by nature, therefore, it does not include the qualitative aspect of how working capital is managed. Future research could consider the qualitative nature.
- For future research, the period could be increased to 15 years instead of 11 years, as it was done in this study, in order to have a clear understanding of working capital management.
- For future research, construction companies that are not listed with JSE could also be used to conduct research.
- For future research, researchers could consider using capital budgeting and capital structuring since WCM was found not significant for profitability in construction companies.

5.4 CONCLUSION

The study analysed the relationship of working capital management and financial performance of JSE-listed construction companies. Findings of the study indicate that working capital management had little or no significant influence on the construction companies. This study contributes to the existing literature such as Nobanee (2018:214), Toan, Nhan, Anh and Man

(2017:175) and Al-Mawsheki (2014:4) who found a negative relationship between WCM and construction companies' financial performance. WCM forecasting is important for construction companies as cash flow is essential at the beginning stages of the project (Kandpal 2015:9). According to Kandpal (2015:9), construction companies focus more on short term financial goals than the long term goals in order to pay salaries and wages as well as pay their suppliers. Construction companies' WCM is handled differently as the companies are largely unique in their production processes, investment process structure and logistics (Meszek & Polewski 2006:222).

According to Mukherjee and Rao (2020:1440), for construction companies to improve their profitability, first, contractors need to collect money from their current projects and not take any new jobs, secondly, collect cash quickly from their debtors to keep the business running. Construction companies need to arrange flexible and manageable payment terms with their subcontractors and suppliers in order to improve their profitability (Reidinger 2015:1). Based on the research results, several recommendations were developed in order to assist managers to understand the influence working capital has on the company's profitability. Limitations of the study were also addressed as well as suggestions for future research.

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APPENDIX A: ETHICAL CLEARANCE LETTER



Vaal University of Technology

Your world to a better future

09 December 2020

Decision: Approved

**Ethics Reference Number: FRECMS-09122020-053
20435011**

Dear LA Sejake

PROJECT TITLE: AN ANALYSIS OF THE RELATIONSHIP BETWEEN WORKING CAPITAL MANAGEMENT AND FINANCIAL PERFORMANCE OF JSE-LISTED CONSTRUCTION COMPANIES IN SOUTH AFRICA.

RESEARCHER: LA Sejake

SUPERVISOR: Dr JD Beneke

Thank you for submitting the above-mentioned M-Tech project for ethical consideration. The application was detailed and provided useful information. You may commence with your data collection. This clearance is valid for three years from the date of this letter. Please also note the following:

The Ethics Reference number, as stated above, should be used in all correspondence regarding this research project.

As the primary researcher you undertake to:

- Only follow the procedures for which approval has been given.
- Inform the Faculty Research Ethics Committee (FREC) of any significant deviations that may occur in the research project which directly influences what has been approved.
- Report any adverse events that might occur, within 14 days of the event, to the FREC. (Refer to the Ethical Guidelines as to what procedure you will need to follow in such an event).
- Submit annual progress reports to the FREC by November each year.

Inform the FREC once the research project has reached completion and the findings have entered the public domain.

The FREC would like to take this opportunity to wish you well with your research project.

Kind Regards

Dr FE Mahomed

Faculty Research Ethics Committee Chair

Faculty of Management Sciences

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APPENDIX B: LETTER FROM THE LANGUAGE EDITOR



English language editing

SATI membership number: 1002595

Tel: 083 654 4156

E-mail: lindascott1984@gmail.com

18 June 2021

To whom it may concern

This is to confirm that I, the undersigned, have language edited the **dissertation of**

Letshaba Abiel Sejake

for the degree

Magister Technologiae : Cost and Management Accounting

entitled:

An analysis of the relationship between working capital management and financial performance of JSE-listed construction companies in South Africa

The responsibility of implementing the recommended language changes rests with the author of the document.

Yours truly,

Linda Scott