ROLE OF WORKING CAPITAL MANAGEMENT ON BUSINESS COMPETITIVENESS OF THE MANUFACTURING COMPANIES LISTED IN DHAKA STOCK EXCHANGE

A THESIS PAPER SUBMITTED TO THE UNIVERSITY OF DHAKA, BANGLADESH FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

UNDER THE SUPERVISION OF

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Thursday, June 27, 2019

DECLARATION

I hereby declare that the thesis, which is titled **Role of Working Capital Management on Business Competitiveness of the Manufacturing Companies Listed in Dhaka Stock Exchange** and submitted to the University of Dhaka, Bangladesh for the degree of Doctor of Philosophy, is based on my own research work carried out under the supervision of Dr. Md. Mohiuddin, Professor, Institute of Business Administration, University of Dhaka.

The material embodied in this thesis is original and has not been submitted in part or in full for any other degree, diploma or title recognition of any university.

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CERTIFICATE

This is to certify that the thesis, which is titled **Role of Working Capital Management on Business Competitiveness of the Manufacturing Companies Listed in Dhaka Stock Exchange**, is hereby submitted by **Shakila Yasmin**, PhD candidate, Institute of Business Administration, University of Dhaka, in partial fulfillment of the requirements of the degree of Doctor of Philosophy.

It is also certified that the research work embodied in this thesis is original and carried out by her under my supervision. No part of the work has been submitted for any other degree.

She is permitted to submit the thesis.

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ACKNOWLEDGEMENT

First, I would like to express my sincere gratitude to my supervisor, Professor Dr. Md. Mohiuddin, for his continuous support during my PhD studies and related research. His wisdom and intellectual guidance helped me all of the time. His friendly gestures and accessibility eased my stress at different stages of this research. His persistent impetus toward my work kept me motivated, energized and on track. I cannot imagine having a better supervisor and mentor for my PhD studies.

I humbly recognize the contributions of my colleagues at the Institute of Business Administration (IBA) who shared their time to be present at my PhD seminars. Their insightful comments and questions during the seminars helped me to fine tune my research questions and methodologies, and to add diverse perspectives to my thesis while analyzing the results.

I also express my sincere gratitude toward the practicing managers from organizations (experts) who made time in their hectic schedules to offer their expertise through in-depth interviews and share a piece of their mind with me in relation to my research topic.

I am thankful to the surveyors of this research as well as to the questionnaire respondents who contributed to the project. This research would not have been possible without their cooperation.

My earnest thanks are due to Professor Dr. Sharada Srinivasan, University of Guelph, Canada for her encouragement to complete the journey. She gladly took time to read my work at different stages of my research and provided me with useful suggestions to improve the research questions and methodology.

I am grateful to all of the faculty members and staff at the IBA, University of Dhaka for giving me the required support and assistance to carry out my PhD studies over the last four years. I also appreciate the PhD office at the IBA and Dhaka University for providing me with all of the related administrative support.

Last but not the least, I would like to thank my family—my parents, spouse and children—for their sacrifices and emotional support throughout my journey.

Shakila Yasmin

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LIST OF ABBREVIATIONS

ACP = Average Collection Period
APD = Accounts Payable Days
APP = Average Payment Period
ARD = Accounts Receivable Days
BBS = Bangladesh Bureau of Statistics
BOD = Board of Directors
BSE = Bombay Stock Exchange
CA = Current Asset
Cash R = Cash Ratio
CCC = Cash Conversion Cycle
CCE = Cash Conversion Efficiency
CEO = Chief Executive Officer
CFO = Chief Financial Officer
CL = Current Liability
CR = Current Ratio
DSE = Dhaka Stock Exchange
DSO = Days Sales Outstanding
DWC = Days of Working Capital
EOQ = Economic Order Quantity
ERP = Enterprise Resource Planning
EU = European Union
GDP = Gross Domestic Product
GOP = Gross Operating Profit
GPM = Gross Profit Margin
ICP = Inventory Conversion Period
ID = Inventory Days
ITP = Inventory Turnover Period
MD = Managing Director
MRP = Material Requirement Planning
npm = Standardized or Normalized Net Profit Margin
NPM= Net Profit Margin
OECD= Organization of Economic Cooperation and Development
PDP = Payable Deferred Period
PIC = Perpetual Inventory Control
QR = Quick Ratio
RCP = Receivable Collection Period
RFID= Radio Frequency Identification
ROA = Return on Assets
roa = Standardized or Normalized Return on Assets
ROI = Return on Investment
SME = Small- and Medium-sized Enterprises
TA = Total Assets
TL = Total Liability
USA = United States of America
WC = Working Capital
WCF = Working Capital Financing
WCM = Working Capital Management

ROLE OF WORKING CAPITAL MANAGEMENT ON BUSINESS COMPETITIVENESS OF THE MANUFACTURING COMPANIES LISTED IN DHAKA STOCK EXCHANGE

ABSTRACT

Although abundant research has focused on working capital management and its influence on organizational performance, almost all of these studies limited their focus to the measures of working capital efficiency, liquidity and strategy. Only a few pieces of existing literature consider the details of working capital management practices that involve policies, strategies, monitoring, control, technology use, and the adaptation of tools and techniques in managing the components of working capital. Moreover, most researchers measure business performance using profitability ratios only, e.g., return on assets, net profit margin, and gross profit margin or sales. They argue that profitability or sales are inadequate measures of a firm's performance because they do not take into account how a firm is performing in relation to market competition over time. Literature on competitiveness suggests that consistent good performance and future prospects of good performance, supported by resources and competencies, makes a company or firm competitive. In this thesis, the researcher explores the details of working capital management practices in organizations and investigates whether and how these practices influence business competitiveness. Inter-industry differences in this regard are also projected. In light of the diverse theories, models and measures of business competitiveness, the researcher also proposes a framework to measure business competitiveness in an objective manner. Drawing from the literature review, the researcher has devised five measures of business competitiveness: standardized return on assets (roa), net profit margin (npm), persistency parameters, α and β, and Tobin's q. Data

were collected from annual reports and through a structured questionnaire that surveyed 164 manufacturing companies listed in Dhaka Stock Exchange. Statistical Package for Social Science (SPSS) software was used for data analysis, and both descriptive and inferential statistics were determined and are presented in this work. Common descriptive statistics like frequency distribution, bar chart, mean, mode, etc., are used to summarize and present the results of the questionnaire on working capital management practices. Standard multiple linear regression analysis was used to determine the role of working capital management on business competitiveness. Results were validated through in-depth interviews with practicing managers from the industry.

Data reveal that the majority of the companies in Bangladesh's manufacturing sector have formal working capital policies and that they have adopted a moderate strategy in managing and financing working capital. Most of the companies surveyed depict above-average levels of sophistication in all of their working capital management practices. However, in terms of cash, receivables and inventory management, most of the companies evidence an average level of sophistication. Payables management practices show an almost equal distribution of average and above-average levels of sophistication. When analyzed across industries within the manufacturing sector, some differences are found in terms of sophistication in managing working capital components. In aggregate cement sector demonstrates the best practices in the industry while ceramic, textile and pharmaceutical sectors lag behind in certain aspects of working capital practices.

The researcher found a significant association between working capital practices and business competitiveness when the latter was measured by standardized profitability (roa and npm). In general, companies with formal working capital policies, aggressive working capital management strategies and conservative working capital financing strategies are found to be

more competitive. Sophistication in payables and cash management shows a positive association whereas sophistication in receivables management and excellence in inventory and stock-out management reveals a negative association with business competitiveness. This suggests that sound practices in a particular area do not directly pay off rather successful performance requires a concerted effort across areas. Most efficiency and liquidity measures of working capital demonstrate a negative association with business competitiveness.

An inter-industry analysis of the data collected for this research reveals that for industries characterized by a small number of companies represented in the survey sample (fuel & power, and the food & allied industry), there is no significant association between working capital practices and business competitiveness. However, the results for sectors with a larger number of companies show a significant association between the two. Still, they differ with respect to the measure of competitiveness and the significance of the dependent variables.

Practitioners may use the methodology employed in this research to assess the level of sophistication in working capital management practices and the measures of competitiveness for evaluating the same in their organizations. Managers of manufacturing companies in Bangladesh may consider this study's results when identifying existing best practices in working capital management. Based on the significant associations found among the variables used in the study, practicing managers may formulate working capital strategies and channel resources and efforts for adopting sound business practices to improve market/industry competitiveness.

Future research projects can validate the measures of competitiveness suggested in this study. The exploration of any possible non-linear relationship between working capital practices and competitiveness may be the thesis of future research projects. Similar research can be conducted on service sector companies and/or on small and medium-sized businesses, non-

listed companies, and on other industry sectors. Future researchers may provide a holistic view of whether and how sound practices in financial management influence business competitiveness by focusing on other areas of financial management like capital budgeting, capital structure (financing decision) and dividend policy.

1. INTRODUCTION

1.1 BACKGROUND OF THE STUDY

In today's competitive marketplace, corporations are continuously challenged to maintain long-run profitability and growth. Many of the factors that contribute to corporate success or failure can be tackled through methodical financial decision-making and strategy application. Numerous studies, such as López Salazar, Contreras Soto and Espinosa Mosqueda (2012) and Gaskill, Van Auken and Manning (1993), argue that a lack of financial planning, inappropriate financing policy, and asset mismanagement are major causes of corporate failure. This suggests that financial management practices are likely to have considerable influence on the competitiveness of a firm/company. Financial management covers three major decision areas: the investment decision, the financing decision, and the asset management decision. The investment decision entails determining the total amount of assets that a firm needs to hold at any point in time. There are two types of investment decisions: 1) capital investment decisions, which involves long-term assets that require a large sum of money to acquire, such as a new machine or setting up a new plant; and 2) working capital investment decisions that are associated with current assets, such as determining of the amount of inventory, and cash and account receivables to hold over a specific period of time or accounting period. The latter requires regular monitoring and incremental adjustments. Financing decisions deal with how and from where the money to make the required and/or planned investments are obtained. Asset management decision-making involves the effective and efficient management of current assets in order to optimize return and minimize risk. This, too, requires close scrutiny and regular commitment of a manager's time. For any company to become and remain competitive, keen management of organizational resources is vital. Working capital is one of the major resources of any company in developed and

developing countries. For example, in the United States, current assets typically constitute about one-third of a company's total assets (Perera and Wickremasinghe, 2010). For a typical manufacturing firm, current assets represent 40% of total assets; the ratio is even higher in some service sectors and retail businesses (Sartoris and Hill, 1988). Therefore, due to the significant ratios and the high turnover rate of investment in working capital, working capital management and all policies associated with it are important components of competitive positioning for any business.

1.2 RESEARCH PROBLEM

The topics of working capital management and competitiveness are poles apart in current business literature. Working capital management is an area of financial management whereas competitiveness is considered to be a topic in the literature for economics and strategy. Both topics have been widely studied because of their considerable implications on the success, failure and sustainability of businesses. However, in the context of Bangladesh, all studies on competitiveness have been limited to either country or industry-level competitiveness; no effort has yet been made to determine individual firm or business competitiveness. The scenario is no better in the case of working capital management. Some researchers like Chowdhury and Amin (2007), Hoque, Mia and Anwar (2015), Mazumder (2015) and others studied working capital management practices and their correlation to companies' profitability in a particular industry. However, profitability and business competitiveness are not synonymous. Business competitiveness is the ability of a firm to sustain itself in the fierce battle for market share and growth through profitability (Chikán, 2008). Research focusing on the influence of working capital management on business competitiveness is also scant in literature across the globe. In light of this fact, this research is essentially a baseline study of the impact of working capital management on business competitiveness. It is titled Role of

Working Capital Management on Business Competitiveness of the Manufacturing Companies Listed in Dhaka Stock Exchange.

1.3 RESEARCH OBJECTIVES AND QUESTIONS

The broad objectives of this research are:

1. To determine the state of working capital management practices of listed manufacturing companies in Bangladesh;
2. To evaluate whether working capital management practices differ across industries;
3. To develop a framework for measuring company's level of competitiveness (business competitiveness);
4. To investigate the role of working capital management on business competitiveness; and,
5. To evaluate any differences across industries with regard to the role of working capital management on business competitiveness.

The main research questions of this study are:

1. What is the current state of working capital management practices for listed manufacturing companies in Bangladesh?
2. Do working capital management practices differ across industries?
3. How is a firm's level of competitiveness measured?
4. What is the impact of working capital management on the business competitiveness of the companies identified in this study/research?
5. Do companies across industries differ in terms of the impact of working capital management on business competitiveness?

1.4THEORETICAL BASIS OF THE STUDY

A number of theories on competitiveness and finance are directly related to this study. The theory of comparative advantage by Ricardo (1817/1965); Porter's (1990) theory of competitiveness; Buckley, Pass and Prescott's (1992) multidimensional theory; and Ajitabh and Momaya's (2004) Asset-Process-Performance framework are theories related to competitiveness. They are discussed in Chapter Four where competitiveness is defined and the related literature is presented.

Theories related to working capital management include: risk-return trade-off, hedging, cost-benefit analysis, portfolio theory, agency theory, and stakeholder theory (Aminu and Zainudin, 2015). Risk-return trade-off is relevant in terms of determining working capital strategies and also in determining the level of working capital and its components. Hedging is associated with the working capital financing mix. Portfolio theory is relevant for determining the mix of working capital components, cash management and investment in marketable securities as well as when considering the choices of credit customers. Cost-benefit analysis is an integral part of any decision related to the use of sophisticated tools and techniques, the time commitment involved in managing working capital, and close scrutiny of the same. As managers are agents of a company's owner, the manager's decisions and commitments are subjects of agency theory. Working capital function involves interactions with a number of relevant parties or stakeholders such as employees/managers, owners, creditors, bankers, customers, suppliers and even competitors. Therefore, stakeholder theory guides the ultimate practices of working capital management.

The study's results are also analyzed in light of the abovementioned theories.

1.5 RESEARCH PHILOSOPHY

The epistemological perspective of the researcher dictates research approach and methods. Findings of similar research may be different due to researchers' different ontological standing (Gilner and Morgan, 2000). The researcher's philosophical standing is therefore important when considering any specific research. There are three major epistemological perspectives—positivism, interpretivism and realism (Edirisingha, 2012; Cooper and Schindler, 2006; Weber, 2004; Carson, Gilmore, Perry and Gronhaug, 2001; Perry, 2000 and others).

Positivism holds that the world consists of regularities, that these regularities can be detected, and, thus, by observing certain phenomenon, researchers can infer knowledge about the real world (Perry, 2000). Positivist researchers emphasize empirical data and scientific methods to draw generalized conclusions following a deductive approach when analyzing data. The positivist researcher is considered to be independent from the study and there are no provisions for human interests within the study (Weber, 2004).

Interpretivists take a humanist approach in doing research. They rely on qualitative data collected through unstructured in-depth interviews, participant observation and personal documents. They strive to derive an empathetic understanding of reality. Interpretivism holds that different individuals perceive and experience the same fact/situation/phenomena very differently. Hence human action/reaction to certain triggers may be very divergent. The objective of interpretivist research is not to draw generalized conclusions but rather to explain certain things under certain circumstances (Edirisingha, 2012; Cooper and Schindler, 2006; Weber, 2004).

Realists believe that reality exists independent of the researcher's mind. This reality is made of abstract things born or created through the interactions of the interrelated actors/objects. In

other words, reality is born out of peoples' minds and actions but exists independently of any individual. However, reality can only be imperfectly and probabilistically apprehensible. Realists, therefore, do not look only for the answer. Rather, they try to construct various views of the reality in relation to time, place and other viable determinants. Realists usually follow mixed methods comprising quantitative and qualitative techniques (Carson, Gilmore, Perry and Gronhaug, 2001; Perry, Riege and Brown, 1999).

The researcher of this study adopts a realist philosophy. Data collected through structured questionnaires are analyzed using quantitative tools but results are triangulated or validated through in-depth interviews.

1.6 RESEARCH APPROACH

The study takes a triangulation approach to validate data through cross verification from more than two sources. There are four types of triangulation: data triangulation, methodological triangulation, investigator triangulation and theory triangulation (Flick, 2004).This research deploys data and methodological triangulation. As mentioned above, results obtained from survey data and related analyses are cross-checked through in-depth interviews. Flick (2004) and Golafshani (2003) described triangulation as a tool to "cross-examine" data. A particular phenomenon can be revealed objectively when it is observed using the triangulation of multiple research methods.

1.7 RESEARCH METHODOLOGY

This study employs a mix of quantitative and qualitative methodology. Data were collected from both primary and secondary sources. Secondary sources include relevant textbooks, journal articles, companies' annual reports, and related publications from different national and international agencies/bodies, including Bangladesh Bureau of Statistics survey reports

and security analysts' reports. Primary data were collected through a survey using structured questionnaires as well as in-depth interviews. To ensure data accessibility, the researcher chose manufacturing companies listed in Dhaka Stock Exchange as her study subjects. Both descriptive and inferential statistical tools were used for data analysis. A detailed description of the research methodology is available in Chapter Six.

1.8 OUTLINE OF THE RESEARCH

The present chapter introduces the research topic, research questions, objectives, scope and research philosophy, and brief methodology of the study.

As the research focuses on manufacturing companies in Bangladesh, Chapter Two describes the country's manufacturing sector. It highlights the sector's size, growth and economic significance, and describes different industry sectors as classified by the Dhaka Stock Exchange.

The following three chapters present literature review. Chapter Three builds the theoretical basis of working capital management practices in organizations. This chapter describes the key concepts and issues related to the topic. Based on literature from finance textbooks, major working capital management policies and strategies are discussed here. Then the tools, techniques and methods suggested in most finance textbooks for managing the components of working capital—cash, inventory, accounts receivable and payables management—are described. Finally, the commonly used measures of working capital are presented.

In Chapter Four, the researcher discusses competitiveness and its underlying theories. The objective of this chapter is to clarify and operationalize the concept of business competitiveness. Based on the literature on competitiveness, this chapter clarifies the concept of business or firm-level competitiveness and presents different measures of the same from

various theoretical perspectives. A critical analysis of the existing measures of business competitiveness is conducted here. The chapter concluded with suggestions for quantitative measures of business competitiveness.

The literature on working capital management and firm performance is elaborated on in Chapter Five. Here, literature on working capital management, especially materials focusing on the relationship between working capital management and firm performance, are reviewed to identify research gaps in the existing literature. On this basis, the chapter concludes with a formulation of the research hypotheses.

In Chapter Six, the researcher presents the research methodologies involved in this study, which include a discussion on the sources of data, tools and techniques used for data collection and for analyzing the population and its sample. This chapter also describes the measures of the variables used in the study.

Results of this study are presented in next three chapters. Chapter Seven delivers the results of the working capital survey and reveals the working capital practices of manufacturing companies in Bangladesh.

Chapter Eight elaborates on the results of regression analysis and the researcher draws conclusions regarding the relationship between working capital management practices and business competitiveness.

In Chapter Nine, the researcher elaborates on the findings of the in-depth interviews and validates the results from the survey and regression analysis.

Chapter Ten is a summary of the study's findings. The researcher offers the implications of the research, recommendations for practitioners, and shares the limitations of the work as well as prospects for future research.

The research outline is presented graphically in Figure 1 below-

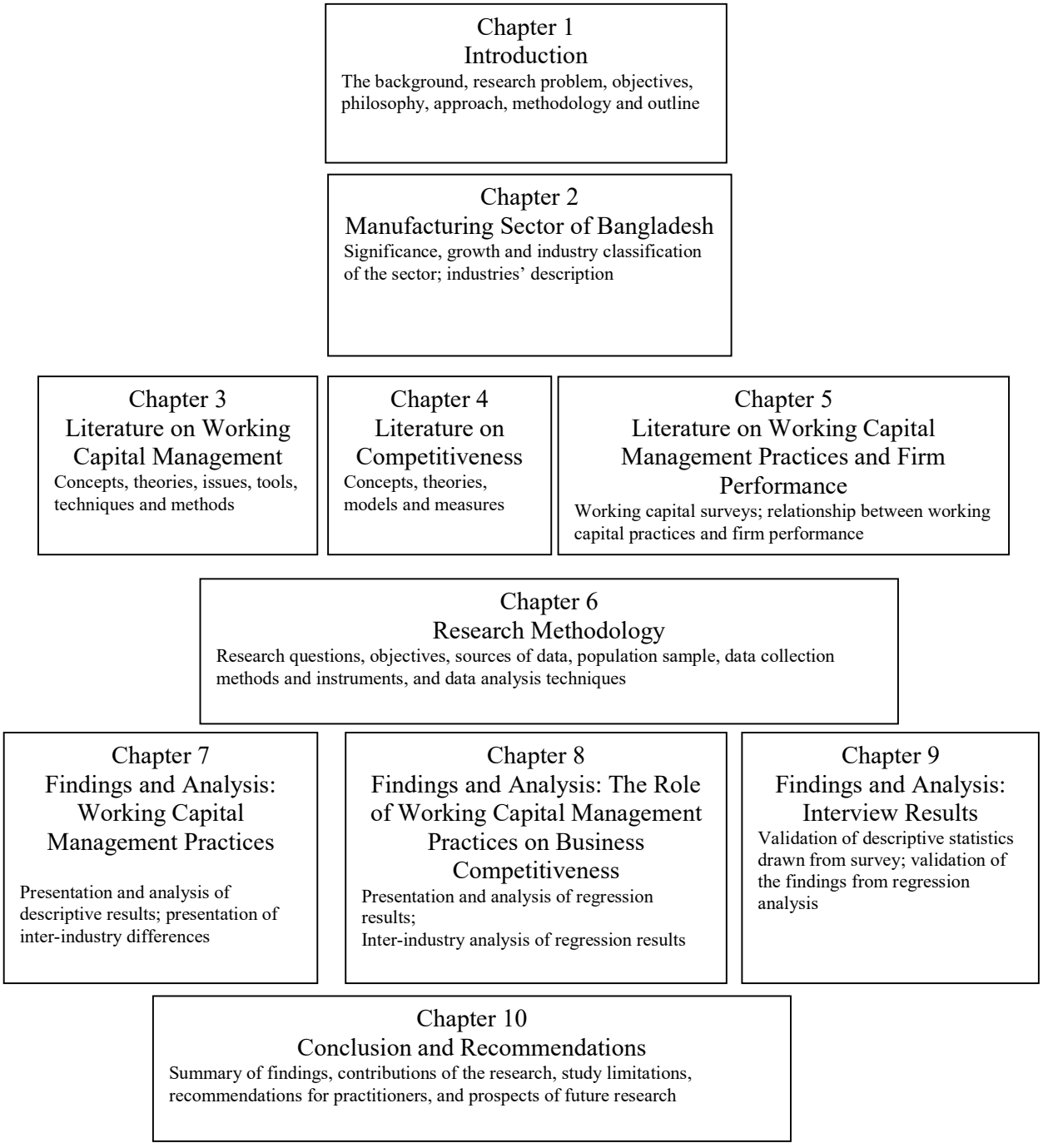

Figure 1: Research Outline

2. MANUFACTURING SECTOR OF BANGLADESH

Economic growth has recently qualified Bangladesh as a middle-income country. The consistent growth of its gross domestic product (GDP) over the years has been the driving force in achieving this status. The National Accounts of Bangladesh indicate that the country has experienced a more than seven percent GDP growth rate since 2015. Growth in the country's manufacturing sector has played a vital role in this respect. In 2018-19 the manufacturing sector is estimated to grow at a rate of 13%. This estimation is based on the fact that the index of large and medium manufacturing has been growing at 11 per cent per annum over the past four years (Bangladesh Bureau of Statistics, 2018). Figure 2 presents the manufacturing sector's GDP contribution from 2008 to 2017.

Figure 2: GDP Contribution of Bangladesh's Manufacturing Sector

Economists like Weiss (1988), Toner (2000) and others have asserted that the manufacturing sector is the engine of productivity growth and development in the manufacturing sector and it is crucial in dealing with the problems of backward nations in terms of income generation and employment creation. While Bangladesh has experienced rapid growth over the last 30

years in its service sector, which contributes more than 55% of the country's GDP, the manufacturing sector also contributed a reasonable portion of GDP (close to 20%). Many developed countries in North America and Europe that established themselves as service-based economies by pushing manufacturing offshore, are now focusing on the growth of onshore and/or near-shore manufacturing in an attempt to reverse the scenario. This reality confirms the fact that a well-developed and robust manufacturing sector is crucial for the sustainability of any economy. East Asian countries like Vietnam, Malaysia, the People's Republic of China, Thailand and others have enhanced growth (between three percent and nine percent) in manufacturing by focusing on private sector involvement and trade openness. On average, the manufacturing sector contributes to approximately 30% of these countries' GDP. Bangladesh has followed the same trend, but at a slower pace (Bangladesh Bureau of Statistics, 2018).Therefore, this research's focus on the manufacturing sector in Bangladesh is justified and timely. Moreover, this research concerns the management of working capital, which comprises more than 50% of the total assets in a typical manufacturing firm.

Bangladesh's manufacturing sector is comprised of about 50,000 establishments. Of these, 41% are micro-enterprises, 51% are small- and medium-sized enterprises, and only eight percent are large companies. However, the latter contribute close to 50% of the country's total generated revenues, claim 60% of the sector's employment as well as 62% of the total wages and benefits paid to employees in this sector (Bangladesh Bureau of Statistics, 2013).Leading industries in the sector are textiles (2%), food products (20%) and Ready Made Garments (RMGs) (16%) in terms of the number of companies. Ceramics, cement, tanneries (leather processing and goods), fuel & power, and engineering are also growing sectors. For the purposes of this study, the researcher adopted the industry classification of the Dhaka Stock Exchange.

2.1 CERAMICS INDUSTRY

The ceramics industry started its journey in 1958 with the establishment of Tajma Ceramic Industry Limited to produce porcelain tableware. Currently, there are 62 small and large ceramics manufacturers in the country but only five of them are listed on the Dhaka Stock Exchange: Fuwang, Monno, RAK (Bangladesh), Standard and Shine Pukur. They produce tableware, tiles and sanitary wares (Jahan, 2010).Ceramic products manufactured in Bangladesh are exported to more than 50 countries in Asia, Europe, Oceania, the Middle East, North Africa and the Americas, and exports generated nearly USD 41.82 million in revenues in 2016–17. More than USD 1 billion has been invested in this sector, which has created employment for over 500,000 people.

2.2 CEMENT INDUSTRY

The inception of the cement industry in Bangladesh dates back to the1950s. However, until 1990, about 95% of the country's demand for cement was met through imports. The sector received a boost between 1997 and 2000 and gradually dependency on imported cement lowered before Bangladesh began exporting cement in 2003. Currently the country exports cement to India, Myanmar, Nepal, the Maldives and Sri Lanka. However, exports have declined in recent years because Bangladesh lost its share of the export market in India to local Indian manufacturers. On one hand, huge infrastructure-based development in India has enhanced accessibility in the country's 'seven sister states' (seven easternmost states located in Northeast India) and the Indian government is providing anti-dumping tax benefits to its local manufacturers. On the other hand, the Bangladesh government has granted transit to India (EBL Securities, 2017). As a result, local Indian manufacturers are able to deliver cement in the region at a cost lower than importing it from Bangladesh.

Currently, Bangladesh has 32 cement manufacturers in operation, and 81% of the total market share is held by ten companies: two multinationals—Heidelberg Cement and Lafarge-Holcim Cement—and eight local companies—Shah, Meghna/Bashundhara, Seven Rings, Premier, Crown, Fresh, Akij and Confidence Cement. Overall, cement manufacturers in Bangladesh are plagued with unutilized capacity. Frequent power failures, high transportation costs, volatility in raw material supply and price, and the volatility in demand are the major problems that the industry is encountering. However, industry specialists hold a positive outlook for the future given the rapid pace of urbanization and industrialization in Bangladesh as well as the number of large-scale infrastructural and governmental development projects underway. The industry is expected to experience a Cumulative Average Growth Rate (CAGR) of 15% between 2017 and 2021 (EBL Securities, 2017).

Currently, seven cement manufacturing companies are listed in Bangladesh's capital market: Aramit Cement Ltd., Confidence Cement Ltd., Heidelberg Cement Bangladesh Ltd., Lafarge Holcim Cement Ltd., Meghna Cement Mills Ltd., MI Cement Factory Ltd., and Premier Cement Ltd. All are local manufacturers except for the two multinationals—Heidelberg and Lafarge. The former has the highest production capacity among the listed companies in the cement sector and the latter is the only fully integrated cement manufacturer in Bangladesh.

2.3 FOOD &ALLIED INDUSTRY

The food & allied industry is, one of the major potential sectors in Bangladesh. The sector accounts for over 22% of all manufacturing production and employs about 20% of the country's industrial labor force. It contributes about two percent of the national GDP. Over the last 12-year period (since 2006),the industry has grown at approximately seven percent per annum (Ashik, 2018).The sector includes cereals' processing, pulses and oil seeds, bakery and confectioneries, fruits and vegetables, dairy products, carbonated/non-carbonated

beverages, fruit juices, spices, processed poultry/beef/fish, frozen snacks and like items. There are more than 250 medium-sized enterprises and numerous small factories and domestic units engaged in food & allied preparation. Commercial-scale food processing using modern technology has gained momentum since 1980. Recently, the defining characteristics of the industry have been the entrance of large conglomerates, the launch of diverse products to meet the changing demands created by the rise of middle-class population in Bangladesh as well as growth in the export market. Major export destinations include Asia, the Middle East and Africa as well as cities in Australia, Europe and North America that are home to Bangladeshi and other Asian diaspora communities.

There are 17 companies listed on the Dhaka Stock Exchange under the food &allied industry category. The sector has generated very high returns in terms of share price appreciation and dividend distribution, which indicates the sound performance of companies in the sector. Although British American Tobacco Company has been the industry's driver overall, other large companies such as Golden Harvest, AMCL Pran, Beach Hatchery, Gemini Sea Food, Bangas, Apex Food, Fuang Food, Olympic Industries and others are consistently generating profits.

2.4 ENGINEERING INDUSTRY

The engineering industry, by Dhaka Stock Exchange classification, is comprised of companies engaged in light engineering, ship-breaking and steel processing, automobile assembly, CNG conversion, galvanizing, and aluminum, polymer and thermoplastic production. There are 36 such companies listed on the Dhaka Stock Exchange in this industry category; the majority are light engineering companies. This industry sector can be considered as the mother of all other industries because it provides backward and forward linkage support to all other industries. Light engineering products include castings, spare

parts, moulds, dies, light machinery, switches, light sheds, channels, cables, electrical fans, bicycles, fancy light fittings, construction equipment, batteries, voltage stabilizers, carbon rods, automobile spares, and electronic items. There are about 40,000 light engineering enterprises in Bangladesh that produce more than 10,000 unique products (Business Promotion Council, 2017; LightCastle, 2016). Although there are about 400 companies involved in steel manufacturing and processing, 20 of them alone meet more than half of the total demand and only seven are listed on the Dhaka Stock Exchange. However, they are the key players in the industry. In general, the engineering sector is growing and has strong potential because of the country's rapid economic development. Engineering goods are required to support any infrastructure and/or industrial development.

2.5 FUEL & POWER INDUSTRY

Nineteen companies are listed on the Dhaka Stock Exchange under the fuel &power industry classification. Nine of them—BarkaPower, DESCO, Doreen Power, GBBPower, KPCL, PowerGrid, SPCL, SumitPower and UPGDC—are directly involved in power/electricity generation, transmission and/or distribution. Other companies such as CVO Petroleum, MeghnaPetroleum, Padma Oil, Jamuna Oil, MJLBD and Eastern Lubricant are involved in the refining and distribution of petroleum products to be used as industrial or automobile fuel and lubricants. Gas transmission and distribution companies such as Titas Gas, INTRACO and Linde Bangladesh are also categorized under this industry sector. The fuel &power industry is a growing sector due to the burgeoning development projects initiated by the government and private (local and foreign) investors to meet sustainable development goals of the country.

2.6 PHARMACEUTICALS &CHEMICALS INDUSTRY

There are 257 licensed pharmaceutical manufacturers in Bangladesh; about 150 of them are operational. These companies meet 97% of local demand for pharmaceutical products. The industry contributed 1.85% of GDP in 2016–17. It is a rapidly growing industry, having experienced CAGR of 15%over the last five-year period (since 2013).The increasing demand for medicine due to population growth, increased life expectancy and growing income levels as well as evolving modern healthcare facilities, a higher living standard and better health awareness among the general population contribute to this growth (EBL Securities, 2018). Apart from meeting local demand, the sector is exporting pharmaceutical products to 107 countries. Major export markets include Myanmar, Sri Lanka, the Philippines, Vietnam, Afghanistan, Kenya and Slovenia, which constitute 60.32% of total pharmaceuticals exports. In 2016–17, the pharmaceuticals export volume was USD 89.17 million. Over the last five years (since 2013), the CAGR of export revenue has been 13.23% (EBL Securities, 2018).

In 2019, 31 companies are listed in this category on the Dhaka Stock Exchange, the majority of which are pharmaceutical manufacturers. Pharmaceutical products include tablets, capsules, ointments, syrups, injections and eye drops. Some of the companies are also involved in producing injection syringes and other medical accessories and devices. However, six of the listed companies produce chemicals to be used as industrial raw materials, not only for the pharmaceutical sector but for toiletries and cosmetics. A few of them, namely Marico Bangladesh, Keya Cosmetics and Kohinoor Chemicals, produce and/or market toiletries and cosmetics using their own brand name. Other companies such as Imam Button Industries Ltd. and Beximco Synthetics Ltd., although listed under in the pharmaceuticals & chemicals category, actually produce garment accessories (e.g., buttons, yarn).

2.7 TANNERY INDUSTRIES

There are about 220 tanneries in Bangladesh, 113 of them are reported to be in operation. Most of these tanneries are small units—only 20 are fairly large. The majority of the tanneries are located in Dhaka and, together, process 84% of the country's total supply of hides and skins. Although there are issues associated with the use of hazardous chemicals, effluent treatment and working conditions in Bangladesh tanneries, the leather produced in the country has a solid reputation worldwide. Bangladeshi leather is widely known for its fine grain, uniform fiber structure, smooth feel and natural texture. The country`s share of the world leather market is two percent. Apart from exporting crushed and finished leather, Bangladesh is currently experiencing growth in the manufacturing and export of leather garments and footwear. Major exporting destinations include Germany, Italy, France, the Netherlands, Spain, Russia, Brazil, Japan, China, Singapore and Taiwan. The local value addition of these exports averages 85% to 100%.The sector accounts for approximately four percent of Bangladesh's total export earnings (Paul, Antunes, Covington, Evans and Phillips, 2013). Over 250 manufacturers produce various leather items such as footwear, travel goods, suitcases, briefcases and fashion accessories, along with belts, wallets, hand bags and case holders. Bangladesh has also entered the field of leather fashion garments. The majority of these companies, however, are small manufacturers employing nine to 15 people. Only six companies are listed on the Dhaka Stock Exchange under the tannery industries category: Apex Footwear, Apex Tannery, Bata Shoe Company, Fortune Shoes, Legacy Footwear and Samata Leather Complex Ltd.—these are the industry's major players.

2.8 TEXTILES INDUSTRY

The textile industry is one of the major economic contributors to Bangladesh in terms of export earnings, employment creation and GDP contribution. This sector accounts for 80% of

the country's export earnings and 23% of GDP (Masum and Inaba, 2015).The United States and the European Union are major export destinations for Bangladesh. The country exported USD28.7 billion worth of clothing in 2017 and has set a target for USD40 billion by 2020.The industry employs more than five million people, which is 75% of total employment in country's manufacturing sector. In Bangladesh, there are about 7,000 factories of different sizes producing clothing for more than 200 foreign brands. On the Dhaka Stock Exchange, 53 companies are listed in the textiles industry category. Finished clothing/garments rely on three basic steps in the production process. The first step is to convert fibers/cotton into yarn. This is done in cotton mills and/or spinning mills. The second step is to convert yarn into grey fabric. This is done using weaving and knitting machines. The final step is to dye, print and finish the fabric. This is usually done in dying and printing facilities. Initially, when the garment sector started to boom in the 1980s, Bangladesh only produced finished garments and all of the raw materials and accessories were imported. As a result, the domestic value addition was only 20% to 25%. To promote growth in domestic value addition, the industry is gradually moving toward backward linkage (Sarkar, Anjum and Khan, 2017).As a result, many companies are now involved in spinning, knitting, weaving, dying and printing functions; the scenario is reflected in the distribution of the companies listed in the capital market. Out of the 53 listed textile companies, 16 are cotton/spinning mills, eight are knitting/weaving mills, and the remainders are involved in dying/printing and/or making finished garments.

3. LITERATURE ON WORKING CAPITAL MANAGEMENT

3.1 WORKING CAPITAL CONCEPTS

Working capital management refers to managing short-term assets and the flow of funds needed to meet a business' day-to-day requirements (Van Horne and Wachowicz, 2005; Brigham and Ehrhardt, 2002). It is essential to keeping a business running smoothly. Working capital includes current assets and liabilities.

3.1.1 Current Assets and Liabilities

Current assets are resources in cash or those readily convertible into cash such as inventory and receivables. Current assets comprise more than 50% of total assets in a typical manufacturing firm. For service sector businesses, the proportion is usually higher (Van Horne and Wachowicz, 2005). Current liabilities are the organizational commitments for which cash is soon due. Accounts payable, sundry creditors, accrued salaries are some of the typical current liabilities.

3.1.2 Net Working Capital

Net Working Capital refers to the difference between current assets and current liabilities in monetary term (Gerstenberg, 1959; Guthmann, 1955). This actually measures the extent to which a firm is protected from liquidity problems. As both current assets and current liabilities change throughout the year, trying to maintain a level of net working capital is not practical. However, it can be used as a benchmark to measure the performance of working capital management.

3.1.3 Gross Working Capital

Gross Working Capital is total current assets, sometimes called circulating capital. Funds invested in a company's cash, marketable securities, receivables, inventory and other current assets comprise Gross Working Capital. Finance managers aim to maintain an adequate level of current assets at all times to support a firm's day-to-day activities (Van Horne and Wachowicz, 2005; Walker, 1964).

3.1.4 Working Capital Management

Working capital management is a process of planning, acquiring holdings, controlling, and using current assets and liabilities. One difference between current assets and liabilities arises from the time lag between the expenditure for the purchase of raw materials and income receipt from the sales of finished goods and services (Brigham and Houston, 2012). In fact, current liabilities arise in the context of current assets. Therefore, the management of working capital involves determining the appropriate level of currents assets, monitoring and controlling those assets for proper utilization, and devising suitable sources of financing to accumulate and maintain the desired level of current assets. It encompasses the management of cash, marketable securities, inventory, receivables accounts, payables accounts and other short-term borrowings with the objective of optimizing/minimizing costs while maintaining uninterrupted business operations.

In this work, the researcher refers to working capital management as the administration of a company's current assets and the channelling of an appropriate financing mix to support current assets. Working capital management can also be referred to as short-term financial management (Khan and Jain, 2005). It differs from long-term financial management in terms of cash flow timing, which typically involves one year or less depending on the company's operating cycle. Due to two major characteristics of current assets—short lifespan and swift

transformation into other asset forms—decisions relating to working capital management are frequent and repetitive.

3.2 ISSUES RELATED TO WORKING CAPITAL

Managers need to make two fundamental decisions relating to working capital management: determine the optimal level of current assets, and decide on the appropriate mix of short-term and long-term financing to support the investment in current assets. In the process of making these two decisions, managers encounter the issue of risk-return trade-off.

If a firm maintains a high level of working capital (current assets), its liquidity becomes high. The firm will do well in terms of paying off immediate obligations and meeting unexpected demand or need. This means the risk of lost sales and defaults will be low. A high level of current assets, though, blocks a large amount of funds that could generate income if invested in profitable opportunities. This foregone income is referred to as the Cost of Funds. It may also lead to higher manpower costs as well as time and effort to monitor and control current assets. Other related costs could include storing and managing inventory, low quality credit, inefficient collection, price discounts to encourage the selling of accumulated finished goods inventory, and the cost of obsolescence. All of these costs will ultimately reduce a firm's profitability. As such, managers have to balance liquidity, risk and profitability (Van Horne and Wachowicz, 2005).

Similar trade-off decisions need to be taken when determining how much short-term and long-term debt should be used to finance current assets. The use of long-term debt reduces the risk of minimizing timely access to financing, but incurs interest costs even when financing is not required, thereby exerting negative pressure on profitability.

3.3 WORKING CAPITAL POLICY AND STRATEGY

3.3.1 Working Capital Policy

Companies may have a formal, semi-formal or informal working capital policy. Having a formal policy means that there are pre-decided written rules and guidelines in place with respect to managing working capital and its components e.g., who is responsible for what, how the issues arising will be resolved. Usually large, seasoned companies have formal policies and small or new companies have semi-formal or informal policies (Perera and Wickremasinghe, 2010; Pandey, Gupta and Perera, 1997). Having a formal policy is likely to provide better control over working capital issues (Burns and Walker, 1991).

3.3.2 Working Capital Management Strategy

Current assets are needed to support day-to-day operations, pay for immediate obligations, and to support sales despite uncertainties in demand. As mentioned previously, if a firm maintains a high level of current assets, it experiences a low risk of lost sales, interruption in production/processes, or credit default but requires high levels of investment. Hence, the total cost of a fund may increase significantly, affecting profitability. Such a strategy in managing working capital is called a ***conservative strategy***.

The opposite happens if a firm maintains a low level of current assets. Profitability will be high because the small amount of funds tied up in current assets allows the company to make larger investments in more profitable long-term projects. However, scarcity of working capital may result in interrupted and inefficient production processes that lead to increases in labor and other manufacturing expenses. Moreover, due to variability in sales/demand and cash obligations, a low level of current assets increases the risk of lost sales and creates a liquidity problem. Lost sales and the inability to pay off obligations usually creates a long-

term impact on the firm's goodwill among its customers and investors. Such a strategy/policy to maintain a low level of current assets while accepting low liquidity and higher risk is considered an ***aggressive strategy***. Usually companies with very stable demand and low variability in supply chain adopt this aggressive strategy (Brigham and Houston, 2012; Van Horne and Wachowicz, 2005).

There are firms who operate in between the above two policies/strategies. They maintain moderate levels of current assets. Such firms have moderate liquidity and experience moderate profitability and risk .Their working capital management strategy is known as a ***moderate strategy***.

Researchers have used the current asset to total asset ratio (CA/TA) as a proxy measure of the degree of conservativeness in working capital management. The lower the CA/TA ratio of a firm, the more aggressive is its working capital strategy (Brigham and Houston, 2012).

3.3.3 Working Capital Financing Strategy

Before deciding on the appropriate mix of financing to fund working capital, managers focus on the classification of working capital in terms of time. Working capital usually has two parts: permanent and temporary.

Permanent working capital is the amount of current assets that a firm always needs. Similar to fixed assets, permanent working capital requires funds for long term and the need for such funding grows over time with the business' growth (Khan and Jain, 2005; Van Horne and Wachowicz, 2005). However, the assets are 'current' in nature, meaning they constantly change—their turnover rate is high. A certain level of cash balance may be required throughout the year but the currency notes in the cash box do not sit there over the whole year,

rather they are used to pay for obligations that are due and are quickly replenished for future use. A similar usage cycle is true for inventory items and receivables.

Temporary working capital, on the contrary, is the portion of current assets whose amount varies with seasonal requirements (Khan and Jain, 2005; Van Horne and Wachowicz, 2005).For example, apparel and grocery retailers need to maintain a high level of inventory before big festivals like Eid and Mohaloya.

Figure 3 illustrates a firm's changing need for working capital over time with the segregation of temporary and permanent working capital.

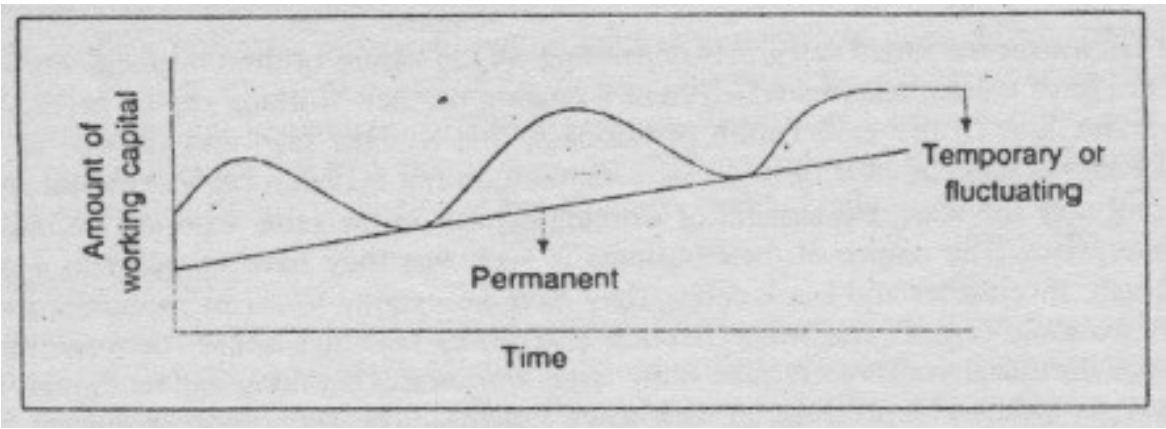

Figure 3: Temporary and Permanent Working Capital

There are three ways to finance working capital: spontaneous financing, short-term financing and long-term financing (Van Horne and Wachowicz, 2005).

Payables created from credit purchases, salaries, wages, interest and taxes due, and other accrued expenses that arise from a firm's day-to-day business transactions are called spontaneous finance. Policies related to payment for purchases and other regular expenses determine the level of spontaneous finance. This will be discussed later in this chapter.

Short-term financing refers to loans with a maturity date less than one year, and/or working capital loans, lines of credit, etc. Long-term financing can be in the form of debt or equity.

Loans with a maturity date of more than one year, bonds and debentures are sources of long-term debt. Equity finance may come from private or public placement. The cost of short-term financing is usually lower than that of the long-term financing. When a firm concentrates more on short-term financing or current liabilities, its profitability is likely to be high. Short-term financing is risky in the case of financing permanent working capital and/or fixed assets. As this amount of funds (permanent working capital and fixed assets) is required for the long term, continuous refinancing is vital for maintaining the level of funds. Moreover, these assets, due to their permanent nature, are unlikely to release enough cash flow to pay off the debts as they become due. As a result, the company bears the risk of defaulting and thereby the lender may not roll over the loan hence is exposed to refinancing risk. Moreover, short-term financing inherently poses uncertainty in interest costs due to the volatility of interest rates.

Although long-term financing has higher interest costs, it carries a low risk of refinancing and related interest costs. However, in the case where long-term financing is used to fund temporary working capital, it will be expensive and can thereby hamper profitability. In such situations, firms have to bear the interest cost even when they do not need the funds (at the troughs of temporary working capital in Figure 3).

Working capital financing strategy involves determining the appropriate mix of short-term and long-term sources to finance working capital. Figure 4 presents different strategies of working capital financing.

Some managers match asset life and financing maturity. They opt for short-term funds sources to finance temporary current assets and long-term sources of funds to finance permanent working capital and fixed assets. This is called maturity matching or the hedging approach. Here, the borrowing and payment schedule for short-term debts correspond to the

expected swings of current assets less spontaneous financing (through payables and accruals).Firms adopting a hedging approach will have no current borrowing at the seasonal trough. When seasonal needs arise, the firm borrows in the short term and pays off the loan with cash released from the temporary assets as their need subsides. The **hedging approach** saves on interest costs on financing temporary working capital but bears a refinancing risk. By financing permanent working capital using long-term funds, this approach means slightly higher interest costs but the refinancing risk is eliminated. Therefore, hedging is considered as a ***moderate strategy*** to finance working capital.

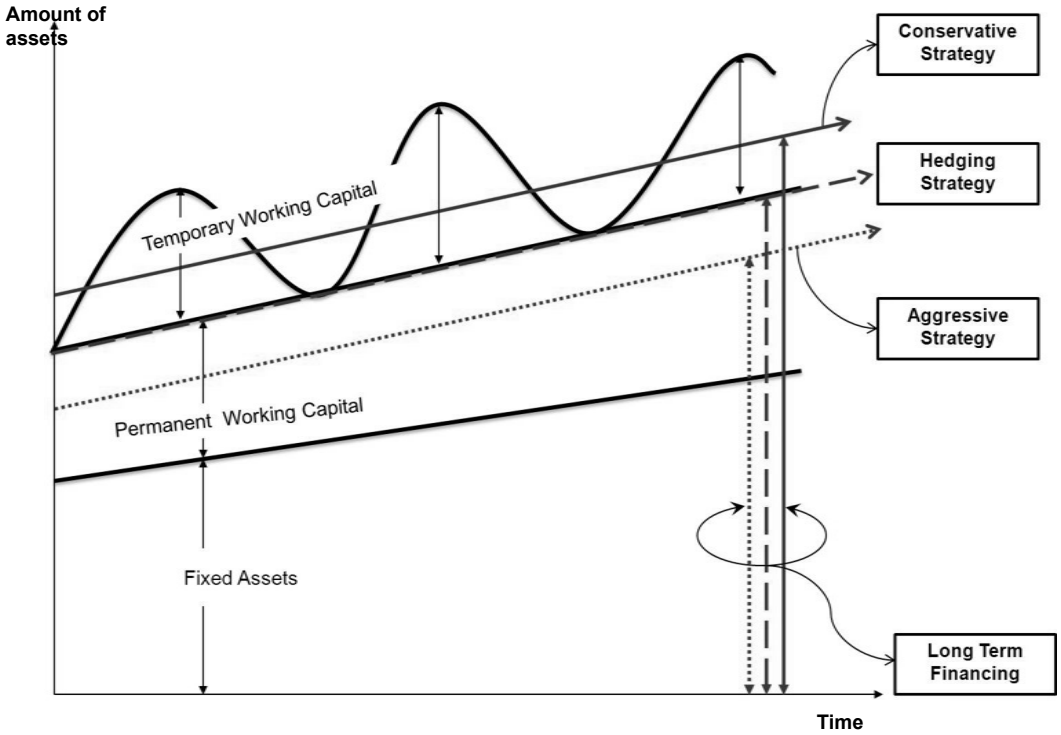

Figure 4: Working Capital Financing Strategies

On the contrary to the above, conservative managers let interest costs rise but further reduce refinancing risk by using long-term funds to finance a portion of temporary working capital. Firms with a ***conservative strategy*** usually maintain higher liquidity, generate lower returns, and experience lower risk compared to similar firms with other strategies. Firms adopting an ***aggressive strategy*** cut interest costs by financing a portion of permanent working capital in

addition to the temporary working capital using short-term funds. By doing so, they enhance their profitability at the cost of increased liquidity and refinancing risk.

The more aggressive a firm in terms of working capital finance, the higher proportion of short-term debt it will incur. Therefore, scholars have used current liability to total liability (CL/TL) or current liability to total liability plus equity or total assets (CL/TA) as a proxy of aggressiveness in working capital financing (Salawu, 2007).Some researchers have used current liability to current assets (CL/CA) as a proxy of the degree of aggressiveness in working capital financing. The higher the value of the measure or the higher the proportion of current liability, the more aggressive the financing strategy (Yegon, Kiprono and Willy, 2014; Brigham and Houston, 2012).

3.3.4 Linking Working Capital Management and Financing Strategy

The decisions to determine the level of current assets and the financing mix to fund current assets are not independent. A firm following a conservative strategy maintains a high level of current assets and is usually better off in heavy use of short-term debt to finance working capital. In other words, firms employing a conservative working capital strategy can afford to follow an aggressive financing strategy. Similarly, firms with aggressive working capital policies should adopt a conservative financing strategy. The bottom line is finding a trade-off between risk and profitability (Brigham and Houston, 2012; Van Horne and Wachowicz, 2005).

Firms with low uncertainty in demand, supply, collection of receivables, and production schedule do not need to maintain a high level of current assets. By minimizing investment in low-yielding current assets, such firms can maximize profit. Companies who have the capability to borrow funds on short notice and are thereby able to match their debt maturity schedule with their future cash net flows schedule can safely rely on short-term debts to

finance most current asset needs. Such companies can minimize reliance on long-term obligations and maximize profitability. Therefore, a firm's choice of working capital strategy and financing strategy largely depends on the volatility of business (sales, demand, supply), its cash flows, and quick access to finance (Sagner, 2010). Companies adopt different strategies such as long-term contracts with customers and suppliers, cash discounts, lines of credit, revolving credit, etc. to reduce the volatility of business and cash flows as well as to enhance quick access to finance.

The following section discusses the components of working capital with an objective to identify the tools and techniques to manage them.

3.4 MANAGING THE COMPONENTS OF WORKING CAPITAL

As mentioned earlier, working capital comprises of current asset and current liabilities. Cash and marketable securities, accounts receivable and inventory are the major components of current assets whereas short-term financing comprises trade credit and accrued expenses (wages, interest, taxes, etc.). Short-term debt is a major component of current liability.

3.4.1 Managing Cash and Marketable Securities

Cash and marketable securities are the most liquid and current form of assets. Companies have three motives for keeping a cash balance: transaction motive—to pay for purchases and expenses in regular business operations; precautionary motive—a buffer to meet unexpected cash needs as companies with less predictable cash flows need to maintain a large cash balance; and speculative motive—to take advantage of temporary opportunities such as sudden decline in the price of raw materials. Cash management involves efficient collection, disbursement and temporary investment of cash (Sagner, 2010; Kumar, 2001).

3.4.1.1 Efficient Collection

Efficient collection entails speeding up cash receipts. This is done through a company's adoption of various techniques to expedite invoice preparation and delivery, accelerate customers' payments, and reduce the time to convert payments into usable cash. Table 1 presents the techniques/mechanisms adopted in this regard.

Table1: Tools and Techniques used for the Efficient Collection of Cash

Objective	Techniques/Mechanisms Adopted
Quick invoice and accelerated customer payments	• Automated/computerized billing • Enclose invoice with product shipment • Send electronic invoice • Request advance payment • Use pre-authorized debit system and eliminate the need to send an invoice.
Accelerated receipt of customer payments	• Request advance payment • Pre-authorized debit arrangement • Use of lockbox system* • Concentration banking**
Quick conversion of payments into usable cash	• Request direct deposit of checks • Concentration banking**

Source: adopted from Van Horne and Wachowicz (2005)

* *Lockbox system* is a service provided by banks to companies for the receipt of payments from customers in different locations (Kumar, 2001). It allows customers to pay for a good or service at their convenient locations, thus potentially expediting customers' payments. Under the service, payments are directed to special post office boxes instead of going to the company. The authorized bank retrieves the payments from the box, processes them and deposits the funds directly into the company's bank account. This mechanism reduces the time to process and clear checks.

**_Concentration Banking_ is the arrangement used by firms wherein the funds from regional banks in different locations are concentrated or collected into a single bank account. Customers' payments are either deposited in regional banks close to customers' premises or by local post (in the lockbox system), thereby accelerating payments and their receipt by the company (Kumar, 2001).In this system, all checks are cleared locally and the concentration bank sends a detailed list of receipts as a credit advice to the company. This service speeds up check processing and clearing so that payments are quickly converted into usable cash. However, the concentration banking system is dependent on the timely transfer of funds between financial institutions. For this purpose, the electronic transfer of checks through automated clearing houses and wire transfers are used.

3.4.1.2 Efficient Payout

The main premise behind efficient payout is to slow down payments and minimize the time that cash deposits remain idle. There are three direct methods of delaying payment. The first is payment on the final due date. The second is payment by bank draft. Unlike checks, drafts are not payable on demand. When the draft is presented for collection, the bank presents it to the issuer for acceptance who then deposits the funds to cover the draft payment. This process delays the time that the issuer firm actually has to have the funds for disbursement. The third method is payment through account payee checks and issue payment checks before bank holidays and/or near the end of the business day so that the checks remain outstanding for a longer period of time (Sagner, 2010; Van Horne and Wachowicz, 2005; Kumar, 2001).

Many firms decide to make all payments from one central account so that disbursements can be precisely timed as desired. This mechanism of controlling disbursement is called *centralized disbursement*.

Some companies maintain separate accounts for payroll and divided disbursements. Companies predict the time when payroll and dividend checks are presented for collection and thereby benefit from reducing the balance of these accounts. For example, if pay day falls before the weekend, all checks are unlikely to be cashed on that day. Consequently the company does not have to have funds available for the entire payroll.

The *zero balance account* is another mechanism to reduce the amount of idle deposit in an account used to cover cash disbursement. It also eliminates the need to accurately estimate and fund each individual disbursement account. Like concentration banking, all disbursement accounts, which are usually non-interest bearing current accounts, are considered subsidiary to a central master account where deposit balances are maintained. Subsidiary accounts are not required to maintain any balance. When checks are cleared at the end of each day, funds are automatically transferred from the master account to the subsidiary accounts to cover only the checks presented.

3.4.1.3 Temporary Investment

Companies keep very little, if any, cash as currency in hand or deposit cash in checking (non-interest bearing) accounts for the three motives of holding cash mentioned above. Usually portions of cash needs that are not immediate are covered by investment in marketable securities—Treasury Bills (T-bills), certificates of deposits, commercial paper, short-term debentures, money market mutual funds, etc. Holding of cash has an opportunity cost because idle cash provides zero yield. In contrast to this, by holding marketable securities to meet non-immediate cash needs, companies can generate some return from an otherwise idle cash balance. However, while creating a portfolio of marketable securities, managers should take safety, marketability, yield and maturity into account. Here too, managers need to make risk-return trade-offs (Van Horne and Wachowicz, 2005; Brigham and Ehrhardt, 2002).

3.4.2 Managing Receivables

Receivables are the amounts of money owed to a company by its customers who bought goods and/or services on credit. Companies offer credit opportunities to some customers to increase sales and/or maintain long-term business relationships with valued customers. However, credit sales not only delays cash inflows but also pose the risk of customer non-payment or bad debts. Therefore, receivables management function deals with the determination of (i) credit standards, (ii) credit terms, (iii) default risk, and (iv) collection policy and procedures (Sagner, 2010; Van Horne and Wachowicz, 2005; Kumar, 2001; and others).

3.4.2.1 Determining Credit Standard

Credit standard is the minimum credit worthiness of a company's customers who are acceptable for credit sales. If a company adopts a lenient credit policy, the number of credit customers is likely to rise but the credit standard will drop, which will negatively impact the risk of bad debt and default. The result is an increase in collection expenditure. However, a lenient credit policy is likely to generate additional sales. Companies have to weigh profitability from additional sales against the cost of increased receivables. A similar trade-off is required in determining credit terms and collection policies.

3.4.2.2 Determining Credit Terms

Credit terms specify the length of time over which credit is extended to a customer and the discount associated with it. Credit terms are usually expressed as '2/10, net 30.' This refers to the offer of a two percent discount if the bill is paid within 10 days of the invoice date. If the discount is not taken, the full amount is due on the 30^{th}day from the invoice date. A special credit term called *seasonal dating* is sometimes used for seasonal products. This term

encourages the buyer to take delivery before peak sales and defer payment until the peak period ends. Such an offer is used to attract customers who are unable to pay until a later date. Thus seasonal dating helps in increasing sales. As delivery is given before the peak season, such terms help companies to avoid building huge inventories in off-peak seasons and to reduce inventory cost.

3.4.2.3 Evaluating Default Risk

To reduce the possibility of bad debt or slow payment, companies become selective in offering credit opportunities. Before deciding to extend credit, they evaluate a prospective debtor's financial statements as well as collect information from the credit-seeking company's bank and trading partners. In the case of an long-term customer, companies evaluate their own past experiences with the customer. The company then uses the collected information in a credit scoring system to rank customers in terms of their credit worthiness. Credit sales are offered only to the customers with an acceptable (sound) credit score.

3.4.2.4 Collection Policies and Procedures

In terms of collection policies and procedures, managers have to decide on timing and collection methods. If collection procedures are initiated too soon, reasonably good customers who for some unavoidable reason may have failed to make certain payments by the due date may resent the lack of trust in the relationship. On the other hand, if collection efforts are delayed too long, such efforts may not bring any benefit—receipt of the full or partial payment—and rather incur costs. A common collection procedure starts with a friendly phone call to notify the customer that payment has not been made by the due date, and seek clarification for non payment. Next, a letter requesting that the customer clear the overdue payment is sent; additional letters with an increasingly serious tone may be required to follow. A letter and/or phone call from the company's attorney may then become

necessary. Some companies may have collection personnel who visit customers to collect on overdue accounts. If all efforts fail, the account may be transferred to a collection agency. Such agencies charge very high fees and direct legal action is too costly for many companies. In this regard, managers must make a cost-benefit trade-off and find the optimal balance. Sometimes, a compromised settlement can result in a higher percentage of collected payments than legal action or handing the account to a collection agency.

3.4.3 Managing Inventory

Inventories are maintained at different stages of the supply chain. They are necessary not only for efficient and smooth operations but also to maintain flexibility in operations to tackle the uncertainties in demand and supply. Due to the benefits of keeping inventory, production and sales managers usually opt for maintaining a high level of inventory. Even the purchasing manager likes to make bulk purchases to avail quantity discounts and thus is biased to build up inventories. Apart from the direct costs of the items kept in inventory, there are several associated costs including ordering costs, storage costs, handling costs, opportunity costs of capital tied up in inventory, and the cost of obsolescence. By considering these inventory-related costs, finance managers usually cordon others' temptations to keep large inventory (Sagner, 2010; Van Horne and Wachowicz, 2005; Khan and Jain, 2005; and others). Like other components of working capital, there must be a trade-off between the costs and benefits of maintaining a large inventory. Inventory levels should be enhanced as long as the benefits outweigh the costs.

Many companies use economic order quantity model (EOQ) to determine the optimum level of inventory. The accuracy of the model's results depends on the estimates of demand and the relevant benefits and costs. Moreover, better control of the inventory items reduces carrying and handling costs, which in turn influence the optimal level of inventory.

Companies today use computer-based, information technology-enabled systems like the enterprise resource planning or ERP system for inventory control, especially for record keeping and tracking inventory movement. Regular stock taking is another method of controlling inventory. Many companies use radio frequency identification (RFID) technology for this purpose.

However, all items in an inventory are not equally important in terms of value and thus do not deserve equal levels of control and monitoring. To address this issue, most companies use ABC analysis based on the Pareto Principle to identify significant inventory items to be more strictly controlled.

3.4.4 Managing Short-term Finance

Sources of short-term financing fit into two basic categories: i) *spontaneous financing* comprised of accounts payable and accrued expenses, and ii) *negotiated financing* consisting of money market credits as well as unsecured and secured short-term loans.

3.4.4.1 Spontaneous Financing

The main catch of spontaneous financing is that it flows with the volume of sales activity during normal business operations and requires no formal application and/or persuasion to lenders or creditors. It is readily available and can be considered as a continuous form of credit. As old bills are paid, new credits automatically become available. As long as timely payments are made, the level of financing available automatically increases with the increase in business volume and vice versa (Sagner, 2010; Van Horne and Wachowicz, 2005; Khan and Jain, 2005; and others).

Accounts Payable

Accounts payable or trade credits from suppliers are the largest source of short-term funds. The supplier ships goods to the buyer and sends an invoice mentioning the goods shipped, amount due and terms of sales. The buyer does not need to sign any formal debt instrument. In some cases, the buyer does need to sign a note that evidences a debt to the seller. This is called a promissory note and it is recorded as notes payable on the buyer's balance sheet. In other cases, the seller draws a draft on the buyer to make a payment on a future date and the buyer need to accept the draft. In doing so, the buyer actually designates its bank to make the payment when it becomes due. This is called trade acceptance. In some instances, trade acceptances are tradable at discount. By trading the trade acceptance the seller can get the money at some discount before it comes due.

Trade credits always come with some terms of sales such as: net period–no discount (mentions the period of time in which to make the payment, and no discount is offered for early payment); net period–cash discount (mentions a discount rate if the payment is made within a certain period and the payment's ultimate due date without any discount); and seasonal dating (offer to deliver the product during off-season but payment is due when the peak season starts).

Buyers need not pay any interest on payables but this does not mean that payables are free credit. There is a cost of payables, and it may be borne by suppliers to increase their sales, it may be transferred to the buyer by charging a higher price, or it may be shared between the buyer and the seller. The manager should understand who is bearing the cost of the trade credit and shop around to get the best deal. It is important to keep in mind that the cost of trade credits may change over time and its distribution between the buyer and seller may also vary. Managers must negotiate with suppliers in this regard.

In terms of paying the payables, the general suggestion is to make the payment on the final due date. However, some managers may decide to make an early payment (on the final date before the cash discount deadline) to avail a cash discount. In such cases, the benefit of a cash discount must outweigh the cost of early payment. In some other instances, managers decide to stretch payables, which means delaying payment beyond the final due date. Here the benefits of making a delayed payment (savings in the cost of funds to make payment) must exceed the cost of late penalties and the possible deterioration in credit quality (Van Horne and Wachowicz, 2005).

Accrued Expense

Wages and taxes are the most common forms of accrued expenses. Usually there is a specific date when accrued expenses must be paid. Failing to pay on or before that date incurs a cost in the form of employee absenteeism, lowered motivation, efficiency and morale in the case of wages/salaries or penalties and interest charges in the case of taxes. However, accrued expenses are a purely costless source of financing. Like the level of accounts payable, the level of accrued expenses changes with the level of business operations. As sales increase, labor costs and salary expenses are likely to increase and the same happens to accrued wages and salaries. Profitability increases when sales increase and so do accrued taxes. Accrued expense management is not discretionary in normal business operations. However, during a cash crunch, companies may decide to postpone or delay the payment of wages and other expenses and then try to manage the consequences at a later date (Khan and Jain, 2005).

3.4.4.2 Negotiated Financing

Short-term financing that a company can arrange only through formal procedures in the public and private markets is called negotiated financing (Sagner, 2010; Van Horne and Wachowicz, 2005; Khan and Jain, 2005; and others). Companies can raise funds from the

public market by issuing money market instruments such as commercial paper, bank-supported commercial paper, debentures, etc. and then selling these to investors. Short-term loans from banks, non-bank financial institutions and other corporations through formal procedures are the private market sources of funds. Such loans can be unsecured or secured. Lines of credit, revolving credit agreements, transaction loans, etc. are common forms of unsecured loans, which have higher interest costs than secured loans. Some assets (usually receivables and inventory in case of short-term loans) are pledged as security or collateral for secured loans. Companies can reduce the cost of borrowing by taking secured loans. Moreover, companies with low credit quality have limited access to unsecured loans and thereby opt for secured loans. Factoring receivables is another way to obtain short-term financing. Companies can sell their receivables to banks or financial institutions at a discount to secure a cash flow before the receivables come due. Receipts of payments on the due date are then transferred to the factor (bank or financial institution that is holding the receivables).

In determining the appropriate mix of short-term financing, the cost, timing, availability, flexibility and the degree to which the firm's assets are encumbered are important factors. Cost differential among the various options varies over time. Timing of financing refers to whether the funds needed are accessible right at the moment that they are needed; it is often associated with availability (Sagner, 2010; Khan and Jain, 2005; Kumar, 2001; and others). Reputed companies can borrow funds by issuing commercial papers. But that require a long processing and legal approval period. For new and/or less reputed companies, bank loans can be a more timely and available option although the associated cost may be higher. Flexibility means having access to funds as required. Lines of credit, revolving credit agreements, bank overdrafts and factoring are widely used flexible options for companies in need of short-term financing.

3.5 COMMON MEASURES OF WORKING CAPITAL PERFORMANCE

Working capital performance is usually measured along two dimensions: efficiency and liquidity (Van Horne and Wachowicz, 2005; Khan and Jain, 2005; Brigham and Ehrhardt, 2002; and others).

3.5.1 Measures of Efficiency

Working capital to sales ratio refers to the ratio of current assets over sales. A higher value indicates a higher level of working capital per dollar sales, which implies lower efficiency.

Working capital turnover is the ratio of sales to working capital—the reciprocal of working capital to sales ratio. A high turnover value indicates better utilization of working capital or in other words, efficient management of working capital.

Apart from the above, component-wise turnover ratios—receivables turnover, inventory turnover, and payable turnover—are measured to review efficiency in the management of each of these components. Formulae for calculating these turnover ratios are as follows:

Receivables turnover = sales/average accounts receivable

Payable turnover = cost of goods sold/average accounts payable

Inventory turnover = cost of goods sold/average inventory

These turnover rates are often converted into days by inserting the number of days in a year (365days) as the denominator value with the turnover rates as the numerator. The resulting number is considered as a variant of the above mentioned measures of efficiency. For example:

Average collection period (ACP) represents the average number of days between the date of credit sales and the date when money is collected from the customers. It is also referred to as the days' sales in accounts receivable. It is calculated as ACP = 365/receivables turnover.

Average payable period (APP) is the average time in days that a company takes to pay for its credit purchases. It is measured as APP= 365/payable turnover.

Inventory conversion period (ICP) is a measure of the average time in days to convert raw materials into sales. A company's actual investment in materials remain tied up in inventory until the product/service is produced/created and sold/delivered. This time period is measured by ICP, which is calculated as ICP = 365/inventory turnover.

Low values of these periods indicate higher efficiency in managing the corresponding component of working capital.

Another measure, *Cash Conversion Cycle* (CCC), is considered as an aggregate measure of working capital efficiency. It is calculated using the formula CCC =ACP+ICP–APP. It represent the average time in days that a company takes to convert its investment in inventory into cash. As with the other periods, a low CCC value represents efficient working capital management.

3.5.2 Measures of Liquidity

Current Ratio is the ratio of current assets and liabilities. A value greater than one (1) indicates a good liquidity position, which translates to low risk of the inability to pay off short-term liabilities. Other measures of liquidity include *Quick Ratio*, calculated using the formula, QR = (current asset – inventory)/current liability, and *Cash Ratio*, calculated as Cash R = cash and equivalents in hand/current liability.

4. LITERATURE ON COMPETITIVENESS

This chapter defines the term competitiveness from different theoretical perspectives. The researcher first considers competitiveness in general and then discusses the concept in terms of different levels of aggregation. Among all of these levels, business or firm-level competitiveness is most pertinent for this research. After providing a brief description of country and industry competitiveness, the researcher elaborates on business competitiveness in this chapter. Based on the literature, a summary of the conceptualization of firm-level competitiveness is presented. In this respect, different theoretical considerations are also covered. The researcher also reviews how this concept has been quantified and/or operationalized in strategy and competitiveness literature. She also analyzes the existing measures of business competitiveness to pinpoint limitations and inadequacies thereby. Based on quantitative literature that focuses on measuring corporate performance and benchmarking, this chapter concludes with the researcher's proposition of a composite framework to quantify firm or business level competitiveness.

4.1 DEFINING COMPETITIVENESS

In today's business and economic literature, competitiveness is a buzzword. Its roots are in the Classical Latin word *petere*, meaning to seek, attack, aim at or desire, and the Latin prefix of *con*, which means together. From these, the term competitiveness was coined during the 1970s. It was during this period that American economists undertook the first attempts to determine the degree of competitiveness between rival economies in the context of a severe trade war between American and Japanese companies (Wziątek-Kubiak, 2003). Although research on competitiveness has been popular for almost 50years, troubles persist in terms of a general understanding of its meaning as well as with its measurement. Scholars from

different theoretical and philosophical backgrounds have defined the term in many different ways. Classical theories of mercantilism introduced the notion of trader rivalry among nations, considered competition as a zero-sum game and suggested protectionism of local production, import barriers and export promotion as ways to enhance competitiveness (Voinescu and Moisoiu, 2015). But Adam Smith's (1776) proposition of absolute advantage opposed mercantilist ideas of consistent restrictions on imports as well as sustained efforts to increase exports in order to enhance national wellbeing. Referring to the concepts of absolute advantage, international labor division and specialization, Smith advocated for free trade in the international arena. However, Ricardo's (1817/1965) theory of comparative advantage suggests that the rationale behind international labor division and specialization reside not in the absolute advantages, but in the relative advantage, which is often interpreted as lower opportunity cost. A country's specialization in producing one particular product depends on the foregone production of all other goods and services in comparison with that of other countries. Therefore, countries should specialize in the production and services that display comparative advantage and thus become competitive. Heckscher and Ohlin's (1991) trade theory focuses on the intensive use of locally abundant factors of production. Relatively capital-abundant countries will export capital-intensive commodities while relatively labor-abundant countries will export labor-intensive commodities. Modern approaches like Paul Krugman's (1996) new economic geography theory take the concept of competitiveness beyond international trade. Krugman (1996) argued that increased productivity is the driver of competitiveness but it must at the same time ensure a higher standard of living. Porter's (2000) theory of management explains competitiveness in a very comprehensive manner and provides an overarching view of the concept. Porter (2000) states that a business environment that supports continual innovation (in products, processes and management) is essential for ensuring long-run productivity, which in other words is competitiveness. According to Porter

(2000), the four underlining conditions driving the global competitiveness of a country's companies are: factor endowments, demand conditions, related and supporting industries (clusters), and the company's strategy, structure and rivalry.

Contemporary definitions of competitiveness employed by international economic organizations take a dynamic approach to welfare. For example, the European Commission (2004) sees competitiveness as a measure of an economy´s ability to productively create valuable goods and services in a globalized world so as to raise the standard of living and secure high employment. The OECD defines a country's international competitiveness as the degree to which it can, under free and fair market conditions, produce goods and services that meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the longer term (Aiginger, Barenthaler-Sieber and Vogel, 2013).

To summarize, competitiveness can be considered as an advantage of a business, industry or economy resulting in consistently strong performance vis-à-vis its competitors in domestic and/or international markets. Strong performance means profitability, market share and growth in the case of businesses or industries. In the case of countries or economies, performance means economic growth, success in international trade, and an increased living standard for the majority of the population.

4.2 MACRO, MESO AND MICRO VIEWSOF COMPETITIVENESS

Considering the fact that competitiveness can be conceptualized from macro, meso and micro perspectives, the following few paragraphs describe competitiveness from these three standpoints. Although the macro-level view of competitiveness may be the most popular, it is also the most controversial. Meso- and micro-level conceptualizations that apply to a single industry or company are less contentious.

4.2.1 Macro/Country Competitiveness

The macro view of competitiveness assumes that countries compete for world market share and foreign investment. Country-level factors such as cost of labor and other factors of production, financial and technological infrastructure, access to markets, institutional and regulatory frameworks as well as others construct a business climate that affects the performance of a country's businesses and/or industries. A favorable business climate enhances a country's competitiveness. With respect to the above conceptualization, Schwab and Sala-i-Martin (2015) define competitiveness as a set of institutions, policies and factors that determine a country's level of productivity. The World Competitiveness Index, computed and published annually by the World Economic Forum (WEF) and the Institute of Management Development (IMD), is one of the best measures of a country's competitiveness. WEF considers 12 pillars or measurement categories to quantify competitiveness: 1.Well-functioning private and public institutions; 2. Appropriate infrastructure; 3. A stable macroeconomic framework; 4. Good health and primary education; 5. Higher education and training; 6. Efficient product market; 7. Efficient labor market; 8. Efficient financial market; 9. Ability to harness the benefits of existing technologies; 10. Market size; 11.Capacity to produce new and different products using the most sophisticated production processes; and 12. Innovation. Another group of researchers, including Dollar & Wolff (1993), Markusen (1992) and Krugman & Hatsopoulos (1987), consider a country to be competitive if it harbors a large number of internationally competitive enterprises and industries. In their views, a competitive country must perform strongly in exports. So, export volume in relation to other countries, or growth in export volume, and relative labor productivity or total factor productivity are some of the measures of country competitiveness. Authors from the International Monetary Fund (IMF) such as Marsh and Tokarick (1994), and Lipschitz and McDonald (1991) consider the degree of currency misalignment as measured by real

exchange rate (RER) or real effective exchange rate (REER) as an indicator of country competitiveness.

4.2.2 Meso/Industry Competitiveness

At the meso level, competitiveness is seen from the perspective of a particular industry. The competitiveness of an industry or industry competitiveness can be assessed by a comparison with the same industry in another region or country with which there is open trade. Size and growth of market share in the world market (Mandeng, 1991), growth in exports (Balassa, 1965), price ratio (Durand and Giorno, 1987), and relative costs and productivity (Turner and Golub, 1997; Siggel and Cockburn, 1995) are some measures of industry competitiveness. However, relative industry price with the exchange rate translated into one currency (Siggel, 2006; Durand and Giorno, 1987) is a widely used measure of industry competitiveness. This measure is similar to RER or REER at the macro level except that the prices reflect one industry only instead of the general price level.

4.2.3 Micro/Firm/Business Competitiveness

Micro-level or firm-level competitiveness is indicated by a firm's capabilities (e.g., resources and competencies) and performance. Competitiveness is simply the capacity to sell one's products more profitably than others. To be competitive, a firm must be able to design, produce and market products and services superior to those offered by competitors (Buckley, Pass and Prescott, 1988). Superiority can be considered in terms of price, quality, technology and others. Similar to industry competitiveness, profitability, productivity, unit cost, market share and growth rate in relation to competitors in domestic and/or international markets are some common measures of business competitiveness (Lall, 2001; Durand, Madaschi and Terribile, 1998; Buckley et al, 1988).Today, measures of business competitiveness include variables such as innovativeness, quality, ethical standing, social responsibility, working

conditions of employees, and others that are beyond the traditional financial or market-based indicators.

These three levels of competitiveness are related to each other. Economy-wide conditions that enhance country-level competitiveness significantly contribute to building competitiveness at the business and/or industry level. Similarly, as economies are aggregate of their micro units, competitiveness at the business and industry levels are likely to enhance macro-level (country) competitiveness. Therefore, the term competitiveness is usually seen from a macro or meso perspective, but a micro (firm-level) view is essential for proper deliberation of the concept (Gorynia, 2005). Companies are the micro units who actually compete with one another and in the process develop country competitiveness at aggregate. Porter (1990) suggests that competitiveness is rooted in a nation's microeconomic fundamentals. As a result, WEF, the international body that publishes a Global Competitiveness Report (GCR) of the countries around the world, has incorporated a companion Business Competitiveness Index (BCI) to focus on the microeconomic drivers of prosperity. The new Global Competitiveness Index (GCI), created by Sala-i-Martin and Schwab (2004), includes both macroeconomic and microeconomic factors.

The focus of this research is business or firm-level competitiveness, and in the following section, the researcher elaborates on firm competitiveness, its measures and determinants.

4.3 FIRM/BUSINESS COMPETITIVENESS

Definitions of business/firm competitiveness available in economics literature can be classified into two broad categories: capability view and outcome view.

According to the capability view, competitiveness is a company's capacity to design and sell its goods and services at prices, quality and/or other features that are more attractive to

customers than those of the competitors (Buckley et al., 1988). Business competitiveness means adapting a company's products to the market and its competition requirements in terms of product range, price, quality, sales channels, promotion and others. Therefore, to be competitive, a firm must formulate strategies to increase sales and/or unit margin.

Two major economic theories—Producer theory and Trade theory—help us to understand and define this capability view of competitiveness. Producer theory suggests that all firms strive to maximize profits, subject to the constraints of their production function that determines the amount it sells. As long as profitable opportunities exist, firms and industries will increase their production and sales. Thus, the existence of profits suggests a business or industry with increasing competitiveness (capacity to sell profitably) just as losses suggest falling competitiveness. Proponents of producer theory argue that to make profits and expand sales, companies must be able to bring unit costs below market-determined prices. Costs are thus the fundamental determinants of competitiveness.

Standard trade theory explains competitiveness in an international context and identifies the causes of world trade. According to this theory, fundamental determinants of competitiveness are divergences in technologies, cost and/or quality advantage of the factors of production, returns on scale, price distortions, etc. In other words, productivity differentials in terms of technical and allocational efficiencies (Cracolici, Nijkamp and Rietveld, 2008; Oral, Cinar and Chabchoub, 1999; Cockburn, Siggel, Coulibaly and Vézina, 1999) are the sources of competitiveness.

Strategic management literature focuses on the importance of firm-specific resources in determining the variance of performance among firms. Resource-based, competence-based and/or knowledge-based views of competitiveness have evolved from this literature. According to these views, a firm's competitive advantage is achieved by controlling the

endowment of rare, valuable, non-substitutable and inimitable resources and capabilities (Barney, Wright and Ketchen, 2001; Conner and Prahalad, 1996).

The second strand of literature view competitiveness as the outcome of a company's competitive advantages and/or core capabilities/competencies. Competitiveness is the long-run profit performance of a business, superior return to its owners, and better compensation to the employees (Buckley et al., 1988). According to Ajitabh and Momaya (2004), competitiveness is a company's market share in a competitive market. In fact, competitiveness is a relative concept. To understand the degree or level of competitiveness of an economic unit or business, we need to have benchmarks, which are usually the major competitors. In other words, competitiveness is performance in relation to competition in the market. Competitiveness is also defined in economic literature from the perspective of relative cost-benefit. This approach is devoted to measuring the costs and benefits of specific projects compared to those of others (Krueger, 1998; Siggel, 2006; Siggel and Cockburn, 1995).

Researchers such as Ajitabh and Momaya (2004), Buckley, Pass and Prescott (1992), Porter (1990) and others have defined business competitiveness as a multi-dimensional concept. Their main argument is that no single measure of competitiveness can entirely capture all of its relevant dimensions.

Porter (1990) ascertains four main determinants of competitiveness, namely (i) factor condition (ii) enterprise strategy, market structure and rivalry; (iii) encountered demand condition; and (iv) the conditions of related industries. This model, although popular as Porter's Diamond model of national competitiveness, is vital for our understanding of business competitiveness. The Diamond model (1990), presented in Figure 5, lays the groundwork to connect macro and micro views of competitiveness (Chikán, 2008).In line

with Heckscher and Ohlin's (1991) perspective of factor proportion theory, Porter(1990) argues that the abundance and endowment of certain basic and advance factors of production enhance competitiveness. Land, labor, natural resources, access to funds, infrastructure, etc. are basic factors, whereas advance factors include knowledge base, skill sets, specialized technology and others. Training, research and innovation create advance factors. Nations and/or organizations must continually upgrade their factor conditions to sustain and enhance competitiveness. Company strategy, market structure and rivalry correspond to the context or the gravity of direct competition that encourages continuous efforts for improvement and innovation. Demand conditions represent the size of the product's market and the nature of customer expectations. Strong, sophisticated and aspiring demand conditions persuade organizations to constantly improve their products and services. Related industry conditions are characterized by competition in supporting and competing industries as well as the availability of substitutes. They create conditions for companies to not only become cost efficient and receive more innovative parts and products but also to strive for constant improvement so that substitutes do not steal market share.

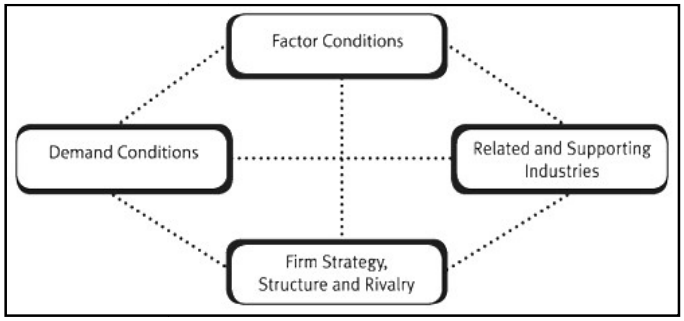

Figure 5: Porter's (1990) Diamond Model of Competitiveness

Buckley et al. (1992) argue for an integrated measure of competitiveness along three aspects of businesses/industries: competitive performance, competitive potential, and competitive process (Figure 6). Competitive performance is performance relative to that of competitors

and is measured by profitable market share. Competitive potential refers to the resources used to generate (superior) performance, which include technological development, long-run price, and cost effectiveness. Competitive process relates to a company's management (administration) represented by closeness to the customer base, investment strategy, technology commercialization, and attitude toward customers and employees.

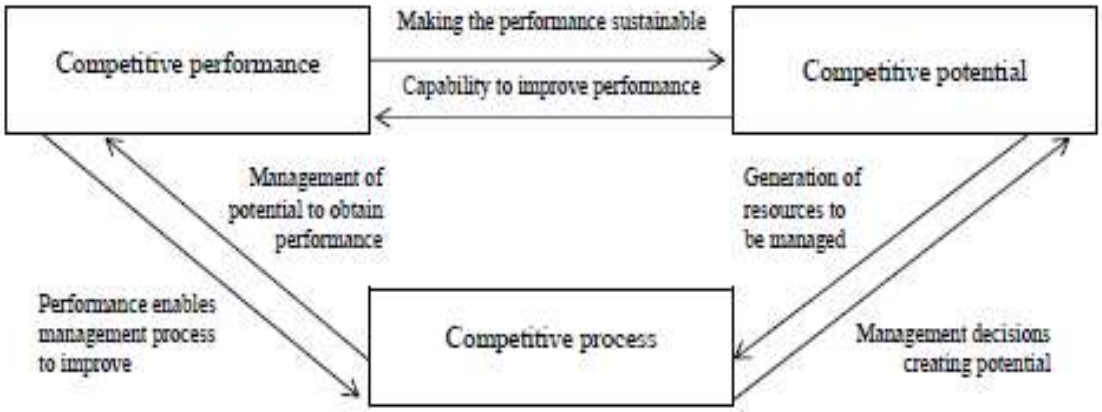

Figure 6: Buckley's (1992) Integrated Model of Competitiveness

Ajitabh and Momaya(2004) use the asset-processes-performance(APP) framework to describe business competitiveness. They suggest that competitiveness at the organizational level depends on the mix and structure of its assets—tangible and intangible assets (knowledge, skill, reputation, trademark, etc.)—and processes within the organization (e.g., strategic management process, operations processes, technology management, human resources management, and others). Assets and processes together create competencies and competitive advantage that generate competitive performance reflected in firm productivity, cost efficiency, profitability, etc.

Depperu and Cerrato (2005) summarize the literature on firm-level competitiveness and present the concept in a multi-dimensional matrix (Figure 7). One dimension considers the degree of dependence in competitiveness. When treated as a dependent variable,

competitiveness is the outcome of a company's competitive advantages and/or core capabilities/competencies. On the other hand, competitiveness can be seen as an independent variable, as a driver of an organization's performance. Research in this area focuses on the sources of a company's competitive advantage. The main classification of these sources is twofold: internal resources—tangible and intangible assets and an organization's resources and external resources, which include market structure and rivalry, encountered demand and supply conditions, and related industries' conditions.

Approach / Nature of competitiveness	Static (assets/resources)	Dynamic (processes)
Driver	Resource based view	Competence based view
Outcome	Financial ratios, market share, other non-financial parameter	Trends of profitability, market based and other growth indicators

Figure 7: Depperu and Cerrato's (2005) Multidimensional Framework of Competitiveness

The other dimension considers competitiveness as a dynamic and/or static concept. Static view perceives competitiveness as a company's relative performance at a particular time. However, organizational performance is not a static construct, rather it changes over time. The same is true for competitiveness. In sum, competitiveness is a dynamic concept. Therefore, any measure of business competitiveness should take into account a long-term rather than limited-term view. A dynamic analysis should emphasize the trends of performance indicators over time.

When competitiveness is considered as an independent variable (e.g., resources and capabilities) both internal and external resources can be classified as static and dynamic. A static view focuses on existing assets and resources whereas a dynamic view focuses on a firm's strategies, human resource capabilities, knowledge base, and process excellence, among other factors. Dynamic capabilities are those that transform resources into new sources of competitive advantage (Teece, Pisano and Shuen, 1997).

When viewed as dependent variable, competitiveness is the outcome of competitive capabilities and resources. Static indicators of competitiveness as outcome include financial ratios, profitability, market share, etc. Trends in profitability, market share and other growth indicators are the dynamic estimates of competitiveness when seen as an outcome.

The next section presents different measures of competitiveness when the outcome view is applied. The objective of this section is to present a framework to measure business or firm-level competitiveness in an objective manner.

4.4 MEASURES OF FIRM/BUSINESS COMPETITIVENESS

Although very few research studies describe the measurement of competitiveness at the business level, there does exist immense diversity and complexity in this measurement due to the varying views of researchers on the subject (Guzmán, Gutiérrez, Cortes and Ramírez, 2012).

Research studies present one-dimensional, two-dimensional and multidimensional measures, as mentioned in previous section. A good example of a multi-dimensional measure is the global competitiveness index (GCI), which considers dimensions including: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development,

technological readiness, market size, business sophistication and innovation. Competitiveness measures can also be classified into two categories: static (assessing the competitiveness level at any point of time) and dynamic (assessing the changes in competitiveness over time). A further distinguishing characteristic of the measures of competitiveness is their positive or normative nature. Positive indicators are based on observable evidence; thus they reflect actual performance. Normative indicators, on the contrary, involve value judgments. Closely related to this distinction is the one between ex-post and ex-ante measures. Ex-post competitiveness is given, for example, by measures of trade (e.g., market share) and current-account balance, both based on past information and thus have limited power to assess potential performance. Potential (ex-ante) competitiveness demonstrates a capacity to compete and relies on indicators of technology, price and cost. A good example of an ex-ante measure is real (effective) exchange rate, which can be calculated by using export prices, import prices and unit labor costs .Moreover, when assessing competitiveness, it is also important to determine if a measure represents the source or the outcome of competitiveness. For instance, low price, low cost and high productivity result in better business outcomes; hence enhance a company's competitiveness. On the other hand, market share, profit growth and trade balance represent a company's competitiveness.

As the focus of this research is to represent competitiveness as a function of working capital management, the researcher takes the outcome view. Therefore, in this research, competitiveness is considered to be a dependent variable. However, both static and dynamic aspects are covered, and competencies and capabilities are seen as a means for achieving outcome or competitive performance.

Competitiveness, when considered from the outcome view, is usually measured by variables or ratios related to company profitability, productivity, export performance and/or market

share. Return on sales (ROS), return on assets (ROA) and return on equity (ROE) are commonly used measures of profitability because of their ease of calculation and universal definitions (Liargovas and Skandalis, 2010). Sound financial performance suggests increasing competitiveness and vice versa. Market share and price/cost advantage are alternately used measures of business competitiveness. In such cases, market share is considered as an outcome and price/cost advantage is the cause (Buckley et al., 1992; Golub, 1994).Unlike the absolute measure of profitability, market share reflects the performance of a company in relation to its industry rivals.

Authors like Oral and Kettani (2009), Ezeala-Harrison (2005), Fendel and Frenkel (2005), Buckley et al. (1988) and others strive for a comprehensive measure of business competitiveness. Their measures include many factors that are internal (e.g., capacity for innovation, brand extension, human capital, etc.) and external (e.g., market size, number of competitors, competitors' strategy, etc.) to a company as well as some exogenous variables (e.g., market efficiency, restrictive regulation, laws of competition, etc.). However, most of these models fall short in suggesting any conclusive measure/proxy of these variables or to offer benchmarking, which makes these models difficult to operationalize. In an attempt to address the abovementioned pitfalls of existing measures, Guzmán et al. (2012) developed a composite measure consisting of three dimensions, namely financial performance, cost reduction, and use of technology. Adapting methodologies from strategic management literature, they created scales of six items for each of these dimensions and sought out business managers' feedback using a five-point Likert scale. Companies' self-evaluation and their use of the Likert scale have made such measurements subjective and prone to respondents' personal biases.

In practice, different award-giving organizations around the world have formulated indices to measure competitiveness. For example, *Real Business* magazine, which gives out the United Kingdom's Company of the Year Award, uses a set of outcome indicators and a self-declaration by CEOs stating why their company deserves such an award. Belgium's HSBC International Growth Strategy of the Year Award selection committee uses international organic growth strategy to achieve improvements in sales, profit and market share as its only evaluation criteria. Similarly, growth rate is the sole criterion for Deloitte's award. Adjudicators for the Porter Prize, launched in 2001, consider only a firm's profitability. Overall, most award models consider a small subset of criteria to measure business competitiveness, usually outcome measures like sales, growth and profit. Perhaps the assumption behind the use of outcome measures is that outcome reflects the availability of unique resources and the effectiveness of utilizing those resources.

4.5 NEW FRAMEWORK TO MEASURE BUSINESS COMPETITIVENESS

Given the above discussion, this section considers the issues with existing measures of business competitiveness.

Literature that measures competitiveness as performance mostly focuses on financial performance and uses sales and common profitability ratios as proxies of competitiveness. However, competitiveness is performance in relation to competitors so a market-based measure is essential. Some researchers use market share as a measure of market-based performance, but in these days of price competition, companies often cut prices or sacrifice profitability to gain market share. As such, an alternate relative or market-based measure of profitability is necessary. The researcher addresses this issue by taking normalized/standardized measures of profitability. A standardized measurement takes the difference of firm performance from the best or average performance in the industry and

divides it by a measure of dispersion (Filbeck and Krueger, 2005; Dodge, 2003). Thus standardized values convert all measurements to one standard scale and allow them to be comparable.

If ROA is our profitability measure, normalized roa can be measured using one of these two formulae:

$$roa_{it} = (HROA_t - ROA_{it})/(HROA_t - LROA_t) \quad \text{.....(1a)}$$

or

$$roa_{it} = (ROA_{it} - AVGROA_t)/SDROA_t \quad \text{.....(1b)}$$

Where, roa_{it}= Standardized ROA of company *I* at time *t*

ROA_{it}= ROA of company *i* at time *t*

$HROA_t$= industry highest ROA at time *t*

$LROA_t$= industry lowest ROA at time *t*

$AVGROA_t$= industry average ROA at time *t*

$SDROA_t$= standard deviation of the ROAs of all companies in a particular industry at time *t*

Standardized value determined by equation 1(a) can be used for any distribution of profitability measure but is likely to be biased by extreme values. Use of equation 1(b) tackles the extreme value problem but it is only applicable for normally distributed data sets. Normality assumption is reasonable for industries that have a large number of players and are not suffering from monopoly or oligopoly.

Another issue arises from the fact that competitiveness is a persistent (dynamic view), superior performance over and above competitors. Some researchers have taken growth in market share and/or growth in profitability as a dynamic measure of performance. However, growth in market share is somewhat incomplete as a measure of competitiveness due to the problem with market share as stated earlier. Growth in profitability is inadequate as it leaves out the relativity of the measure. Moreover, positive growth over the last year does not necessarily ensure persistent performance. It can happen that in one year there is tremendous growth but in other years there is zero or negative growth. Jacobsen (1988) and Schohl (1990) show that normalized firm performance over time tends to follow a first order autoregressive process. This autoregressive property reflects whether and how fast above-average performance converges upon normal long-run performance (McGahan and Porter, 2003; Mueller, 1992).Thus, persistent profitability can be measured by the β coefficient and α in the following autoregressive process:

$roa_{it} = \alpha + \beta\ roa_{i(t-1)} + e_{it}$……(2) where, e_{it} is error term.

β is the persistent measure.An estimate of β that is significantly higher than 1 (one) indicates that good performance (above average profitability) persists indefinitely. More generally, the higher is β , the more persistent the performance. The parameter α indicates the level upon which profits converge in the long run. An estimate that is significantly greater than 0 indicates that the firm earns relatively high long-run profits. Therefore, the higher is α , the more persistent the profit.

Therefore, this researcher argues for using the measures of normalized profitability and their persistence parameters as the measures of competitiveness.

Profitability measures (in whatever form) only reveal the past and present competitiveness of a firm and cannot fully appraise whether and to what extent the firm will remain competitive in the future. In fact, past performance and related persistence parameters do not provide enough information about the sustainability of performance in future. Comprehensive measures of competitiveness proposed in the literature have addressed this issue. For example, Buckley et al. (1992) measure competitiveness in three ways: competitive performance, competitive potential and competitive process .Porter's (1990) multi-dimensional view of competitiveness suggests four main determinants of enterprise competitiveness: enterprise strategy, market structure and rivalry, encountered demand and supply conditions, and related industries' conditions. But such measures are problematic because of the subjectivity in measurement, vagueness in identifying the right variable, and the need for a huge amount of micro- and macro-level data. Therefore, we need an objective proxy to measure a firm's prospective competitiveness.

An estimation of a firm's intangible resources such as its managerial capabilities to utilize tangible resources and available opportunities in the market, unique strategies, technological and/or operational excellence, and others can be considered as proxies of its prospective competitiveness. Anderson (1992) proposes that the value of a firm's intangible assets can be estimated as the difference between a firm's market value and the replacement cost of its tangible assets. When capital markets are efficient, security prices provide the best estimate of the value of the firm's resources (Malkiel and Fama, 1970; Ross, 1983). Several studies such as Hall, Jaffé and Trajtenberg (2000), Lev (2001), Teece, Rumelt, Dosi and Winter (1994) and others have used Tobin's q, which is the ratio of a firm's market value and book value (balance sheet value) or its variations as a measure of resource intangibility. Therefore, this research proposes q to be measured using the following formula as a measure of prospective competitiveness.

$q_{it} = MV_{it}/BV_{it}$ ……(3)

Where, q_{it}= prospective competitiveness of firm i at time t

MV_{it}= market value of firm i at time t

BV_{it} = book value of firm i at time t (firm's balance sheet value)

MV_{it}= P_{it}* no of shares outstanding; P_{it} = price per share of firm i at time t

The higher the value of q, the better is a business' prospective competitiveness.

To summarize, the researcher proposes three measures of business competitiveness in this chapter: i) normalized value of profitability, ii) persistency parameter β and α from the first order autoregressive process of the normalized profitability, and iii) Tobin's q. ROA is found to be the most commonly used measure of performance/profitability (Lalinsky, 2013; Guzman et al., 2012; Depperu and Cerrato, 2005). However, the choice of profitability ratio may vary depending on the purpose and use of the competitiveness measure. More than one measure of profitability can also be used. How many and which profitability measures should be included can be determined by conducting a factor analysis of the different profitability measures.

The main advantage of the proposed measure is that all of the component variables are readily available in companies' financial statements and the measures are objective. If the focal firm is not a publicly listed company, the determination of market value becomes subjective. In economies where capital markets are not well performing or inefficient, the assumption behind using Tobin's q as a measure of competitive prospect is violated. In this case, alternative measures need to be identified.

5. LITERATURE ON WORKING CAPITAL MANAGEMENT PRACTICES AND FIRM PERFORMANCE

Research on working capital management gained momentum in the sixties (Walker, 1964; Gentry, 1988). Researchers have focused on many different aspects of managing working capital. For example, Smith (1973), Kim and Chung (1990), Van Horne and Wachowicz(2005), Eljelly(2004) and others worked towards determining an optimal level of working capital while others such as Moyer, McGuigan and Rao (2007), Soenen (1993) and Joshi (1995) focus on the frequent, repetitive and time consuming nature of working capital decisions and argue for high involvement of management and formal policies and strategies with respect to working capital management. Weinraub and Visscher (1998), Vishnani and Shah (2007), Salawu (2007), Nazir and Afza (2009) and others highlight the working capital policies and strategies devised and followed by organizations and their implications on the organizational bottom-line. Shin and Soenen (1998), Van Horne and Wachowicz (2005), Filbeck and Krueger (2005) and others proposed measures of working capital efficiency and argue that the significance of working capital efficiency is irrefutable. Others such as Burns and Walker (1991), Mintz and Lazere (1997), Corman (1998), Chowdhury and Amin (2007), Mathuva (2010) and Bhattacharya(2014) surveyed on overall working capital management practices in particular economies and industry sectors. These studies highlight general practices, tools and techniques used in working capital management. Many researchers have focused on a particular component of working capital management. For instance, Hill, Sartoris and Ferguson (1984), Gitman and Maxwell (1985), and Petersen and Rajan (1997) studied practices in short-term credit and payables management. Schiff and Leiber (1974),

Lieber and Orgler (1975), Mian and Smith (1992), Asselbergh (1999), Buzacott and Zhang (2004), Salek (2005), and Michalski (2009, 2012) deliberate on inventory and receivables management practices and assert their interdependence in relation to working capital management. Firth (1976) and Opler, Pinkowitz, Stulz and Williamson(1999) elaborate on cash and marketable securities management in light of policy, strategy, practices and other factors associated with working capital management.

Therefore, working capital literature can be characterized as focusing either on management practices in relation to working capital and its components, or on the association between working capital management and firm performance. Therefore, section one of this chapter presents surveys on working capital practices, section two details studies relating to working capital management and firm performance, section three highlights relevant research in the context of Bangladesh, and in the final section, the researcher identifies the research gaps and formulates research hypotheses based on a summary of the literature presented in this chapter and the previous chapter on business competitiveness.

5.1 WORKING CAPITAL MANAGEMENT PRACTICES

Using *CFO Magazine*'s annual Working Capital Management Survey data, Filbeck and Krueger (2005) determined a benchmark for working capital performance. They also provide a ranking of working capital management performance across industries and project the changes in working capital performance over time. The common working capital measures used in the study include cash conversion efficiency (CCE = Cash flow from operations/sales).This value indicates how well a company transforms revenues into cash flow. Another measure was days of working capital (DWC= (Receivables + Inventory – Payables) / (Sales/365)) representing the time period between inventory purchase on account until its sale to customers, the collection of receivables, and payment receipt. Thus, it reflects

a company's ability to finance its core operations with vendor credit. Component-wise turnover rate such as receivables turnover, inventory turnover, payable turnover or days sales outstanding as well as days of inventory and days payable outstanding are used to measure performance in managing receivables, inventory and payables. Differences in the aggregate value and their standard deviation across industries indicate that depending on the nature of business, benchmark value must also differ. Changes in the values over time reflect that working capital needs and practices change with the company's growth, decline, and/or shifts in competition, strategic focus, etc. Changes may become inevitable due to changed macroeconomic factors like interest rate, inflation, investment climate, etc.

Khoury, Smith and Mackay (1999) conducted a survey on the working capital management practices of Canadian firms with a survey instrument designed to complement questionnaires used in similar surveys in the United States (Smith & Sell, 1980; Belt & Smith,1992) and Australia (Belt & Smith,1991). Their work projected how working capital practices vary across time and across international borders. Results reveal that about half of the firms in all four surveys do not regularly review their working capital. Rather it is done at manager's discretion. Conservative policies are more prevalent in Canadian firms compared to their U.S. and Australian counterparts. In terms of managing cash and equivalents average, U.S. and Australian firms are more sophisticated than Canadian firms in their use of set guidelines, daily cash budgeting, investment strategies, etc. Results are similar with reference to inventory and receivables and payables management. Authors argue that the average smaller size of Canadian firms is responsible for the differences found among the survey results.

Pandey, Gupta and Perera (1997) investigated the working capital management of manufacturing companies listed on the Colombo Stock Exchange (CSE) in Sri Lanka, and compared the results with those of U.S. companies. They found that majority firms in Sri

Lanka have informal working capital policies. The managing director plays a major role in formulating policy and finance managers have the responsibility of managing working capital components. The use of material requirement planning and perpetual inventory control is commonplace for inventory management of companies listed on the CSE. Stretching payables and monitoring aging schedules are predominant techniques of managing cash disbursement and customer credits, respectively. Current ratio and cash budgeting are widely used techniques for planning and controlling working capital. The majority firms in Sri Lanka accept cash discounts, which enhances the cost of funding working capital. When compared to the working capital practices of U.S. companies, the prominent difference is in computerized system usage and the lack of scope to invest idle funds in money market securities.

Zhao (2011) studied working capital practices of companies in Australia based on a survey of 120 corporations. The study reports that most of the companies emphasize the importance of working capital management for smooth operations and performance and put in place structure, governance and dedicated resources for this purpose. Term sheets, rollover agreements, outsourcing and securitization are prominently used methods of working capital management. For cash management, companies in Australia emphasize the centralization of decisions, timely payments, diversification of bank transactions, standardization of liquidity parameters, netting, etc. Sales forecasting, material requirement planning, enterprise resources planning, just-in-time system, and economic order quantity (EOQ) models are commonly used inventory management tools. In most cases, working capital is financed through term loans, lines of credit, money market securities and bank bills. However, Zhao (2011) asserts that working capital practices vary with certain fundamental factors such as firm size, company profitability, credit ratings, industry as well as education, gender and age of the working capital manager. He also examined how working capital managers' behavioral

biases affect working capital management and firm performance, and proposed a desired profile set for a good working capital manager.

Perera and Wickremasinghe (2010) observed that most of the manufacturing companies in Sri Lanka have an informal working capital management policy. The managing director usually takes the critical responsibility of formulating working capital policies and the finance manager manages the working capital components. Credit payment lags and aging schedules are the major techniques for managing trade debtors and creditors. The primary tools of inventory management are a perpetual inventory control system and material requirements planning. Most of the sample companies use cash budget and current assets ratio for planning and controlling their working capital. Sales growth and profitability are found to be associated with working capital management practices.

Salawu (2007) investigated working capital investment and financing policies across 15industry sectors over a ten-year period. He concludes that firms pursuing aggressive working capital investment policies match them with conservative working capital financing to balance the risk under the former through the safety offered under the latter. The study also projects inter-industry differences in working capital policies.

Burns and Walker (1990) surveyed small companies in the United States and asserted that small companies often do not have formal and/or written working capital management policies, but those that do are more profitable. In general, more profitable firms regularly (monthly or quarterly) review their working capital policies. Current ratio is found to be the most common measure of working capital. High current ratio indicates a higher level of working capital. Computers are used mostly for managing accounts receivable and accounts payable and to a lesser extent for inventory control and cash budgeting. The majority of the companies surveyed for the study use cash budgeting on a weekly basis to plan for cash

shortages and surpluses, however firms with aggressive and/or written working capital policies do this on daily basis. In most cases idle cash is invested in certificates of deposit. Companies typically used the 5C's of credit to grant credit to their customers. Collection period and aging schedules are used to monitor credit customers' payment behavior. In determining credit terms and policies, the impact on sales and possible bad debt losses are considered. The survey revealed that most companies have a computerized system in place to determine the reorder point of inventoried items. Only the profitable firms were found to take a discount on payables. Aggressive firms and those with written working capital policies were more likely to be net users of trade credit. One fourth of the firms in Burns and Walker's (1990) study did not engage in short-term borrowing. Only the companies with aggressive working capital policy borrowed in the short-term and used those funds to finance the regular and constant part of their working capital needs. Commercial banks initiated almost all of the short-term loans taken by companies in the study, most often in the form of a simple loan or line of credit and/or stretching payables. Only the firms with high profitability and/or a written working capital policy were able to obtain loans without collateral.

Based on a survey on Mauritian small- and medium-sized enterprises (SMEs), Padachi and Carole (2014) reveal that smaller firms fall behind larger firms in terms of working capital policies, and overall management of the same. Owners/managers' education or professional qualifications in accounting and finance was found to be another important factor that influenced working capital management practices. This study also reveals that there are inter-industry differences in working capital management practices. Among the three industry sectors covered in the study, the food and beverage sector represents lower debtor days. Atrill (2005) argues that in most cases, SMEs are plagued with problems in managing working capital, especially in the collection of receivables. He attributes this problem to the lack of expertise, resources and relevant procedures.

Research conducted by Kiprotich, Wanjare, Joab and Oluoch (2013) on sugarcane out-grower companies in Kenya reveals that in general, companies are conservative in their working capital management practices. The trade receivables period was found to be longer than the payables period, which indicates that receivables and payables management schemes were not used coherently. Most companies in the study had appropriate policies and practices, such as the prompt issuance of invoices, late payment charges, overdue notice issuance, deployment of collection agencies, and others means of accelerating collection and efficient receivables management. However, such initiatives were not sufficient to mob-up receipts. Additionally, the majority of the companies failed to utilize payables as a sheer source of financing. With regard to inventory management, the companies unnecessarily held stock for long period although they had a low stock-out risk. Due to a problematic order management system, the companies generally incurred considerable additional costs to face the (occasional) uncertainties in supply and demand. Finally, they maintained an excessive cash balance, which exerted a negative pressure on profitability. There was also a lack of innovation in controlling cash balance and investing the excess cash.

5.2 ASSOCIATION BETWEEN WORKING CAPITAL MANAGEMENT AND FIRM PERFORMANCE

Research focusing on the relationship between working capital and firm performance can be classified into three groups. The first group reveals a negative relation between working capital and firm profitability, and the findings recommend lowering the level of working capital to enhance profitability. On the other hand, the second group of research portrays a positive association between the components of working capital and business profitability. These researchers advocate for maintaining a high level of working capital to ensure smooth operations and sales, hence enhanced profitability. A third group of research displays mixed

relations and suggest an optimal level of working capital that encounters a balance between availability and the costs of holding working capital.

5.2.1 Negative Association

Shin and Soenen (1998), Lazaridis and Tryfonidis (2006), Raheman and Nasr (2007),and others measured working capital with the CCC, which is a composite measure of a stockholding period, debtor collection period, and creditor payment period. Researchers such as Baños-Caballero, García-Teruel and Martínez-Solano (2014) and Nazir and Afza (2009) reveal that greater investment in working capital as indicated by a longer CCC leads to a reduction in a firm's profitability. Wang (2002) used a sample of Japanese and Taiwanese firms and found that a shorter CCC leads to a firm's better operating performance. Deloof (2003) used a sample of Belgian firms to investigate the impact of working capital components on firm profitability and his findings reveal that firms can increase their profitability by reducing the debtor collection period and the days-in-inventory period. He also found that less profitable firms wait longer to pay their bills. Juan García-Terueland Martinez-Solano (2007) took samples of small to medium-sized Spanish firms between 1996 and 2002, and their study found that firms can create value by reducing the days-in-inventory period and the debtor collection period, thus leading to a reduction in the CCC. Based on data from 48 companies listed on the Cyprus Stock Exchange during the period 1998 to 2007, Charitou, Elfani and Lois (2010) assert that the CCC and all of its major components—days in inventory, days sales outstanding, and creditor payment period—are negatively associated with a firm's profitability (ROA).In Padachi and Carole's (2014) examination of trends in working capital management and its impact on firm's performance, results prove that a high investment in inventory is associated with lower profitability. Further, they show that the inventory-holding period had a negative relation with profitability. Mathuva (2010) also

conducted a study on the impact of working capital on the productivity of the companies listed on the Nairobi Stock Exchange using data collected between 1993 and 2008.The study found a negative relationship between the time required to collect cash from customers and business productivity—companies that are more profitable enjoy a shorter time period for cash collection from customers as compared to less profitable firms. Thus, when CCC is shorter, business profitability is likely to be higher. Based on 2001–2006 data from 1,063 companies listed on the Tehran Stock Exchange, Alipour (2011) asserts that there is a significant negative relationship between the CCC, days of accounts receivable, inventory turnover in days, and profitability. The paper concludes that managers can create value for stockholders by decreasing the amount of receivables and/or expediting customer credit collection alongside efficient inventory management. Overall, CCC reduction that does not create disorder in operations will improve performance.

Cotis (2004) states that a reduction of 10 days in the CCC of American companies leads to a 0.26% increase in profitability. Companies with lower than average CCCs have higher than average stock returns. Poirters (2004) indicates that the marginal benefit of a lower CCC is 1.3 million in terms of market capitalization. Bhatia and Srivastava (2016) studied 179 companies listed on the Bombay Stock Exchange index using four measures as proxies for working capital efficiency—CCC, ARD, ID and APD—and two measures of firm performance—gross operating profit (GOP) for financial performance and Tobin's q, which is the ratio of firm's market to book value for market performance. They found that the CCC has a significant negative impact on both financial and market performance. This indicates that firms can improve performance by shortening their CCC. In fact, a shorter CCC implies a shorter average collection period, better inventory turnover, and longer payable period. As a result, working capital maintenance costs decline and less funds remain tied up in working

capital, which reduces the requirement of working capital finance, thus lowering financing costs. Companies ultimately enjoy better margins and enhanced firm value.

Based on the results of the empirical studies presented above, it can be asserted that firms should strive to reduce the amount of working capital to enhance profitability.

5.2.2 Positive Association

However, Perera and Wickremasinghe (2010) state that current assets are about one-third of the total assets of a company in the United States. Burns and Walker's (1990) study on small manufacturing firms in the country reveals that 39% of an average company's total assets are working capital. Sartoris and Hill (1988) argue that for a typical manufacturing firm, current assets represent 40% of total assets; the ratio is even higher in some service sectors and retail businesses. Deloof's (2003) study shows that a significant amount of funds are tied up in the working capital of Belgian firms. Summers and Wilson (2000) also found that more than 80% of daily business transactions in the United Kingdom's corporate sector are on credit terms that accumulate to receivables accounts. Researchers such as Blinder and Maccini (1991) argue that investing more in the CCC (conservative policy) may lead to increased profitability since maintaining high inventory levels is expected to increase sales, reduce supply costs, reduce the cost of possible interruptions in production, and protect against price fluctuations. A higher debtor collection period may also strengthen the relationship with customers, leading to an increase in sales revenue (Ng, Smith & Smith, 1999).

Atrill (2005) found that less than half of SME owner/managers surveyed view accounts payable as a source of finance for their businesses. Hence, the time for repayment was insignificant to them. Similarly, Talha, Christopher and Kamalavalli (2010) assert that the longer the accounts payable period, the more advantageous for the firm as such funds can be put to other uses. Mathuva (2010) notes a high positive relation between firm profitability

and the time to convert inventory into sales and that to pay the suppliers. Alipour (2011) reveals that days of accounts payable depicted a positive association with profitability, which means that delaying payments may positively impact a company's profit.

5.2.3 Mixed Association

Yegon et al. (2014) conducted panel data analysis of six tea companies in Kenya using data collected between 2005 and 2012. The empirical results did not support the influence of an average collection period and an average payment period on net operating profit. This study found a significant positive association of gross working capital or current assets to total assets ratio with net operating profit. However, current liability to total assets ratio was found to be negatively related to net operating profit. In the Alipour (2011) study, the trade payables period was found to be substantially shorter than the receivables period. This means that the companies were accelerating their payables more than their receivables. To explain this phenomenon, the researcher argues that a longer accounts holding period can erode a firm's credit worthiness.

Muhammad, Jabril, Wambai, Ibrahim and Ahmad (2015) examined the influence of working capital management on the profitability of food and beverage companies listed on the Nigerian Stock Exchange. They used data from annual reports over the period 2008 to 2012. The results indicate that the Average Collection Period (ACP) has a positive relationship, whereas Inventory Turnover Period and Average Payment Period have a negative relationship with profitability. The authors explain the positive association of ACP with profitability with reference to inefficiency in the management of collected funds. They recommend quick short-term investment of collected funds and a reduction of idle cash balance. Therefore, companies may boost operating profits by maintaining a high level of current assets and lowering current liability. Pandey et al. (1997) investigated the relationship

between working capital management and profitability by considering profitability as the independent variable. They assert that firms with higher profitability enjoy flexibility in accessing cheaper sources of working capital finance and adopt more sophisticated tools and techniques for working capital management. However, the data did not represent any statistically significant relationship.

Ndagijimana (2014) studied all of the registered SMEs in Nairobi and asserts that a balance between credit and cash sales and the proper management of accounts receivable and accounts payable is crucial, so as to enhance the efficiency of business processes and to avoid the challenges emanating from over/under liquidity as both are essential for maintaining good performance.

Padachi (2006) examined the trends in working capital management and its impact on firms' performance for 58 small manufacturing firms in Mauritius using data collected between 1998 and 2003. He explained that well-designed and implemented working capital management is expected to positively contribute to the creation of firm's value.

Kiprotich et al. (2013) assert that weaker financial performance of the sugarcane out-grower companies in Kenya was due to their poor and misguided working capital management practices. In this study, asset accumulation, membership and net profit were used as measures of financial performance.

Li, Dong, Chen and Yang (2014) studied the working capital configuration, competitive strategic choices, and the relationship between working capital and firm performance of the wholesale and retail companies listed on the Shenzhen and Shanghai stock markets. Results indicate that depending on the competitive strategy pursued, each company has a target optimal working capital configuration and policy. Moreover, the marginal effect of working capital management on financial performance varies among the different strategies. For

example, companies following the differentiation strategy usually maintain a high level of receivables and inventory to enhance serviceability; hence their performance is highly sensitive to working capital management. On the other hand, companies adopting a cost leadership strategy maintain a lean level of working capital and a higher amount of payables. For these companies, marginal adjustments in working capital management do not affect performance significantly. Companies with hybrid strategies sit in the middle in this regard.

Sharma and Kumar (2011) investigated the relationship between working capital management and profitability of 263 Indian firms listed on the BSE covering 15 industry sectors. They used data for the period 2000 to 2008, and results indicate a negative relationship between profitability and the number of days accounts payable and number of days of inventory, and a positive relationship between profitability and number of days accounts receivable. However, the CCC, which is an aggregate measure of working capital, showed a positive relationship.

Afrifa (2015) investigated the effects of working capital management practices on profitability of SMEs listed in the alternative investment market from the perspective of a finance director/manager. Data were collected using a questionnaire that asked for respondents' perceptions on the management of working capital and its components in terms of target level, frequency of review and adjustments, strategy and importance to profitability. Results indicate that working capital management affects SMEs' profitability. Specific target levels and the frequency of alteration are relatively more important than strategy.

In summary, the literature relating to the role of working capital management practices on business competitiveness is diverse in terms of the context (e.g., country/economy, type of companies studied, etc.) and variables used (e.g., measures of working capital and firm performance). Moreover, results of the studies are very divergent.

5.3 LITERATURE ON WORKING CAPITAL MANAGEMENT IN THE CONTEXT OF BANGLADESH

In the context of Bangladesh, few studies have focused on working capital management and its influence on profitability. Most researchers have focused only on one particular industry sector, like pharmaceuticals or the cement industry. Only Quayyum (2012) studied the whole manufacturing sector but collected data only from pharmaceuticals, food, cement and engineering companies. Moreover, Chowdhury and Amin's (2007) research is the only work to focus on the details of managing the components of working capital in the country. Other research is limited to the measures of working capital efficiency and policies and investigated their influence on firm profitability from a high level. Therefore, it can be argued that this in-depth study of working capital management practices and their influence on firm performance will offer new insights for academics and practitioners.

Chowdhury and Amin (2007) critically evaluated working capital practices of pharmaceutical manufacturing companies listed on the Dhaka Stock Exchange. In terms of cash management, most companies maintain a predetermined optimum level of liquidity. Credit sales are not commonplace among the companies surveyed. Nevertheless half of the companies that offer credit sales use 5C analysis for evaluating customers, while the remainder do not conduct any specific evaluation. The days sales outstanding is the prevalent method of monitoring credit sales. They found that the collection of receivables through agencies eliminates billing and mailing float, and banking transactions through the use of automated clearing houses brings down collection float to a bare minimum. About 80% of firms prepare a cash budget, however the majority of them do so on an annual or semi-annual basis. To hedge against an unexpected liquidity crisis, the companies maintain a line of credit with their banks. In general, pharmaceutical companies maintain a high level of inventory and rarely experience

any stock-out situations. Inventory levels are determined based on production/sales targets and current stock level. Only a few companies in the study use the economic order quantity (EOQ) model for inventory management. Half of the companies in the study finance working capital through trade credit and the rest use short-term bank loans. Almost all of the firms in the study use inventory as collateral (bonded warehouse financing); only a few firms stretch their payables and other accruals.

Chowdhury and Amin (2007) also investigated the relationship between firm profitability and working capital ratios. Their results indicate that companies that adopt an aggressive working capital policy (i.e., lower levels of current assets), a conservative financing policy (i.e., financing working capital needs with medium-term borrowing), and a high level of inventory (i.e., higher inventory turnover in days) project higher profitability as measured by ROA.

Hoque, Mia and Anwar (2015) studied working capital management and the profitability of cement manufacturers in Bangladesh. Using data from 2010 to 2012, they conclude that the domestic industry is underperforming in terms of both working capital efficiency and profitability. Using regression analysis they investigated the relationship between the two factors. They measured working capital efficiency by inventory conversion period, receivables collection period or days sales outstanding (DSO), payable deferred period, and CCC, while profitability was measured using net profit margin (NPM) and ROA. Regression results indicate that only DSO has a statistically significant negative association with NPM and ROA, which means that decreased DSO will enhance NPM and ROA and vice versa.

Mazumder (2015) also studied the relationship between working capital management and the profitability of cement companies in Bangladesh. He used data collected between 2009 and 2014, and concluded that working capital policy measured by current assets to sales ratio and working capital financing policy estimated by current liability to total assets ratio have a

significant association with profitability as measured by ROA. A high level of current assets and a low current liability positively influence the profitability of the cement companies in the study. Among the measures of working capital efficiency, only the receivable in days showed a significant negative relation with profitability, which infers that profitability can be improved by expediting the collection of receivables.

Quayyum (2011) also used data from a four-year period (2005–2009) to study the relationship between working capital and profitability in the industry. The researcher used ROA and NPM as measures of profitability and employed CCC, receivable collection period (RCP), payable deferred period (PDP), and inventory turnover period (ITP) to measure working capital efficiency. Common measures of liquidity (e.g., quick ratio [QR] and interest coverage ratio) and cash adequacy (e.g., cash to sales and cash to current liability) were other independent variables used in the study's regression model. Quayyum (2011) ran simple regression as well as multiple regression. The results show that as the independent variables are considered one at a time, they all reveal a significant influence on profitability. However, the results of multiple regression analysis are more practical and reveal that CCC has a significant negative influence on profitability.

In 2012, Quayyum conducted a similar study on Bangladesh's manufacturing sector. The study took data collected between 2005 and 2009 from the cement, food, pharmaceuticals and engineering industries. The researcher ran simple regression (one dependent and one independent variable) using NPM and ROA as the dependent variables and CCC, RCP, PDP, ITP, current ratio (CR) and QR as independent variables. Results reveal that CCC has a significant negative influence on profitability for all of the industries in the study but the level of significance varies across the industries. Moreover, the influence of other independent variables also differs across industries. However, the study did not explain the role of

working capital on the profitability of manufacturing companies in aggregate. Furthermore, the use of simple regression has limited the practicality of the results. In reality a number of independent variables relating to working capital management may work together and result in a synergistic or cohesive impact on firm performance that cannot be captured without using multiple regression analysis.

5.4 RESEARCH GAPS

Given the literature presented above, it can be concluded that despite the diverse research on working capital management, there remain unsettled issues relating to working capital management practices and their role on business performance and competitiveness.

First, almost all of the research focusing on the influence of working capital on firm performance uses common profitability measures such as ROA, return on equity (ROE), NPM or Gross Profit Margin. These are absolute financial performance indicators and are not adequate for representing long-run performance with respect to market competition. A firm may have high ROA or ROE in certain years by reducing its investment in long-term and/or short-term assets and/or by deferring some expenses (such as maintenance expenses, selling and advertising expenses, insurance expenses, etc.) that may negatively affect firm performance in the long run. Furthermore, positive ROA or ROE is not enough for survival in competition. As such, the inclusion of market-based performance in the studies has merit to provide better insights. Only a few studies investigated the influence of working capital management on share price (or shareholders' wealth) and/or Tobin's q, which they argue are market-based measures of performance (Bhatia and Srivastava, 2016; Cotis, 2004; Poirters, 2004).Again, using share price as an indicator of performance may turn faulty in inefficient markets like Bangladesh. Therefore, whether working capital practices contribute to consistent better performance of a company in relation to market competition, which in other

words is business competitiveness (as defined in Chapter Four), is still an unanswered question. Hence, this researcher's work investigates the role of working capital management on business competitiveness. Given the varying relationships between working capital management and firm performance found in the literature, the broad hypothesis of this study is that ***there is an association between working capital management practices and business (firm) competitiveness***. The researcher strives to identify the direction and strength of association between the variables.

Second, researchers who investigated the relationship[between working capital management and firm performance mostly used measures of liquidity and working capital efficiency as proxies of working capital management. Only few of the existing studies considered the influence of formal policies and investment or financing strategies on firm performance (Burn and Walker, 1990; and others). Most of the studies left out other aspects of working capital management such as use of technology, information systems, tools and techniques for managing the components of working capital, regular reviews, managers' involvement (time commitment),etc. while investigating the influence of working capital management on firm performance. With the objective of closing the gap, this researcher has devised a coding mechanism to determine the level of sophistication in managing working capital and its components. This measure covers the aspects (as mentioned above and demonstrated in section one of this chapter) beyond efficiency, liquidity, strategy and policy in relation to working capital. Measures for determining excellence in managing stock-out situations and liquidity crises are also devised. Finally these variables are included in the researcher's analysis to investigate their influence on business competitiveness.

Third, past studies relating to working capital management and firm performance provided varying results, which means that findings from other studies may not be generalized in other

contexts. Moreover, Khoury et al. (1999) and Pandey et al. (1997) assert that working capital practices vary across international borders. The same logic applies in the influence of working capital on firm performance. Nevertheless, related studies in Bangladesh have focused only on particular industry sectors and used only the measures of working capital efficiency, liquidity and strategy. Hence, new comprehensive studies in the context of Bangladesh are worth exploring.

5.5 RESEARCH HYPOTHESES

The research has three broad hypotheses.

H1: There is an association between working capital management practices and business (firm) competitiveness

In light of the literature that focuses on different aspects of working capital management and its influence on firm performance, the broad hypothesis stated above can be broken down into the following specific hypotheses:

H(i): Working capital policies has some association in business competitiveness. Companies with formal working capital policies are likely to be more competitive (Burns and Walker, 1990; Padachi, 2006; Kiprotich, 2013; and others)

H(ii) Working capital management strategy as perceived by managers has some influence on business competitiveness (Afrifa, 2015; Filbeck and Krueger, 2005; Padachi and Carole, 2014; and others).

H(iii) Working capital financing strategy as perceived by managers has some influence on business competitiveness (Afrifa, 2015; Filbeck and Krueger, 2005; Padachi and Carole, 2014; and others).

H(iv): Use of sophisticated techniques and tools in working capital management leads to business competitiveness (Padachi, 2006; Kiprotich, 2013; Muhammad et al., 2015;and others).

H(iva): Business (firm) competitiveness has a positive association with sophistication in receivable management

H(ivb): Business (firm) competitiveness has a positive association with sophistication in payables management

H(ivc):Business (firm) competitiveness has a positive association with sophistication in inventory management

H(ivd): Business (firm) competitiveness has a positive association with sophistication in cash and equivalents management

H(ive): Business (firm) competitiveness has a positive association with overall sophistication in working capital management practices

H(v): A firm's business competitiveness is positively associated to its excellence in managing stock-out situations (Kiprotich, 2013; Padachi, 2006; and others)

H(vi): A firm's business competitiveness is positively associated to its excellence in liquidity crisis management (Muhammad et al., 2015; Kiprotich, 2013; and others)

H(vii): A firm's business competitiveness is associated to its working capital strategy as measured quantitatively (Yegon et al., 2014; Li et al., 2014; Chowdhury and Amin, 2007;and others)

H(viia): Business (firm) competitiveness has a negative association with the degree of conservativeness in working capital management strategy (Chowdhury and Amin, 2007; Mazumder, 2015; and others).

H(viib): Business (firm) competitiveness has a positive association with the degree of aggressiveness in working capital financing strategy (Chowdhury and Amin, 2007; Mazumder, 2015; and others).

H(viii): A firm's business competitiveness is associated to its working capital efficiency and measures of liquidity (Padachi and Carole, 2014; Quayyum, 2012; Alipour, 2011; Deloof, 2003; and others).

H(viiia): Business (firm) competitiveness has a negative association with the inventory conversion period (or days of inventory) (Alipour, 2011; Deloof, 2003; and others)

H(viiib): Business (firm) competitiveness has a positive association with average and average collection (or debtor collection) period (Alipour, 2011; Deloof, 2003; and others)

H(viiic): Business (firm) competitiveness has a positive association with average payment period (or days of payables) (Atrill, 2005; Talha et al., 2010; Alipour, 2011; and others)

H(viiid): Business (firm) competitiveness has a negative association with CCC (Poirters, 2004; Nazir and Afza, 2009; Wang, 2002; Deloof, 2003; and others)

H(viiie): Business (firm) competitiveness has a negative association with measures of liquidity, namely current ratio and quick ratio (Padachi and Carole, 2014; Quayyum, 2012; and others)

H2: Companies across industries differ in their working capital management practices (Padachi and Carole, 2014; Salawu, 2007; Zhao, 2011; Filbeck and Krueger, 2005; and others)

H3: There are inter-industry differences in the role of working capital management on business competitiveness (Padachi and Carole, 2014; Salawu, 2007; Zhao, 2011; Filbeck and Krueger, 2005; and others)

6. RESEARCH METHODOLOGY

There is no best or correct methodology to conduct research for a particular purpose as every research methodology has its own strengths and weaknesses (De Vaus, 2013). In fact, the researcher's philosophy, purpose of study, research questions, etc. determine which research methods are most appropriate. The researcher's broad objectives and this study's main research questions are presented in the Introduction chapter. In this chapter, carefully devised specific research objectives and research questions are used as a guideline for designing appropriate methodology for the research.

6.1 RESEARCH OBJECTIVE

Based on the literature reviews presented in Chapters Three, Four and Five and the research gaps identified in Chapter Five the following objectives are formulated –

1. To determine the state of working capital management practices of the manufacturing companies listed on the Dhaka Stock Exchange, Bangladesh;
2. To identify if there are any differences in working capital management practices across industries;
3. To develop a framework for measuring business or firm-level competitiveness;
4. To investigate the role of working capital management on business competitiveness;
5. To evaluate if there are any differences among the companies across industries in terms of the role of working capital management on business competitiveness.

To comprehend the broad objectives stated above number of specific objectives are devised-

- To determine the working capital policies and strategies adopted by the DSE listed manufacturing companies in Bangladesh;

- To identify the tools and techniques commonly used for managing working capital and its components;
- To determine the level of sophistication in managing working capital and its components;
- To identify the commonly used sources of short-term financing;
- To identify the ratios and/or measures commonly used to monitor performance of working capital management and its components;
- To identify the existing measures of business or firm-level competitiveness;
- To choose/devise appropriate measures of business competitiveness based on objectivity and ease of operationalization for quantitative analysis as required for this research;
- To investigate the association between working capital policy, strategy and business competitiveness;
- To investigate how the levels of sophistication in managing working capital and its components are associated with business competitiveness;
- To investigate how efficiency in managing working capital and its components is related to business competitiveness;

6.2 RESEARCH QUESTIONS

A number of research questions deduce from the research gaps indentified in Chapter 5. These questions are presented below. Main research questions are followed up by some specific research questions for clarity, focus and depth.

Research Question 1

What is the current state of working capital management practices of the listed manufacturing companies in Bangladesh?

As working capital management involves not only policy, strategy but also management of its multiple components and efficiency in managing those components; following specific research questions should be answered to respond to the above research question.

- What type of working capital policies do the companies implement?
- What types of strategies do companies commonly adopt while managing and financing working capital?
- What is the level of sophistication in managing working capital and its components?
    - Are there dedicated personnel in the organizations to carry out responsibilities related to working capital and its components' management?
    - How frequently is working capital and its components monitored and reviewed?
    - What is the average level of time commitment for managers in charge of working capital and its components?
    - To what extent are technology and information systems used in managing working capital and its components?
    - What tools and techniques are used for managing working capital and its components?
    - What is considered the level of excellence in managing liquidity crisis and stock-out situations?
- What are the commonly used marketable securities for the temporary investment of cash?
- What are the commonly used sources of short-term financing?

- Which ratios are regularly monitored to evaluate working capital management performance?

Research Question 2

Do companies across industries differ in terms of their working capital management practices?

This research question requires answering the following specific question-

- Do companies in different industry sectors have different levels of sophistication and/or excellence in managing working capital, its components and issues arising in this regard?

Research Question 3

How to measure firm-level competitiveness?

Following specific questions are explored to answer the above research question-

- What are the existing measures of business or firm-level competitiveness?
- What are the limitations of existing measures in terms of objectivity and usability in quantitative analysis?
- Which measures of business or firm-level competitiveness are appropriate for the purpose of this study?

Research Question 4

What is the role of working capital management on the business competitiveness of the companies in question?

Working capital management practices may influence business competitiveness along different aspects. Following specific questions capture those diverse aspects -

- How are working capital policies and strategies associated with the measures of business competitiveness devised for this study?
- How do the levels of sophistication in managing working capital and its components influence business competitiveness measures?
- How do the levels of excellence in managing a liquidity crisis or stock-out situation influence business competitiveness measures?
- How does the degree of conservativeness in managing working capital and degree of aggressiveness in working capital financing influence business competitiveness measures?
- How do the measures of efficiency in managing working capital and its components influence business competitiveness measures?

Research Question 5

Do companies across industries differ in terms of the role of working capital management on business competitiveness?

Companies across industries may differ in terms of various aspects of working capital management. Those aspects are made specific in the following question-

- When measuring business competitiveness across industries, do the influences of working capital management practices in terms of policy, strategy, level of sophistication, efficiency and liquidity differ? If yes, what are the differences?

6.3 SOURCES OF DATA

Most research on working capital management utilizes data from firms' annual reports. The downside of this source is that these reports only contain numbers related to levels of working capital, liquidity and efficiency. These data cannot shed enough light on working capital management strategies, tools, techniques and overall sophistication of working capital management practices. Few studies have used questionnaires to survey on information related to working capital management. Therefore, data from primary and secondary sources has been used for this study.

6.3.1 Secondary Sources of Data

Secondary data sources include companies' annual reports published between 2012–13 and 2016–17. The following data was recorded for analysis: total assets, total current assets, current liabilities, sales, cost of goods sold, accounts receivable, accounts payable, inventory and net income data. Companies' annual closing share prices over the aforementioned years were downloaded from the Dhaka Stock Exchange website.

Apart from the above, information from finance, economics and strategy textbooks, journal articles and periodicals were vital for building the theoretical framework, hypotheses and literature review section of this research. The researcher devised the measures of business competitiveness used in this study based on the literature review on competitiveness in Chapter Four.

6.3.2 Primary Sources of Data

Primary data was collected in two stages: a questionnaire survey followed by in-depth interviews.

6.3.2.1 Questionnaire Survey

A questionnaire is a cost effective and quick method of collecting information. Surveys can be conducted via mail, e-mail, telephone and in person. The response rate for mail and e-mail surveys is usually low. The telephone survey method improves the response rate but a long and complicated questionnaire may result in a high turnaround time, which may generate impatience in the respondent and may result in an incomplete response. Telephone surveys are also costlier than mail or e-mail surveys. When compared to mail, e-mail and telephone options, in-person surveys are expensive but the response rate is much higher. This method also has the advantage of human interaction that may be of help in case any clarification is needed (De Vaus, 2013). The researcher chose the in-person survey method for this study to enhance response rate over a given timeframe.

Questionnaire Design

Based on the literature (finance textbooks and journal articles), the researcher designed a questionnaire. It began with questions related to overall working capital management as well as financing policy and strategy. There were questions related to each component of working capital, namely cash and equivalents, receivables, inventory and payables. The questions focused on a close scrutiny of the components, use of technologies, responsibility centers, and tools and techniques used for managing working capital components. There were also questions regarding incidences of problems such as liquidity crises, stock-out situations, bad debts, etc. in managing working capital. The majority of questions were multiple choice questions (MCQ) or yes/no questions in order to save respondents' time and facilitate data processing. Some open-ended questions were included to allow for flexibility in responses because MCQs, in some cases, may result in respondents' sub-optimal answers. Questions related to the use of technologies and other tools and techniques for managing working

capital sought answers in a 5-point Likert scale (5=very extensively or always and 1= never). Respondents were asked to choose the most appropriate options. The overall objective of the questionnaire survey was to determine the level of sophistication in managing working capital and its components. Questions were sequenced from general to specific and from less sensitive to more sensitive.

Piloting the Questionnaire

It is important to test a questionnaire before using it to collect data in order to estimate its validity and comprehensibility. Pretesting or piloting helps to identify questions that do not make sense to participants or problems with the tool that might lead to biased answers. Piloting also can provide estimates on the expected response rates as well as data quality (Kelley, Clark, Brown and Sitzia, 2003). The researcher designed the questionnaire based on the relevant literature and piloted it with finance managers from six different companies. These six managers were chosen on a convenience basis—all are the researcher's acquaintances. Pilot survey respondents were asked to complete the questionnaire in the researcher's presence. She requested them to think out loud during the process and to ask questions if they required any clarification. This procedure helped the researcher to pinpoint and correct the inconsistencies and/or ambiguities in the questionnaire. Responses were then recorded using SPSS software and the researcher performed descriptive analysis to determine if the data collection format would be appropriate for the intended analysis required for the project. Cronbach's alpha value was determined to estimate the questionnaire's reliability and the scales used in it (Bland and Altman, 1997). The alpha value was between 0.72 and 0.86, which is within the acceptable range of reliability.

Administration of the Questionnaire

The researcher administered the questionnaire to the Chief Financial Officer (CFO) or Head of Finance (HOF) of the companies chosen for this study. The researcher recruited 20 surveyors from among students who have completed the financial management course at the Institute of Business Administration. Each surveyor conducted eight to nine questionnaires after being trained on its administration and briefed on each of its components. Surveyors contacted the companies with a letter of introduction from the researcher and sought an appointment to survey the prospective respondents. In 90% of the companies, the surveyors could successfully book a 15- to 20-minute appointment with the desired respondents. Further persuasion using the researcher's personal and professional network allowed the researcher to book appointments with the rest of the companies. On a scheduled date and time, the surveyors met the respondents and briefed them about the questionnaire's purpose before asking the questions and recording the responses. In some cases (about 12%), respondents asked the surveyor to leave the questionnaire with them and collect it later. Such situations were managed by making a follow-up phone call to remind the respondent about the questionnaire and the return schedule. Some of the CFOs/HOFs referred the surveyors to other personnel (manager) working in the finance (or accounting) department. In those cases, responses were collected from the individuals authorized by the intended respondent. In-person administration of the questionnaire was very effective—the response rate was above 95%. Only a few companies who are newly listed on the Dhaka Stock Exchange and/or were recently delisted from the Exchange did not provide responses.

6.3.2.2 In-depth Interviews

The researcher used in-depth interviews in her research as a method of data source triangulation, which refers to the use of multiple methods or data sources in order to develop

a comprehensive understanding of a reality (Patton, 1999). It is also viewed as a strategy to validate information through the convergence of data from different sources.

Interviews can be of various types such as structured, semi-structured and unstructured. Among these three widely used categories, semi-structured interviews allow the researcher to use a clear list of questions while offering flexibility in terms of asking probing questions, altering the sequence of questions, different response options, accommodating open-ended responses, etc. In using a clear list of questions, the researcher can ensure that an issue or topic of concern is not omitted. Moreover, the semi-structured method allows the researcher to maintain control over time while retaining flexibility.

In order to validate the questionnaire findings and the annual report data, the researcher conducted eight in-depth interviews with industry experts from the manufacturing sector in Bangladesh. The majority of the interviewees held the post of COF/HOF or were a senior manager in finance in their respective organization. The researcher selected interviewees based on professional connections and referrals. Each interview was a mix of formal and informal conversation of 30 to 60 minutes in length. The researcher did use a checklist of questions (see Appendix V) to ensure that all the relevant points were covered in the discussion.

6.4 THE POPULATION

As service sector and financial institutions have very different working capital structures when compared to manufacturing companies, this research focuses only on the latter. While all manufacturing companies in Bangladesh comprise the population of this study, only the companies listed on the Dhaka Stock Exchange are considered for this study to ensure data accessibility and comparability.

6.5 THE SAMPLE

Data was sought from all 175 manufacturing companies listed on the Dhaka Stock Exchange but only 164 datasets were found to be usable. Industry-wide distribution of the sample companies is presented in Table 2.

Table2: Sample Distribution

Industry	**Number of Companies**
Ceramic	5
Cement	7
Engineering	33
Fuel & Power	19
Food & Allied	18
Pharmaceuticals& Chemicals	29
Tannery	6
Textile	45
Paper & Printing	2
Total	**164**

6.6 THE VARIABLES AND THEIR MEASURES

The measures of working capital practices were taken as independent variables for this study. The dependent variable was business competitiveness.

6.6.1 Measures of Working Capital Practices

Working capital practices are measured in terms of policy, strategy, sophistication in management, excellence in handling stock-out and liquidity crisis situations, efficiency of managing working capital and its components, and liquidity position.

6.6.1.1 Working Capital Management Policy (WCMpolicy)

Companies may have formal, semiformal or informal working capital policies. Multiple choice questions were used in the questionnaire to gain information on the working capital

management policies currently in place. Responses were numerically coded for their use in regression analysis (Appendix II). This is represented as WCM policy for the purpose of this research.

6.6.1.2 Working Capital Management Strategy (WCMstrategy)

Working capital management strategy is measured in two ways. First, respondents were asked to choose among aggressive, moderate and conservative strategy. This is considered as perceived strategy and represented as WCM strategy for the purpose of this research. Survey responses are coded to numeric values for the purpose of analysis (Appendix II)

Second, a numeric score representing the degree of conservativeness in working DOCWCM was calculated using the following formula:

DOCWCM = Current Assets/Total Assets (Salawu, 2007; Chowdhury and Amin, 2007). A higher value indicates more conservative working capital management practices.

6.6.1.3 Working Capital Financing Strategy (WCfinancingstrategy)

Like working capital management strategy, working capital financing strategy is measured in two ways. In the questionnaire, respondents were asked to choose among aggressive, moderate and conservative strategy. This is considered as perceived strategy and represented as WCfinancingstrategy for the purpose of this research. Survey responses were coded to numeric values for the purpose of analysis (Appendix II).

Apart from the above, a numeric score representing the degree of aggressiveness in working capital financing was calculated using data from the annual reports. This is represented as DOAWCF and is calculated using the following formula:

DOAWCF = Current Liability/Total Assets (Salawu, 2007; Chowdhury and Amin, 2007). A lower value represents more aggressive working capital financing practices.

6.6.1.4 Sophistication in Working Capital Management (wcsophistication)

The researcher calculated a score by summing up the firms' responses on different tools and techniques used, technology uses, time dedicated to managing working capital and its components, frequency of monitoring, etc. The sum is then multiplied by 10 and divided by the sum of the highest possible score in each area (as mentioned above) to convert the score on a 10-point scale. That numeric score is then converted into five ordinal levels representing very good, good, average, poor and very poor. For example, a score of two or below represent a very poor level of sophistication, a score between two to four is poor performance, a score between four and six is average, a score between six and eight is a good level, and any score above eight represents a very good level of sophistication (See Appendix III). This is represented as wcsophistication in regression analysis.

Sophistication in Receivables Management (arsophistication)

The aggregate score of responses to questions on sophistication in receivables management in the working capital questionnaire is represented as arsophistication in regression analysis (See Appendix III).

Sophistication in Inventory Management (invsophistication)

The aggregate score of responses to questions relating to inventory management in the working capital questionnaire is represented as invsophistication in regression analysis (See Appendix III).

Sophistication in Payables Management (apsophistication)

The aggregate score of responses to questions relating to payables management in the working capital questionnaire is represented as apsophistication in regression analysis (See Appendix III).

Sophistication in Cash Management (cashsophistication)

The aggregate score of responses to questions relating to cash management in the working capital questionnaire is represented as cashsophistication in regression analysis (See Appendix III).

6.6.1.5 Stock-Out Management (stockout)

The researcher has calculated an aggregate score on stock-out management. Companies who did not face a stock-out situation in the last three-year period were scored at the top of the scale while those at the other end of the spectrum were scored at the bottom. Based on their use of different techniques to tackle stock-out situations, an additional score was added. The final score was converted in a 10-point numeric scale to be used in regression analysis (See Appendix III). Numeric scores were translated to ordinal scale for better interpretation of descriptive results. This is represented as stockout in regression analysis.

6.6.1.6 Liquidity Crisis Management (lqdty)

An aggregate score for liquidity crisis management was calculated following the same procedure used for calculating the stock-out management score (See Appendix III). This is represented as lqdty in regression analysis.

6.6.1.7 Working Capital Efficiency (WCE)

(Shin and Soenen, 1998; Padachi, 2006; Quayyum, 2012; and others)

Inventory Conversion Period (icp) = 365*Average Inventory/Cost of Goods Sold

Average Collection Period (acp) = 365*Average Accounts Receivable/Sales

Average Payment Period (app) = 365* Average Accounts Payable/Cost of Goods Sold

Cash Conversion Cycle (CCC) or Net Trade Cycle (NTC) = acp + icp – app

6.6.1.8 Liquidity Ratios

Current Ratio (cr) = Current Assets/Current Liability

Quick Ratio (qr) = (Current Assets – Inventory)/Current Liability

6.6.2 Measures of Business Competitiveness

Based on the literature and analysis presented in Chapter 4, the researcher devised five measures of business competitiveness to employ as a dependent variable in the study.

6.6.2.1 Standardized Return on Assets (roa)

$$roa_{it} = (ROA_{it} - AVGROA_t)/SDROA_t$$

ROA_{it}= ROA of company *i* at time *t*
$AVGROA_t$= industry average ROA at time *t*
$SDROA_t$= standard deviation of the ROAs of all companies in a particular industry at time *t*

6.6.2.2 Standardized Net Profit Margin (npm)

$$npm_{it} = (NPM_{it} - AVGNPM_t)/SDNPM_t$$

NPM_{it}= NPM of company *i* at time *t*

$AVGNPM_t$= industry average NPM at time *t*

$SDNPM_t$= standard deviation of the NPMs of all companies in a particular industry at time *t*

6.6.2.3 Persistent Parameters (α and β)

The parameter α is the constant term and parameter β is the coefficient in the following first order autoregressive process of standardized profitability.

$roa_{it} = \alpha \quad + \beta \quad roa_{i(t-1)} + \ e_{it}$……(2) Where, e_{it} is error term.

α > 0 indicates high long-run profits. The higher the value of α, the more persistent profit.

β =>1 indicates persistent above average profitability. The higher the value of β, the more persistent performance

6.6.2.4 Tobin's q or Prospective Competitiveness (q)

$q_{it} = MV_{it}/BV_{it}$ ……(3)

Where, q_{it}= prospective competitiveness of firm i at time t

MV_{it}= market value of firm i at time t

BV_{it} = book value of firm i at time t (firm's balance sheet value)

MV_{it}= P_{it}* number of shares outstanding; P_{it} = price per share of firm i at time t

6.7 DATA ANALYSIS TECHNIQUE

The researcher used SPSS software to analyze the collected data. Both descriptive and inferential statistics are determined and presented. Common descriptive statistics like frequency distribution, bar chart, mean, median mode, etc. are used to summarize and present

survey results on working capital management practices. Cross-tab analysis is done to determine inter-industry differences in working capital management practices.

Standard multiple linear regression analysis is done to determine the role of working capital management on business competitiveness. Regression was run using the measures of working capital management practices as the independent variables and the measures of business competitiveness as the dependent variable. The underlying regression model is as follows:

Business Competitiveness = a + b_1*WCMpolicy + b_2*WCMstrategy + b_3*WCfinancingstrategy + b_4*arsophistication +b_5*apsophistication +b_6*invsophistication+ b_7*cashsophistication + b_8*lqdty +b_9*stockout +b_{10}*wcsophistication + b_{11}*docwcm + b_{12}*doawcf + b_{13}*acp + b_{14}*icp + b_{15}*app + b_{16}*ccc + b_{17}*cr + b_{18}*qr

Where,

WCMpolicy = working capital management policy

WCMstrategy = working capital strategy

WCfinancingstrategy = working capital financing strategy

arsophistication = accounts receivable management sophistication

apsophistication = accounts payable management sophistication

invsophistication = inventory management sophistication

cashsophistication = cash management sophistication

lqdty = excellence in liquidity crisis management

stockout = excellence in stock-out situation management

wcsophistication = working capital sophistication

docwcm = degree of conservativeness in working capital management

doawcf = degree of aggressiveness in working capital financing

acp = average collection period

icp= inventory conversion period

app = average payment period

ccc = cash conversion cycle

cr = current ratio

qr = quick ratio

a = regression constant term

$b_1, b_2, b_3, \ldots\ldots\ldots\ldots, b_{18}$= regression coefficients

The researcher ran separate regression for each of the five devised measures of business competitiveness to demonstrate which of these measures are influenced by working capital practices.

Separate regression analysis is done for different industry sectors and results are compared to see if there are inter-industry differences in the role of working capital practices on business competitiveness.

Assumptions behind multiple regression analysis are checked using bi-variate correlation matrix, normal probability plot, and scatter plot of the standardized residuals. To determine predictability power and statistical significance of the regression models, R-square value, F-statistic value and/or sig. value have been observed. The absolute value of standardized beta coefficients was taken to determine unique contributions of the independent variables in the regression model (Pallant, 2016). Finally, the researcher formulated a regression equation to explain the relationship between the dependent variable and independent variables. t-statistics and sig. value of the independent variables are evaluated to test the formulated hypotheses.

6.8 ETHICAL CONSIDERATIONS

In case of both questionnaires and interviews, the researcher and surveyors provided a disclaimer regarding the maintenance of the strict confidentiality of responses. The participants were assured that their data and information would only be used in aggregate form for this particular study. Respondents had the right and flexibility to withdraw their full/a portion of their responses at any time during the study.

7. FINDINGS AND ANALYSIS: WORKING CAPITAL MANAGEMENT PRACTICES

In this chapter, the researcher first presents the findings of overall working capital management practices in terms of policy, strategy, responsibility center, time commitment, monitoring and use of technology. Then the practices specific to working capital management components— receivables, inventory, and cash and equivalents—are presented. Payables management is not discussed separately as it is incorporated into cash and equivalents management. However, practices related to short-term financing are presented separately in this study. Finally, the researcher presents her findings in the sophistication/excellence in the management of working capital components and overall working capital management. Here, she highlights inter-industry differences (if any).

7.1 OVERALL WORKING CAPITAL MANAGEMENT PRACTICES

7.1.1 Working Capital Policy and Strategy

The majority (55%) of the companies surveyed have formal working capital policies in place. About 40% of the companies have a semi-formal policy. Only five percent of the companies asserted that their working capital policy is informal.

In terms of working capital strategy, about 37% of the companies adopt a conservative strategy, 58.4% follow a moderate strategy, and the rest follow an aggressive strategy in managing their working capital (Table 3).

Table 3: Working Capital Strategy

	Financing	Management
Strategy	%	%
Conservative	36.6	36.6
Moderate	54.0	58.4
Aggressive	9.3	5.0
Total	100.0	100.0

Working capital theories elaborated on in Chapter 3 suggests that companies that adopt a conservative approach in managing working capital usually take an aggressive strategy in financing and vice versa to balance cost and risk. However, in this study, the percentage of companies adopting a conservative strategy in financing working capital is found to be 36.6% and the percentages for moderate and aggressive financing strategies are 54% and 9.3%, respectively (Table 3).Cross tabulation results presented in Table 4 indicate that 38 companies (approximately 24%) are conservative, both in managing and financing working capital and four companies (approximately 2.5%) adopt an aggressive strategy both in managing and financing working capital. A large proportion of the companies (44%) adopt a moderate strategy for both. Only 5% of the companies revealed that they use a conservative-aggressive or aggressive-conservative combination in working capital management and financing strategy.

Table 4: Cross Tabulation Results

WCM Strategy * WCM Financing Strategy Crosstabulation

Count

		WCM Financing Strategy			
		Conservative	Moderate	Aggressive	Total
WCM Strategy	Conservative	38	14	7	59
	Moderate	19	71	4	94
	Aggressive	2	2	4	8
Total		59	87	15	161

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	.352	.084	4.158	.000
N of Valid Cases		161			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

7.1.2 Responsibility Center

The distribution of responsibility for managing working capital and its components is presented in Table 5 below.

Table 5: Responsibility of Managing Working Capital and its Components

Area of responsibility	Person responsible	Companies (%)
WC Management Strategy	Board of Director	7.3%
	Managing Director	24.2%
	Chief Financial Officer	58.2%
WC Financing Strategy	Board of Director	15.2%
	Managing Director	20.6%
	Chief Financial Officer	55.2%
Receivables Management	Finance Manager	38.8%
	Account Manager	45.5%
	Sales Manager	10.9%
Inventory Management	Finance Manager	29.7%
	Production Manager	33.3%
	Supply Chain Manager	18.8%
Payables Management	Finance Manager	71.1%
Cash Management	Chief Financial Officer	40.6%
	Finance Manager	29.7%
	Account Manager	23.0%

In most of the companies studied, either the CFO or the managing director is responsible for determining working capital management and financing strategies. Usually the account manager and/or finance manager is responsible for receivables management. In some cases, the sales manager carries out this responsibility. Results reveal that inventory management is the responsibility of either the production or finance manager. However in some companies, the supply chain manager or store manager carries out this responsibility. For cash management, usually the CFO is in charge but finance and account managers carry out this responsibility in about 30% and 23% of the companies, respectively. Payables management is the responsibility of finance managers in more than 70% of the companies surveyed. Overall, in most of the companies, this study found that there are dedicated personnel for managing the components of working capital.

7.1.3 Managers' Time Commitment

As presented in Table 6 below, it is evident that almost half of the managers in charge of working capital spend less than 30% of their time dealing with working capitalstrategies;40% spend between 30% to 60% of their time and only few of them (10%) spend more than 60% of their time for this purpose. A similar time commitment applies for receivables, payables and cash management. However, inventory management seems to be more demanding in this regard. About 40% of managers in charge spend between 30% to 60% of their time; 25% of them spend more than 60% of their time and 35% spend less than 30% of their time on this activity.

Table 6: Time Spent on Working Capital and its Components Management

	WC Management Strategy	WC Management Financing Strategy	Cash and Equivalent	Accounts Receivable	Accounts Payable	Inventory
Less than 30%	46.1	50.9	47.9	46.7	44.2	35.2
30% to 60%	41.2	38.2	39.4	38.2	38.8	38.8
Above 60%	10.3	8.5	10.3	12.7	14.5	23.6
Missing	2.4	2.4	2.4	2.4	2.4	2.4

7.1.4 Monitoring and Review

Table 7 presents the frequency of reviewing working capital and its components.

Table 7: Frequency of Reviewing Working Capital and its Components

	WC	AR	Inventory	Cash	AP
Frequency of Review	%	%	%	%	%
Annually	4.3	1.9	2.5	1.2	1.2
Semi-annually	11.2	6.8	3.7	3.7	3.7
Quarterly	35.4	30.4	35.4	25.5	30.4
Monthly	32.9	33.5	36.6	23.0	42.2
Weekly	12.4	19.9	17.4	19.9	16.1
Daily	3.7	7.5	4.3	26.7	6.2
Total	100	100	100	100	100

More than 68% of the companies surveyed review working capital on monthly or quarterly basis. About 15% of them do this on an annual or semi-annual basis. The practice is similar with respect to the components of working capital. About 72% of the companies review payables and receivables and 63% of the companies review inventory on a monthly or quarterly basis. About 16% to 20% of the companies review working capital components on a weekly basis. Monitoring and reviewing was found to be more stringent in the case of cash. Under one-third (27%) of the companies review cash on a daily basis, 20% do this on a weekly basis, and about 48% do this on a monthly or quarterly basis.

To monitor working capital management, about 43% of the companies regularly review working capital to sales ratio and 19.5% of the companies use working capital to total assets ratio. About 40% of the companies focus on current ratio to monitor working capital and/or liquidity. Of the other measures of liquidity, 21.2% of respondent companies use quick ratio and 11.5% use cash ratio (Table 8).

Table 8: Ratios Commonly used to Monitor Working Capital Management Performance

Ratios	Companies monitoring the ratios (%)
Working capital to sales ratio	43%
Working capital to total assets ratio	19.5%
Current ratio	40%
Quick ratio	21.2%
Cash ratio	11.5%
Working capital turnover ratio	14%

Only about 15% of the companies regularly monitor working capital turnover ratio to determine working capital efficiency (Table 8). In fact, companies monitor component-wise turnover ratios—receivables turnover, inventory turnover and payable turnover—to review working capital efficiency.

7.1.5 Use of Technology

The researcher found that computer usage in managing working capital was prevalent. Only 2.5% of the companies rarely use a computer whereas the rest use this tool at least

moderately and 78% extensively use computers for managing working capital (Table 9).The scenario is similar for the management of receivables, inventory and cash. The use of computers/information and communication technology is little less extensive in payables management as evidenced in the table below:

Table 9: Computer Usage in Managing Working Capital and its Components

	WC	AR	Inventory	Cash	AP
Frequency of Usage	%	%	%	%	%
Rarely	2.5	1.9	1.9	1.9	3.1
Moderately	23.6	18.6	19.3	19.9	26.1
Extensively	45.3	44.7	39.8	41.6	44.1
Very Extensively	28.6	34.8	39.1	36.6	26.7
Total	100.0	100.0	100.0	100.0	100.0

The scenario is better in Bangladesh when compared to that in other developing countries like Sri Lanka, Kenya and others (Perera &Wickermasinghe, 2010; Mathuva, 2010; and others).

7.2 RECEIVABLES MANAGEMENT

Apart from overall monitoring and review, a manager's time commitment, and use of technology, etc. presented above, the selection and monitoring of credit customers as well as terms of sales, etc. are important aspects of accounts receivable management.

7.2.1 Analysis to Grant Customer Credit

As evident in Table 10, 5C analysis, sequential credit analysis, and credit scoring are found to be the most commonly used methods of evaluating credit customers. The table below presents the percentage of the companies adopting different types of analysis to evaluate their credit customers. One important observation from the survey results is that about 19% of the companies surveyed do not engage in any kind of analysis before they grant a customer credit (Table 9). However, many companies use more than one method, which is why the sum of the percentage column exceeds 100%.

Table 10: Usage of Customer Credit Analysis Techniques

Customer Credit Analysis Techniques	Usage (%)
5C analysis	31.5%
Sequential credit analysis	36.4%
Credit scoring	21.2%
None	18.8%

7.2.2 Factors Considered in Determining the Terms of Sales

Terms of sales specify the credit period, discount period and rate (if any), seasonal dating, etc. These are important, not only for enhancing sales but also for expediting the collection of receivables. Usually terms of sales vary depending on the company's expected cash flow and/or competitors' terms of sales. Terms may also vary from customer to customer based on their financial condition and/or their relative size. Table 11 presents the factors considered by the respondent companies in determining their terms of sales.

Table 11: Factors Considered in Determining Terms of Sales

Factors	Responses (%)
Buyers' financial condition	45.5%
Firm's expected cash flow	27.3%
Competitors' terms of trade	17.60%

7.2.3 Ways to Monitor Receivables

Among the different ways to monitor accounts receivable, creation and review of the aging schedule of credit sales was found to be the most prevalent, followed by tracking customer payment behavior, investigation on credit customers, and scrutiny of collection experiences. Table 12 presents the different ways that respondent companies monitor accounts receivable.

Table 12: Ways to Monitor Accounts Receivable

Ways	Responses (%)
Investigate credit customers	36.4%
Track customer payment behavior	43.0%
Track collection period	15.2%
Scrutinize collection experience	26.7%
Create and review aging schedule of credit	50.9%

7.3 INVENTORY MANAGEMENT

The section of the questionnaire that focused on inventory management practices was used to collect respondents' feedback on tools and techniques used in managing inventory, methods used in determining safety stock, the incidence of stock-out situations, how stock-out situations are managed, etc. The researcher also measured overall sophistication in managing inventory through consideration of all of the responses to inventory-related questions.

7.3.1 Tools and Techniques Used

Study results indicate that lead time projection and management, JIT (Just-In-Time) system, and ABC analysis are commonly used inventory management techniques among the respondent companies. The economic order quantity (EOQ) method and enterprise resource planning (ERP) systems are also used by a few companies. Table 13 presents the distribution of different tools/techniques/systems used by the companies surveyed. Many companies use a number of different tools and techniques that made the total percentage of responses more than 100%.

Table 13: Tools and Techniques used for Managing Inventory

Tools/Techniques	Responses (%)
ABC analysis	23.60%
EOQ	9.70%
JIT	26.10%
Lead-time projection and management	36.10%
ERP system	7.90%
Other	6.90%

7.3.2 Methods used to Determine Safety Stock Levels

Table 14 presents the distribution of the methods used by companies to determine safety stock levels. The use of the industry average is found to be the most commonly used method of determining a firm's safety stock level. About 60% of the companies surveyed adopt this method. However, adhoc basis determination of safety stock is also very commonplace (48.5%). Almost 30% of the respondent companies rely on past experience and managers' judgment in determining how much safety stock to keep. Only 18.2% of the companies use scientific statistical tools for this purpose.

Table 14: Methods used to Determine Safety Stock Level

Methods	Companies (%)
Industry average	63%
Adhoc basis	48.5%
Past experience and/or manager's judgment	29.7%
Use of scientific statistical tools	18.2%

7.3.3 Stock-out Situation

Only 2% of the companies surveyed admitted to facing some kind of stock-out situation in last three-year period. The distribution of stock-out situations is presented in Table 15. About 10% of respondents experienced a stock-out situation four or more times a year, 40% admitted to two or three times a year, and the rest experienced this situation less than twice annually.

Table 15: Prevalence of Stock-out Situations

Prevalence	Companies (%)
Furor more times a year	11%
Two or three times a year	40%
Less than twice a year	49%

Table 16 presents the distribution of the companies' methods for handling stock-out situations. About 55% stated that they rely on outsourcing, 13.1% on purchases from reserve sources and the remainder either accept the loss of sales or convince the customer to agree to later delivery.

Table 16: Methods used to Handle Stock-out Situations

Methods	Companies (%)
Outsourcing	54.8%
Purchase from reserve sources	13.1%
Lose sales or convince customer to accept later delivery	32.1%

7.4 MANAGEMENT OF CASH AND EQUIVALENTS

Cash and equivalents management involves efficient collection, cash disbursement, and short-term investment of excess cash with an objective to avoid a liquidity crisis (being able to satisfy all the motives of holding cash) and minimize the opportunity cost of holding cash. Liquidity management function involves monitoring and controlling liquidity problems. Common principles for efficient collection and disbursement include managing floats, expediting collection, slowing down disbursements, and stretching payables.

7.4.1 Liquidity Management

Survey data indicates that only 34% of the companies in this study have faced some sort of liquidity crisis in the last five-year period. Table 17 presents the average frequency of liquidity crisis faced by these companies.

Table 17: Frequency of Liquidity Crisis

Frequency	Companies (%)
More than four times a year	17.5%
Three to four times a year	31.6%
Once or twice a year	35.1%
Less than once in a two-year period	15.8%

Almost 67% of the companies faced a liquidity crisis between once and four times annually. Only 17.5% of the companies faced this crisis more than four times a year and 15.8% faced it less that once in a two-year period. The higher the frequency of liquidity crisis, the lower the effectiveness of cash and equivalents management practices.

Reserve lines of credit with banks, rollover agreements with suppliers, and portfolios of marketable securities are common ways that respondent companies handle liquidity problems. Table 18 presents the distribution of the usage of the abovementioned methods in managing liquidity crises.

Table 18: Methods used to Manage Liquidity Crisis

Methods	Companies (%)
Reserve line of credit	62%
Rollover agreement with suppliers	35%
Marketable securities	12%
Mix of the above three and others	22%

About 60% of the companies stated that they use reserve lines of credit with banks to manage unexpected liquidity crises while 35% of the companies reported that they use rollover agreements with suppliers in such situations. A further 12% of the companies asserted that their holding of marketable securities is meant to take care of liquidity problems. Many companies (22%) use several of these and other methods to combat liquidity crises.

7.4.2 Investment in Marketable Securities

Data reveal that the distribution of investment in marketable securities is highly skewed. Results presented in Table 19 reveal that 87% of the companies invest less than 20% of their cash balances in marketable securities. Almost 10% of those surveyed invest between 20% and 40% while a very small percentage (2%) invests more than 40%. The remaining 2% of the companies do not invest in marketable securities.

Table 19: Proportion of Cash Balance Invested in Marketable Securities

Proportion	Companies (%)
Less than 20%	87%
Between 20% and 40%	9%
More than 40%	2%
None	2%

Commonly used marketable securities in terms of their predominance among the companies surveyed were Money Market Mutual Funds (MMF), Certificate of Deposits (CD) and T-bills, respectively.

7.4.3 Managing Float

Often there is a difference between available cash balance and the cash balance on a firm's ledger books. This difference is called float, which is created mainly due to the time required to process and clear checks. Floats are created both for the collection and payment of cash. A requirement for holding cash can be minimized by an efficient management of float. The first step to managing float is to track it. Data suggest that only 37% of the companies surveyed regularly track their float. Managers adopt many different techniques and tools to play float, including expedited collection and slowing down disbursements.

7.4.3.1 Expediting Collection

Table 20 presents the different ways that the surveyed companies expedite cash collection as well as their frequency of use.

Table 20: Methods used to Expedite Cash Collection

	Automated Billing System	Pre-authorized Debit	Concentration Banking	Depository Transfer Check	Use of Lockbox system
Never	21.2%	28.5%	23.0%	24.2%	31.5%
Rarely	7.9%	12.1%	15.8%	18.2%	12.1%
Sometimes	27.3%	26.1%	26.1%	22.4%	26.7%
Most of the time	26.7%	18.8%	18.8%	24.2%	22.4%
Always	17.0%	14.5%	15.8%	10.9%	7.3%

About 45% of the companies most of the time or always use an automated billing system. This can be considered as the most popular method of expediting collection. Pre-authorized debit, concentration banking and depository transfer checks are equally used methods, and about 35% of the companies regularly adopt these methods. The Lockbox system is the least common method of speeding up cash collection.

7.4.3.2 Slowing Down Disbursements

Different methods of slowing down cash disbursements and the frequency of their use by the companies surveyed are presented in Table 21.

Table 21: Methods used to Slow Down Cash Disbursement

	Draft Payment	Zero Balance Account	Centralized Disbursement	Profiling Payroll and Dividend Disbursement Time
Never	39.4%	22.4%	24.8%	46.1%
Rarely	15.8%	13.9%	9.7%	11.5%
Sometimes	18.2%	22.4%	26.7%	21.2%
Most of the time	17.0%	24.2%	25.5%	10.9%
Always	9.7%	17.0%	13.3%	10.3%

About 40% of the companies either most of the time or always use zero balance account or centralized disbursement (Table 21). These two methods are commonly adopted techniques for slowing down disbursement. Paying through draft and profiling payroll and dividend disbursements are moderately used techniques. More than 55% of the companies never or rarely use these techniques.

7.4.3.2 Stretching Payables

Apart from the abovementioned methods of controlling (slowing down) disbursements, companies sometimes adopt direct techniques to delay bill payments and/or credit purchases. This is called stretching of payables. Sending payment at the end of the cash discount period

in case cash discounts are taken otherwise delays payment until the final due date. Making a payment through a check drawn on a remote account where check clearing may be delayed, and delivering checks through the mail, etc. are common techniques of stretching payables. The frequency of stretching payables by the respondent companies is uniformly distributed between companies that rarely or never stretch payables, those that sometimes do, and those that mostly or always stretch payables (Table 22).

Table 22: Prevalence of Stretching Payables

Prevalence	Companies (%)
Never or rarely	33%
Sometimes	33%
Mostly or always	34%

The benefits of stretching payables come along with costs which include unfavorable future deals, worsened credit rating, and late payment penalties. Table 23 presents how the surveyed companies view the consequences of stretching payables.

Table 23: Extent of Considering Different Consequences of Stretching Payables

	Not at all	To a small extent	To a moderate extent	To a large extent	To a very great extent
Unfavorable future deals	14.5%	18.2%	32.7%	27.3%	7.3%
Worsened credit worthiness	17.0%	17.6%	28.5%	22.4%	14.5%
Late payment penalties	47.9%	30.9%	13.3%	6.1%	1.8%

The possibility of a loss of credit worthiness is the prime concern of the companies followed by unfavorable future deals. Companies are least concerned about late payment penalties as a consequence of stretching payables.

7.5 SHORT-TERM FINANCING

The amount or proportion of short-term financing is determined by the working capital financing strategy adopted by a company. As discussed earlier, an aggressive financing

strategy calls for a higher level of short-term financing and a conservative strategy relies less on short-term financing. Here the composition of the different sources of short-term financing is discussed.

When comparing between spontaneous and negotiated financing, the researcher found that 13% of the companies prefer the former. Commonly stated reasons for this preference include zero lead time, no restrictions on operations and financing activities, and no security or collateral requirements. All of these reasons were found to be equally important.

Data presented in Table 24 reveal that among the spontaneous sources of financing, accounts payable is more commonplace than accrued expenses. Almost 70% (cumulative percentage of always, most of the time and sometimes) of the companies asserted that they use accounts payable at least sometimes as a source of short-term financing. The percentage is 48% in the case of accrued expenses.

Table 24: Frequency of Using Spontaneous Sources of Short-Term Financing

	Accounts Payable	Accrued Expenses
Never	12.7%	27.9%
Rarely	19.4%	24.2%
Sometimes	33.9%	16.4%
Most of the time	17.0%	17.6%
Always	17.0%	13.9%

Among the negotiated sources of financing, commercial paper is most prevalent followed by transaction loans, lines of credit, revolving credit, secured loans, and factoring receivables, respectively. Table 25 presents the frequency of usage for different negotiated sources of short-term financing.

Table 25: Frequency of Using Negotiated Sources of Short-Term Financing

	Commercial Paper	Line of Credit	Revolving Credit	Transaction Loan	Secured Loan	Factoring Receivables
Never	9.1%	17.6%	15.2%	12.7%	21.2%	44.8%
Rarely	13.9%	11.5%	20.0%	12.7%	15.8%	33.3%
Sometimes	26.1%	19.4%	20.0%	20.0%	22.4%	12.1%
Most of the time	27.3%	31.5%	24.2%	33.3%	22.4%	6.1%
Always	23.6%	20.0%	20.6%	21.2%	18.2%	3.6%

7.6 SOPHISTICATION/EXCELLENCE IN MANAGING WORKING CAPITAL AND ITS COMPONENTS

7.6.1 Sophistication in Managing Receivables

Figure 8 presents the level of sophistication of the surveyed companies in their receivables management practices. Sophistication is an aggregate measure of good practices (explained in Appendix III). It is evident that the average level of sophistication is commonplace across the different industries included in the study.

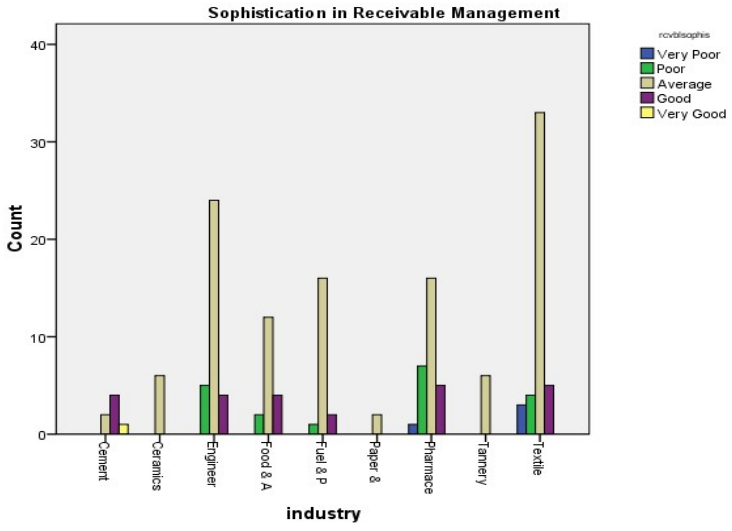

Figure 8: Sophistication in Receivables Management

However, the distribution of the level of sophistication in receivables management is different across industries (Figure 8). In the case of the cement industry, a good level of sophistication is prevalent. In the textile and pharmaceuticals industries, there are several companies with very poor and poor receivables management practices. Cement, ceramic, paper and tannery industries do not have any one company with poor or very poor receivables management practices. The rest of the industries in the study have some companies with poor practices.

7.6.2 Excellence in Stock-out Management

Figure 9 reveals that most of the companies are doing very well in their management of stock-out situations.

The scenario is similar across industries, except in two industries: paper and pharmaceuticals & chemicals. In the latter industry, the majority of the companies are good whereas those in the former have an average performance in managing stock-out situations.

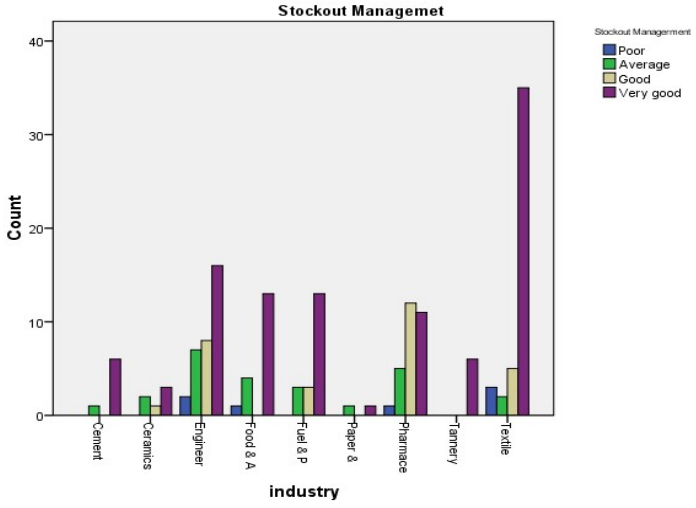

Figure 9: Excellence in Stock-out Management

7.6.3 Sophistication in Inventory Management

In terms of overall inventory management practices, most of the companies surveyed depict an average level of sophistication. Very few companies represent a good level of sophistication and none was found to have very good inventory management practices. Results relating to sophistication in inventory management are presented in Figure 10.

The distribution of a good and/or very good level of sophistication in inventory management across industries is not significant. Few companies in the textile industry or the pharmaceuticals sector showed a very poor level of sophistication. No one company in the cement or paper industry showed a poor or very poor level of sophistication in inventory management practices (Figure 10).

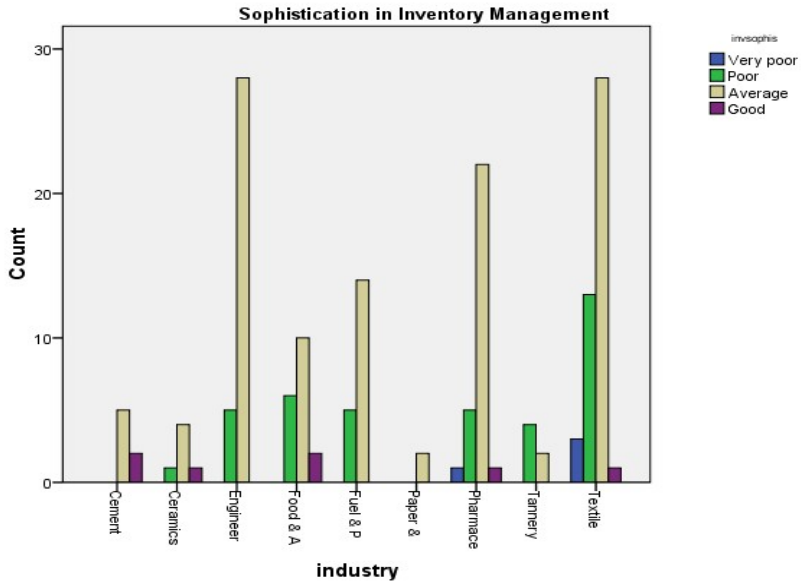

Figure 10: Sophistication in Inventory Management

7.6.4 Excellence in Liquidity Crisis Management

Figure 12 displays the liquidity crisis management performance of the companies surveyed. Most companies are found to do excellent in handling liquidity crises.

Inter-industry difference in managing liquidity crisis is very insignificant. Only the paper manufacturers do not meet the excellence standard in managing liquidity crises. Small proportions of the companies across different industries are found to be average or very poor in this regard (Figure 11).

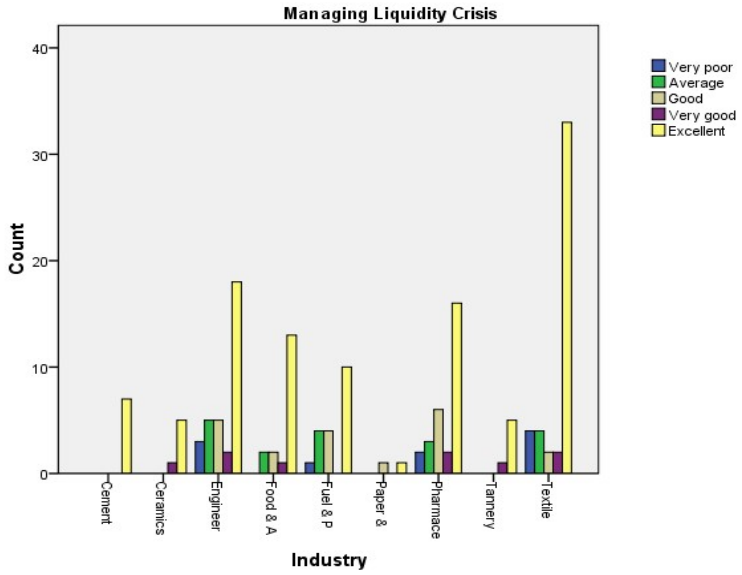

Figure 11: Excellence in Liquidity Crisis Management

7.6.5 Sophistication in Payables Management

In general, most of the companies maintain good or average levels of sophistication in payables management. Data reveal that the majority of the companies in the cement, engineering, food & allied, and textile industries maintain a good level of sophistication in payables management (Figure 12). Most companies in the ceramic, pharmaceuticals and tannery sectors are found to be average. A few companies in the fuel &power sector demonstrate a very good level of sophistication and very few others from the same industry and the textile industry exhibit poor payables management practices (Figure 12).

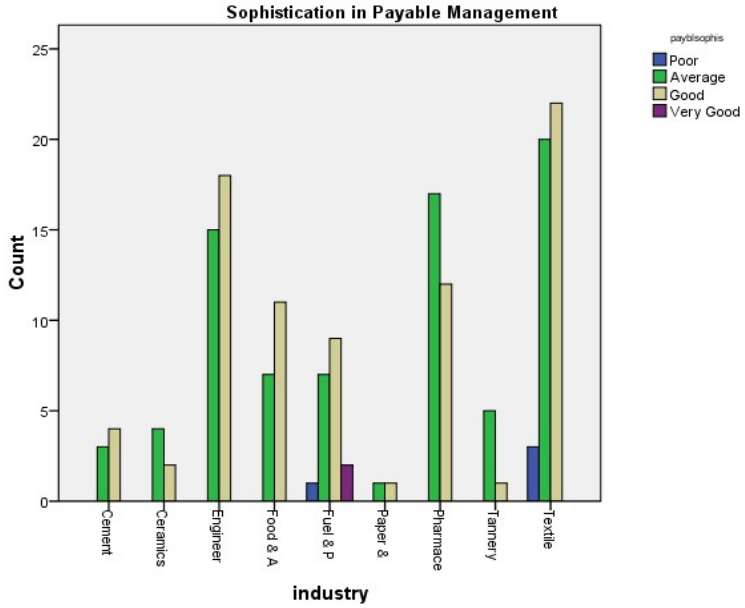

Figure 12: Sophistication in Payables Management

7.6.6 Sophistication in Managing Cash and Equivalents

Figure 13 presents the level of sophistication in how the management of cash and equivalents is distributed among the companies across industries.

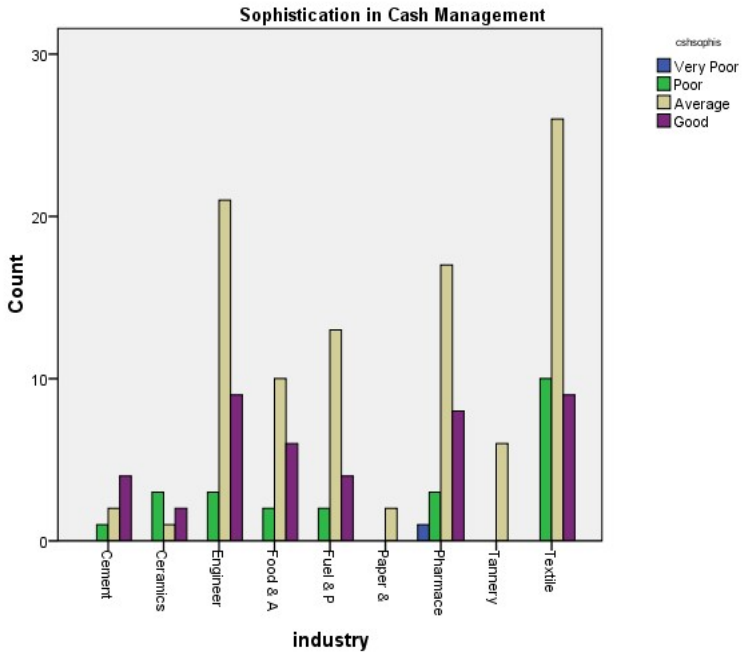

Figure 13: Sophistication in Cash and Equivalents Management

The average level of sophistication is commonplace followed by good and poor, respectively, among the companies in most industry sectors except for ceramics and cement.

A good level of sophistication is prevalent in the cement sector but a poor level is dominant in the ceramics sector. None of the companies portray very good performance with regard to sophistication in managing cash and equivalents. Only a few companies in the pharmaceuticals sector have very poor cash management practices (Figure 13).

7.6.7 Sophistication in Overall Working Capital Management

In general, working capital management practices of the organizations that the researcher studied were good.

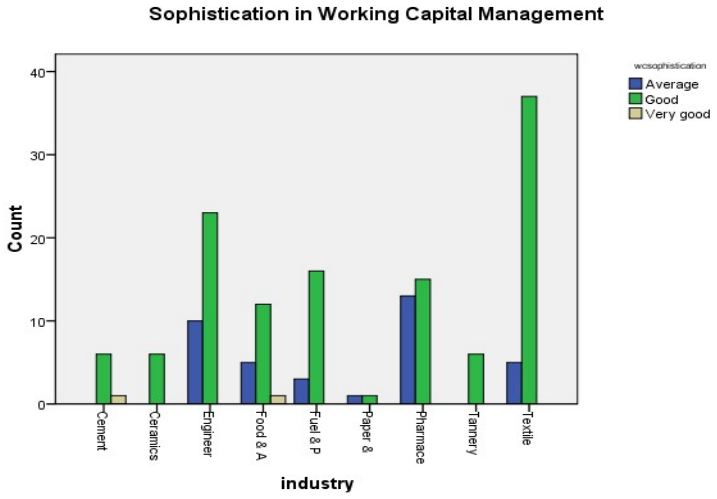

Figure 14: Sophistication in Working Capital Management

The majority of the companies in almost all of the industries covered scored a good level of sophistication in working capital management (Figure 14). A few companies in the cement and in the food &allied sectors scored very well whereas the rest of the companies depicted only an average level of sophistication (Figure 14).

7.7 INTER-INDUSTRY DIFFERENCES IN WORKING CAPITAL MANAGEMENT PRACTICES

The major differences in working capital management practices across industries are evident from Figures 8 through 14 and discussed under the heading, level of sophistication/excellence in managing working capital and its components.

In terms of receivables management, it can be said that companies in the cement sector stand out as a good level of sophistication is prevalent in this sector and no company displayed a poor or very poor level of sophistication. However, the pharmaceuticals & chemicals industry falls back as a poor level of sophistication is the second dominant practice among the companies in these sectors, followed by good practices (Figure 8) whereas in other industries, a good level of sophistication is the second dominant practice.

As evidenced in Figure 9, most industries are at par in managing stock-out situations (order of dominance in the level of excellence in stock-out management are very good, good and average in terms of frequency). The pharmaceuticals sector is dominated by companies with a good level of excellence but they are not very good in stock-out management, hence this industry falls behind.

The cement industry's companies are the best in managing inventory (no poor or very poor performing companies), whereas the textile sector and pharmaceuticals & chemicals sector both fall back due to the presence of companies with very poor practices in inventory management (Figure 10).

The researcher did not observe a significant difference across industries in the excellence of liquidity crisis management (Figure 11).

Figure 12 reveals that the pharmaceuticals & chemicals sector along with the ceramics sector lags behind other industries in terms of payables management because the order of dominance of the level of sophistication in these two sectors is average, followed by good (in other industries, the order is good followed by average).

The cement sector stands out in cash management as well, having the following order of prevalence in the level of sophistication: good, average and poor (Figure 13). For most other industries, the order is average, good and poor. The ceramics sector is at the other end of the spectrum as a poor level of sophistication is dominant among the companies in this industry. The textile industry follows on this with an average, poor and good level of sophistication as the order of prevalence.

In terms of overall working capital management, the pharmaceuticals & chemicals, engineering, food & allied, and fuel & power sectors fall behind the other sectors. The reason is, in the above mentioned industry sectors a reasonably large percentages of companies portray an average level of sophistication whereas in other industries, only a few companies portray below good levels of sophistication (Figure 14).

From the above discussion, it can be concluded that there are inter-industry differences in working capital management practices. Hence the hypothesis, **H2: Companies across industries differ in their working capital management practices**, is accepted.

8. FINDINGS AND ANALYSIS: THE ROLE OF WORKING CAPITAL MANAGEMENT PRACTICES ON BUSINESS COMPETITIVENESS

The researcher ran a multiple linear regression to determine the role of working capital management practices on business competitiveness. The regression was necessary as working capital practices were measured using a number of variables including: working capital policy, strategy, sophistication in the management of its components, liquidity, efficiency, overall sophistication and others.

8.1 ANALYSIS OF MULTICOLINEARITY

Before this multiple linear regression can be performed, it is important to check whether there is a high correlation among the independent variables. A high correlation—usually higher than 0.7—between any pair of independent variables indicates a multi-co-linearity problem and a correlation close to 1 indicate a singularity issue. In such cases, it is suggested to omit one of the variables or form a composite variable from the two highly correlated variables (Pallant, 2016).

The researcher conducted bi-variate correlation analysis to identify the variables with multi-co-linearity problem. Table 26 presents the results of this correlation analysis.

Table 26: Correlation Matrix

Correlations

		arsophisticati on	apsophisticati on	invsophisticati on	cshsophistica tio	wcsophisticati on	docwcm	doawcf	icp	acp	app	ccc	cr	qr	lqdty	stockout
arsophistication	Pearson Correlation	1	.488**	.696**	.163*	.251**	-.074	-.087	.025	-.056	.027	-.042	-.059	-.026	.120	-.083
	Sig. (2-tailed)		.000	.000	.036	.001	.348	.268	.753	.483	.738	.602	.457	.742	.124	.291
	N	165	165	165	165	161	162	163	160	161	158	157	163	163	165	165
apsophistication	Pearson Correlation	.488**	1	.420**	.213**	.170*	-.115	-.117	-.042	-.077	-.039	.017	.002	.000	-.049	-.143
	Sig. (2-tailed)	.000		.000	.006	.031	.144	.138	.600	.330	.623	.832	.979	.996	.534	.066
	N	165	165	165	165	161	162	163	160	161	158	157	163	163	165	165
invsophistication	Pearson Correlation	.696**	.420**	1	.129	.266**	-.090	-.094	.064	-.108	.066	-.099	-.040	-.037	.145	-.260**
	Sig. (2-tailed)	.000	.000		.099	.001	.253	.235	.420	.174	.407	.218	.612	.642	.063	.001
	N	165	165	165	165	161	162	163	160	161	158	157	163	163	165	165
cshsophisticatio	Pearson Correlation	.163*	.213**	.129	1	-.057	.043	-.087	.035	.069	.037	-.014	.039	.034	-.245**	-.074
	Sig. (2-tailed)	.036	.006	.099		.473	.589	.271	.663	.385	.643	.864	.624	.663	.002	.347
	N	165	165	165	165	161	162	163	160	161	158	157	163	163	165	165
wcsophistication	Pearson Correlation	.251**	.170*	.266**	-.057	1	-.113	.030	.039	-.151	.038	-.080	.038	.035	.534**	.508**
	Sig. (2-tailed)	.001	.031	.001	.473		.157	.703	.625	.059	.643	.323	.634	.661	.000	.000
	N	161	161	161	161	161	158	159	156	157	154	153	159	159	161	161
docwcm	Pearson Correlation	-.074	-.115	-.090	.043	-.113	1	.240**	.265**	.868**	.261**	-.004	-.040	-.031	.051	.084
	Sig. (2-tailed)	.348	.144	.253	.589	.157		.002	.001	.000	.001	.964	.615	.698	.519	.287
	N	162	162	162	162	158	162	162	160	161	158	157	162	162	162	162
doawcf	Pearson Correlation	-.087	-.117	-.094	-.087	.030	.240**	1	.164*	.185*	.164*	-.110	-.179*	-.218**	.087	.146
	Sig. (2-tailed)	.268	.138	.235	.271	.703	.002		.038	.019	.039	.168	.022	.005	.268	.063
	N	163	163	163	163	159	162	163	160	161	158	157	163	163	163	163
icp	Pearson Correlation	.025	-.042	.064	.035	.039	.265**	.164*	1	.035	.999**	-.957**	-.020	-.017	-.062	.058
	Sig. (2-tailed)	.753	.600	.420	.663	.625	.001	.038		.657	.000	.000	.805	.829	.439	.469
	N	160	160	160	160	156	160	160	160	159	158	157	160	160	160	160
acp	Pearson Correlation	-.056	-.077	-.108	.069	-.151	.868**	.185*	.035	1	.036	.246**	-.021	-.012	.043	.050
	Sig. (2-tailed)	.483	.330	.174	.385	.059	.000	.019	.657		.650	.002	.789	.880	.588	.532
	N	161	161	161	161	157	161	161	159	161	157	157	161	161	161	161
app	Pearson Correlation	.027	-.039	.066	.037	.038	.261**	.164*	.999**	.036	1	-.959**	-.024	-.020	-.064	.056
	Sig. (2-tailed)	.738	.623	.407	.643	.643	.001	.039	.000	.650		.000	.769	.801	.421	.485
	N	158	158	158	158	154	158	158	158	157	158	157	158	158	158	158
ccc	Pearson Correlation	-.042	.017	-.099	-.014	-.080	-.004	-.110	-.957**	.246**	-.959**	1	.019	.018	.077	-.040
	Sig. (2-tailed)	.602	.832	.218	.864	.323	.964	.168	.000	.002	.000		.811	.822	.339	.618
	N	157	157	157	157	153	157	157	157	157	157	157	157	157	157	157
cr	Pearson Correlation	-.059	.002	-.040	.039	.038	-.040	-.179*	-.020	-.021	-.024	.019	1	.969**	-.017	.025
	Sig. (2-tailed)	.457	.979	.612	.624	.634	.615	.022	.805	.789	.769	.811		.000	.827	.752
	N	163	163	163	163	159	162	163	160	161	158	157	163	163	163	163
qr	Pearson Correlation	-.026	.000	-.037	.034	.035	-.031	-.218**	-.017	-.012	-.020	.018	.969**	1	-.016	.016
	Sig. (2-tailed)	.742	.996	.642	.663	.661	.698	.005	.829	.880	.801	.822	.000		.844	.836
	N	163	163	163	163	159	162	163	160	161	158	157	163	163	163	163
lqdty	Pearson Correlation	.120	-.049	.145	-.245**	.534**	.051	.087	-.062	.043	-.064	.077	-.017	-.016	1	.346**
	Sig. (2-tailed)	.124	.534	.063	.002	.000	.519	.268	.439	.588	.421	.339	.827	.844		.000
	N	165	165	165	165	161	162	163	160	161	158	157	163	163	165	165
stockout	Pearson Correlation	-.083	-.143	-.260**	-.074	.508**	.084	.146	.058	.050	.056	-.040	.025	.016	.346**	1
	Sig. (2-tailed)	.291	.066	.001	.347	.000	.287	.063	.469	.532	.485	.618	.752	.836	.000	
	N	165	165	165	165	161	162	163	160	161	158	157	163	163	165	165

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

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

Table 27 presents the pairs of independent variables with a strong correlation between each other. To eliminate the multi-co-linearity and singularity problem, one from each pair of variables in the multi-co-linearity table above (e.g., qr, app and ccc) is taken out before running a regression.

Table 27: Variables with Multi-co-linearity Issue

Pair of variables	Correlation coefficient
Current ratio (cr) and Quick ratio (qr)	0.9689
Inventory conversion period (icp) and Average payment period (app)	0.999
Inventory conversion period (icp) and Cash conversion cycle (ccc)	-0.957
Average payment period (app) and Cash conversion cycle (ccc)	-0.959

Thus the regression model turns out to be:

Business Competitiveness = $a + b_1$*WCMpolicy + b_2*WCMstrategy + b_3*WCfinancingstrategy + b_4*arsophistication +b_5*apsophistication +b_6*invsophistication+ b_7*cashsophistication + b_8*lqdty +b_9*stockout +b_{10}*wcsophistication + b_{11}*docwcm + b_{12}*doawcf + b_{13}*acp + b_{14}*icp + b_{15}*cr

8.2 ANALYSIS OF REGRESSION RESULTS

Regression outputs are analyzed first to check whether the assumptions of multiple regression analysis hold. Normal probability plot (P-P) of the regression standardized residuals is inspected to check the normality assumption. If the points in the Normal P-P lie in a reasonably straight diagonal from bottom left to top right, there are no major deviations from normality. The scatter plot of the standardized residuals is scrutinized to check linearity, homoscedasticity and independence of residuals' assumptions. When there are no major deviations from the assumptions, the residuals are expected to be distributed roughly in a rectangular pattern with most of the scores concentrated in the center (along 0,0 coordinate). A scatter plot of the (standardized) residuals deviated from a centralized rectangle indicate some violations of the

assumptions. Tolerance and/or variance inflation factor (VIF) are monitored to identify the presence of multi-co-linearity among the variables. A tolerance value less than 0.1 and VIF value above 10 suggests a multi-co-linearity problem (Pallant, 2016).Then the R-square value, F-statistic value and sig. value are investigated to evaluate the regression model. Unstandardized and standardized coefficients, their significance levels and part correlations are observed to evaluate influence and the unique contributions of each of the independent variables.

8.2.1 Regression Results with Standardized Return on Assets (roa) as the Measure of Business Competitiveness

The Normal P-P plot presented in Appendix VI (A1) indicates that the variable and data set satisfies the normality assumption. The centralized rectangular shape of residuals scatter plot in Appendix VI (A1) confirms linearity, homoscedasticity and the independence of residuals assumption. Table 28 is developed from Appendix VI (A1) to present a summary of the regression results. All values of VIF in Table 27 are below10, which means that there is no multi-co-linearity problem (Pallant, 2016).

The resulting regression model has an R-square value of 0.273 (Table 28), which means that 27.3% of the variance in standardized return on assets (roa) is explained by this model. The significance value of .000 and F-statistic value of 3.487 in Table 28 indicates that the model is statistically significant.

Statistics presented in Table 28 also reveal that among the independent variables, degree of aggressiveness in working capital financing (doawcf) is the most powerful predictor of business competitiveness measured by standardized return on assets (roa) because this variable has the highest absolute value of standardized coefficient beta (0.483) (Pallant, 2016).

Table 28: Summary of Regression Results with roa as a Measure of Competitivenes

Measure of competitiveness	R-square	F- statistic	Sig.	Normality	Multi-co-linearity	Linearity, homoscadasticity, independence of residuals
roa	27.30%	3.487	0	Held	No	Held
Variable	**Unstandardized Coefficients, B**	**Standardized Coefficients, beta**	**Sig.**	**Part Correlation**	**Unique contribution**	**Colinearity statistics, VIF**
(Constant)	0.192		0.016			
WCM Policy	-0.009	-0.066	0.400	-0.061	0.37%	1.167
WCM Strategy	0.009	0.064	0.430	0.057	0.33%	1.255
WCFinancingstrategy	-0.022	-0.167	0.048	-0.144	2.08%	1.335
arsophistication	-0.006	-0.068	0.472	-0.052	0.27%	1.699
apsophistication	0.004	0.052	0.543	0.044	0.19%	1.366
invsophistication	-0.006	-0.057	0.574	-0.041	0.17%	1.929
cshsophisticatio	0.001	0.011	0.890	0.010	0.01%	1.172
lqdty	0.000	-0.007	0.938	-0.006	0.00%	1.758
stockout	-0.004	-0.086	0.399	-0.061	0.37%	2.000
wcsophistication	0.004	0.023	0.839	0.015	0.02%	2.481
docwcm	-0.001	-0.288	0.093	-0.122	1.49%	5.559
doawcf	-0.144	-0.483	0.000	-0.453	20.50%	1.136
icp	0.000	0.137	0.115	0.115	1.32%	1.434
acp	0.000	0.273	0.101	0.119	1.42%	5.224
cr	-0.001	-0.078	0.302	-0.075	0.56%	1.084

The order of other independent variables in terms of their unique power of predictability is as follows: WCfinancingstrategy, docwcm, acp, icp, cr, stockout, WCM policy, WCM strategy, arsophistication, apsophistication, invsophistication, wcsophistication, cashsophistication and lqdty. However, of all of the independent variables, only doawcf and WCfinancingstrategy have significant unique power to predict the dependent variable roa (sig. =0.000 and 0.048, unique contribution = 20.5% and 2.08%, respectively).All of the other independent variables generate sig. value higher than 0.05, which is unacceptable at a 5% level of significance.

Thus, the regression equation turns out to be:

roa = 0.19 – 0.009 WCM policy + 0.009 WCM strategy– 0.022 WCfinancingstrategy – 0.006 arsophistication + 0.004 apsophistication–0.006 invsophistication+ 0.001 cashsophistication + 0.000 lqdty – 0.004stockout+ 0.004 wcsophistication – 0.001docwcm – 0.144 doawcf +9.751E-7 icp + 4.686 E-6 acp – 0.001cr

8.2.2 Regression Results with Standardized Net Profit Margin (npm) as the Measure of Business Competitiveness

When standardized net profit was used as the measure of business competitiveness, the data set satisfied all of the assumptions of multiple linear regressions. Regression outputs are presented in Appendix VI (A2). Table 29 is developed from Appendix VI (A2) to present a summary of the regression results. VIF values (all values are less than 10) in Table 29 indicate that there was no multi-co-linearity problem.

Table 29: Summary of Regression Results with npm as a Measure of Competitivenes

Measure of competitiveness	R-square	F- statistic	sig. value	Normality	Multi-co-linearity	Linearity, homoscadasticity, independence of residuals
npm	79.40%	35.793	0	Held	No	Held
Variable	**Unstandardized Coefficients, B**	**Standardized Coefficients, beta**	**Sig.**	**Part Correlation**	**Unique contribution**	**Colinearity statistics, VIF**
(Constant)	1.210		0.026			
WCM Policy	-0.120	-0.068	0.104	-0.063	0.40%	1.167
WCM Strategy	0.061	0.033	0.445	0.029	0.09%	1.255
WCFinancingstrategy	-0.085	-0.051	0.253	-0.044	0.19%	1.335
arsophistication	0.029	0.027	0.595	0.020	0.04%	1.699
apsophistication	0.050	0.045	0.315	0.039	0.15%	1.366
invsophistication	-0.087	-0.068	0.208	-0.049	0.24%	1.929
cshsophisticatio	0.009	0.010	0.812	0.009	0.01%	1.172
lqdty	-0.002	-0.005	0.921	-0.004	0.00%	1.758
stockout	-0.023	-0.040	0.461	-0.028	0.08%	2.000
wcsophistication	-0.131	-0.055	0.362	-0.035	0.12%	2.481
docwcm	-0.127	-1.971	0.000	-0.836	69.91%	5.559
doawcf	-0.498	-0.130	0.002	-0.122	1.48%	1.136
icp	0.000	0.574	0.000	0.479	22.95%	1.434
acp	0.000	1.582	0.000	0.692	47.92%	5.224
cr	-0.001	-0.009	0.821	-0.009	0.01%	1.084

F-statistic value (35.793) and sig.value (.000) presented in Table 29 assert that the model is statistically significant. R-square value (79.4%), which is higher than that of the previous model, indicates that this regression model has better predictive power than the previous one and in terms of the unique predictive power of the independent variables, docwcm stands at the top followed by acp, icp, doawcf and others as represented by the percentage of unique contributions

(69.9%, 47.9%, 22.95% and 1.48%, respectively) and the absolute values of standardized coefficients (1.971, 1.582, 0.574 and 0.131, respectively) in Table 28.

The sig. values of the coefficients designate that only docwcm (sig. =0.000), doawcf (sig. = 0.002), icp (sig. = 0.000) and acp (sig. = 0.000) have statistically significant unique power to predict the dependent variable npm.

Thus, the regression equation is:

npm =1.212 – 0.120 WCM policy + 0.061 WCM strategy – 0.085 WCfinancingstrategy + 0.029 arsophistication + 0.050 apsophistication – 0.087 invsophistication + 0.009 cashsophistication – 0.002 lqdty – 0.023 stockout – 0.131 wcsophistication – 0.127 docwcm – 0.498 doawcf +9.751E-7 icp + 4.686 E-6 acp – 0.001cr

8.2.3 Regression Results with Persistency Parameter α of Autoregressive Profitability as the Measure of Business Competitiveness

When persistency parameter alpha is used as the measure of business competitiveness, the data set deviates not only from normality assumption (Normal P-P in Appendix VI [A3)]) but also from the other assumptions of multiple linear regression e.g., linearity, homoscedasticity and independence of residuals (residual scatter plot in Appendix VI [A3)]). Although multi-co-linearity problem is not present in this case, a very low F-statistic value (0.207) and sig. value of 0.999 in ANOVA table of Appendix VI (A3) reveals that the regression results are not statistically significant. Moreover, the R-square value presented in the model summary of Appendix VI (A3) is very low (only 2.2%), which means that the resulting model has minimal explanatory power. In other words, the variances in the measures of working capital practices considered in this model are not adequate to explain the variances in persistency measure alpha.

Simply put, working capital practices do not have a significant role in business competitiveness when measured by alpha (persistence performance).

8.2.4 Regression Results with Persistency Parameter β of Autoregressive Profitability as the Measure of Business Competitiveness

The normal P-P, scatter plot, model summary and ANOVA table presented in Appendix VI (A4) indicate that when persistency parameter beta is used as the measure of competitiveness, the data violate normality, linearity, homoscedasticity and independence of residuals assumptions. Therefore, the multiple linear regression model is not appropriate for this case. Moreover, very low R-square value (2.2%), F-statistic value (0.206) and high sig. value (0.999) evident in Appendix VI (A4) assert that the resulting model from the regression analysis has meek explanatory power and it is not statistically significant.

8.2.5 Regression Results with Tobin's q (q) as the Measure of Business Competitiveness

A similar result is found when Tobin's q is used as a measure of business competitiveness. The only exception is that in this case, the data set is closer to normality than the previous two cases (Normal P-P in Appendix VI [A5)]). Nevertheless, the regression results in this case have low explanatory power (R-square = 9.7% found in model summary of Appendix VI [A5)]) and is not statistically significant (F-statistic value = 0.995 and sig. value = 0.464 found in ANOVA table of Appendix VI [A)]).

Table 30 is derived from Appendix VI (A3), Appendix VI (A4) and Appendix VI (A5) to present the summary of regression results when business competitiveness is measured by persistency parameter α and β of autoregressive profitability and Tobin's q, respectively.

Table 30: Summary of Regression Results with Different Measures of Competitivenes

Measure of competitiveness	R-square	F- statistic	sig. value	Normality	Multi-co-linearity	Linearity, homoscadasticity, independence of residuals
alpha	2.20%	0.207	0.999	Deviated	No	Deviated
beta	2.20%	0.206	0.999	Deviated	No	Deviated
Tobin's q	9.70%	0.995	0.464	Somewhat held	No	Deviated

8.3 ANALYSIS OF HYPOTHESES BASED ON REGRESSION RESULTS

The hypotheses developed for this study are analyzed based on the results of regression runs. A particular hypothesis is considered accepted if the underlying regression model and/or its coefficients are found statistically significant (sig. <= 0.05).

8.3.1The Broad Hypothesis

H1: There is an association between working capital practices and business (firm) competitiveness.

As this study has five measures of business competitiveness, the researcher ran five regression models. Each time, one of these measures is used as the dependent variable and the measures of working capital practices as independent variables. It is evident from Tables 28, 29 and 30 that only two models—one with roa and the other with npm as the dependent variables—were found to be statistically significant (sig. = 0.000).Moreover, while using the other measures of business competitiveness, the data set deviated from some of the assumptions of multiple linear regressions (Table 30). As such, the results assert that of the five measures of business competitiveness, the measures of working capital practices used in this study can only explain roa and npm.

Therefore the broad hypothesis is accepted only when roa and npm are used as the measures of business competitiveness. In other words, the broad hypothesis is conditionally accepted.

8.3.2 The Specific Hypotheses

The specific hypotheses claim a relationship between the dependent and each of the independent variables separately. The signs of the coefficients in the coefficient table of regression outputs in appendices VI (A1), VI (A2), VI (A3), VI (A4) and VI (A5) indicate the direction of the relationship between the dependent and independent variables, and sig. values of the independent variables indicate whether the relationships are statistically significant. However, as only two of the five regression models were found to be statistically significant (Table 28, 29 and 30), specific hypotheses are evaluated using just the two significant models (presented in Table 28 and 29).

The researcher ran industry-wide regression models using different measures of business competitiveness to analyze the hypothesis H (ix), which concerns inter-industry differences in the role of working capital management on business competitiveness. Therefore, this hypothesis is analyzed separately after all of the other specific hypotheses are tested.

8.3.2.1 First Regression Model (Where roa is the Measure of Business Competitiveness)

H (i): Working capital policies (WCM Policy) have some association with business competitiveness; companies with formal working capital policies are likely to be more competitive.

A summary of the results of the first regression model presented in Table 28 reveal that the coefficient value of WCM Policy is -0.009 and the sig. value is 0.400 (higher than 0.05). The

higher the value of WCM Policy, the more formal the working capital policy in place (see coded questionnaire in Appendix II). A negative association of WCM Policy with business competitiveness is indicative that companies with less formal working capital policies are more competitive. Hence, hypothesis H (i) is rejected.

H (ii) Working capital management strategy (WCM Strategy) as perceived by managers has some influence on business competitiveness.

The coefficient and sig. value of WCM Strategy is 0.009 and 0.430 (Table 28), respectively. This means that the more aggressive the working capital management strategy, the higher the level of competitiveness, but the relationship is not statistically significant. So hypothesis H (ii) is rejected.

H (iii) Working capital financing strategy (WCfinancingstrategy) as perceived by managers has some influence on business competitiveness.

Table 28 presents a coefficient value of -0.022 and a sig. value of 0.048 (less than 0.05) for WCfinancingstrategy. This is interpreted as the more conservative the working capital financing strategy, the higher the level of business competitiveness and the relationship is statistically significant. Therefore, hypothesis H (iii) is accepted.

H (iv): The use of sophisticated techniques and tools in working capital management (wcsophistication) leads to business competitiveness.

Based on the coefficient value (0.004) and sig. value (0.839) of wcsophistication presented in Table 28, it can be inferred that the level of sophistication in working capital management is

positively related to business competitiveness. However, the relationship is not statistically significant (sig. value>0.05). Hypothesis H (iv) is rejected.

H (iva): Business (firm) competitiveness has a positive association with sophistication in receivables management (arsophistication).

The coefficient value of arsophistication is negative (-0.006) and the sig. value (0.472) is higher than 0.005 (Table 28). As such, hypothesis H (iva) is rejected.

H (ivb): Business (firm) competitiveness has a positive association with sophistication in payables management (apsophistication).

Although the variable apsophistication has a positive coefficient (0.004), its sig. value (0.543) is higher than 0.05 (Table 28), which means the rejection of hypothesis H (ivb).

H (ivc): Business (firm) competitiveness has a positive association with sophistication in inventory management (invsophistication).

The variable invsophistication displays a negative coefficient (-0.006) and a sig. value (0.574) that is higher than 0.05 and as such, hypothesis H (ivc) is rejected.

H (ivd): Business (firm) competitiveness has a positive association with sophistication in cash and equivalents management (cashsophistication).

Although the variable cashsophistication has a positive coefficient (0.001), its sig. value (0.89) (Table 28) is higher than 0.05. Hypothesis H (ivd) is rejected as a result.

H(v): The firm's business competitiveness is positively associated to its excellence in managing stock-out situations (stockout).

The coefficient of the variable stockout in Table 28 is negative (-0.004) and the sig. value (0.399) is much higher than 0.05 so hypothesis H (v) is rejected.

H (vi): A firm's business competitiveness is positively associated to its excellence in liquidity crisis management (lqdty).

The coefficient of the variable lqdty in Table 28 is very low (0.000) and the sig. value (0.938) is higher than 0.05. Therefore, hypothesis H (vi) is rejected.

H (vii): A firm's business competitiveness is associated to its working capital strategy as measured quantitatively.

This hypothesis actually has two parts. The first part refers to working capital management strategy and the second part is about working capital financing strategy. Acceptance or rejection of the component hypotheses determines the fate of this overall hypothesis. Therefore hypotheses H (viia) and H (viib) are tested before concluding on the fate of H (vii).

H (viia): Business (firm) competitiveness has a negative association with the degree of conservativeness in working capital management strategy (docwcm).

The variable docwcm displays a negative coefficient (-0.001), which is in line with the statement of hypothesis H (viia). However, the sig. value (0.093) is higher than 0.05 (Table 28). As a result, hypothesis H (viia) is rejected.

H (viib): Business (firm) competitiveness has a positive association with the degree of aggressiveness in working capital financing strategy (doawcf).

The variable doawcf displays a negative coefficient (-0.144), which is in contrast with the statement of hypothesis H (viib). The sig. value (0.000) is less than 0.05 (Table 28) so hypothesis H (viib) is rejected.

Based on the above conclusions about hypotheses H (viia) and H (viib), it can be stated that companies with more conservative working capital management strategies and/or less aggressive working capital financing strategies are likely to be more competitive. Hence, hypothesis H (vii) is accepted.

H (viii): A firm's business competitiveness is associated to its working capital efficiency and measures of liquidity.

As there are several measures of working capital efficiency and liquidity, this hypothesis is dissected into five hypotheses.

H (viiia): Business (firm) competitiveness has a negative association with inventory conversion period (icp).

It is evident from Table 28 that the variable icp has a very low positive coefficient (0.000) and a high sig. value (0.115).Therefore, it can be concluded that the inventory conversion period has a positive but insignificant association with business competitiveness. Hypothesis H (viiia) is rejected.

H (viiib): Business (firm) competitiveness has a positive association with average collection period (acp).

The variable acp shows a very low positive association (coefficient = 0.000) with business competitiveness. The sig. value is found to be 0.101 (Table 28), which is higher than 0.05.As a result, hypothesis H (viiib) is rejected.

H (viiic): Business (firm) competitiveness has a positive association with average payment period (app).

Due to the multi-co-linearity issue, the variable app was removed from the regression model. As such, its coefficient value is not available in Table 28. However, it is evident from Table 27 that app has a high positive correlation (0.999) with icp. Hence, the conclusion with the hypothesis involving icp can be projected for that involving app. Therefore, hypothesis H (viiic) is rejected.

H (viiid): Business (firm) competitiveness has a negative association with cash conversion cycle (ccc).

Like app, the researcher removed the variable CCC from the regression model to deal with the multi-co-linearity issue. As a result, CCC or its coefficient is not available in regression results (Table 28). However, as CCC displayed a very high negative correlation (-0.957) with icp (Table 27), the conclusion for the hypothesis involving icp can be projected for that involving CCC.Therefore, hypothesis H (viiid) is rejected.

H (viiie): Business (firm) competitiveness has a negative association with the measures of liquidity, namely current ratio and quick ratio (cr and qr).

qr or its coefficients are not available in Table 28 because cr and qr displayed a very high positive correlation (0.9689) (Table 27) and thereby qr was removed from the regression model to deal with the multi-co-linearity issue. However for hypothesis testing, the conclusion for the

hypothesis involving cr can be projected for that involving qr. The coefficient value of cr is negative (-0.001) and the sig. value (0.302) is higher than 0.05 (Table 28). Hence, hypothesis H (viiie) is rejected.

As all of the five component hypotheses—H (viiia), H (viiib), H (viiic), H (viiid) and H (viiie)—are rejected, the resultant hypothesis H (viii) is rejected.

8.3.2.2 Second Regression Model (Where npm is the Measure of Business Competitiveness)

H (i): Working capital policies (WCM Policy) have some association with business competitiveness; companies with formal working capital policies are likely to be more competitive.

Summary results of the first regression model presented in Table 29 reveal that the coefficient value of WCM Policy is -0.12 and the sig. value is 0.104 (higher than 0.05). The higher the value of WCM Policy, the more formal the working capital policy in place (see coded questionnaire in Appendix II). A negative association of WCM Policy with business competitiveness infers that companies with less formal working capital policies are more competitive. Hence, hypothesis H (i) is rejected.

H (ii) Working capital management strategy (WCM Strategy) as perceived by managers has some influence on business competitiveness.

The coefficient and sig. value of WCM Strategy is 0.061 and 0.445 (Table 29), respectively. This means that the more aggressive the working capital management strategy, the higher the level of competitiveness, but the relationship is not statistically significant. So hypothesis H (ii) is rejected.

H (iii) Working capital financing strategy (WCFinancingstrategy) as perceived by managers has some influence on business competitiveness.

Table 29 presents a coefficient value of -0.085 and a sig. value of 0.253 (higher than 0.05) for WCFinancingstrategy. This means that the more conservative the working capital financing strategy, the higher the level of business competitiveness and the relationship is statistically insignificant. Therefore, hypothesis H (iii) is rejected.

H (iv): The use of sophisticated techniques and tools in working capital management (wcsophistication) leads to business competitiveness.

Based on the coefficient value (-0.131) and the sig. value (0.362) of wcsophistication presented in Table 29, it can be inferred that the level of sophistication in working capital management is negatively related to business competitiveness. The relationship is not statistically significant (sig. value>0.05) and therefore, hypothesis H (iv) is rejected.

H (iva): Business (firm) competitiveness has a positive association with sophistication in receivables management (arsophistication).

The coefficient value of arsophistication is positive (0.029) but the sig. value (0.595) is higher than 0.005 (Table 29). As such, hypothesis H (iva) is rejected.

H (ivb): Business (firm) competitiveness has a positive association with sophistication in payables management (apsophistication).

Although the variable apsophistication has a positive coefficient (0.050), its sig. value (0.315) is higher than 0.05 (Table 29), which leads to the rejection of hypothesis H (ivb).

H (ivc): Business (firm) competitiveness has a positive association with sophistication in inventory management (invsophistication).

The variable invsophistication displays a negative coefficient (-0.087) and a sig. value (0.208) that is higher than 0.05 so hypothesis H (ivc) is rejected.

H (ivd): Business (firm) competitiveness has a positive association with sophistication in cash and equivalents management (cashsophistication).

Although the variable cashsophistication has a positive coefficient (0.009), its sig. value (0.812) (Table 29), which is higher than 0.05, means that hypothesis H (ivd) is rejected.

H (v): A firm's business competitiveness is positively associated to its excellence in managing stock-out situations (stockout).

The coefficient of the variable stockout in Table 29 is negative (-0.023) and the sig. value (0.461) is much higher than 0.05. Therefore, hypothesis H (v) is rejected.

H (vi): A firm's business competitiveness is positively associated to its excellence in liquidity crisis management (lqdty).

The coefficient of the variable lqdty in Table 29 is very low (-0.002) and the sig. value (0.921) is higher than 0.05.Therefore, hypothesis H (vi) is rejected.

H (vii): A firm's business competitiveness is associated to its working capital strategy as measured quantitatively.

This hypothesis actually has two parts. The first part refers to working capital management strategy and the second part is about working capital financing strategy. The

acceptance/rejection of the component hypotheses determines the fate of this overall hypothesis. Therefore hypotheses H (viia) and H (viib) are tested before concluding on the fate of H (vii).

H (viia): Business (firm) competitiveness has a negative association with the degree of conservativeness in working capital management strategy (docwcm).

The variable docwcm displays a negative coefficient (-0.127), which is in line with the statement of hypothesis H (viia). The sig. value (0.000) is less than 0.05 (Table 29). As such, hypothesis H (viia) is accepted.

H (viib): Business (firm) competitiveness has a positive association with the degree of aggressiveness in working capital financing strategy (doawcf).

The variable doawcf displays a negative coefficient (-0.498), which is in contrast with the statement of hypothesis H (viib). The sig. value (0.002) is less than 0.05 (Table 29) so hypothesis H (viib) is rejected.

Based on the above conclusions about hypotheses H (viia) and H (viib), it can be stated that companies with more conservative working capital management strategies and/or less aggressive working capital financing strategies are likely to be more competitive. Hence, hypothesis H (vii) is accepted.

H (viii): A firm's business competitiveness is associated to its working capital efficiency and measures of liquidity.

As there are several measures of working capital efficiency and liquidity, this hypothesis is dissected into five hypotheses.

H (viiia): Business (firm) competitiveness has a negative association with inventory conversion period (icp).

It is evident from Table 29 that the variable icp has a very low positive coefficient (0.000) and a low sig. value (0.000). Therefore, it can be concluded that inventory conversion period has a significant positive association with business competitiveness. Hypothesis H (viiia) is rejected.

H (viiib): Business (firm) competitiveness has a positive association with average collection period (acp).

The variable acp shows a positive association (coefficient = 0.000) with business competitiveness. The sig. value is found to be 0.000 (Table 29), which is lower than 0.05.Therefore, hypothesis H (viiib) is accepted.

H (viiic): Business (firm) competitiveness has a positive association with average payment period (app).

Due to the multi-co-linearity issue, the variable app was removed from the regression model, so its coefficient value is not available in Table 29. However, it is evident from Table 27 that app has a high positive correlation (0.999) with icp. Hence the conclusion for the hypothesis involving icp can be projected for that involving app. Therefore, hypothesis H (viiic) is accepted.

H (viiid): Business (firm) competitiveness has a negative association with cash conversion cycle (ccc).

Like app, the variable CCC was removed from the regression model to deal with the multi-co-linearity issue. As such, neither the CCC nor its coefficient is available in regression results

(Table 29).As CCC displayed a very high negative correlation (-0.957) with icp (Table 27), the conclusion for the hypothesis involving icp can be projected for that involving CCC. Therefore, hypothesis H (viiid) is rejected.

H (viiie): Business (firm) competitiveness has a negative association with the measures of liquidity, namely current ratio and quick ratio (cr and qr).

Neither qr nor its coefficients are available in Table 29 because cr and qr displayed a very high positive correlation (0.999) (Table 26) and therefore qr was removed from the regression model to deal with the multi-co-linearity issue. However for hypothesis testing, the conclusion for the hypothesis involving cr can be projected for that involving qr. The coefficient value of cr is negative (-0.001) and the sig. value (0.821) is higher than 0.05 (Table 29) so hypothesis H (viiie) is rejected.

As all of the five component hypotheses—H (viiia), H (viiib), H (viiic), H (viiid) and H (viiie)—are rejected, the resultant hypothesis H (viii) is also rejected.

8.4 INTER INDUSTRY ANALYSIS OF REGRESSION RESULTS

In order to investigate if there are any differences in terms of the role of working capital management in business competitiveness across industries, the researcher ran regression separately using data of large industry subsectors, namely engineering, fuel & power, food & allied, pharmaceuticals & chemicals, and textiles, each of which have more than 15 companies listed on the Dhaka Stock Exchange.

8.4.1 Fuel &Power Sector

To summarize regression results of the fuel & power sector, Table 31 is derived from Appendices VI (B1), (B2), (B3), (B4) and (B5).

Table 31: Regression Results of the Fuel & Power Sector

Measure of competitiveness	R-square	F- statistic	sig. value	Normality	Multi-co-linearity	Linearity, homoscadasticity, independence of residuals
roa	84.00%	0.376	0.875	Violated	Yes	Violated
alpha	99.30%	9.504	0.25	Deviated	Yes	Deviated
beta	76.80%	0.236	0.941	Deviated	Yes	Deviated
Tobin's q	94.00%	1.11	0.641	Deviated	Yes	Deviated
npm	90.80%	0.702	0.748	Deviated	Yes	Deviated

It is evident from Table 31 that data of the fuel & power sector have multi-co-linearity issues. Also, most of the assumptions of multiple linear regression are violated in the case of this industry. Therefore, none of the regression runs are statistically significant (all sig. values in Table 30 are higher than 0.05). As such, the broad hypothesis stating that the role of working capital management on business competitiveness, let alone the specific hypotheses under this broader statement, are rejected for this industry sector.

8.4.2 Food & Allied Sector

Table 32 is devised from Appendices VI (C1), (C2), (C3), (C4) and (C5) to present a summary of regression results of the food & allied sector.

Table 32: Regression Results of the Food and Allied Sector

Measure of competitiveness	R-square	F- statistic	sig. value	Normality	Multi-co-linearity	Linearity, homoscadasticity, independence of residuals
roa	96.50%	3.668	0.235	Deviated	No	Deviated
alpha	99.20%	15.93	0.061	Slightly deviated	Yes	Somewhat held
beta	72.40%	0.35	0.911	Somewhat held	Yes	Deviated
Tobin's q	80.80%	0.561	0.798	Deviated	Yes	Deviated
npm	99.10%	15.007	0.064	Somewhat held	Yes	Deviated

Data of the food & allied sector have multi-co-linearity issues except when standardized return on asset (roa) is taken as the dependent variable (Table 32). Moreover, for this sector most of the assumptions of multiple linear regression are violated. Therefore, none of the regression runs are statistically significant (all sig. values in Table 32 are higher than 0.05). As such, the broad hypothesis stating that the role of working capital management on business competitiveness, let alone the specific hypotheses under this broader statement, are rejected for this industry sector.

The results may be explained by the small data set as both the food & allied industry and the fuel & power sector have less than 20 companies each listed on the Dhaka Stock Exchange. The scenario is different for engineering, pharmaceuticals & chemicals, and the textile industries as these sectors have a large number of companies and a resultant reasonably large data set.

8.4.3 Engineering Sector

The summary of regression results of engineering companies as devised from Appendices VI (D1), (D2), (D3), and (D4) and (D5) is presented in Table 33.

Table 33: Regression Results of the Engineering Companies

Measure of competitiveness	R-square	F- statistics	sig. value	Normality	Multi-co-linearity	Linearity, homoscadacity, independence of resuals
roa	25.70%	0.445	0.935	held	no	deviated
alpha	36.30%	0.732	0.72	held	no	deviated
beta	60.70%	1.984	0.086	held	no	deviated
tobin's Q	49.00%	1.237	0.331	held	no	deviated
npm	78.10%	4.584	0.002	held	no	somewhat held
Variable	**Unstandardized Coefficients, B**	**Standardized Coefficients, beta**	**Sig.**	**Part Correlation**	**Unique contribution**	**Colinearity statistics, VIF**
(Constant)	0.158		0.479			
WCM Strategy	-0.022	-0.192	0.238	-0.135	1.81%	2.02
WCM Policy	0.002	0.013	0.930	0.010	0.01%	1.89
WCFinancingstrategy	-0.036	-0.263	0.162	-0.161	2.59%	2.66
arsophistication	0.014	0.140	0.561	0.065	0.43%	4.59
apsophistication	-0.001	-0.007	0.969	-0.004	0.00%	2.61
cshsophisticatio	-0.037	-0.307	0.155	-0.164	2.68%	3.51
lqdty	-0.015	-0.439	0.103	-0.190	3.60%	5.34
stockout	-0.002	-0.055	0.868	-0.019	0.03%	8.65
wcsophistication	0.054	0.291	0.323	0.112	1.26%	6.73
docwcm	0.009	0.323	0.216	0.142	2.00%	5.21
doawcf	0.013	0.034	0.843	0.022	0.05%	2.42
icp	0.000	0.178	0.349	0.106	1.13%	2.80
acp	0.000	0.192	0.539	0.069	0.48%	7.75
cr	0.010	0.212	0.226	0.138	1.91%	2.35

It is evident from Table 33 that of the five regression runs, only the one with npm as the measure of business competitiveness satisfies all of the assumptions of multiple linear regression and is statistically significant (sig. value 0.002 < 0.05). This means that for the engineering sector, working capital practices influence business competitiveness as measured by npm. The broad hypothesis, **H1: working capital management practices have some association with business competitiveness,** is accepted when npm is used as the dependent variable. Although the model has a 78.1% predictability (R-square value), the unique contribution of individual independent variables is very low (Table 33). None of the independent variables display statistically significant association with business competitiveness (all sig. values are higher than 0.05). Therefore, it can be concluded that in the case of the engineering industry, the variables representing working capital practices (only when put together in a certain manner as evident from the coefficients presented in Table 33) have a combined influence on business

competitiveness. In this case, only the broad hypothesis relating working capital practices and competitiveness is accepted but all of the underlying specific hypotheses are rejected.

8.4.4 Pharmaceuticals &Chemicals Industry

Table 34 is devised from Appendices VI (E1), (E2), (E3), (E4) and (E5) to present a summary of the regression results of the pharmaceuticals & chemicals industry.

In this case, all of the regression runs except that with α as the dependent variable violate some of the assumptions of multiple linear regression (Table 34). Therefore, only the regression model with α (alpha) as the dependent variable is found to be statistically significant (sig. value 0.034 < 0.05).

Table 34: Regression Results of the Pharmaceuticals and Chemical Sector

Measure of competitiveness	R-square	F- statistic	sig. value	Normality	Multi-co-linearity	Linearity, homoscadasticity, independence of residuals
roa	47.10%	0.653	0.782	Somewhat held	No	Deviated
npm	64.60%	1.338	0.318	Held	No	Deviated
beta	39.40%	0.478	0.908	Somewhat held	No	Deviated
Tobin's q	66.00%	1.427	0.279	Somewhat held	No	Deviated
alpha	80.70%	3.063	0.034	Held	No	Somewhat held
Variable	**Unstandardized Coefficients, B**	**Standardized Coefficients, beta**	**Sig.**	**Part Correlation**	**Unique contribution**	**Colinearity statistics, VIF**
(Constant)	-3.877		0.236			
WCM Strategy	0.075	0.038	0.912	0.015	0.02%	6.422
WCM Policy	1.068	0.582	0.017	0.374	13.96%	2.425
WCFinancingstrategy	0.618	0.489	0.067	0.269	7.26%	3.301
arsophistication	-0.219	-0.225	0.423	-0.110	1.21%	4.156
apsophistication	-0.492	-0.502	0.092	-0.245	5.99%	4.210
invsophistication	0.915	0.642	0.044	0.302	9.10%	4.534
cshsophisticatio	0.070	0.082	0.748	0.044	0.19%	3.525
lqdty	0.106	0.255	0.398	0.117	1.36%	4.774
stockout	-0.230	-0.404	0.150	-0.205	4.21%	3.876
wcsophistication	0.621	0.326	0.335	0.134	1.78%	5.954
docwcm	0.031	0.034	0.839	0.027	0.08%	1.508
doawcf	-1.264	-0.266	0.283	-0.149	2.23%	3.168
icp	0.000	-0.031	0.871	-0.022	0.05%	2.013
acp	0.000	-0.020	0.929	-0.012	0.01%	2.775
cr	-0.026	-0.077	0.702	-0.052	0.27%	2.181

Hence the broad hypothesis stating that working capital practices influence business competitiveness,**H1: working capital management practices have some association with business competitiveness,** is accepted for this industry sector, provided competitiveness is measured by α (alpha).The significant model has a predictive power of 80.7% (R-square value with α in Table 34).In terms of the unique contribution of the independent variable, WCM policy ranks top (13.96%), followed by invsophistication (9.10%), WCfinancing strategy (7.26%), apsophistication(5.99%) and others, respectively. Of all of the independent variables considered in the model, only the WCM policy and invsophistification have a sig. value less than 0.05 (0.017 and 0.044, respectively) and therefore have significant influence on business

competitiveness. Based on the sign of the coefficients of the significant independent variables (positive), it can be asserted that specific hypotheses, *H (i): Working capital policies (WCM Policy) have some association with business competitiveness; companies with formal working capital policies are likely to be more competitive*, and *H (ivc): Business (firm) competitiveness has a positive association with sophistication in inventory management (invsophistication)*, are accepted. All other specific hypotheses are rejected.

8.4.5 Textile Industry

Table 35 presents a summary of regression results of the textile industry as devised from Appendices VI (F1), (F2), (F3), (F4) and (F5). Of the five regression runs, only two—one with roa and the other with npm as the measure of business competitiveness—satisfy all of the assumptions of multiple linear regression and are found to be statistically significant (sig. values 0.048 and 0.030, respectively). As such, the broad hypothesis relating to working capital and business competitiveness, **H1: working capital management practices have some association with business competitiveness,** is accepted only when roa or npm are used as dependent variables.

The regression model with roa has a 55.9% predictive power and that with npm has a 58.2% predictive power (R-square values in Table 35). The two models differ in terms of the variables depicting a significant association with business competitiveness. In the first model (the one with roa), docwcm shows a significant negative association (coefficient = -.019 and sig. value = 0.018 < 0.05). As such, specific hypothesis, *H (viia): Business (firm) competitiveness has a negative association with the degree of conservativeness in working capital management strategy (docwcm),* is rejected.

Table 35: Regression Results of the Textile Sector

Measure of competitiveness	R-square	F- statistic	sig. value	Normality	Multi-co-linearity	Linearity, homoscadasticity, independence of residuals
roa	55.90%	2.108	0.048	Held	No	Held
Variable	**Unstandardized Coefficients, B**	**Standardized Coefficients, beta**	**Sig.**	**Part Correlation**	**Unique contribution**	**Colinearity statistics, VIF**
(Constant)	0.017		0.875			
WCM Strategy	0.002	0.027	0.866	0.023	0.05%	1.455
WCM Policy	-0.017	-0.250	0.165	-0.190	3.61%	1.732
WCFinancingstrategy	0.026	0.365	0.068	0.253	6.40%	2.086
arsophistication	0.006	0.121	0.548	0.081	0.66%	2.248
apsophistication	0.005	0.125	0.464	0.099	0.98%	1.608
invsophistication	-0.001	-0.017	0.941	-0.010	0.01%	2.920
cshsophisticatio	-0.010	-0.338	0.053	-0.270	7.29%	1.570
lqdty	0.001	0.051	0.811	0.032	0.10%	2.520
stockout	0.005	0.240	0.319	0.135	1.82%	3.170
wcsophistication	-0.008	-0.073	0.801	-0.034	0.12%	4.689
docwcm	-0.019	-0.513	0.018	-0.335	11.22%	2.349
doawcf	-0.077	-0.356	0.181	-0.183	3.35%	3.782
icp	0.000	-0.079	0.643	-0.062	0.39%	1.620
acp	0.000	0.331	0.084	0.239	5.72%	1.911
cr	0.005	0.356	0.146	0.199	3.97%	3.188
Measure of competitiveness	**R-square**	**F statistic**	**sig. value**	**Normality**	**Multi-co-linearity**	**Linearity, homoscadasticity, independence of residuals**
alpha	51.30%	1.753	0.104	Held	No	Somewhat deviated
beta	32.50%	0.0802	0.666	Somewhat held	No	Somewhat deviated
Tobin's q	45.80%	1.407	0.218	Somewhat held	No	Somewhat deviated
npm	58.20%	2.321	0.030	Held	No	Somewhat held
Variable	**Unstandardized Coefficients, B**	**Standardized Coefficients, beta**	**Sig.**	**Part Correlation**	**Unique contribution**	**Colinearity statistics, VIF**
(Constant)	0.282		0.111			
WCM Strategy	0.008	0.070	0.660	0.058	0.33%	1.455
WCM Policy	-0.002	-0.016	0.924	-0.013	0.02%	1.732
WCFinancingstrategy	0.034	0.299	0.122	0.207	4.29%	2.086
arsophistication	0.016	0.219	0.269	0.146	2.14%	2.248
apsophistication	-0.005	-0.074	0.656	-0.058	0.34%	1.608
invsophistication	-0.002	-0.023	0.918	-0.013	0.02%	2.920
cshsophisticatio	-0.015	-0.298	0.078	-0.238	5.65%	1.570
lqdty	0.005	0.150	0.473	0.094	0.89%	2.520
stockout	0.010	0.279	0.236	0.157	2.46%	3.170
wcsophistication	-0.076	-0.415	0.151	-0.191	3.67%	4.689
docwcm	-0.016	-0.272	0.182	-0.178	3.15%	2.349
doawcf	-0.208	-0.602	0.025	-0.309	9.57%	3.782
icp	0.000	-0.150	0.371	-0.118	1.39%	1.620
acp	0.000	0.323	0.083	0.234	5.46%	1.911
cr	-0.004	-0.151	0.518	-0.085	0.72%	3.188

As none of the other independent variables are found to be significant (all sig. values are higher than 0.05), no generalizable conclusion can be drawn regarding their relationship with business competitiveness. In other words, all other specific hypotheses are rejected.

In the second significant model (the one with npm as the dependent variable), only doawcf depicts a significant negative association (coefficient = -0.208, sig. value = 0.025 < 0.05) with business competitiveness. As such, the specific hypothesis, *H (viib): Business (firm) competitiveness has a positive association with the degree of aggressiveness in working capital financing strategy (doawcf)*, is rejected.

No other independent variable is found to be significantly associated (all sig. values are higher than 0.05) with business competitiveness measured by npm. As a result, all other specific hypotheses are also rejected.

Based on the analysis stated above, the researcher concludes that the role of working capital management practices on business competitiveness varies across industries on multiple terms. First, the role is not significant in all industry sectors. It plays a significant role only in industries characterized by a reasonably large number of companies. Second, even where a significant role is found, the measure of business competitiveness that is significantly influenced by working capital management practices is different across industries. Third, the independent variables or the aspects of working capital management practices that have a significant influence on business competitiveness vary across industries. The summary of the differences is presented in Table 36.

Table 36: Summary of inter-industry difference in the role of working capital

Industry	Dependent variables resulting in significant regression models	Significant independent variables	Hypotheses accepted
Fuel and Power	None	None	None
Food and allied	None	None	None
Engineering	npm	None	H1
Pharmaceuticals and Chem	α	WCM policy, invsop	H1, H(i) and H(ivc)
Textile	roa	docwcm	H1
	npm	doawcf	H1

Hence, the broad hypothesis, **H3: The role of working capital management practices on business competitiveness varies across industries,** is accepted.

9. FINDINGS AND ANALYSIS: INTERVIEW RESULTS

In order to validate the findings from the survey and the annual report data presented above, the researcher conducted eight in-depth interviews with industry experts from the manufacturing sector. Results were validated across all of the findings' dimensions: policy and strategy, responsibility, time commitment, monitoring and review, technology use, sophistication or good practices in working capital management, significance of working capital management function, common measures of business competitiveness, relationship between working capital practices and competitiveness, and inter-industry differences.

9.1 WORKING CAPITAL PRACTICES

9.1.1 Policy and Strategy

In terms of having formal policies, experts agree that most firms have formal working capital policies that state general guidelines related to working capital management and financing such as who is responsible for what, frequency of monitoring and evaluating working capital components, general credit terms, principles for selecting credit customers, regular billing and collection mechanisms, maintenance of cash balances, etc. During the interviews, experts also validated the survey results that most companies in Bangladesh adopt moderate strategies for managing and financing working capital.

9.1.2 Persons/Managers Responsible

Interviewees' responses are somewhat in line with the survey findings regarding persons/managers responsible for overall working capital and its components. Interviewees agree that either the Chief Executive Officer (CEO) or the Chief Financial Officer (CFO) take policy

and strategy decisions. The head of finance (HFO)/CFO or the Treasurers are usually in charge of cash management decisions, though cash is handled by accounts officers for regular operations. The responsibility for managing receivables and payables usually lies with the finance manager. The store manager, and in some cases the production manager, is responsible for managing inventory. In relation to cash management, the experts commented on the mechanism of the separation of authority in bill approval and cash disbursement as well as the dual signatory of checks as a control mechanism against fraud risk.

9.1.3 Time Commitment

Although survey results display almost uniform distribution of the manager's time in dealing with the components of working capital, experts opined that cash and inventory management claim more of the responsible manager's time than that in payables and receivables management. Strategic issues do not require regular involvement but demand rigorous involvement periodically.

9.1.4 Monitoring and Review

The experts noted that monthly or quarterly reviews of working capital and its components is common among the industry players. This affirms the survey findings, which indicate that more than60% of the companies conduct a monthly or quarterly review in this regard. Interview results also affirm that cash is reviewed more frequently (more than half of the companies surveyed review cash on a weekly or daily basis). According to the experts, cash management needs special attention due to the inherent risk of fraud, theft, etc. associated with it. Some of them opined that the same is true for some inventory items such as finished goods or small items that are easy to carry and readily usable or saleable in the market.

As found in the survey results, experts mentioned that companies use working capital turnover ratios (inventory, receivable and payable turnover), average collection and payable periods, inventory conversion period, cash conversion cycle, and liquidity ratio (current ratio and quick ratio) to monitor and evaluate a company's working capital performance.

9.1.5 Technology Use and Information Systems

It has been asserted that companies do understand the benefits of using technology and information systems. Most of them strive to enhance their use to improve monitoring, tracking and efficient management of the components of working capital. The experts also agreed that there is no difference in technology and information systems across the different components of working capital. This opinion slightly deviates from the survey results, which state that the payables management function in general make less extensive use of technology and information systems.

9.1.6 Sophistication in Managing Working Capital

The interviewees were in agreement that good practice or sophistication in managing working capital in important, not only for improving working capital management performance but also for a company's overall performance. According to them, good practice is comprised of many factors, including: formal policies in place, dedicated personnel for managing the components, regular review and monitoring, adoption of an information system, technology and other sophisticated methods for managing working capital, and others. When asked to define sophistication with respect to the components of working capital, the interviewees mentioned several methods, techniques and practices in relation to the management of specific items. A list

of the indicators of sophistication in managing the components of working capital as derived from the researcher's discussions with the experts is presented in Table 36.

Table 37: Indicators of Sophistication in Managing the Components of Working Capital

Area of working capital management	Indicators of sophistication in management
Accounts receivable	• Use of several tool such as 5C analysis, sequential credit scoring. etc. to evaluate credit customers • Well-articulated terms of sales by taking a firm's expected cash flow, buyers' financial condition, competitors' terms, etc. into account • Track customer payment behavior, collections experience, creation of aging schedule, etc.
Inventory	• Implement JIT, ABC analysis, EOQ and other statistical models • Use of the ERP system • Use statistical tools and industry benchmarks for determining safety stock levels and projecting lead times and others • Regular stock taking by using RFID technology • Reserve sources for handling unexpected stock-out situations
Cash and equivalents	• Use of automated billing system, pre-authorized debit, etc. for expediting collection • Pay through draft, centralized disbursement, paying on the last date of the credit period, etc. for slowing down payment • Concentration banking, zero balance account, etc. for playing the float • Maintain a reserve line of credit and rollover agreement with suppliers, investment in term deposits and money market securities to combat unexpected liquidity crisis • Investment of excess cash (beyond the balance for regular transactions) in a well-diversified portfolio of marketable securities
Accounts payable	• Send pay checks through the mail, delay payment until last due date to stretch payables • Conduct cost-benefit analysis of cash discount before accepting • Consider the drawbacks of stretching payables such as unfavorable future deals, deterioration in credit rating, etc. before stretching payables
Working capital financing	• Emphasis on spontaneous financing such as trade credit and accruals over negotiated financing • Explore various sources of negotiated financing in terms of cost minimization and timely access to funds

As evident from Table 36, this research can assert that the sophistication score calculated in the study covers almost all of the aspects of good practices cited by the experts in the in-depth interviews.

9.2 SIGNIFICANCE OF THE WORKING CAPITAL MANAGEMENT FUNCTION

The interviewed experts were unanimous in their declaration of the importance of functioning working capital management for smooth business operations. They agreed that about 40% to 50% of a typical manufacturing firm's total assets are tied up in working capital. It influences a firm's liquidity and profitability. They also opined that efficiency in working capital management is not directly proportional to profitability because working capital is a double-edged sword. A low level of working capital requires lower investment and hence reduced financing cost, but poses the risk of distorted operations, lost sales, and other outcomes that negatively affect profitability. On the other hand, a high level of working capital involves larger investment, financing and carrying costs that in turn reduce profitability. Therefore, companies always strive to find a balance and determine the optimum level of efficiency in working capital management.

9.3 COMMON MEASURES OF BUSINESS COMPETITIVENESS

Interviewees took diverse conceptual stands when asked about business competitiveness. A few of them who view competitiveness as a comparative advantage think that it is relevant only for international trade. The majority viewed competitiveness from an industry perspective. They define competitiveness in terms of the numbers for competitors, availability of substitutes, supplier and customer bargaining power, barriers to entry, etc. Some even mentioned Porter's Five Forces and the Diamond model with regard to competitiveness. A few interviewees,

especially those from large renowned companies, agreed on a view of competitiveness as a firm-level concept to describe how a firm is performing over the years with respect to its competitors in the market. They opined that company ranking in the industry in terms of profitability, sales and market share are commonly used measures of business competitiveness. They also mentioned that the results of one particular year is not an adequate measure, so companies usually follow these indicators over a longer period to determine consistency in performance because consistently good performance over competitors is the appropriate measure of competitiveness. Very few of the interviewees cited that an assessment regarding the presence of core competencies, unique comparative advantages, and other strategies is needed and must be incorporated in the measure of business competitiveness.

In sum, the interview findings are conceptually in line with the researcher's efforts to formulate a comprehensive measure of competitiveness. However, the commonly used measures of competitiveness mentioned by the experts do not coincide with the measures proposed in this study.

9.4 THE ROLE OF WORKING CAPITAL PRACTICES ON BUSINESS COMPETITIVENESS

All of the interviewees agreed that working capital practices influence business competitiveness. They all opined that sophistication in working capital practices pays off in terms of providing an edge over competition, hence business competitiveness. Some of them mentioned about how Japanese auto manufacturers became industry leaders by implementing just-in-time manufacturing into their inventory systems. Others spoke of the burgeoning growth and success

of big retailers like Walmart that have adopted best practices in managing inventory and supply chain.

When asked if there was any particular area of working capital management where companies should focus in order to enhance their business competitiveness, the interviewees unanimously opined that many factors determine success in this area, including type of business, business model and competitive strategies pursued. For example, companies with lot of credit sales should have a special focus on receivables management, whereas a company that offers product variety and availability should focus on inventory management to get an edge over its competitors.

With respect to the role of working capital efficiency and liquidity, the experts also affirmed that a firm's goals should be obtaining optimum efficiency and liquidity rather than maximizing these factors. In this regard, the majority noted that the optimum may be different for different companies depending on their size, business model, core competencies, competitive strategy, and industry sector alongside other factors.

9.5 INTER-INDUSTRY DIFFERENCES IN WORKING CAPITAL PRACTICES AND THEIR ROLE ON BUSINESS COMPETITIVENESS

Interviewees' responses assert that working capital practices may vary across industries in terms of general strategy, liquidity, efficiency and focus. Usually there are some basic differences between the service and manufacturing sectors. However, within the manufacturing sector, there might be differences due to the variations in products manufactured, raw material sources, geographical distribution of customers, overall industry competitiveness, and others. Industry experts also agree that inter-industry differences also prevail in terms of the level of

sophistication or good practices. They attribute such differences to the wide spectrum of time taken to adopt best practices rather than a lack of intention or interest on the managers' part.

All of the interviewees agreed that business competitiveness in influenced by working capital practices irrespective of their industry. However unique contributions and the significance of different aspects of working capital (different independent variables used in this study) may vary from industry to industry. For example, the textile or pharmaceuticals sector is very much dependent on the supply of raw materials from abroad and export revenue from finished goods. As most of the cross-border trade involves credit terms, the management of trade credits are crucial for the competitiveness of firms in these industries. Due to an inherently long lead time and uncertainty in supply, firms in these industries may require better inventory management practices to become competitive.

In summary, the researcher concludes that the findings from the in-depth interviews do not deviate much from the annual report information and survey data results. Moreover, the interviews provided many insights that are useful in explaining the study's results.

10. CONCLUSION AND RECOMMENDATIONS

In this chapter, the researcher summarizes her findings following the four research questions before discussing the study's contributions and limitations. Based on the findings, the researcher formulates recommendations for practitioners. Suggestions for future research prospects are also provided for academic researchers.

10.1 SUMMARY OF FINDINGS

The majority of the companies in Bangladesh's manufacturing sector have formal working capital policies and adopt moderate strategies in managing and financing working capital. All of the companies have dedicated personnel for managing working capital and its components. CFOs or CEOs are usually in charge of working capital policy and strategy. In most cases, operational responsibility for receivables, inventory, cash and payables management lies with a finance/account manager, store/production manager and CFO, respectively. Almost half of the mangers responsible for working capital management spend less than 30% of their time on this. aspect of their job. However, inventory management entails a larger time commitment from the manager responsible. More than 60% of the companies review working capital and its components on a monthly or quarterly basis, but a higher frequency of monitoring (weekly or daily) is prevalent for cash and equivalents management. Common ratios monitored to measure working capital performance are: working capital to sales ratio, current ratio, working capital turnover ratios, e.g., inventory turnover, receivable turnover and payable turnover as well as the cash conversion cycle. Technology and information system usage is prevalent in all areas of working capital management.5C analysis and sequential credit analysis are commonly used

methods of evaluating credit customers. Credit terms are usually determined based on a customer's financial condition and the firm's expected cash flow. Aging schedule, customer payment behavior, and collection experiences are commonly reviewed to monitor receivables. For inventory management, only a few companies use the ERP system, EOQ model, etc. Lead time projection, ABC analysis and the JIT system are commonly practiced. The use of the industry average to determine safety stock levels is prevalent. Adhoc determination is also very common and a small percentage of the companies use statistical tools to determine their safety stock level. Frequent/regular stock-out situations are very uncommon among the companies surveyed. To manage unexpected stock-out situation they usually outsource the deal and/or buy from reserve sources. Liquidity crises are also uncommon for the companies in this study. The maintenance of reserve lines of credit with banks, rollover agreements with suppliers, and a portfolio of marketable securities are commonly used to tackle liquidity crises. With respect to cash management, playing the float is common among the companies. For expediting collection, companies use techniques like automated billing systems, pre-authorized debit, concentration banking and others to expedite cash collection, while automated billing is the most popular method among the companies. The use of zero balance account and centralized disbursement are the most commonly used methods of slowing down disbursement. Two-thirds of the companies stretch payables by delaying payment until the last due date, pay through check on a remote bank account, and/or send checks through mail. In taking stretching decisions, companies do need to consider the consequences, namely worsening credit worthiness, unfavorable future deals, and late payment penalties, respectively, in order of emphasis. For short-term financing, most companies emphasize spontaneous financing (trade credit) over negotiated financing. Major sources of the latter are commercial paper followed by transaction loans, lines of credit,

revolving credit, secured loans and factoring receivables, respectively, in order of their prevalence.

In aggregate, the large majority of the companies in the study have a good level of sophistication in overall working capital management practices. Aggregate score in stock-out and liquidity crisis management reveals that the majority of the companies score at the top in these two aspects of working capital management. However, in terms of cash, receivables and inventory management, most portray an average level of sophistication. There is almost equal distribution of average and good levels of sophistication in companies' payables management practices.

In analyzing the various conceptual frameworks of business or firm-level competitiveness and commonly used measures of the same, the researcher recommends five measures of business competitiveness: i) normalized/standardized return on assets (roa); ii) standardized net profit margin (npm); iii) persistency parameter, constant α from the first order autoregressive process of the standardized profitability; iv) persistency parameter, coefficient β from the first order autoregressive process of the standardized profitability; and v) Tobin's q.

This study has revealed that working capital practices have a significant association with business competitiveness when the latter is measured by standardized profitability (roa and npm). In general, companies with formal working capital policies, aggressive working capital management strategies, and conservative working capital financing strategies are found to be more competitive. Sophistication in payables and cash management shows a positive association whereas sophistication in receivables, inventory and stock-out management depicts a negative association with business competitiveness. This means that sophistication does not directly pay off. Most efficiency and liquidity measures of working capital demonstrate a negative

association with business competitiveness. The above relationships remain somewhat the same with either (roa or npm) measures of business competitiveness. However, the regression model with npm has better predictive power and a comparatively larger number of significant variables.

A varying distribution of levels of sophistication in managing working capital and its components is evident from the data but none of these variables were found to be statistically significant. Results did vary across industries when the influence of working capital on business competitiveness was tested. For industries characterized by a small number of companies (fuel & power, and food & allied industry), none of the regression runs were found to be significant. However, larger industries represent a significant association, but they differ with respect to the measure of competitiveness and significance of the dependent variables.

10.2 CONTRIBUTIONS OF THE RESEARCH

This research contributes to working capital and competitiveness literature in multiple ways.

First, this is one of the few studies in Bangladesh that has undertaken a comprehensive analysis of working capital management practices. Most other researchers reviewed only working capital efficiency, policies and strategies based on annual report data and studied one particular sub-sector of the manufacturing industry (Hoque et al., 2015; Mazumder, 2015; Quayuum, 2011). Chowdhury and Amin's (2007) study is the only work that has focused on the details of managing working capital components. However, they studied only the pharmaceutical companies listed on the Dhaka Stock Exchange. In his 2012 study, Quayyum claimed to cover the whole manufacturing sector, but only looks at pharmaceuticals& chemicals, food, cement and engineering companies, and the study is based solely on the measures of working capital efficiency and liquidity. In contrast to the above, this research covers all of the manufacturing

companies listed on the Exchange, and it investigates issues beyond policy, strategy, efficiency and liquidity such as technology and information system usage, relevant tools and techniques, monitoring and review, manager's time commitment, and other factors. Finally, the researcher developed an assessment of good practices or level of sophistication in managing working capital and its components. The method deployed for this purpose may be considered as a score card for evaluating companies' working capital practices. As the study covers a larger population and takes on a larger sample size in comparison to other similar studies in Bangladesh, the results regarding working capital practices may be generalized for all manufacturing companies in Bangladesh.

Second, the findings related to the practices in managing working capital and its components may be used by practicing managers to identify the existing best practices in the manufacturing sector. The findings may be used as a benchmark for an organization and may motivate the firm to improve its practices in order to beat the existing benchmark. Senior managers may use the benchmark to measure the operational managers' performance in different areas of working capital management.

Third, this study has critically evaluated the existing measures of firm-level or business competitiveness and developed a new framework for measuring the same. Through an elaborate conceptual dissection of the construct of business competitiveness, the researcher has proposed five measures of business competitiveness backed up by theories from finance and economics. This is a unique theoretical contribution to the competitive literature. Practicing managers can use these measures to gauge their firm's level of competitiveness.

Forth, unlike other research that has investigated the role of working capital management on firm performance (usually measured by absolute profitability), the researcher investigated the role of working capital management on business competitiveness. Absolute profitability over a particular year may not project sustainable good performance to survive in competition. This study therefore extends earlier research and answers a more relevant question—whether good practices in working capital management provide a firm with an edge over its competition in the market.

Finally, the exploration of inter-industry differences in working capital practices and in their influences on business competitiveness adds an additional dimension to working capital literature that has not been tapped in the past, at least in the context of Bangladesh.

10.3 LIMITATIONS OF THE STUDY

Among the measures of competitiveness used in this study, the last three measures α, β and Tobin's q did not demonstrate significant association with working capital practices. In fact, whenever one of those was used as a dependent variable in regression runs, the data set violated one or more of the assumptions of multiple linear regression. There may be several reasons. First, perhaps these measures of competitiveness were not linearly associated with working capital practices, but the researcher did not delve into identifying possible non-linear association. Second, the use of data for a five-year period may have been inadequate to obtain significant values of α and β in the autoregressive process of profitability. However, given the stock market crash in 2010–11 in Bangladesh, representative (not outlier) data over a longer time horizon was not available, though a solution could be an expanded timeline omitting the crash years. However, in this case, running a year-to-year auto-regressive process would become faulty.

Moreover, some of the companies included in the study were recently listed and so data older than five years are not available. Third, the research results suggest Tobin's q as a measure of business competitiveness based on the assumption that the stock market is efficient. In an efficient market, share price reflects not only past performance but also future prospects of performance. Empirical research indicates that the Dhaka Stock Exchange market was not efficient over the time period covered in this study (Pervez, Rashid, Chowdhury and Rahaman, 2018). As such, the assumption behind taking Tobin's q as an estimate of business competitiveness did not hold in this case.

This researcher studied the companies listed on the Dhaka Stock Exchange under the manufacturing industry. Non-listed and/or small manufacturing companies were not included, neither were service sector companies. This means that the study's results cannot be generalized for companies in other industry sectors and/or for small companies.

While conducting the inter-industry comparison within the manufacturing sector, the researcher found that some industries were characterized by a small number of companies listed on the Dhaka Stock Exchange. As a result, these industries cannot be generalized for the sector as a whole.

10.4 RECOMMENDATIONS FOR PRACTITIONERS

To evaluate performance of the working capital management function, practitioners should take the comprehensive approach presented in this research rather than focusing only on a few measures of working capital efficiency and liquidity. They can even create a score card based on the coded questionnaire presented in the appendix and use it as a tool to evaluate a company's working capital performance.

In terms of a company's performance evaluation, practitioners should focus on the measures of competitiveness rather than the conventional absolute measures of profitability.

Practitioners may refer to the study's results when they approach the board of directors or top management to release resources (such as the investment required for an ERP system, working capital managers' recruitment or training, signing up for concentration banking, etc.) to enhance sophistication in working capital management.

In general, practitioners should emphasize the importance of implementing formal policies and choosing management and financing strategies in relation to working capital that best fit their industry and business model in order to enhance competitiveness.

The researcher found that although working capital practices influence business competitiveness, the relationship between competitiveness and the variables included in the study was not always significant. As such, practitioners must be careful in choosing which area of working capital management that they will focus on to improve competitiveness. Improvement efforts should only focus on the variables that are found to be significant.

As the research results demonstrate that sophistication in different areas of working capital is a mix of positive and negative associations in business competitiveness, practitioners should not blindly strive to adopt all good practices in all areas. Rather, they must keep in mind that good practices are not free, and a cost-benefit analysis is essential before adopting any new tools/techniques and/or discarding/changing any old practices.

In some industries and with certain measures of competitiveness, the researcher found that the working capital practices in aggregate significantly influence business competitiveness but none

of the individual components (measures) of working capital practices showed significant association with competitiveness. This means a standalone effort focusing on an individual component may not contribute to competitiveness but a concerted effort in all areas will pay off. Practitioners should not limit their focus to one or a few particular areas of working capital and miss out on the others. Rather, they should contribute a balanced effort based on the unique contribution (presented in the summary regression results) of each of the areas/aspects of working capital management.

10.5 PROSPECTS FOR FUTURE RESEARCH

Given the findings and limitations of this research, academics should delve further to answer the research questions with better accuracy and also extend the research questions to gain more comprehensive insights in the areas of interest—working capital management, business competitiveness and the relationship between the two.

Future research projects could validate the measures of competitiveness suggested in this study, especially α and β, by using time series data over longer and representative time horizons. Researchers may also use data from developed efficient markets to test the validity of Tobin's q as a measure of competitiveness. The exploration of possible non-linear relationships between the working capital practices and competitiveness may be the thesis of a future research project. In the process of doing a further in-depth study on estimating business competitiveness, a researcher may develop new and better measures of business competitiveness.

The survey instrument, the scoring scheme, and the framework for measuring business competitiveness that the researcher developed for this study may be used for other related

research. However, before using the above (the survey instrument) in other studies, these tools must be contextualized and validated with the subjects and data in hand.

Similar research could be conducted on service sector companies and/or on small and medium-sized enterprises. Other researchers could take the initiative to compare the results between large and small businesses and/or between manufacturing and services sector companies. A research project could be focused on a number of large industry sectors to obtain a more representative view of inter-industry differences. By taking only the non-listed companies as subjects, a researcher may end up with different results from that of this study. Examining the reasons for such differences may also be an interesting project.

Academics could also focus on investigating the role of other areas of financial management like capital budgeting and capital structure (financing decision) on business competitiveness.

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APPENDICES

APPENDIX I: SURVEY QUESTIONNAIRE

This survey is being conducted solely for academic purposes. The data collected will be used only in aggregate form. Respondents' privacy will be maintained duly.

Name of the company _____ Industry _____

Please circle the most appropriate answer for your organization.

1. How would you categorize the following in your company?

Working capital management policy	Formal	Semi-formal	Informal
Working capital management strategy in determining the level of gross working capital (risk, profitability and liquidity trade-off)	Conservative	Moderate	Aggressive
Working capital financing strategy (short-term and long-term composition for financing working capital need)	Conservative	Moderate	Aggressive

2. How frequently do you review the level of working capital and its components?

	Daily 6	Weekly 5	Monthly 4	Quarterly 3	Semiannually 2	Annually 1
Overall working capital	6	5	4	3	2	1
Accounts receivable	6	5	4	3	2	1
Inventory	6	5	4	3	2	1
Cash &equivalents	6	5	4	3	2	1
Accounts payable	6	5	4	3	2	1

3. Please estimate the extent of the use of computers in managing the components of working capital.

	Very Extensively 5	Extensively 4	Moderately 3	Rarely 2	Never 1
Overall working capital	5	4	3	2	1
Accounts receivable	5	4	3	2	1
Inventory	5	4	3	2	1
Cash &equivalents	5	4	3	2	1
Accounts payable	5	4	3	2	1

4. Please identify the person responsible for managing working capital and its components. Also please provide an estimate of his/her time spent on managing the aforementioned.

Job	**Person Responsible**	**% of time spent on the specific job**
Overall working capital management (strategic level)	MD/BOD/CFO/Controller/Other (specify)	Less than 30% 30% to 60% Above 60%
Working capital financing (strategic level)	MD/BOD/CFO/Controller/Other (specify)	Less than 30% 30% to 60% Above 60%
Cash and equivalents management (operational)	CFO/Finance Mngr/Account Mngr/Other (Specify)	Less than 30% 30% to 60% Above 60%
Receivables management (operational)	Finance Mngr/Account Mngr/Sales Mngr/Other (Specify)	Less than 30% 30% to 60% Above 60%
Payables management (operational)	Finance Mngr/Store Mngr/PrdtnMngr/ PrftCntrMngr/Other (Specify)	Less than 30% 30% to 60% Above 60%
Inventory management (operational)	Finance Mngr/Account Mngr/Other (Specify)	Less than 30% 30% to 60% Above 60%

5. On average what percentage of the cash balance in your balance sheet is invested in marketable securities?

6. Please choose the common marketable securities that you use.

- ☐ Money market funds
- ☐ CDs
- ☐ T-bills
- ☐ Others (Specify)

7. Did you ever face a liquidity crisis in last five years? Yes/No. If not, skip to question 8

8. How often do you face it?

- ☐ Four times a year or more
- ☐ Two to four times a year
- ☐ Once or twice a year
- ☐ Less than once in a two-year period

9. How do you hedge the risk of a liquidity crisis?

- ☐ Reserve line of credit with a bank
- ☐ Roll over agreements with suppliers
- ☐ Maintain a portfolio of marketable securities
- ☐ Others (Specify)

10. Do you track your collection float and its components? Yes/No. If not, skip to question 11.

11. Please fill up the following table

Float	Average length in days
Collection float	
Mailing float	
Processing float	
Availability float	

12. How often do you use the following to play the float (speed up cash receipts and slow down cash payout?

	Always	Most of the time	Sometimes	Rarely	Never
	5	4	3	2	1
Automated billing system	5	4	3	2	1
Pre-authorized debit	5	4	3	2	1
Cash concentration	5	4	3	2	1
Concentration banking	5	4	3	2	1
Paying through drafts	5	4	3	2	1
Maintaining zero balance account	5	4	3	2	1
Centralized disbursement	5	4	3	2	1
Profiling payroll and dividend check presentation time	5	4	3	2	1
Using lock boxes	5	4	3	2	1
Shopping for minimum compensating balances and fees	5	4	3	2	1

13. What type of analysis do you do while granting credit to your customers?

- ☐ 5C analysis
- ☐ Sequential credit analysis
- ☐ Credit scoring
- ☐ None

14. How do you monitor your accounts receivable?

- ☐ Investigate credit customers
- ☐ Track customer payment behavior
- ☐ Track collection period
- ☐ Scrutinize collection experience
- ☐ Create and review aging schedule of customer credits
- ☐ Others (Specify)

15. What are the factors taken into consideration in determining terms of sales?

- ☐ Buyers' financial condition
- ☐ Firm's expected cash flow
- ☐ Competitors' terms of trade

16. Please provide the following information about bad debts in your company.

a. Average bad debt as a percentage of total debt: ☐

b. Average bad debt as a percentage of total sales: ☐

c. Average recovery rate of defaulted loans : ☐

d. Frequency of bad debts becoming higher than estimated:

5	4	3	2	1
Never	Rarely			Mostly

17. What are the techniques used for managing inventory in your organization?

- ☐ ABC analysis
- ☐ EOQ
- ☐ JIT
- ☐ Lead-time projection and magement

☐ ERP system

☐ Others

18. How do you determine safety stock level?

☐ Adhoc basis

☐ Based on experience/judgment

☐ Use of statistical model

☐ Industry average

19. Do you face any stock-out situation? Yes/No.If not, skip to question 20

20. How frequently do you experience stock-out situations?

☐ Four times a year or more

☐ Two to three times a year

☐ Less than twice a year

21. What do you do to hedge against stock-out situations?

☐ Outsourcing

☐ Buying from reserve sources

☐ Others (Specify)

22. To what extent do you use the following to finance your working capital needs?

	Always	Most of the time	Sometimes	Rarely	Never
	5	4	3	2	1
Accounts payable	5	4	3	2	1
Accrued expenses	5	4	3	2	1
Commercial paper	5	4	3	2	1
Line of credit	5	4	3	2	1
Revolving credit agreement	5	4	3	2	1
Transaction loan	5	4	3	2	1
Secured loan	5	4	3	2	1
Factoring receivables	5	4	3	2	1
Others (Specify)	5	4	3	2	1

23. Do you prefer trade credit over other short-term financing? Yes/NoIf not, skip to quesion 24.

24. Which of the following are the reasons for preferring trade credit?

☐ Zero lead time

☐ No restrictions on operation and financing activities

☐ No security or colletaral required

25. How often do you stretch your payables?

Never	Rarely	Some times	Most of the time	Always

26. While stretching, to what extent do you take the following into consideration?

	Very great extent (5)	To a great extent (4)	To a moderate extent (3)	To a small extent (2)	Not at all (1)
Possibility of price increase in future purchases	5	4	3	2	1
Impact on credit worthiness	5	4	3	2	1
Penalties for late payment	5	4	3	2	1
Others (Specify)	5	4	3	2	1

27. What ratio measure do you use to monitor working capital?

☐ Current ratio

☐ Working capital turnover

☐ Working capital to total assets

☐ Working capital to total sales

28. What liquidity measure do you use for managing working capital?

☐ Current ratio

☐ Quick ratio

☐ Cash ratio

29. What efficiency measure do you use for managing working capital?

☐ ARTO

☐ AITO

☐ APTO

☐ Operating cycle

☐ Cash conversion cycle

Thank You!

APPENDIX II: SURVEY QUESTIONNAIRE (CODED)

This survey is being conducted solely for academic purposes. The data collected will be used only in aggregate form. Respondents' privacy will be maintained duly.

Name of the company _____ Industry _____

Please circle the most appropriate answer for your organization.

1. How would you categorize the following in your company?

Q code		Response	**Code**	Response	**Code**	Response	**Code**
1a	1(a)Working capital management policy	Formal	**3**	Semi-formal	**2**	Informal	**1**
1b	Working capital management strategy in determining the level of gross working capital (risk, profitability and liquidity trade-off)	Conservative	**1**	Moderate	**2**	Aggressive	**3**
1c	Working capital financing strategy (short-term and long-term composition for financing working capital need)	Conservative	**1**	Moderate	**2**	Aggressive	**3**

2. How frequently do you review the level of working capital and its components?

Q code	Response	Daily	Weekly	Monthly	Quarterly	Semiannually	Annually
	Code	**6**	**5**	**4**	**3**	**2**	**1**
2a	Overall working capital	Daily	Weekly	Monthly	Quarterly	Semiannually	Annually
2b	Accounts receivable	Daily	Weekly	Monthly	Quarterly	Semiannually	Annually
2c	Inventory	Daily	Weekly	Monthly	Quarterly	Semiannually	Annually
2d	Cash and equivalents	Daily	Weekly	Monthly	Quarterly	Semiannually	Annually

2e	Accounts payable	Daily	Weekly	Monthly	Quarterly	Semiannually	Annually

3. Please estimate the extent of the use of computers in managing the components of working capital.

Q code	Response	Very Extensively	Extensively	Moderately	Rarely	Never
	Code	**5**	**4**	**3**	**2**	**1**
3a	Overall working capital	Very Extensively	Extensively	Moderately	Rarely	Never
3b	Accounts receivable	Very Extensively	Extensively	Moderately	Rarely	Never
3c	Inventory	Very Extensively	Extensively	Moderately	Rarely	Never
3d	Cash and equivalents	Very Extensively	Extensively	Moderately	Rarely	Never
3e	Accounts payable	Very Extensively	Extensively	Moderately	Rarely	Never

4. Please identify the person responsible for managing working capital and its components. Also please provide an estimate of his/her time spent on managing the aforementioned.

Job	**Q code**	**Person Responsible**	**Q code**	**% of time spent on the specific job**	
Overall working capital management (strategic level)	**4aa**	MD/BOD/CFO/Controller/Other (Specify)	**4ab**	Response	**code**
				Less than 30% 30% to 60% Above 60%	**1** **2** **3**
Working capital financing (strategic level)	**4ba**	MD/BOD/CFO/Controller/Other (Specify)	**4bb**	Less than 30% 30% to 60% Above 60%	**1** **2** **3**
Cash and equivalents management (operational)	**4ca**	CFO/Finance Mngr/Account Mngr/Other (Specify)	**4cb**	Less than 30% 30% to 60% Above 60%	**1** **2** **3**
Receivables management	**4da**	Finance Mngr/Account Mngr/Sales	**4db**	Less than 30%	**1**

(operational)		Mngr/Other (Specify)		30% to 60% Above 60%	**2** **3**
Payables management (operational)	**4ea**	Finance Mngr/Store Mngr/PrdtnMngr/PrftCntrMngr/Other (Specify)	**4eb**	Less than 30% 30% to 60% Above 60%	**1** **2** **3**
Inventory management (operational)	**4fa**	Finance Mngr/Account Mngr/Other (Specify)	**4fb**	Less than 30% 30% to 60% Above 60%	**1** **2** **3**

5. Q code = 5

On average what percentage of the cash balance in your balance sheet is invested in marketable securities?

6. Please choose the common marketable securities that you use.

Q code	Instrument	**Response – Code**
6a	Money market funds	**Yes =1, No = 0**
6b	CDs	**Yes =1, No = 0**
6c	T-bills	**Yes =1, No = 0**
6d	Others (Specify)	

7. Q code = 7

Did you ever face a liquidity crisis in last five years? **Yes = 1, No = 6**, If no, skip to question 8.

8. Q code = 8 How often do you face it?

Response	**Code**
Four times a year or more	**1**
Two to four times a year	**2**
Once or twice a year	**3**
Less than once in two year period	**4**

9. How do you hedge the risk of a liquidity crisis?

Q code	Instrument	**Response -- Code**
9a	Reserve line of credit with a bank	**Yes =1, No = 0**
9b	Roll over agreements with suppliers	**Yes =1, No = 0**

9c	Maintain portfolio of marketable securities	**Yes =1, No = 0**
9d	Others (Specify)	

10. Q code = 10 Do you track collection float and its components? **Yes =1, No = 0,** If not, skip to question 11.

11. Please fill up the following table

Q code	Float	Average length in days
11a	Collection float	
11b	Mailing float	
11c	Processing float	
11d	Availability float	

12. How often do you use the following to play the float (speed up cash receipts and slow down cash payout?

Q code	Response	Always	Most of the time	Sometimes	Rarely	Never
	Code	**5**	**4**	**3**	**2**	**1**
12a	Automated billing system	Always	Most of the time	Sometimes	Rarely	Never
12b	Pre-authorized debit	Always	Most of the time	Sometimes	Rarely	Never
12c	Cash concentration	Always	Most of the time	Sometimes	Rarely	Never
12d	Concentration banking	Always	Most of the time	Sometimes	Rarely	Never
12e	Paying through drafts	Always	Most of the time	Sometimes	Rarely	Never
12f	Maintaining zero balance account	Always	Most of the time	Sometimes	Rarely	Never
12g	Centralized disbursement	Always	Most of the time	Sometimes	Rarely	Never
12h	Profiling payroll and dividend check presentation time	Always	Most of the time	Sometimes	Rarely	Never
12i	Using lock boxes	Always	Most of the time	Sometimes	Rarely	Never
12j	Shopping for minimum compensating balances and fees	Always	Most of the time	Sometimes	Rarely	Never

13. What type of analysis do you do while granting credit to your customers?

Q code	Instrument	**Response – Code**
13a	5C analysis	**Yes =1, No = 0**

13b	Sequential credit analysis	**Yes =1, No = 0**
13c	Credit scoring	**Yes =1, No = 0**
13d	None	**Yes =1, No = 0**

14. How do you monitor your accounts receivable?

Q code	Method	**Response -- Code**
14a	Investigate credit customers	**Yes =1, No = 0**
14b	Track customer payment behavior	**Yes =1, No = 0**
14c	Track collection period	**Yes =1, No = 0**
14d	Scrutinize collection experience	**Yes =1, No = 0**
14e	Create and review aging schedule of customer credits	**Yes =1, No = 0**
14f	Others (Specify)	

15. What are the factors taken into consideration in determining terms of sales?

Q code	Method	**Response -- Code**
15a	Buyers' financial condition	**Yes =1, No = 0**
15b	Firm's expected cash flow	**Yes =1, No = 0**
15c	Competitors' terms of trade	**Yes =1, No = 0**

16. Please provide the following information about bad debts in your company.

Q code		**Response -- Code**
16a	Average bad debt as a percentage of total debt	
16b	Average bad debt as a percentage of total sales	
16c	Average recovery rate of defaulted loans	
16d	Frequency of bad debts becoming higher than estimated	**Mostly = 1, Usually = 2, Sometimes =3, Rarely = 4, Never = 5**

17. What are the techniques used for managing inventory in your organization?

Q code	Techniques	**Response --**

		Code
17a	ABC analysis	**Yes =1, No = 0**
17b	EOQ	**Yes =1, No = 0**
17c	JIT	**Yes =1, No = 0**
17d	Lead-time projection and management	**Yes =1, No = 0**
17e	ERP system	**Yes =1, No = 0**
17f	Others (Specify)	

18. How do you determine safety stock level?

Q code	Method	**Response -- Code**
18a	Adhoc basis	**Yes =1, No = 0**
18b	Based on experience /judgment	**Yes =2, No = 0**
18c	Use of statistical model	**Yes =3, No = 0**
18d	Industry average	**Yes =3, No = 0**

19. Do you face any stock-out situation? Yes = 1, No = 5 , If not, skip to question 20.

20. If yes, how frequently do you experience stock-out?

Q code	Response	**Code**
20a	Four times a year or more	**1**
20b	Two to three times a year	**2**
20c	Less than twice a year	**3**

21. What do you do to hedge against stock-out situations?

Q code	Response	**Code**
21a	Outsourcing	**2**
21b	Buying from reserve sources	**2**
21c	Let the sales go (loss) or convince customer to buy later	**1**

22. To what extentdo you use the following to finance your **working capital needs?**

Q code	Response	Always	Most of the time	Sometimes	Rarely	Never
	Code	**5**	**4**	**3**	**2**	**1**
22a	Accounts payable	Always	Most of the time	Sometimes	Rarely	Never
22b	Accrued expenses	Always	Most of the time	Sometimes	Rarely	Never
22c	Commercial paper	Always	Most of the time	Sometimes	Rarely	Never
22d	Line of credit	Always	Most of the time	Sometimes	Rarely	Never
22e	Revolving credit agreement	Always	Most of the time	Sometimes	Rarely	Never
22f	Transaction loan	Always	Most of the time	Sometimes	Rarely	Never
22g	Secured loan	Always	Most of the time	Sometimes	Rarely	Never
22h	Factoring receivables	Always	Most of the time	Sometimes	Rarely	Never
22i	Others (Specify)	Always	Most of the time	Sometimes	Rarely	Never

23. Q code 23
Do you prefer trade credit over other short-term financing? **Yes =1, No = 0** If not, skip question 24.

24. Which of the following are the reasons for preferring trade credit?

Q code	Response	**Code**
24a	Zero lead time	**1**
24b	No restrictions on operation and financing activities	**1**
24c	No security or colletaral required	**1**

25. Q code 25
How often you stretch your payables?

Response	Never	Rarely	Sometimes	Most of the time	Always
Code	**1**	**2**	**3**	**4**	**5**

26. While stretching**,to what** extent do **you** take the following into consideration?

Q code	Response	Very great extent	To a great extent	To a moderate extent	To a small extent	Not at all
	Code	**5**	**4**	**3**	**2**	**1**
26a	Possibility of price increase in future purchases	Very great extent	To a great extent	To a moderate extent	To a small extent	Not at all
26b	Impact on credit worthiness	Very great	To a great	To a moderate	To a small	Not at

		extent	extent	extent	extent	all
26c	Penalties for late payment	Very great extent	To a great extent	To a moderate extent	To a small extent	Not at all
26d	Others (Specify)	Very great extent	To a great extent	To a moderate extent	To a small extent	Not at all

27. What ratio measure do you use to monitor working capital?

Q code	Response	**Code**
27a	Current ratio	**1**
27b	Working capital turnover	**1**
27c	Working capital to total assets	**1**
27d	Working capital to total sales	**1**

28. What liquidity measure do you use for managing working capital?

Q code	Response	**Code**
28a	Current ratio	**1**
28b	Quick ratio	**1**
28c	Cash ratio	**1**

29. What efficiency measure do you use for managing working capital?

Q code	Response	**Code**
29a	ARTO	**1**
29b	AITO	**1**
29c	APTO	**1**
29d	Operating cycle or cash conversion cycle	**1**

Thank You!

APPENDIX III: MEASUREMENT OF COMPOSITE VARIABLES

Formulae for calculating Aggregate score:

Excellence in liquidity crisis management = (Sum of response code of Q7,Q8,Q9a Q9c)*10/9

Excellence in stock-out situation management = Sum of response code of Q19, Q20a, Q20b, Q20c, Q21a, Q21b, Q21c

Sophistication in accounts receivable management = (Sum of response code of Q2b,Q3b, Q4db, Q13a-Q13d, Q14a-Q14e, Q15a-Q15c and Q16d)*10/30

Sophistication in inventory management = (Sum of response code of Q2c,Q3c, Q4fb, Q17a-Q17e, Q18a-Q18d, Q19, Q20a, Q20b, Q20c, Q21a, Q21b, Q21c)*10/36

Sophistication in cash and equivalent management= (sum of response code of Q2d,Q3d, Q4cb, Q6a-Q6c, Q7,Q8,Q9a- Q9c,Q10, Q12a-Q12j, Q25, Q26a-Q26d)*10/102

Sophistication in payables management = (Sum of response code of Q2e, Q3e, Q4cb, Q25 and Q26a-Q26d)*10/39

Sophistication in working capital management= (Sum of response code of Q2a, Q3a, Q4ab, Q6a-Q6c, Q7,Q8,Q9a- Q9c,Q10, Q12a-Q12j, Q13a-Q13d, Q14a-Q14e, Q15a-Q15c, Q16d, Q17a-Q17e, Q18a-Q18d, Q19, Q20a, Q20b, Q20c, Q21a, Q21b, Q21c, Q22a-Q22i, Q23, Q24a-Q24c, Q25 and Q26a-Q26d)*10/186

Table38: Conversion of aggregate scores into ordinal values

Range of aggregate score	Ordinal value
Aggregate score<3	Very poor
3<= Aggregate score<5	Poor
5<= Aggregate score<6	Average
6<= Aggregate score<8	Good
8<= Aggregate score	Very good

APPENDIX IV: SECONDARY DATA COLLECTION CHECKLIST

The researcher collected the following data from five years (2012–13 to 2016–17) of annual reports of the companies included in the study:

Balance Sheet Data
Current Assets
Current Liability
Total Assets
Accounts Receivable
Accounts Payable
Inventory

Income Statement Data
Sales
Cost of Goods Sold
Net Income

Other Information
Number of shares outstanding

The annual closing price of each company over the five-year period was obtained from Dhaka Stock Exchange records.

APPENDIX V: INTERVIEW CHECK LIST
(FOR THE TRIANGULATION OF RESULTS)

1. Good practices in managing working capital and its components (e.g., cash and equivalents, receivables, payables and inventory management and working capital financing) in terms of:
   a) Formal policy and strategy
   b) Regular monitoring
   c) Use of tools, techniques and methods
   d) Use of technology and information systems
   e) Time commitment of manager, dedicated manager, etc.

2. Importance of working capital management on firm performance.

3. How to measure good performance in relation to competitors?

4. How to measure consistency in performance in relation to competitors?

5. Do good practices pay off in giving a firm the edge over competition in the market?

6. Is there any particular area of working capital management that is crucial for enhancing and maintaining performance (long-term profitability and doing better than other players in the market)?

7. Inter-industry differences in working capital management practices.

8. Inter-industry differences (if any) in the role of working capital management on creating an edge over competition in the market.

APPENDIX VI: REGRESSION OUTPUTS

Appendix VI (A1): Manufacturing Sector, Business Competitiveness Measured by roa

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.523[a]	.273	.195	.07336

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

b. Dependent Variable: roa1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.282	15	.019	3.487	.000[a]
	Residual	.748	139	.005		
	Total	1.030	154			

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

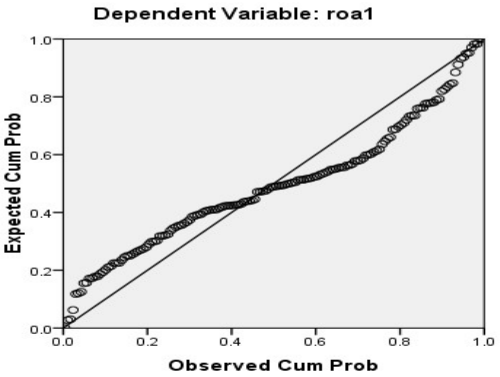
b. Dependent Variable: roa1

Coefficients[a]

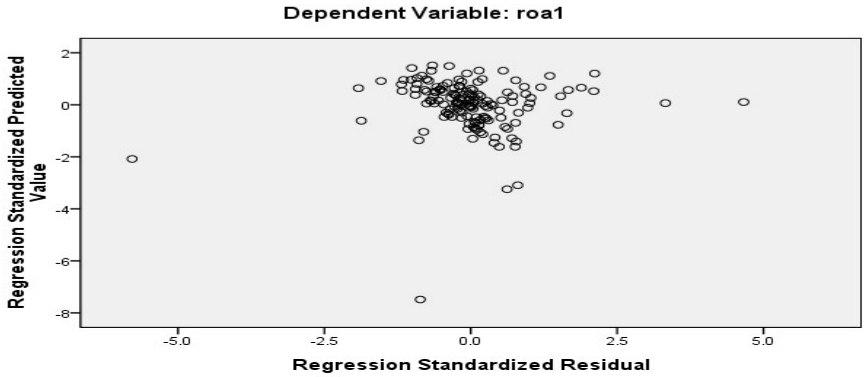
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.192	.079		2.443	.016					
	WCM Policy	-.009	.011	-.066	-.845	.400	-.057	-.071	-.061	.857	1.167
	WCM Strategy	.009	.012	.064	.791	.430	.028	.067	.057	.797	1.255
	WCM Financing Strategy	-.022	.011	-.167	-1.996	.048	-.106	-.167	-.144	.749	1.335
	arsophistication	-.006	.008	-.068	-.721	.472	-.025	-.061	-.052	.589	1.699
	apsophistication	.004	.007	.052	.610	.543	.084	.052	.044	.732	1.366
	invsophistication	-.006	.010	-.057	-.563	.574	.037	-.048	-.041	.518	1.929
	cshsophisticatio	.001	.006	.011	.138	.890	.018	.012	.010	.853	1.172
	lqdty	.000	.004	-.007	-.078	.938	-.053	-.007	-.006	.569	1.758
	stockout	-.004	.005	-.086	-.845	.399	-.097	-.071	-.061	.500	2.000
	wcsophistication	.004	.021	.023	.204	.839	-.022	.017	.015	.403	2.481
	docwcm	-.001	.001	-.288	-1.691	.093	-.127	-.142	-.122	.180	5.559
	doawcf	-.144	.023	-.483	-6.262	.000	-.464	-.469	-.453	.880	1.136
	icp	1.163E-6	.000	.137	1.586	.115	-.040	.133	.115	.697	1.434
	acp	4.392E-6	.000	.273	1.649	.101	-.060	.139	.119	.191	5.224
	cr	.000	.001	-.078	-1.036	.302	.015	-.087	-.075	.923	1.084

a. Dependent Variable: roa1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (A2): Manufacturing Sector, Business Competitiveness Measured by npm

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.891[a]	.794	.772	.50177

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

b. Dependent Variable: npm1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	135.180	15	9.012	35.793	.000[a]
	Residual	34.997	139	.252		
	Total	170.177	154			

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

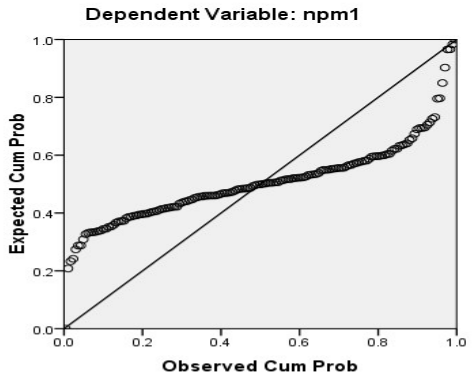
b. Dependent Variable: npm1

Coefficients[a]

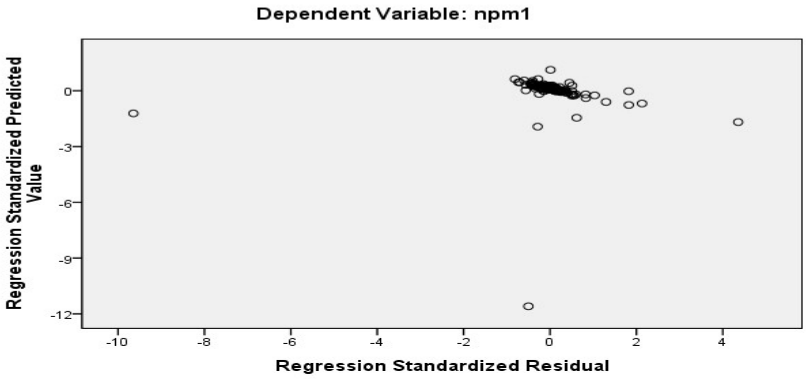
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.210	.539		2.247	.026					
	WCM Policy	-.120	.073	-.068	-1.637	.104	-.124	-.138	-.063	.857	1.167
	WCM Strategy	.061	.080	.033	.766	.445	.023	.065	.029	.797	1.255
	WCM Financing Strategy	-.085	.074	-.051	-1.147	.253	.012	-.097	-.044	.749	1.335
	arsophistication	.029	.055	.027	.532	.595	.092	.045	.020	.589	1.699
	apsophistication	.050	.050	.045	1.007	.315	.125	.085	.039	.732	1.366
	invsophistication	-.087	.069	-.068	-1.266	.208	.061	-.107	-.049	.518	1.929
	cshsophisticatio	.009	.039	.010	.238	.812	.034	.020	.009	.853	1.172
	lqdty	-.002	.025	-.005	-.099	.921	-.107	-.008	-.004	.569	1.758
	stockout	-.023	.031	-.040	-.739	.461	-.099	-.063	-.028	.500	2.000
	wcsophistication	-.131	.143	-.055	-.914	.362	-.042	-.077	-.035	.403	2.481
	docwcm	-.127	.006	-1.971	-21.737	.000	-.474	-.879	-.836	.180	5.559
	doawcf	-.498	.157	-.130	-3.164	.002	-.190	-.259	-.122	.880	1.136
	icp	6.243E-5	.000	.574	12.454	.000	.069	.726	.479	.697	1.434
	acp	.000	.000	1.582	17.997	.000	-.141	.836	.692	.191	5.224
	cr	-.001	.006	-.009	-.226	.821	.039	-.019	-.009	.923	1.084

a. Dependent Variable: npm1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (A3): Manufacturing Sector, Business Competitiveness Measured by α

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.148[a]	.022	-.084	83.24155

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

b. Dependent Variable: alpha

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21491.012	15	1432.734	.207	.999[a]
	Residual	963152.521	139	6929.155		
	Total	984643.533	154			

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

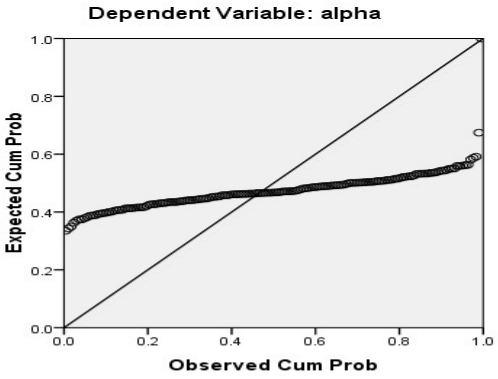
b. Dependent Variable: alpha

Coefficients[a]

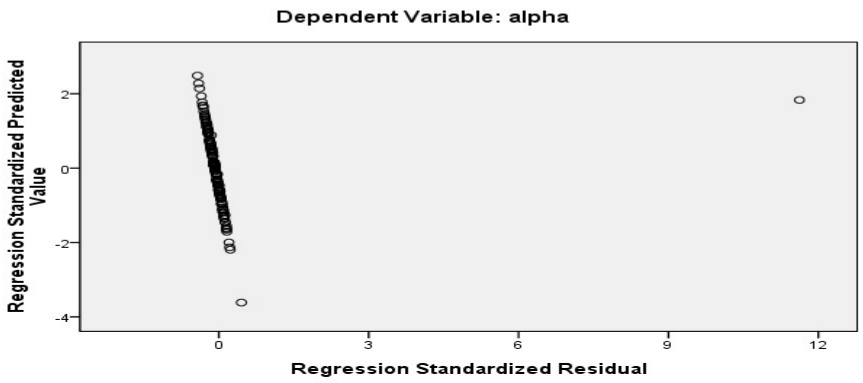
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-67.961	89.338		-.761	.448					
	WCM Policy	12.074	12.153	.090	.993	.322	.068	.084	.083	.857	1.167
	WCM Strategy	3.268	13.306	.023	.246	.806	.044	.021	.021	.797	1.255
	WCM Financing Strategy	4.581	12.352	.036	.371	.711	.035	.031	.031	.749	1.335
	arsophistication	2.487	9.044	.030	.275	.784	.026	.023	.023	.589	1.699
	apsophistication	.913	8.221	.011	.111	.912	.021	.009	.009	.732	1.366
	invsophistication	1.354	11.399	.014	.119	.906	.000	.010	.010	.518	1.929
	cshsophisticatio	-.572	6.387	-.008	-.089	.929	-.005	-.008	-.008	.853	1.172
	lqdty	1.432	4.151	.038	.345	.731	.052	.029	.029	.569	1.758
	stockout	3.841	5.202	.088	.738	.462	.055	.063	.062	.500	2.000
	wcsophistication	-3.820	23.723	-.021	-.161	.872	.040	-.014	-.014	.403	2.481
	docwcm	-.199	.971	-.040	-.204	.838	-.014	-.017	-.017	.180	5.559
	doawcf	-23.849	26.113	-.082	-.913	.363	-.072	-.077	-.077	.880	1.136
	icp	-3.379E-5	.001	-.004	-.041	.968	-.008	-.003	-.003	.697	1.434
	acp	.000	.003	.026	.135	.893	-.008	.011	.011	.191	5.224
	cr	-.120	1.038	-.010	-.116	.908	-.004	-.010	-.010	.923	1.084

a. Dependent Variable: alpha

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (A4): Manufacturing Sector, Business Competitiveness Measured by β

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.147[a]	.022	-.084	91.13916

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

b. Dependent Variable: beta

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25630.654	15	1708.710	.206	.999[a]
	Residual	1154582.262	139	8306.347		
	Total	1180212.916	154			

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

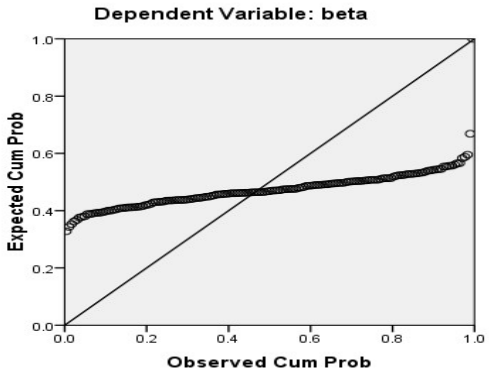
b. Dependent Variable: beta

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-73.000	97.815		-.746	.457					
	WCM Policy	13.173	13.306	.090	.990	.324	.068	.084	.083	.857	1.167
	WCM Strategy	3.491	14.568	.023	.240	.811	.044	.020	.020	.797	1.255
	WCM Financing Strategy	5.010	13.523	.036	.370	.712	.035	.031	.031	.749	1.335
	arsophistication	2.633	9.902	.029	.266	.791	.024	.023	.022	.589	1.699
	apsophistication	.954	9.001	.010	.106	.916	.020	.009	.009	.732	1.366
	invsophistication	1.558	12.480	.015	.125	.901	-.001	.011	.010	.518	1.929
	cshsophisticatio	-.680	6.993	-.009	-.097	.923	-.005	-.008	-.008	.853	1.172
	lqdty	1.594	4.545	.039	.351	.726	.052	.030	.029	.569	1.758
	stockout	4.256	5.695	.089	.747	.456	.055	.063	.063	.500	2.000
	wcsophistication	-4.637	25.974	-.024	-.179	.859	.038	-.015	-.015	.403	2.481
	docwcm	-.205	1.063	-.038	-.193	.847	-.013	-.016	-.016	.180	5.559
	doawcf	-26.310	28.590	-.082	-.920	.359	-.072	-.078	-.077	.880	1.136
	icp	-3.701E-5	.001	-.004	-.041	.968	-.008	-.003	-.003	.697	1.434
	acp	.000	.003	.025	.128	.898	-.007	.011	.011	.191	5.224
	cr	-.132	1.136	-.010	-.116	.908	-.004	-.010	-.010	.923	1.084

a. Dependent Variable: beta

Normal P-P Plot of Regression Standardized Residual



Scatterplot

Appendix VI (A5): Manufacturing Sector, Business Competitiveness Measured by q

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.311[a]	.097	.000	2.19589

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

b. Dependent Variable: tobinq

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.954	15	4.797	.995	.464[a]
	Residual	670.249	139	4.822		
	Total	742.203	154			

a. Predictors: (Constant), cr, apsophistication, WCM Policy, WCM Financing Strategy, icp, lqdty, acp, doawcf, cshsophisticatio, invsophistication, WCM Strategy, stockout, arsophistication, wcsophistication, docwcm

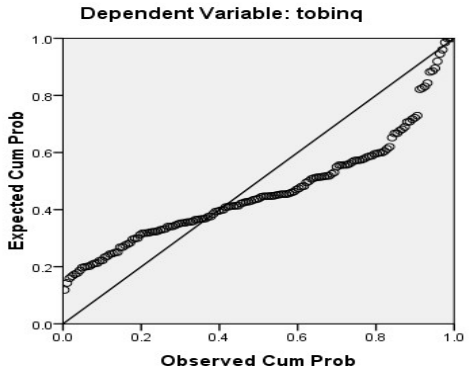
b. Dependent Variable: tobinq

Coefficients[a]

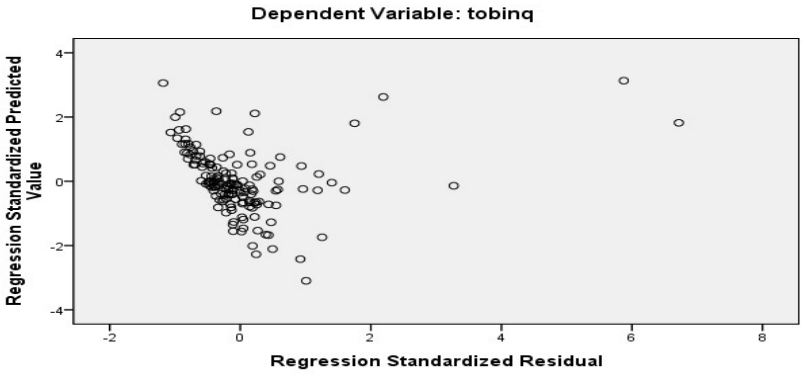
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.890	2.357		1.650	.101					
	WCM Policy	.149	.321	.040	.464	.644	.039	.039	.037	.857	1.167
	WCM Strategy	.565	.351	.145	1.609	.110	.057	.135	.130	.797	1.255
	WCM Financing Strategy	-.999	.326	-.286	-3.067	.003	-.194	-.252	-.247	.749	1.335
	arsophistication	.268	.239	.118	1.123	.263	-.029	.095	.091	.589	1.699
	apsophistication	-.116	.217	-.050	-.534	.594	-.074	-.045	-.043	.732	1.366
	invsophistication	-.246	.301	-.092	-.818	.415	-.049	-.069	-.066	.518	1.929
	cshsophisticatio	.141	.168	.073	.838	.403	-.017	.071	.068	.853	1.172
	lqdty	.144	.110	.141	1.315	.191	.081	.111	.106	.569	1.758
	stockout	-.045	.137	-.037	-.326	.745	-.008	-.028	-.026	.500	2.000
	wcsophistication	-.853	.626	-.173	-1.363	.175	-.057	-.115	-.110	.403	2.481
	docwcm	-.011	.026	-.083	-.436	.663	-.048	-.037	-.035	.180	5.559
	doawcf	.377	.689	.047	.548	.585	.046	.046	.044	.880	1.136
	icp	2.453E-6	.000	.011	.112	.911	-.040	.009	.009	.697	1.434
	acp	-1.418E-5	.000	-.033	-.178	.859	-.031	-.015	-.014	.191	5.224
	cr	.001	.027	.002	.025	.980	-.032	.002	.002	.923	1.084

a. Dependent Variable: tobinq

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (B1): Fuel & Power Sector, Business Competitiveness Measured by npm

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.953[a]	.908	-.386	.30678

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

b. Dependent Variable: npm1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.925	14	.066	.702	.748[a]
	Residual	.094	1	.094		
	Total	1.019	15			

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

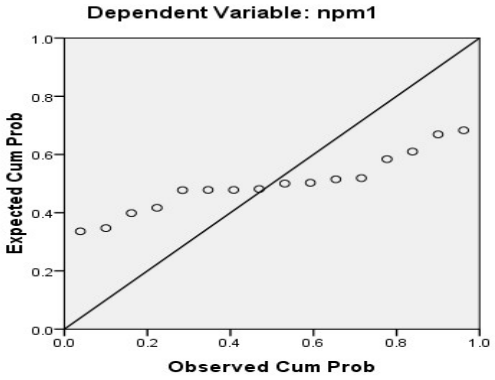
b. Dependent Variable: npm1

Coefficients[a]

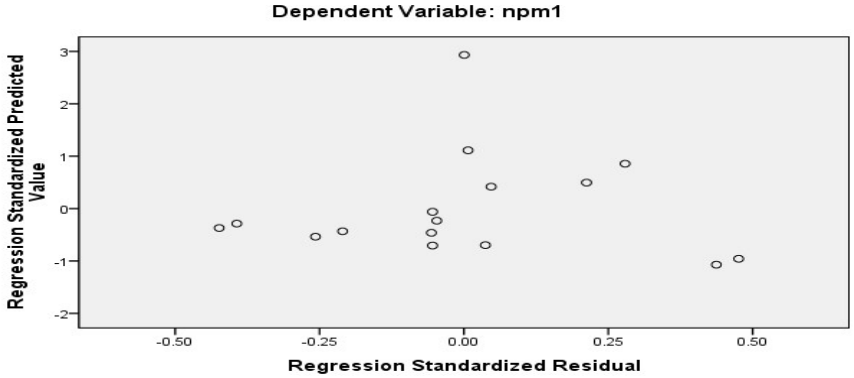
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.060	3.303		.018	.988					
	WCM Policy	-.102	.508	-.196	-.201	.874	.122	-.197	-.061	.097	10.278
	WCM Strategy	.171	.813	.414	.211	.868	.438	.206	.064	.024	41.746
	WCM Financing Strategy	-.138	.695	-.329	-.199	.875	.458	-.195	-.061	.034	29.550
	arsophistication	.051	.514	.179	.100	.937	.112	.100	.030	.029	34.669
	apsophistication	.046	.212	.218	.216	.865	-.052	.211	.066	.091	11.030
	invsophistication	-.148	.248	-.467	-.598	.657	.001	-.513	-.182	.151	6.607
	cshsophisticatio	.070	.236	.277	.294	.818	.308	.282	.089	.105	9.554
	lqdty	-.012	.132	-.109	-.090	.943	-.234	-.089	-.027	.062	16.079
	stockout	.062	.133	.390	.469	.721	.181	.425	.143	.133	7.500
	wcsophistication	-.060	.578	-.093	-.104	.934	-.231	-.103	-.032	.115	8.662
	doawcf	-.596	4.508	-.489	-.132	.916	.590	-.131	-.040	.007	147.989
	icp	7.122E-6	.000	.821	.299	.815	.745	.286	.091	.012	81.773
	acp	.000	.001	.494	.282	.825	.765	.272	.086	.030	33.172
	cr	-.038	.235	-.213	-.162	.898	.051	-.160	-.049	.053	18.831

a. Dependent Variable: npm1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (B2): Fuel& Power Sector, Business Competitiveness Measured by roa

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.917[a]	.840	-1.395	.10389

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

b. Dependent Variable: roa1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.057	14	.004	.376	.875[a]
	Residual	.011	1	.011		
	Total	.068	15			

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

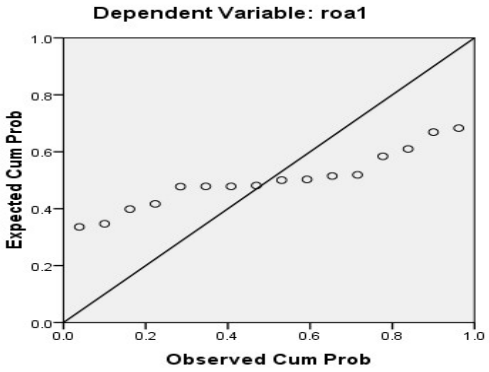
b. Dependent Variable: roa1

Coefficients[a]

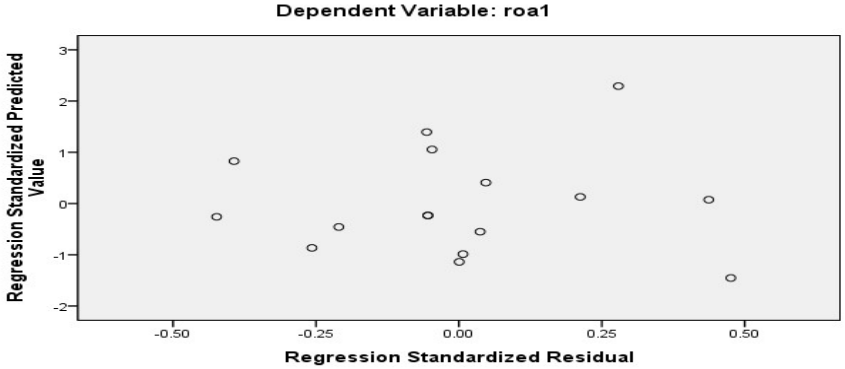
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.881	1.119		-.788	.575					
	WCM Policy	.053	.172	.397	.310	.808	-.258	.296	.124	.097	10.278
	WCM Strategy	.027	.275	.249	.096	.939	-.063	.096	.038	.024	41.746
	WCM Financing Strategy	.029	.236	.268	.123	.922	-.209	.122	.049	.034	29.550
	arsophistication	.003	.174	.037	.016	.990	.058	.016	.006	.029	34.669
	apsophistication	.037	.072	.693	.522	.694	.318	.463	.209	.091	11.030
	invsophistication	-.123	.084	-1.508	-1.469	.381	-.135	-.827	-.587	.151	6.607
	cshsophisticatio	.068	.080	1.051	.851	.551	.183	.648	.340	.105	9.554
	lqdty	.004	.045	.157	.098	.938	-.308	.097	.039	.062	16.079
	stockout	.014	.045	.336	.307	.810	-.098	.294	.123	.133	7.500
	wcsophistication	.115	.196	.691	.588	.662	.123	.507	.235	.115	8.662
	doawcf	.533	1.527	1.697	.349	.786	-.378	.330	.140	.007	147.989
	icp	-1.382E-6	.000	-.619	-.171	.892	-.279	-.169	-.068	.012	81.773
	acp	.000	.000	-1.392	-.605	.654	-.394	-.517	-.242	.030	33.172
	cr	.041	.080	.892	.514	.698	.350	.457	.206	.053	18.831

a. Dependent Variable: roa1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (B3): Fuel & Power Sector, Business Competitiveness Measured by α

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.996[a]	.993	.888	.18650

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

b. Dependent Variable: alpha

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.628	14	.331	9.504	.250[a]
	Residual	.035	1	.035		
	Total	4.663	15			

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

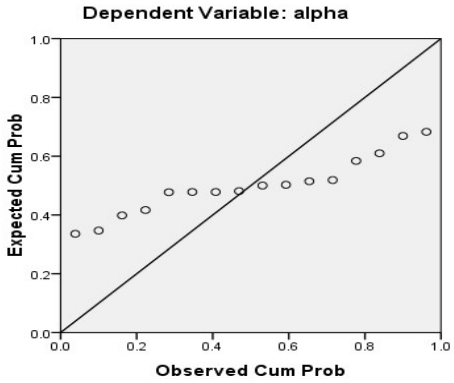
b. Dependent Variable: alpha

Coefficients[a]

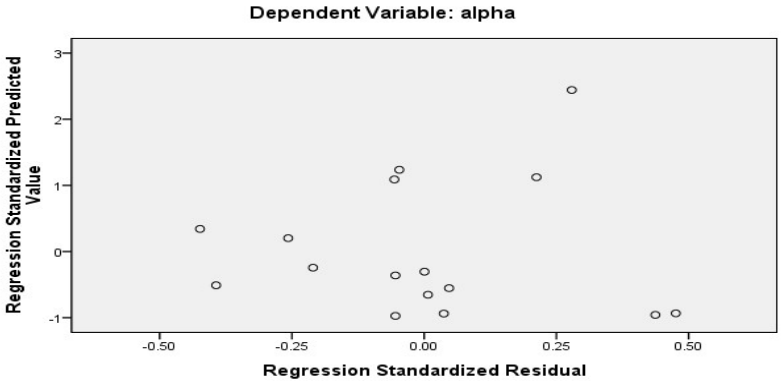
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-9.501	2.008		-4.732	.133					
	WCM Policy	.270	.309	.242	.875	.542	-.099	.659	.076	.097	10.278
	WCM Strategy	-.214	.495	-.241	-.432	.740	.004	-.397	-.037	.024	41.746
	WCM Financing Strategy	.151	.423	.167	.356	.782	-.081	.336	.031	.034	29.550
	arsophistication	-.162	.313	-.264	-.519	.695	.378	-.460	-.045	.029	34.669
	apsophistication	.424	.129	.945	3.294	.188	.293	.957	.284	.091	11.030
	invsophistication	-.755	.150	-1.114	-5.018	.125	.156	-.981	-.433	.151	6.607
	cshsophisticatio	.653	.144	1.212	4.541	.138	.465	.977	.392	.105	9.554
	lqdty	.198	.080	.856	2.471	.245	-.258	.927	.213	.062	16.079
	stockout	.092	.081	.269	1.136	.460	.113	.751	.098	.133	7.500
	wcsophistication	1.415	.352	1.023	4.026	.155	.259	.971	.348	.115	8.662
	doawcf	-1.132	2.740	-.434	-.413	.751	-.333	-.382	-.036	.007	147.989
	icp	1.064E-5	.000	.574	.735	.597	-.080	.592	.063	.012	81.773
	acp	7.212E-5	.000	.117	.236	.853	-.184	.229	.020	.030	33.172
	cr	.318	.143	.832	2.221	.269	.374	.912	.192	.053	18.831

a. Dependent Variable: alpha

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (B4): Fuel & Power Sector, Business Competitiveness Measured by β

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.876[a]	.768	-2.487	2.12142

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

b. Dependent Variable: beta

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.858	14	1.061	.236	.941[a]
	Residual	4.500	1	4.500		
	Total	19.358	15			

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

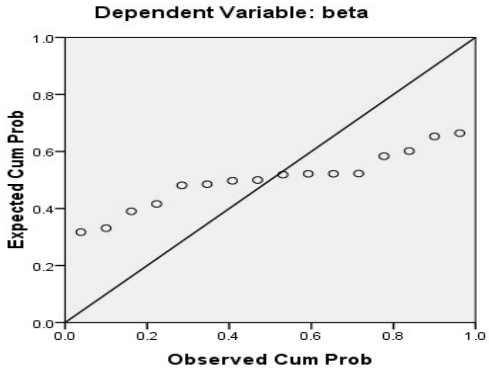
b. Dependent Variable: beta

Coefficients[a]

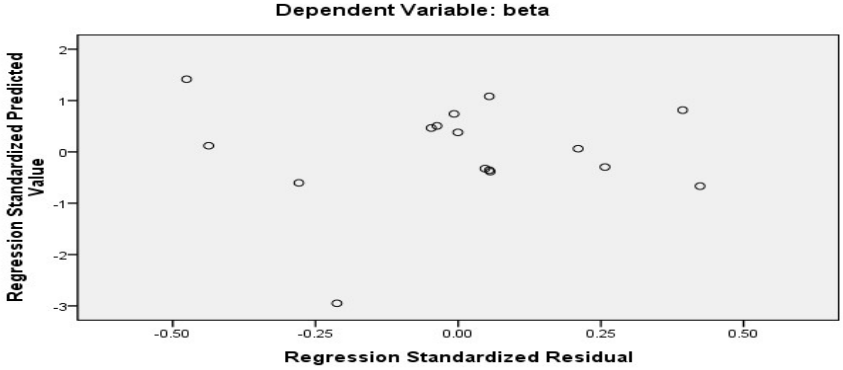
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	8.657	22.840		.379	.769					
	WCM Policy	.271	3.512	.119	.077	.951	.192	.077	.037	.097	10.278
	WCM Strategy	1.759	5.625	.974	.313	.807	-.141	.298	.151	.024	41.746
	WCM Financing Strategy	-2.105	4.809	-1.147	-.438	.737	-.146	-.401	-.211	.034	29.550
	arsophistication	1.524	3.556	1.217	.429	.742	-.489	.394	.207	.029	34.669
	apsophistication	-1.120	1.465	-1.224	-.764	.584	-.467	-.607	-.369	.091	11.030
	invsophistication	-.072	1.712	-.052	-.042	.973	-.391	-.042	-.020	.151	6.607
	cshsophisticatio	-1.094	1.635	-.997	-.669	.625	-.404	-.556	-.323	.105	9.554
	lqdty	-.437	.910	-.927	-.480	.715	.053	-.432	-.231	.062	16.079
	stockout	-.394	.922	-.564	-.427	.743	-.048	-.393	-.206	.133	7.500
	wcsophistication	.225	3.999	.080	.056	.964	-.123	.056	.027	.115	8.662
	doawcf	10.116	31.170	1.904	.325	.800	.262	.309	.156	.007	147.989
	icp	-4.890E-5	.000	-1.294	-.297	.816	.088	-.284	-.143	.012	81.773
	acp	.000	.003	-.231	-.083	.947	.176	-.083	-.040	.030	33.172
	cr	-.011	1.628	-.014	-.006	.996	-.165	-.006	-.003	.053	18.831

a. Dependent Variable: beta

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (B5): Fuel & Power Sector, Business Competitiveness Measured by q

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.969[a]	.940	.093	.87260

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

b. Dependent Variable: tobinq

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.828	14	.845	1.110	.641[a]
	Residual	.761	1	.761		
	Total	12.589	15			

a. Predictors: (Constant), cr, apsophistication, icp, arsophistication, wcsophistication, cshsophisticatio, WCM Policy, WCM Strategy, stockout, invsophistication, acp, lqdty, WCM Financing Strategy, doawcf

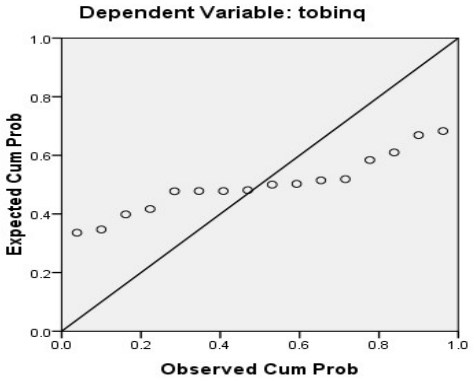
b. Dependent Variable: tobinq

Coefficients[a]

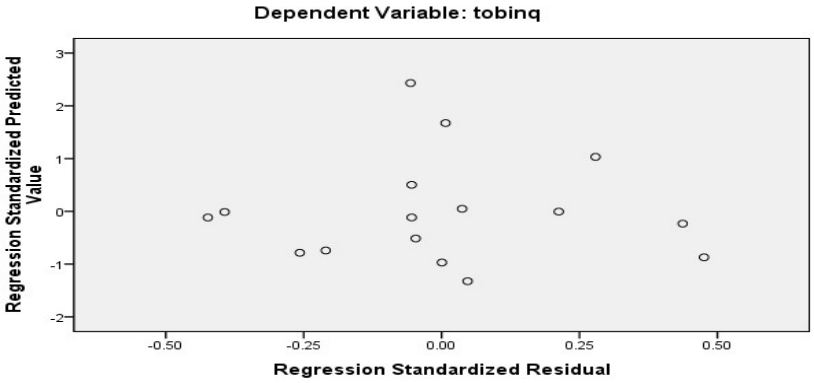
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-17.038	9.395		-1.814	.321					
	WCM Policy	1.921	1.445	1.049	1.330	.410	-.292	.799	.327	.097	10.278
	WCM Strategy	.023	2.314	.016	.010	.994	-.354	.010	.002	.024	41.746
	WCM Financing Strategy	.658	1.978	.445	.333	.796	-.311	.316	.082	.034	29.550
	arsophistication	-.010	1.463	-.010	-.007	.996	-.328	-.007	-.002	.029	34.669
	apsophistication	.416	.603	.564	.690	.615	-.067	.568	.170	.091	11.030
	invsophistication	-.423	.704	-.379	-.600	.656	-.344	-.515	-.148	.151	6.607
	cshsophisticatio	.542	.673	.612	.805	.568	-.197	.627	.198	.105	9.554
	lqdty	-.153	.374	-.403	-.409	.753	.071	-.378	-.100	.062	16.079
	stockout	.594	.379	1.055	1.566	.362	.433	.843	.385	.133	7.500
	wcsophistication	.581	1.645	.256	.353	.784	-.037	.333	.087	.115	8.662
	doawcf	14.122	12.821	3.295	1.101	.469	.029	.740	.271	.007	147.989
	icp	-8.301E-5	.000	-2.723	-1.224	.436	-.251	-.775	-.301	.012	81.773
	acp	.000	.001	-.939	-.663	.627	.100	-.553	-.163	.030	33.172
	cr	.823	.670	1.312	1.229	.435	.237	.776	.302	.053	18.831

a. Dependent Variable: tobinq

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (C1): Food & Allied Sector, Business Competitiveness Measured by roa

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.982[a]	.965	.702	.08848

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

b. Dependent Variable: roa1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.431	15	.029	3.668	.235[a]
	Residual	.016	2	.008		
	Total	.446	17			

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

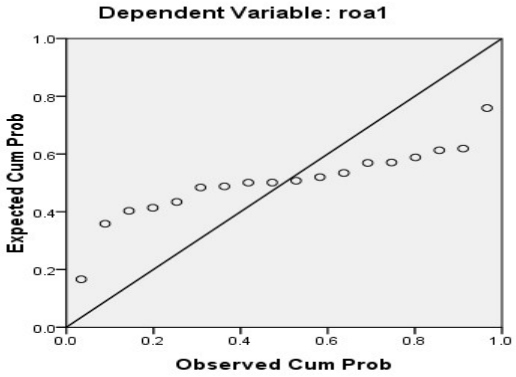
b. Dependent Variable: roa1

Coefficients[a]

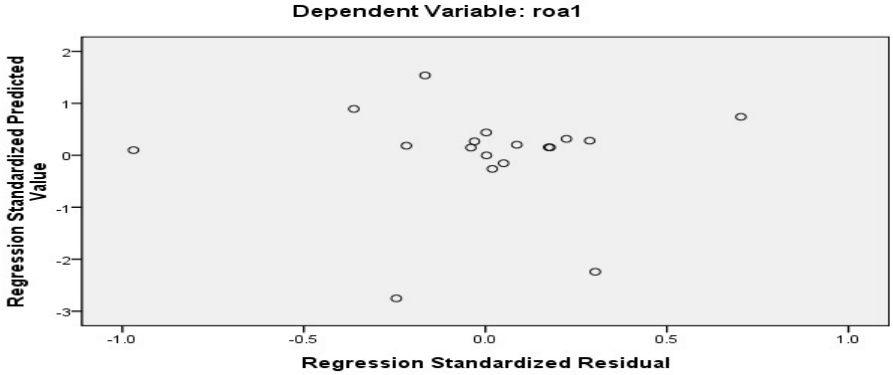
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-1.904	.606		-3.140	.088					
	WCM Policy	.546	.193	2.256	2.834	.105	-.087	.895	.375	.028	36.128
	WCM Strategy	.445	.158	1.378	2.815	.106	.159	.894	.373	.073	13.656
	WCM Financing Strategy	.360	.150	1.352	2.402	.138	-.090	.862	.318	.055	18.054
	arsophistication	.405	.200	2.421	2.027	.180	.183	.820	.268	.012	81.317
	apsophistication	-.281	.207	-1.651	-1.356	.308	.529	-.692	-.180	.012	84.423
	invsophistication	-.575	.209	-3.709	-2.750	.111	.151	-.889	-.364	.010	103.687
	cshsophisticatio	-.115	.050	-.845	-2.275	.151	-.047	-.849	-.301	.127	7.855
	lqdty	-.096	.051	-1.070	-1.858	.204	-.251	-.796	-.246	.053	18.933
	stockout	-.026	.026	-.332	-.993	.425	-.336	-.575	-.131	.157	6.364
	wcsophistication	1.108	.478	3.749	2.319	.146	-.079	.854	.307	.007	148.944
	docwcm	-.018	.013	-5.088	-1.408	.294	-.061	-.706	-.187	.001	744.077
	doawcf	-.800	.288	-2.836	-2.781	.109	-.649	-.891	-.368	.017	59.292
	icp	.000	.001	1.004	.723	.545	-.295	.455	.096	.009	109.867
	acp	5.722E-5	.000	5.241	1.478	.277	.000	.723	.196	.001	716.882
	cr	.015	.006	1.274	2.411	.137	.061	.863	.319	.063	15.911

a. Dependent Variable: roa1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (C2): Food & Allied Sector, Business Competitiveness Measured by α

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.996[a]	.992	.929	.15631

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

b. Dependent Variable: alpha

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.838	15	.389	15.930	.061[a]
	Residual	.049	2	.024		
	Total	5.887	17			

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

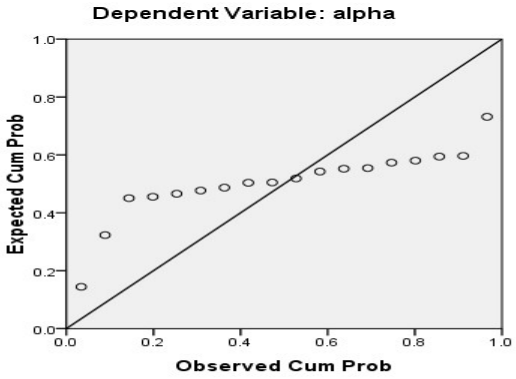
b. Dependent Variable: alpha

Coefficients[a]

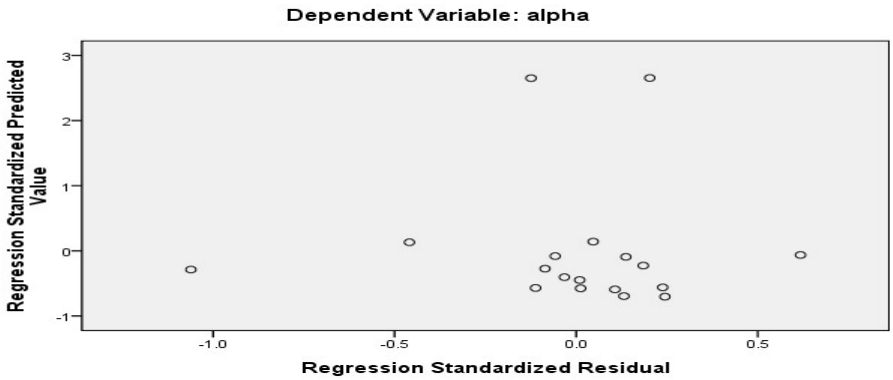
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	4.011	1.071		3.745	.064					
	WCM Policy	-1.678	.341	-1.907	-4.926	.039	.166	-.961	-.317	.028	36.128
	WCM Strategy	-1.072	.279	-.914	-3.839	.062	-.026	-.938	-.247	.073	13.656
	WCM Financing Strategy	-1.512	.265	-1.562	-5.705	.029	-.184	-.971	-.368	.055	18.054
	arsophistication	-2.011	.353	-3.311	-5.699	.029	-.065	-.971	-.367	.012	81.317
	apsophistication	1.335	.366	2.158	3.646	.068	-.283	.932	.235	.012	84.423
	invsophistication	2.166	.369	3.845	5.862	.028	-.060	.972	.378	.010	103.687
	cshsophisticatio	.424	.089	.860	4.764	.041	-.091	.959	.307	.127	7.855
	lqdty	.475	.091	1.467	5.234	.035	.253	.965	.337	.053	18.933
	stockout	.077	.046	.270	1.661	.239	.198	.761	.107	.157	6.364
	wcsophistication	-3.533	.844	-3.292	-4.188	.053	.226	-.947	-.270	.007	148.944
	docwcm	.102	.023	7.749	4.409	.048	-.137	.952	.284	.001	744.077
	doawcf	3.282	.508	3.205	6.461	.023	.720	.977	.416	.017	59.292
	icp	-.004	.001	-2.741	-4.060	.056	.114	-.944	-.262	.009	109.867
	acp	.000	.000	-7.931	-4.598	.044	-.113	-.956	-.296	.001	716.882
	cr	-.059	.011	-1.400	-5.448	.032	-.141	-.968	-.351	.063	15.911

a. Dependent Variable: alpha

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (C3): Food & Allied Sector, Business Competitiveness Measured by β

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.851[a]	.724	-1.347	.95085

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

b. Dependent Variable: beta

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.742	15	.316	.350	.911[a]
	Residual	1.808	2	.904		
	Total	6.550	17			

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

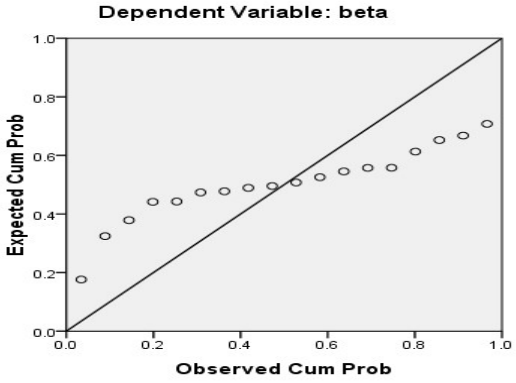
b. Dependent Variable: beta

Coefficients[a]

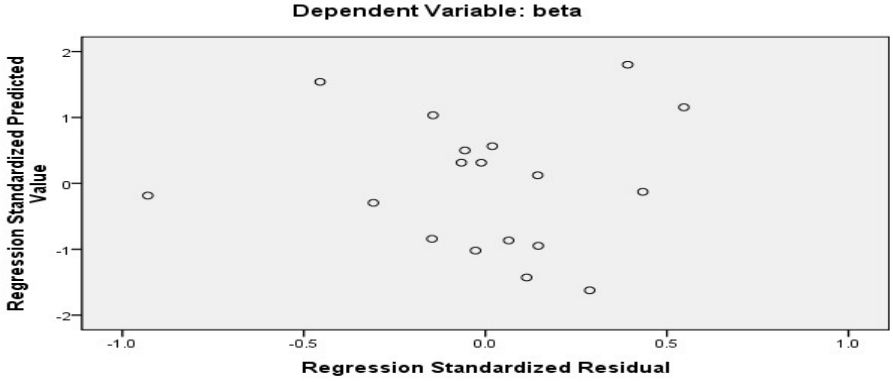
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.174	6.516		.027	.981					
	WCM Policy	.647	2.072	.698	.312	.784	.127	.216	.116	.028	36.128
	WCM Strategy	1.307	1.699	1.056	.769	.522	.275	.478	.286	.073	13.656
	WCM Financing Strategy	.693	1.613	.679	.430	.709	-.012	.291	.160	.055	18.054
	arsophistication	.251	2.146	.392	.117	.917	-.212	.083	.043	.012	81.317
	apsophistication	-.725	2.227	-1.112	-.326	.776	-.209	-.224	-.121	.012	84.423
	invsophistication	-.497	2.247	-.837	-.221	.845	-.260	-.155	-.082	.010	103.687
	cshsophisticatio	-.408	.541	-.785	-.754	.530	-.317	-.470	-.280	.127	7.855
	lqdty	-.085	.553	-.250	-.154	.891	-.121	-.109	-.057	.053	18.933
	stockout	-.062	.281	-.207	-.220	.846	-.270	-.154	-.082	.157	6.364
	wcsophistication	1.486	5.133	1.312	.289	.800	-.492	.200	.108	.007	148.944
	docwcm	.059	.141	4.226	.417	.717	.114	.283	.155	.001	744.077
	doawcf	-.451	3.090	-.418	-.146	.897	-.263	-.103	-.054	.017	59.292
	icp	-.004	.006	-2.775	-.713	.550	-.022	-.450	-.265	.009	109.867
	acp	.000	.000	-3.575	-.359	.754	.072	-.246	-.134	.001	716.882
	cr	.019	.066	.438	.296	.795	-.221	.205	.110	.063	15.911

a. Dependent Variable: beta

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (C4): Food & Allied Sector, Business Competitiveness Measured by q

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.899[a]	.808	-.633	4.93936

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

b. Dependent Variable: tobinq

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	205.190	15	13.679	.561	.798[a]
	Residual	48.795	2	24.397		
	Total	253.985	17			

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

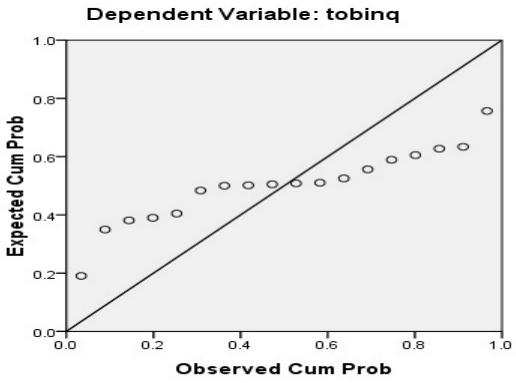
b. Dependent Variable: tobinq

Coefficients[a]

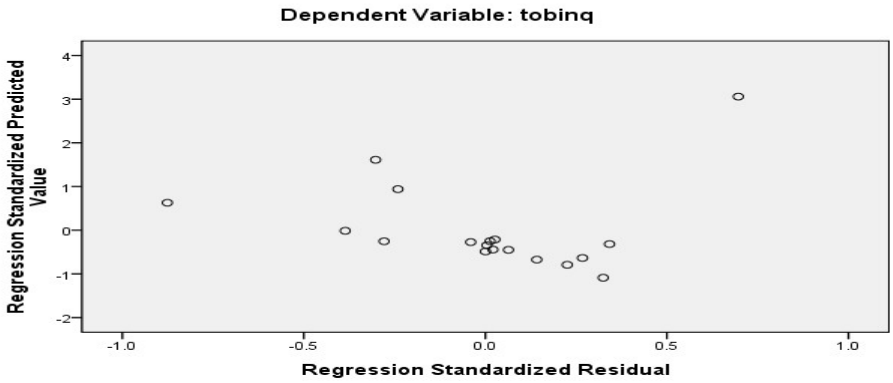
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-3.574	33.846		-.106	.926					
	WCM Policy	-2.049	10.761	-.355	-.190	.867	.061	-.133	-.059	.028	36.128
	WCM Strategy	3.321	8.825	.431	.376	.743	.296	.257	.117	.073	13.656
	WCM Financing Strategy	-5.639	8.376	-.886	-.673	.570	-.340	-.430	-.209	.055	18.054
	arsophistication	-6.967	11.148	-1.747	-.625	.596	-.029	-.404	-.194	.012	81.317
	apsophistication	5.002	11.571	1.231	.432	.708	.000	.292	.134	.012	84.423
	invsophistication	2.248	11.675	.608	.193	.865	-.206	.135	.060	.010	103.687
	cshsophisticatio	1.769	2.813	.546	.629	.594	-.028	.406	.195	.127	7.855
	lqdty	1.910	2.870	.897	.665	.574	.049	.426	.206	.053	18.933
	stockout	.549	1.457	.294	.376	.743	-.046	.257	.117	.157	6.364
	wcsophistication	-5.873	26.664	-.833	-.220	.846	-.221	-.154	-.068	.007	148.944
	docwcm	.477	.732	5.516	.652	.581	-.155	.419	.202	.001	744.077
	doawcf	3.607	16.053	.536	.225	.843	-.198	.157	.070	.017	59.292
	icp	-.024	.029	-2.713	-.835	.491	-.199	-.509	-.259	.009	109.867
	acp	-.001	.002	-5.743	-.692	.560	-.112	-.440	-.215	.001	716.882
	cr	-.176	.340	-.638	-.516	.657	-.083	-.343	-.160	.063	15.911

a. Dependent Variable: tobinq

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (C5): Food & Allied Sector, Business Competitiveness Measured by npm

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.996[a]	.991	.925	.79658

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

b. Dependent Variable: npm1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142.840	15	9.523	15.007	.064[a]
	Residual	1.269	2	.635		
	Total	144.109	17			

a. Predictors: (Constant), cr, invsophistication, WCM Financing Strategy, lqdty, icp, cshsophisticatio, stockout, WCM Strategy, doawcf, acp, WCM Policy, apsophistication, arsophistication, wcsophistication, docwcm

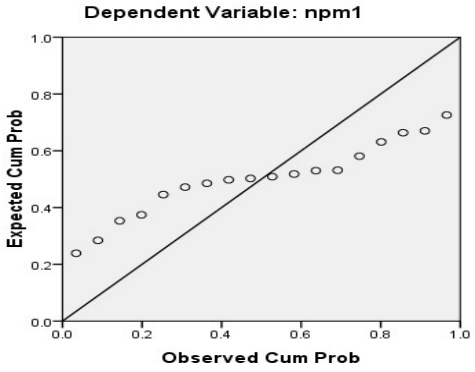
b. Dependent Variable: npm1

Coefficients[a]

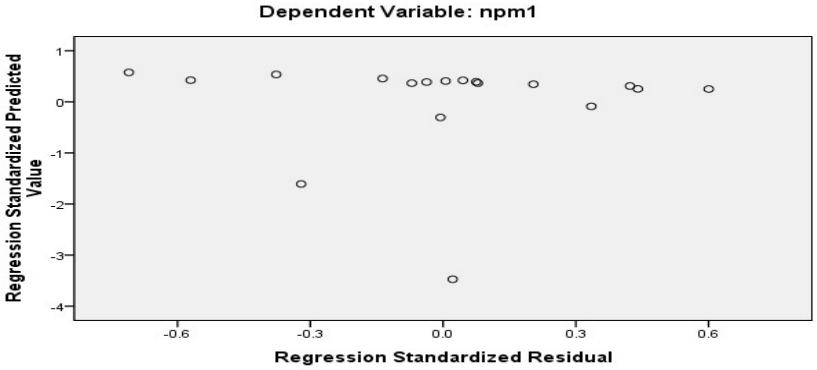
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-19.042	5.459		-3.489	.073					
	WCM Policy	5.685	1.736	1.307	3.276	.082	-.228	.918	.217	.028	36.128
	WCM Strategy	4.122	1.423	.710	2.896	.101	.003	.899	.192	.073	13.656
	WCM Financing Strategy	4.497	1.351	.939	3.329	.080	-.002	.920	.221	.055	18.054
	arsophistication	5.497	1.798	1.830	3.058	.092	.223	.908	.203	.012	81.317
	apsophistication	-3.716	1.866	-1.214	-1.991	.185	.486	-.815	-.132	.012	84.423
	invsophistication	-6.549	1.883	-2.350	-3.478	.074	.136	-.926	-.231	.010	103.687
	cshsophisticatio	-1.194	.454	-.489	-2.631	.119	.112	-.881	-.175	.127	7.855
	lqdty	-1.210	.463	-.755	-2.614	.120	-.239	-.880	-.173	.053	18.933
	stockout	-.325	.235	-.231	-1.381	.301	-.257	-.699	-.092	.157	6.364
	wcsophistication	11.796	4.300	2.222	2.743	.111	-.086	.889	.182	.007	148.944
	docwcm	-.466	.118	-7.144	-3.947	.059	-.471	-.941	-.262	.001	744.077
	doawcf	-8.608	2.589	-1.699	-3.325	.080	-.160	-.920	-.221	.017	59.292
	icp	.012	.005	1.729	2.485	.131	-.847	.869	.165	.009	109.867
	acp	.001	.000	6.842	3.851	.061	-.073	.939	.256	.001	716.882
	cr	.178	.055	.860	3.247	.083	.145	.917	.215	.063	15.911

a. Dependent Variable: npm1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (D1): Engineering Sector, Business Competitiveness Measured by roa

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.507[a]	.257	-.321	.03750

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

b. Dependent Variable: roa1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.009	14	.001	.445	.935[a]
	Residual	.025	18	.001		
	Total	.034	32			

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

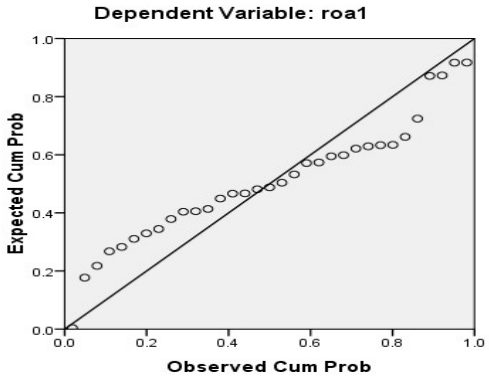
b. Dependent Variable: roa1

Coefficients[a]

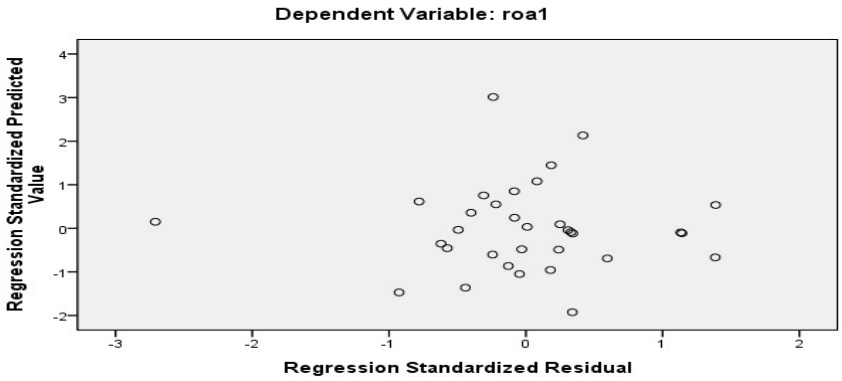
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.091	.153		.592	.561					
	WCM Policy	-.003	.012	-.064	-.223	.826	.007	-.052	-.045	.494	2.024
	WCM Strategy	-.003	.015	-.046	-.166	.870	-.129	-.039	-.034	.529	1.889
	WCM Financing Strategy	-.007	.017	-.144	-.433	.670	-.135	-.102	-.088	.375	2.663
	arsophistication	-.004	.016	-.120	-.275	.786	-.173	-.065	-.056	.218	4.586
	apsophistication	1.480E-5	.014	.000	.001	.999	.060	.000	.000	.383	2.612
	invsophistication	-.010	.018	-.208	-.547	.591	-.163	-.128	-.111	.285	3.506
	lqdty	-.006	.006	-.448	-.954	.353	-.088	-.219	-.194	.187	5.343
	stockout	-.003	.010	-.166	-.278	.784	-.015	-.065	-.057	.116	8.652
	wcsophistication	.027	.037	.382	.725	.478	.063	.168	.147	.149	6.732
	docwcm	-.001	.005	-.132	-.285	.779	-.100	-.067	-.058	.192	5.215
	doawcf	.007	.045	.048	.150	.882	-.255	.035	.031	.414	2.418
	icp	3.338E-6	.000	.018	.054	.957	-.087	.013	.011	.357	2.798
	acp	-4.999E-6	.000	-.095	-.167	.869	-.065	-.039	-.034	.129	7.749
	cr	.005	.006	.281	.901	.380	.377	.208	.183	.425	2.350

a. Dependent Variable: roa1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (D2): Engineering Sector, Business Competitiveness Measured by npm

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.884[a]	.781	.611	.05368

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

b. Dependent Variable: npm1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.185	14	.013	4.584	.002[a]
	Residual	.052	18	.003		
	Total	.237	32			

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

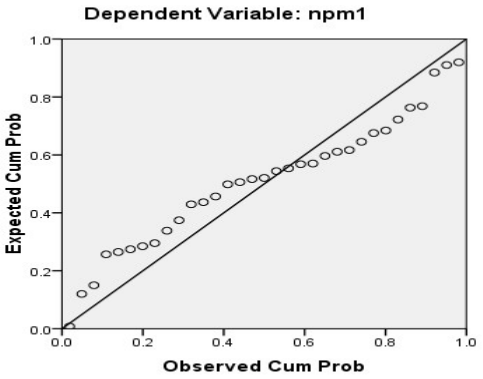
b. Dependent Variable: npm1

Coefficients[a]

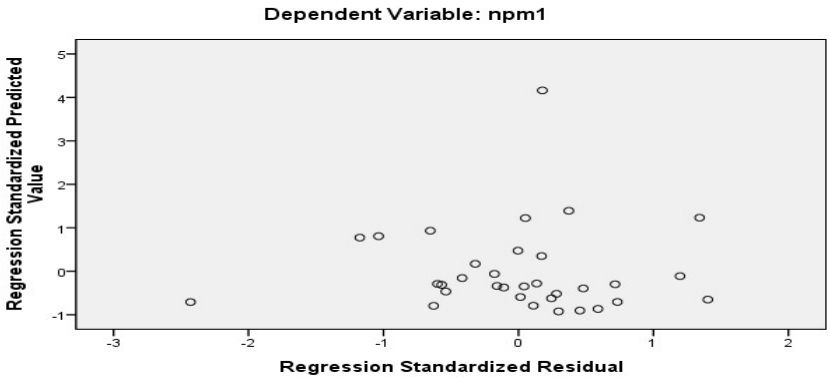
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.158	.219		.722	.479					
	WCM Policy	-.022	.018	-.192	-1.220	.238	-.131	-.276	-.135	.494	2.024
	WCM Strategy	.002	.022	.013	.089	.930	-.100	.021	.010	.529	1.889
	WCM Financing Strategy	-.036	.025	-.263	-1.460	.162	-.082	-.325	-.161	.375	2.663
	arsophistication	.014	.023	.140	.593	.561	.074	.138	.065	.218	4.586
	apsophistication	.000	.021	-.007	-.040	.969	-.083	-.009	-.004	.383	2.612
	invsophistication	-.037	.025	-.307	-1.484	.155	-.158	-.330	-.164	.285	3.506
	lqdty	-.015	.009	-.439	-1.720	.103	-.448	-.376	-.190	.187	5.343
	stockout	-.002	.014	-.055	-.169	.868	-.258	-.040	-.019	.116	8.652
	wcsophistication	.054	.053	.291	1.016	.323	-.216	.233	.112	.149	6.732
	docwcm	.009	.007	.323	1.283	.216	.713	.290	.142	.192	5.215
	doawcf	.013	.064	.034	.201	.843	-.086	.047	.022	.414	2.418
	icp	8.502E-5	.000	.178	.963	.349	.622	.221	.106	.357	2.798
	acp	2.677E-5	.000	.192	.626	.539	.712	.146	.069	.129	7.749
	cr	.010	.008	.212	1.254	.226	.253	.283	.138	.425	2.350

a. Dependent Variable: npm1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (D3): Engineering Sector, Business Competitiveness Measured by α

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.602[a]	.363	-.133	.46659

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

b. Dependent Variable: alpha

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.231	14	.159	.732	.720[a]
	Residual	3.919	18	.218		
	Total	6.149	32			

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

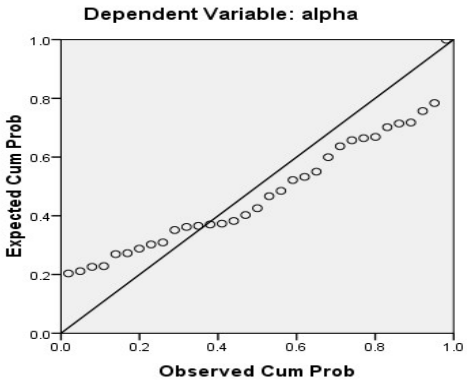
b. Dependent Variable: alpha

Coefficients[a]

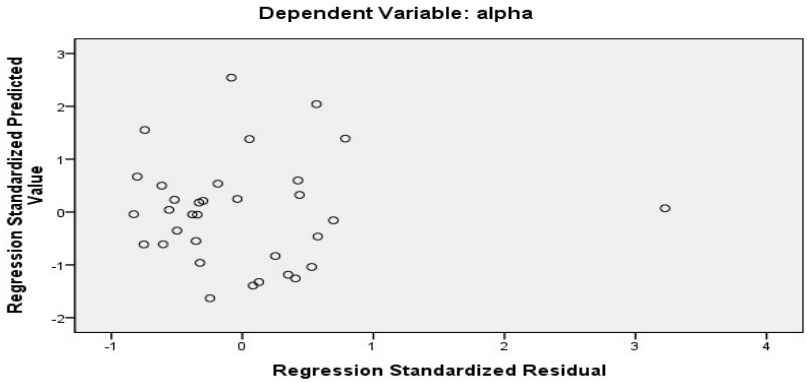
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.937	1.905		1.017	.323					
	WCM Policy	-.028	.155	-.048	-.180	.859	-.047	-.042	-.034	.494	2.024
	WCM Strategy	.079	.190	.107	.415	.683	-.127	.097	.078	.529	1.889
	WCM Financing Strategy	-.067	.215	-.095	-.309	.761	.199	-.073	-.058	.375	2.663
	arsophistication	.326	.202	.650	1.614	.124	.159	.356	.304	.218	4.586
	apsophistication	-.295	.179	-.502	-1.651	.116	-.093	-.363	-.311	.383	2.612
	invsophistication	-.136	.220	-.219	-.621	.542	.155	-.145	-.117	.285	3.506
	lqdty	.039	.078	.217	.499	.624	-.033	.117	.094	.187	5.343
	stockout	-.137	.125	-.610	-1.102	.285	-.174	-.251	-.207	.116	8.652
	wcsophistication	.159	.459	.169	.346	.734	-.077	.081	.065	.149	6.732
	docwcm	-.068	.063	-.460	-1.071	.298	-.188	-.245	-.202	.192	5.215
	doawcf	-.217	.557	-.114	-.389	.702	-.039	-.091	-.073	.414	2.418
	icp	.000	.001	-.314	-.997	.332	-.276	-.229	-.188	.357	2.798
	acp	.000	.000	.239	.456	.654	-.121	.107	.086	.129	7.749
	cr	.041	.070	.169	.585	.566	.250	.136	.110	.425	2.350

a. Dependent Variable: alpha

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (D4): Engineering Sector, Business Competitiveness Measured by β

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.779[a]	.607	.301	.57441

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

b. Dependent Variable: beta

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.167	14	.655	1.984	.086[a]
	Residual	5.939	18	.330		
	Total	15.106	32			

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

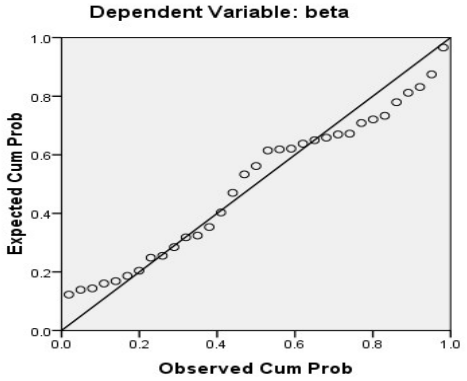
b. Dependent Variable: beta

Coefficients[a]

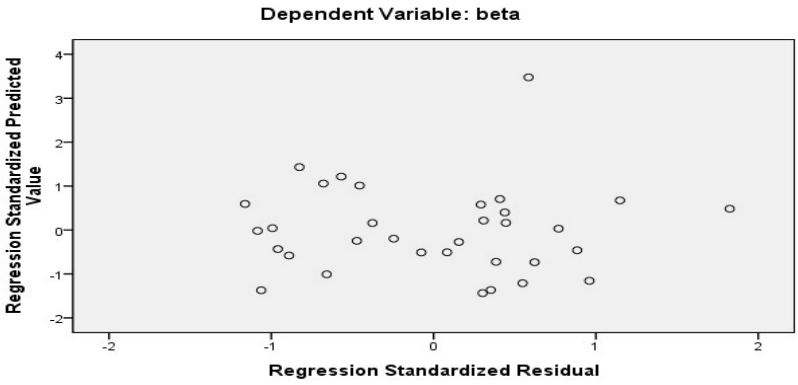
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.281	2.345		.547	.591					
	WCM Policy	.262	.191	.288	1.369	.188	.304	.307	.202	.494	2.024
	WCM Strategy	.274	.234	.237	1.168	.258	.197	.265	.173	.529	1.889
	WCM Financing Strategy	-.237	.265	-.216	-.894	.383	-.247	-.206	-.132	.375	2.663
	arsophistication	.279	.249	.355	1.122	.277	-.075	.256	.166	.218	4.586
	apsophistication	-.527	.220	-.571	-2.392	.028	-.366	-.491	-.354	.383	2.612
	invsophistication	-.016	.270	-.017	-.060	.953	.131	-.014	-.009	.285	3.506
	lqdty	-.007	.096	-.024	-.069	.945	.061	-.016	-.010	.187	5.343
	stockout	-.034	.154	-.097	-.223	.826	-.131	-.052	-.033	.116	8.652
	wcsophistication	-.100	.565	-.068	-.177	.861	-.134	-.042	-.026	.149	6.732
	docwcm	.073	.078	.315	.933	.363	.162	.215	.138	.192	5.215
	doawcf	1.421	.686	.476	2.072	.053	.373	.439	.306	.414	2.418
	icp	.002	.001	.416	1.683	.110	.169	.369	.249	.357	2.798
	acp	.000	.000	-.863	-2.097	.050	.074	-.443	-.310	.129	7.749
	cr	.140	.087	.366	1.616	.124	-.044	.356	.239	.425	2.350

a. Dependent Variable: beta

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (D5): Engineering Sector, Business Competitiveness Measured by q

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.700[a]	.490	.094	.69212

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

b. Dependent Variable: tobinq

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.294	14	.592	1.237	.331[a]
	Residual	8.623	18	.479		
	Total	16.916	32			

a. Predictors: (Constant), cr, docwcm, WCM Financing Strategy, invsophistication, WCM Strategy, apsophistication, WCM Policy, wcsophistication, doawcf, icp, arsophistication, lqdty, acp, stockout

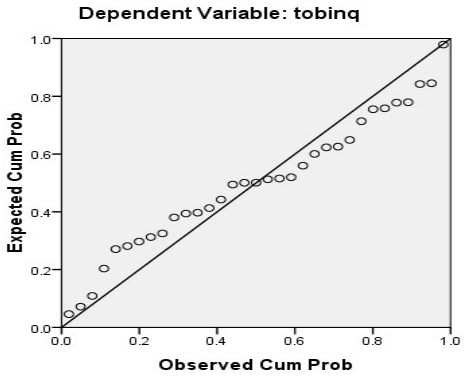
b. Dependent Variable: tobinq

Coefficients[a]

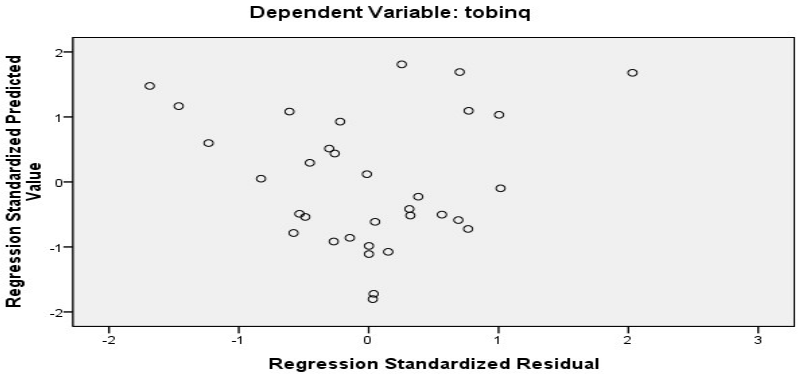
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-1.699	2.825		-.601	.555					
	WCM Policy	.379	.231	.393	1.643	.118	.412	.361	.276	.494	2.024
	WCM Strategy	-.283	.283	-.232	-1.001	.330	.107	-.230	-.168	.529	1.889
	WCM Financing Strategy	.271	.319	.233	.849	.407	-.264	.196	.143	.375	2.663
	arsophistication	-.686	.300	-.825	-2.288	.034	-.506	-.475	-.385	.218	4.586
	apsophistication	.305	.265	.313	1.149	.266	-.005	.261	.193	.383	2.612
	invsophistication	.336	.326	.325	1.031	.316	-.209	.236	.173	.285	3.506
	lqdty	-.028	.116	-.094	-.241	.813	.263	-.057	-.040	.187	5.343
	stockout	.128	.185	.341	.689	.499	.069	.160	.116	.116	8.652
	wcsophistication	.144	.680	.093	.212	.834	.273	.050	.036	.149	6.732
	docwcm	-.019	.094	-.079	-.205	.840	-.211	-.048	-.034	.192	5.215
	doawcf	.744	.827	.236	.901	.380	-.083	.208	.152	.414	2.418
	icp	.000	.001	.057	.201	.843	-.100	.047	.034	.357	2.798
	acp	.000	.001	.123	.262	.796	-.118	.062	.044	.129	7.749
	cr	.131	.104	.324	1.258	.225	.200	.284	.212	.425	2.350

a. Dependent Variable: tobinq

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (E1): Pharmaceuticals & Chemicals Sector, Business Competitiveness Measured by roa

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.686[a]	.471	-.250	.08629

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

b. Dependent Variable: roa1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.073	15	.005	.653	.782[a]
	Residual	.082	11	.007		
	Total	.155	26			

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

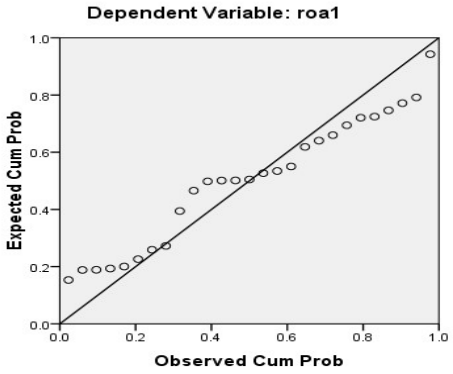
b. Dependent Variable: roa1

Coefficients[a]

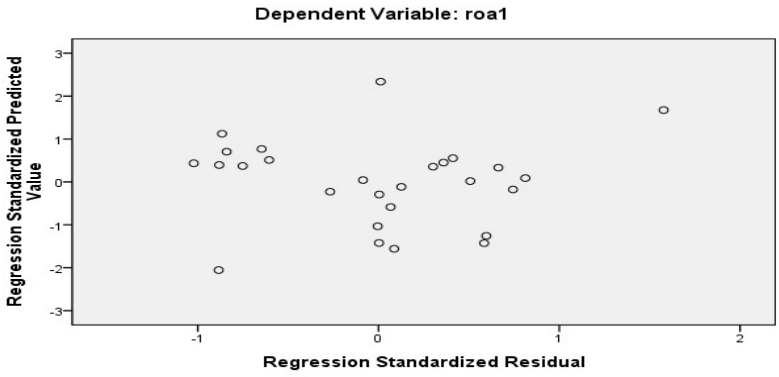
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.092	.409		-.225	.826					
	WCM Policy	-.002	.087	-.014	-.025	.980	-.008	-.008	-.005	.156	6.422
	WCM Strategy	-.017	.050	-.115	-.337	.742	-.136	-.101	-.074	.412	2.425
	WCM Financing Strategy	-.009	.040	-.094	-.235	.818	-.296	-.071	-.052	.303	3.301
	arsophistication	-.012	.035	-.153	-.342	.739	-.414	-.102	-.075	.241	4.156
	apsophistication	.032	.035	.415	.922	.376	-.105	.268	.202	.238	4.210
	invsophistication	.006	.053	.057	.122	.905	-.166	.037	.027	.221	4.534
	cshsophisticatio	.028	.028	.406	.985	.346	-.024	.285	.216	.284	3.525
	lqdty	.018	.016	.544	1.135	.280	.255	.324	.249	.209	4.774
	stockout	.020	.020	.431	.998	.340	.003	.288	.219	.258	3.876
	wcsophistication	-.114	.082	-.745	-1.393	.191	-.086	-.387	-.305	.168	5.954
	docwcm	-.006	.020	-.088	-.328	.749	-.108	-.098	-.072	.663	1.508
	doawcf	.047	.148	.123	.314	.759	-.088	.094	.069	.316	3.168
	icp	-3.941E-5	.000	-.145	-.467	.649	-.094	-.139	-.102	.497	2.013
	acp	.000	.000	-.356	-.974	.351	-.281	-.282	-.214	.360	2.775
	cr	.010	.009	.350	1.080	.303	.316	.310	.237	.459	2.181

a. Dependent Variable: roa1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (E2): Pharmaceuticals & Chemicals Sector, Business Competitiveness Measured by npm

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.804[a]	.646	.163	.10419

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

b. Dependent Variable: npm1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.218	15	.015	1.338	.318[a]
	Residual	.119	11	.011		
	Total	.337	26			

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

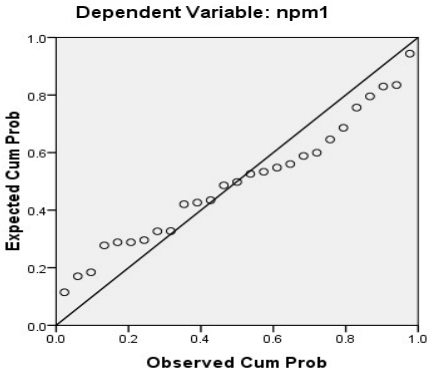
b. Dependent Variable: npm1

Coefficients[a]

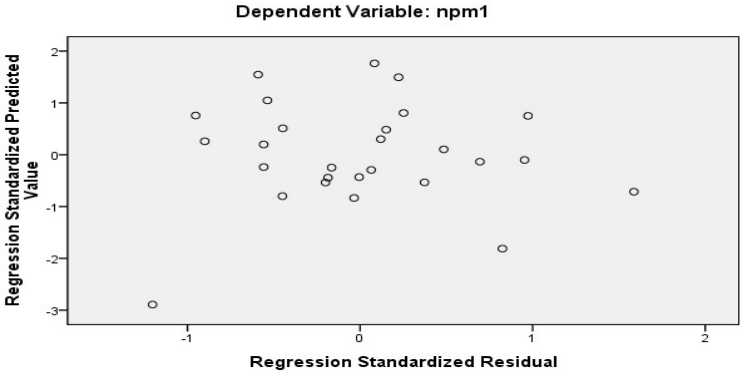
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.310	.494		.627	.543					
	WCM Policy	-.021	.105	-.090	-.198	.847	.021	-.060	-.036	.156	6.422
	WCM Strategy	-.048	.061	-.220	-.787	.448	-.244	-.231	-.141	.412	2.425
	WCM Financing Strategy	-.044	.049	-.297	-.912	.381	-.278	-.265	-.164	.303	3.301
	arsophistication	-.031	.042	-.271	-.740	.475	-.356	-.218	-.133	.241	4.156
	apsophistication	.054	.043	.466	1.265	.232	.114	.356	.227	.238	4.210
	invsophistication	-.024	.064	-.144	-.377	.714	-.257	-.113	-.068	.221	4.534
	cshsophisticatio	.018	.034	.181	.537	.602	.121	.160	.096	.284	3.525
	lqdty	.001	.019	.028	.072	.944	.037	.022	.013	.209	4.774
	stockout	.011	.024	.168	.475	.644	.132	.142	.085	.258	3.876
	wcsophistication	-.054	.098	-.241	-.551	.593	-.027	-.164	-.099	.168	5.954
	docwcm	.018	.024	.165	.747	.471	.280	.220	.134	.663	1.508
	doawcf	-.185	.179	-.330	-1.033	.324	-.431	-.297	-.185	.316	3.168
	icp	6.761E-7	.000	.002	.007	.995	.035	.002	.001	.497	2.013
	acp	.000	.000	-.365	-1.221	.248	-.078	-.345	-.219	.360	2.775
	cr	.005	.011	.130	.491	.633	.437	.147	.088	.459	2.181

a. Dependent Variable: npm1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (E3): Pharmaceuticals & Chemicals Sector, Business Competitiveness Measured by α

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.898[a]	.807	.543	.65222

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

b. Dependent Variable: alpha

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.542	15	1.303	3.063	.034[a]
	Residual	4.679	11	.425		
	Total	24.222	26			

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

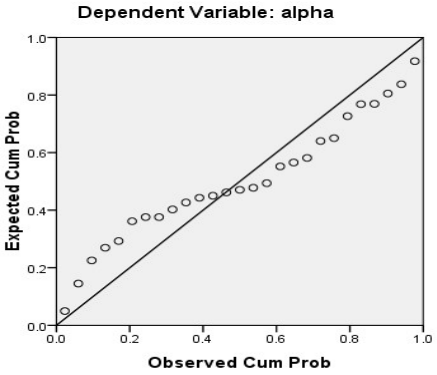
b. Dependent Variable: alpha

Coefficients[a]

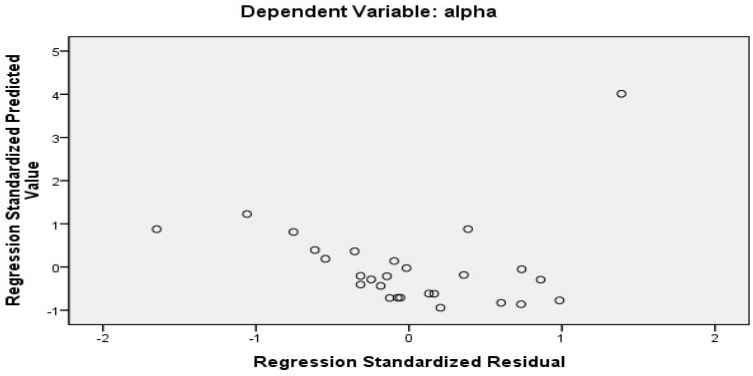
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-3.877	3.090		-1.255	.236					
	WCM Policy	.075	.659	.038	.113	.912	.324	.034	.015	.156	6.422
	WCM Strategy	1.068	.379	.582	2.819	.017	.426	.648	.374	.412	2.425
	WCM Financing Strategy	.618	.304	.489	2.033	.067	.222	.523	.269	.303	3.301
	arsophistication	-.219	.264	-.225	-.831	.423	.210	-.243	-.110	.241	4.156
	apsophistication	-.492	.266	-.502	-1.847	.092	-.043	-.487	-.245	.238	4.210
	invsophistication	.915	.402	.642	2.276	.044	.251	.566	.302	.221	4.534
	cshsophisticatio	.070	.211	.082	.330	.748	-.021	.099	.044	.284	3.525
	lqdty	.106	.120	.255	.880	.398	.301	.256	.117	.209	4.774
	stockout	-.230	.149	-.404	-1.549	.150	-.493	-.423	-.205	.258	3.876
	wcsophistication	.621	.616	.326	1.007	.335	.061	.291	.134	.168	5.954
	docwcm	.031	.148	.034	.207	.839	-.157	.062	.027	.663	1.508
	doawcf	-1.264	1.121	-.266	-1.128	.283	-.004	-.322	-.149	.316	3.168
	icp	.000	.001	-.031	-.166	.871	-.131	-.050	-.022	.497	2.013
	acp	.000	.002	-.020	-.092	.929	-.155	-.028	-.012	.360	2.775
	cr	-.026	.067	-.077	-.393	.702	-.063	-.118	-.052	.459	2.181

a. Dependent Variable: alpha

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (E4): Pharmaceuticals & Chemicals Sector, Business Competitiveness Measured by β

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.628[a]	.394	-.432	1.13377

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

b. Dependent Variable: beta

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.207	15	.614	.478	.908[a]
	Residual	14.140	11	1.285		
	Total	23.347	26			

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

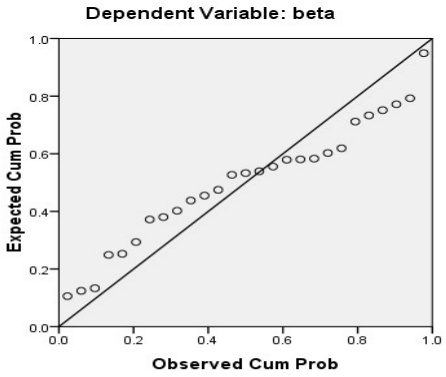
b. Dependent Variable: beta

Coefficients[a]

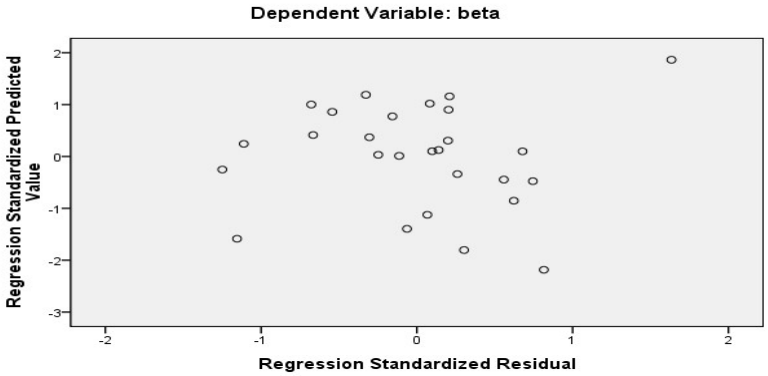
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.441	5.371		.641	.535					
	WCM Policy	.561	1.145	.291	.490	.634	.026	.146	.115	.156	6.422
	WCM Strategy	-.345	.659	-.191	-.524	.611	.084	-.156	-.123	.412	2.425
	WCM Financing Strategy	.280	.529	.226	.529	.607	.296	.158	.124	.303	3.301
	arsophistication	.204	.458	.213	.445	.665	-.105	.133	.104	.241	4.156
	apsophistication	-.493	.463	-.513	-1.065	.310	-.080	-.306	-.250	.238	4.210
	invsophistication	-.881	.698	-.630	-1.261	.233	-.433	-.355	-.296	.221	4.534
	cshsophisticatio	-.017	.367	-.021	-.047	.964	.007	-.014	-.011	.284	3.525
	lqdty	-.016	.209	-.040	-.078	.939	-.060	-.024	-.018	.209	4.774
	stockout	-.063	.258	-.112	-.243	.812	-.030	-.073	-.057	.258	3.876
	wcsophistication	.375	1.071	.201	.350	.733	-.220	.105	.082	.168	5.954
	docwcm	.261	.257	.293	1.016	.331	.188	.293	.238	.663	1.508
	doawcf	1.649	1.949	.353	.846	.415	-.188	.247	.199	.316	3.168
	icp	-9.526E-5	.001	-.029	-.086	.933	.159	-.026	-.020	.497	2.013
	acp	.001	.003	.155	.396	.700	.133	.119	.093	.360	2.775
	cr	.120	.117	.355	1.025	.327	.220	.295	.241	.459	2.181

a. Dependent Variable: beta

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (E5): Pharmaceuticals & Chemicals Sector, Business Competitiveness Measured by q

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.660	.198	3.10359

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

b. Dependent Variable: tobinq

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	206.128	15	13.742	1.427	.279[a]
	Residual	105.955	11	9.632		
	Total	312.083	26			

a. Predictors: (Constant), cr, WCM Strategy, stockout, icp, acp, arsophistication, docwcm, invsophistication, apsophistication, cshsophisticatio, lqdty, doawcf, WCM Financing Strategy, wcsophistication, WCM Policy

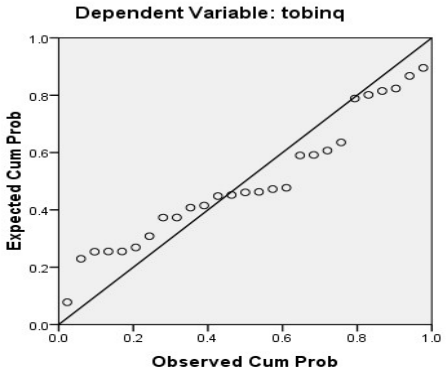
b. Dependent Variable: tobinq

Coefficients[a]

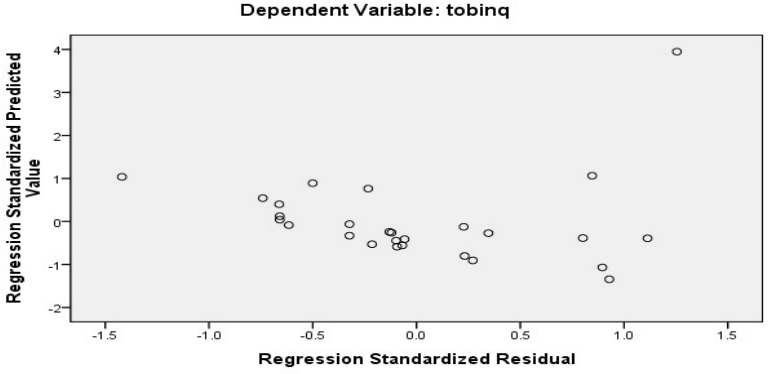
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	5.301	14.702		.361	.725					
	WCM Policy	2.399	3.134	.341	.765	.460	-.219	.225	.134	.156	6.422
	WCM Strategy	.421	1.803	.064	.233	.820	.092	.070	.041	.412	2.425
	WCM Financing Strategy	-2.859	1.447	-.631	-1.976	.074	-.280	-.512	-.347	.303	3.301
	arsophistication	2.368	1.254	.676	1.888	.086	.124	.495	.332	.241	4.156
	apsophistication	-.976	1.267	-.278	-.770	.457	-.187	-.226	-.135	.238	4.210
	invsophistication	-2.886	1.912	-.565	-1.509	.159	.133	-.414	-.265	.221	4.534
	cshsophisticatio	.241	1.005	.079	.239	.815	-.128	.072	.042	.284	3.525
	lqdty	.163	.572	.110	.285	.781	.218	.086	.050	.209	4.774
	stockout	-.408	.707	-.200	-.577	.575	-.100	-.171	-.101	.258	3.876
	wcsophistication	-.827	2.933	-.121	-.282	.783	.074	-.085	-.050	.168	5.954
	docwcm	.263	.703	.081	.374	.716	-.123	.112	.066	.663	1.508
	doawcf	19.070	5.335	1.118	3.574	.004	.527	.733	.628	.316	3.168
	icp	.000	.003	-.036	-.145	.888	-.038	-.044	-.025	.497	2.013
	acp	.010	.009	.334	1.141	.278	-.181	.325	.200	.360	2.775
	cr	.575	.320	.466	1.797	.100	-.113	.476	.316	.459	2.181

a. Dependent Variable: tobinq

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (F1): Textile Sector, Business Competitiveness Measured by roa

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.747[a]	.559	.294	.03211

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

b. Dependent Variable: roa1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.033	15	.002	2.108	.048[a]
	Residual	.026	25	.001		
	Total	.058	40			

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

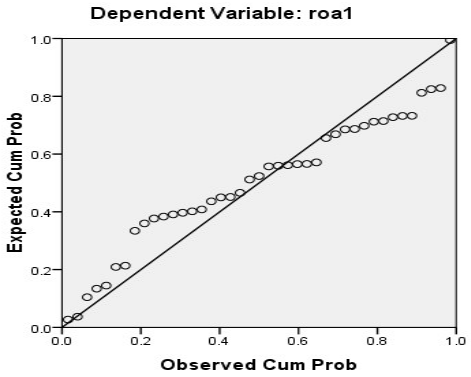
b. Dependent Variable: roa1

Coefficients[a]

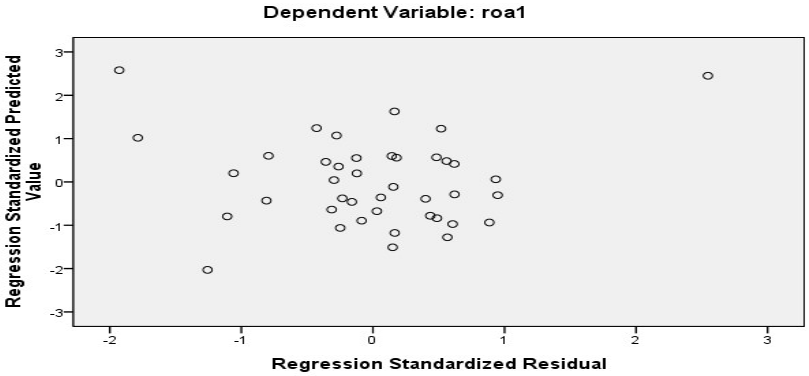
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.017	.110		.159	.875					
	WCM Policy	.002	.011	.027	.171	.866	.130	.034	.023	.687	1.455
	WCM Strategy	-.017	.012	-.250	-1.431	.165	.177	-.275	-.190	.577	1.732
	WCM Financing Strategy	.026	.013	.365	1.904	.068	.287	.356	.253	.479	2.086
	arsophistication	.006	.009	.121	.609	.548	-.046	.121	.081	.445	2.248
	apsophistication	.005	.007	.125	.744	.464	-.052	.147	.099	.622	1.608
	invsophistication	.000	.011	-.017	-.075	.941	.118	-.015	-.010	.342	2.920
	cshsophisticatio	-.010	.005	-.338	-2.031	.053	-.013	-.376	-.270	.637	1.570
	lqdty	.001	.004	.051	.242	.811	-.043	.048	.032	.397	2.520
	stockout	.005	.005	.240	1.016	.319	-.109	.199	.135	.315	3.170
	wcsophistication	-.008	.033	-.073	-.255	.801	-.116	-.051	-.034	.213	4.689
	docwcm	-.019	.008	-.513	-2.520	.018	-.181	-.450	-.335	.426	2.349
	doawcf	-.077	.056	-.356	-1.378	.181	-.493	-.266	-.183	.264	3.782
	icp	-2.574E-5	.000	-.079	-.470	.643	-.255	-.094	-.062	.617	1.620
	acp	.000	.000	.331	1.800	.084	.176	.339	.239	.523	1.911
	cr	.005	.004	.356	1.499	.146	.498	.287	.199	.314	3.188

a. Dependent Variable: roa1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (F2): Textile Sector, Business Competitiveness Measured by npm

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.716[a]	.513	.220	.54811

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

b. Dependent Variable: alpha

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.898	15	.527	1.753	.104[a]
	Residual	7.511	25	.300		
	Total	15.409	40			

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

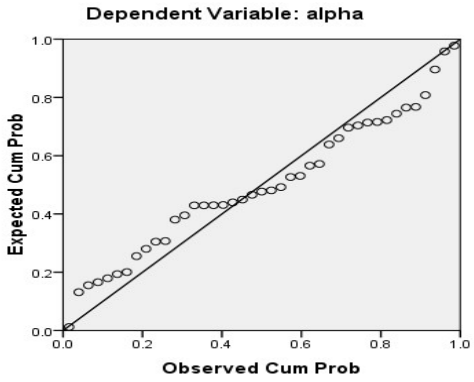
b. Dependent Variable: alpha

Coefficients[a]

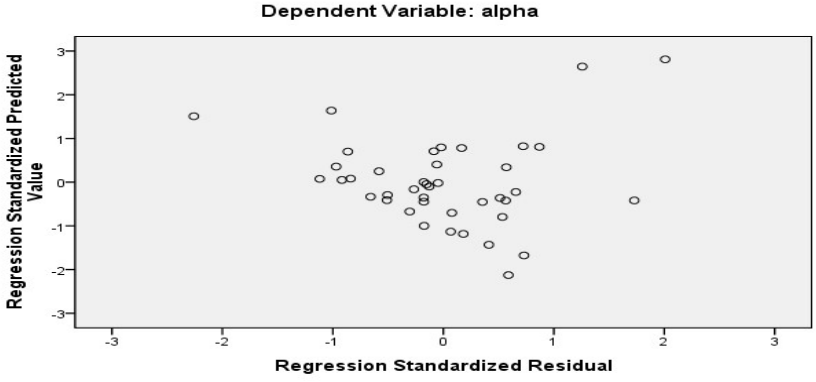
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.156	1.876		.083	.934					
	WCM Policy	.198	.193	.173	1.028	.314	.109	.201	.144	.687	1.455
	WCM Strategy	-.114	.200	-.104	-.568	.575	-.278	-.113	-.079	.577	1.732
	WCM Financing Strategy	.012	.230	.010	.051	.960	-.060	.010	.007	.479	2.086
	arsophistication	.168	.156	.225	1.076	.292	-.117	.210	.150	.445	2.248
	apsophistication	.087	.124	.125	.705	.488	.013	.140	.098	.622	1.608
	invsophistication	-.333	.188	-.423	-1.772	.089	-.379	-.334	-.247	.342	2.920
	cshsophisticatio	-.013	.088	-.026	-.148	.883	-.143	-.030	-.021	.637	1.570
	lqdty	.033	.070	.106	.478	.637	.051	.095	.067	.397	2.520
	stockout	-.073	.086	-.211	-.849	.404	.070	-.167	-.119	.315	3.170
	wcsophistication	.167	.566	.089	.294	.771	.056	.059	.041	.213	4.689
	docwcm	.078	.129	.129	.603	.552	-.056	.120	.084	.426	2.349
	doawcf	1.579	.952	.451	1.659	.110	.441	.315	.232	.264	3.782
	icp	.000	.001	-.098	-.551	.587	-.126	-.109	-.077	.617	1.620
	acp	-.003	.002	-.393	-2.036	.052	-.404	-.377	-.284	.523	1.911
	cr	.080	.061	.325	1.305	.204	-.099	.253	.182	.314	3.188

a. Dependent Variable: alpha

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (F3): Textile Sector, Business Competitiveness Measured by α

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.763[a]	.582	.331	.04994

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

b. Dependent Variable: npm1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.087	15	.006	2.321	.030[a]
	Residual	.062	25	.002		
	Total	.149	40			

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

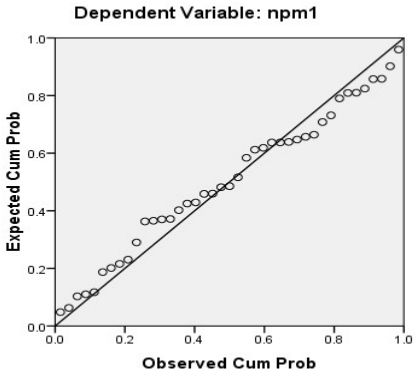
b. Dependent Variable: npm1

Coefficients[a]

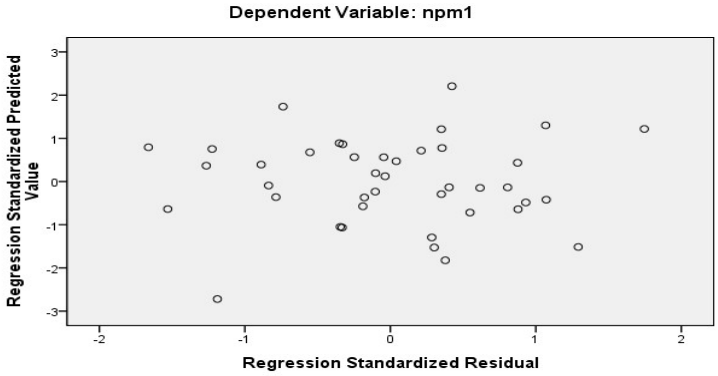
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.282	.171		1.651	.111					
	WCM Policy	.008	.018	.070	.446	.660	.085	.089	.058	.687	1.455
	WCM Strategy	-.002	.018	-.016	-.097	.924	.355	-.019	-.013	.577	1.732
	WCM Financing Strategy	.034	.021	.299	1.601	.122	.341	.305	.207	.479	2.086
	arsophistication	.016	.014	.219	1.131	.269	.095	.221	.146	.445	2.248
	apsophistication	-.005	.011	-.074	-.451	.656	-.074	-.090	-.058	.622	1.608
	invsophistication	-.002	.017	-.023	-.104	.918	.158	-.021	-.013	.342	2.920
	cshsophisticatio	-.015	.008	-.298	-1.838	.078	.033	-.345	-.238	.637	1.570
	lqdty	.005	.006	.150	.729	.473	-.183	.144	.094	.397	2.520
	stockout	.010	.008	.279	1.213	.236	-.163	.236	.157	.315	3.170
	wcsophistication	-.076	.052	-.415	-1.481	.151	-.296	-.284	-.191	.213	4.689
	docwcm	-.016	.012	-.272	-1.373	.182	.007	-.265	-.178	.426	2.349
	doawcf	-.208	.087	-.602	-2.393	.025	-.638	-.432	-.309	.264	3.782
	icp	-7.766E-5	.000	-.150	-.912	.371	-.116	-.179	-.118	.617	1.620
	acp	.000	.000	.323	1.808	.083	.251	.340	.234	.523	1.911
	cr	-.004	.006	-.151	-.655	.518	.417	-.130	-.085	.314	3.188

a. Dependent Variable: npm1

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (F4): Textile Sector, Business Competitiveness Measured by β

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.570[a]	.325	-.080	1.12191

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

b. Dependent Variable: beta

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.144	15	1.010	.802	.666[a]
	Residual	31.467	25	1.259		
	Total	46.612	40			

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

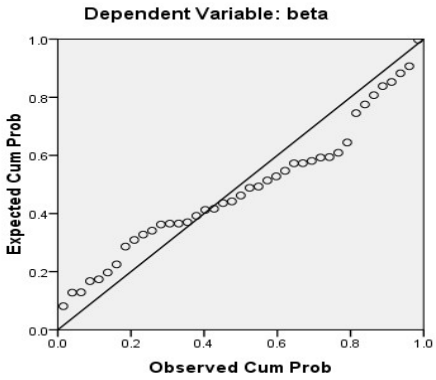
b. Dependent Variable: beta

Coefficients[a]

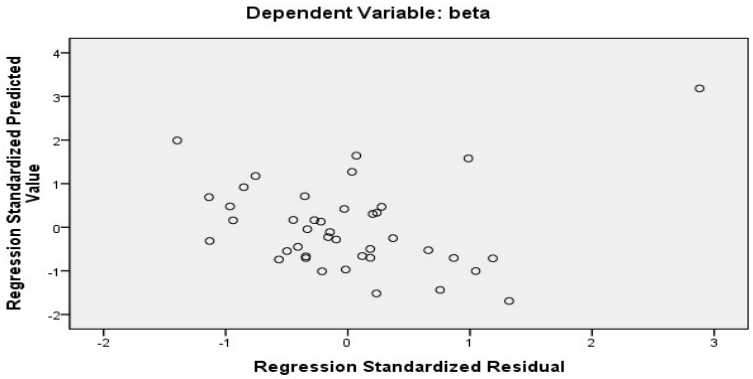
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.901	3.840		.495	.625					
	WCM Policy	.244	.395	.123	.618	.542	-.054	.123	.102	.687	1.455
	WCM Strategy	-.304	.409	-.161	-.743	.465	-.328	-.147	-.122	.577	1.732
	WCM Financing Strategy	.182	.472	.092	.386	.703	-.158	.077	.063	.479	2.086
	arsophistication	.003	.320	.002	.008	.994	-.069	.002	.001	.445	2.248
	apsophistication	-.369	.253	-.304	-1.457	.158	-.235	-.280	-.239	.622	1.608
	invsophistication	.236	.384	.173	.615	.544	-.053	.122	.101	.342	2.920
	cshsophisticatio	.020	.180	.023	.113	.911	-.110	.023	.019	.637	1.570
	lqdty	.128	.142	.235	.900	.377	.167	.177	.148	.397	2.520
	stockout	-.046	.177	-.077	-.262	.795	.026	-.052	-.043	.315	3.170
	wcsophistication	-.771	1.159	-.237	-.665	.512	.084	-.132	-.109	.213	4.689
	docwcm	-.024	.265	-.023	-.090	.929	-.077	-.018	-.015	.426	2.349
	doawcf	3.516	1.949	.577	1.804	.083	.394	.339	.296	.264	3.782
	icp	.000	.002	.013	.063	.950	-.074	.013	.010	.617	1.620
	acp	.000	.003	-.011	-.047	.963	-.145	-.009	-.008	.523	1.911
	cr	.052	.125	.122	.415	.682	-.110	.083	.068	.314	3.188

a. Dependent Variable: beta

Normal P-P Plot of Regression Standardized Residual



Scatterplot



Appendix VI (F5): Textile Sector, Business Competitiveness Measured by q

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.677[a]	.458	.132	.38914

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

b. Dependent Variable: tobinq

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.196	15	.213	1.407	.218[a]
	Residual	3.786	25	.151		
	Total	6.982	40			

a. Predictors: (Constant), cr, icp, arsophistication, lqdty, cshsophisticatio, WCM Policy, WCM Strategy, stockout, acp, apsophistication, WCM Financing Strategy, invsophistication, docwcm, doawcf, wcsophistication

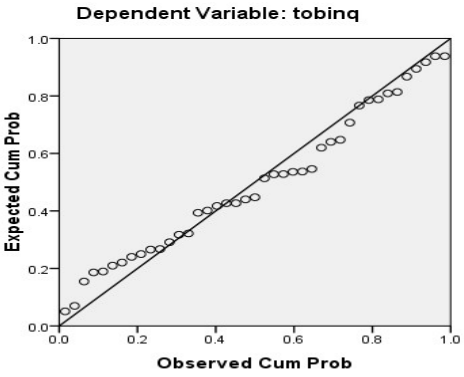
b. Dependent Variable: tobinq

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.398	1.332		1.801	.084					
	WCM Policy	.210	.137	.272	1.531	.138	.192	.293	.225	.687	1.455
	WCM Strategy	-.291	.142	-.398	-2.052	.051	-.253	-.380	-.302	.577	1.732
	WCM Financing Strategy	.365	.164	.475	2.231	.035	.102	.408	.329	.479	2.086
	arsophistication	.045	.111	.089	.404	.690	-.188	.081	.059	.445	2.248
	apsophistication	-.098	.088	-.209	-1.120	.273	-.232	-.219	-.165	.622	1.608
	invsophistication	.021	.133	.040	.158	.875	-.225	.032	.023	.342	2.920
	cshsophisticatio	-.138	.062	-.406	-2.202	.037	-.155	-.403	-.324	.637	1.570
	lqdty	-.012	.049	-.058	-.248	.806	-.206	-.050	-.037	.397	2.520
	stockout	.105	.061	.448	1.710	.100	.184	.324	.252	.315	3.170
	wcsophistication	-.580	.402	-.460	-1.442	.162	-.087	-.277	-.212	.213	4.689
	docwcm	-.112	.092	-.276	-1.222	.233	-.146	-.237	-.180	.426	2.349
	doawcf	.220	.676	.093	.326	.747	.122	.065	.048	.264	3.782
	icp	.000	.001	-.057	-.304	.764	-.190	-.061	-.045	.617	1.620
	acp	.002	.001	.312	1.531	.138	-.118	.293	.226	.523	1.911
	cr	-.023	.044	-.136	-.517	.610	-.079	-.103	-.076	.314	3.188

a. Dependent Variable: tobinq

Normal P-P Plot of Regression Standardized Residual



Scatterplot