EVALUATING LATE PAYMENT-INDUCED WASTE IN SOUTH AFRICA THROUGH LEAN CONSTRUCTION PRINCIPLES

By

Eric A. Akuffo-Ntow

Student No. 206042132

Submitted in partial fulfilment of the requirements for the Degree of Magister Scientiae in the Built Environment (Project Management) in the Faculty of Engineering, the Built Environment and Information Technology at the Nelson Mandela Metropolitan University

Supervisor: Professor Fanie Buys

January 2016

DECLARATION

I Eric Ayesu Akuffo – Ntow (206042132), hereby declare that the treatise "Evaluating Late Payment-Induced Waste in South Africa Through Lean Construction Principles for MSc in Built Environment (Project Management) is my own work and that it has not previously been submitted for assessment or completion of any post graduate qualification to another University or for another qualification.

EAAkuffo-Ntow

……..
Eric Ayesu Akuffo-Ntow

ABSTRACT

Central to the sustainable and competitive growth of the South African construction industry is a predictable cash flow through on time payment by clients to contractors. However, chronic late payments, a recurring problem in the industry, especially in the public sector, is bringing untold hardship to contractors by derailing their competitiveness and also eroding the trust among the supply chain partners to the extent that some firms end up closing business in the industry. The situation is viewed from the lean construction perspective as an obstacle that is preventing the accrual of the required value to project parties in the construction industry.

This research addresses the causes of late payments to contractors and the role of the quantity surveyor (QS) in terms of influencing early payment from a lean construction perspective. A mixed method approach was used for compiling the primary data for the study. Sequentially, one hundred and two (102) quantitative and twelve (12) interview questionnaires were administered to selected contractors and construction professionals working predominantly on public sector projects.

The findings revealed that the approval process for evaluation and certification by the client-appointed agent and intermediary institutions is taking longer than contractually allowed, with parties independently undertaking their evaluation prior to the certification date. This is found to be adverse to achieving consensus on the values of the works for authorisation. Other significant barriers are the lack of funds to authorise payment, random auditor general's documentation changes, lack of administrators' system integration and capacity to handle cyclical payment processing. Also, contractors have been found to be in default of timeously submitting complete claim documents.

It is therefore recommended that the client agents should partner with the contractor in regular design and documentation reviews, arranging the payment process and should also meet jointly to prepare monthly evaluations. In addition, contractors should be mentored from the onset of the project regarding all the necessary documentation and supporting documents that will be required by the client to ensure that payment approvals are not delayed. The payment authorisation agent's capacity should be enhanced through training and improved powers as a singular

point of control to perform efficiently and their systems and processes should be integrated to ensure that all parties are implementing the same protocols.

Keywords: Late payment, Lean construction, Quantity surveying

ACKNOWLEDGEMENTS

I would like to thank the following:

- Randcivils for their financial support to undertake this research;
- All respondents who took the time to complete the questionnaires;
- My friend, Prof. F. Emuze, family and landlady (Lynn) who have believed in me and supported me over my period of study; and
- My supervisor, Prof. F. Buys, for his enormous contribution towards the research.

TABLE OF CONTENTS

CHAPTER 3: RESEARCH METHODOLOGY

CHAPTER 4: ANALYSIS OF THE RESEARCH RESULTS

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Abbreviations

- **BoQ:** bills of quantities
- **CIDB:** Construction Industry Development Board
- **DPW:** Department of Public Works
- **MS:** mean score
- **NVAAs:** non-value adding activities
- **QS:** quantity surveyor
- **PMT:** programme management team

List of Figures

List of Tables

CHAPTER 1

THE PROBLEM AND SETTING

1.1 INTRODUCTION

Sustainable growth of the construction industry is one of the prerequisites for the continuous development of the South African economy (Construction Industry Development Board [CIDB], 2010: 2). Central to this prerequisite is a resourceful contractor base with adequate funds to honour the obligations required by stakeholders involved in the construction process (Aiyetan, Smallwood & Shakantu, 2011: 27). However, chronic late payments that negatively affect the development of a resourceful contractor base have been a recurring problem in the industry, especially in the public sector where payments for work done are mostly delayed (CIDB, 2010: 2-4). The CIDB notes that this practice is bringing untold hardship to contractors by derailing their competitiveness and also eroding the trust among the supply chain partners, to the extent that some firms end up closing their businesses in the industry. Even though legislation (CIDB, 2010: 4) and contractual obligations (Buys, 2006: 115-116) mandate clients to honour payment obligations within 30, 60 and 90 day notice, reports from the industry suggest that this is not the case. This practice has manifested in instances where contractors have had to lose discounts on materials that had already been purchased and in even worse cases, have found it difficult to pay their employees' wages (CIDB, 2004: 4).

McCabe (2010: 107-108) viewed this situation from the lean construction perspective as an obstacle that could prevent the accrual of the required value to project parties in the construction industry. The lean philosophy is an approach that considers a combination of lean principles in production management by focusing on project development from its conceptual phase until its final use with a view to maximising value (Ballard, 2008: 14). It is engineered towards eliminating non-value adding activities (NVAAs) in construction. Such activities that are otherwise called 'wastes' do not benefit the contractor or the client. Ballard (2008: 3) further asserts that if waste can be eliminated, better buildings can be designed and constructed for less than they would otherwise cost. From the lean construction perspective, waste that manifests owing to late payments to contractors is seen as a hindrance to efficient workflow and the precursor to cost overruns (Simonsson, Björnfot, Erikshammar & Olofsson, 2012: 36). This

research addresses the causes of late payments to contractors and the role of the quantity surveyor (QS) in terms of influencing early payment from a lean construction perspective.

1.2 RESEARCH PROBLEM

Late payment that seems to be the norm in South Africa engenders waste in construction. In effect, certain activities in contract administration require careful management in order to eliminate late payment-induced waste in construction.

1.3 SUB-PROBLEMS

1. On-site production experiences obstacles in construction.
2. Contractors often deviate from activity sequence and schedule.
3. Projects are marginalised by slow operational decision-making processes.

1.4 HYPHOTHESES

1. Delays in the release of funds to contractors lead to incessant disruptions in the flow of on-site production activities.
2. The non-availability of required funds results in deviation from activity sequence and schedule in construction.
3. Inconsistency in the release of project funds leads to slow operational decision-making processes that marginalise projects benefits.

1.5 DELIMITATIONS

The scope of the research encompasses the role that the QS can play in influencing early or timeous payment to contractors in South Africa. Emphasis will be placed on Port Elizabeth and East London public sector projects with a value not exceeding R250 million.

1.6 DEFINITION OF TERMS

- **Cash flow:** The movement of money in and out of the firm: in the construction industry it is known as interim and final payment certificates (Cunningham, 2013: 4).

- **Lean construction**: An approach that considers a combination of lean principles in production management by focusing on project development from its conceptual phase until its final use with a view to maximising value (Ballard, 2008: 14).

- **Non-value adding activities:** According to Koskela (1992), NVAAs can be defined as activities that take time, resources or space but do not add value.

- **Sustainable development:** Development that meets the needs of the present without compromising the ability of future generations, whilst achieving an effective or equitable balance between the financial, social and environmental choices during business activities (Ma, 2011: 14-15).

- **The supply chain:** This is a conduit for the network of flows, encompassing activities such as material supply, information supply, funds, stationery and human resource capital. (Forbes & Ahmed, 2011: 118).

1.7 OBJECTIVES OF THE RESEARCH

- To evaluate the bottlenecks that contribute to late payments in the South African construction industry;
- To establish the extent of the waste that eventuates due to late payment in the construction industry;
- To identify ways that the QS can influence early payment; and
- To recommend ways that will minimise late payments to contractors by clients.

1.8 IMPORTANCE OF THE STUDY

The significance of the research is to identify value-adding activities in the evaluation and certification of interim and final payment certificates for contractors. It will also identify the role of the QS in facilitating these processes. This study is significant since research that is

related to the causes of projects' cost and time overruns has identified payment issues as a prevalent contributor to poor performance. Late payment to the contractor plays a critical role in impeding the continuous flow of work: when the right resources are not available when required (Baloyi & Bekker, 2011: 55), it result in critical work being given less attention (McCabe, 2010: 108). When faced with payment delay issues, contractors then adopt strategies that often lead to deviation from scheduled works and the extension of project completion time (Hanid, Siriwardena & Koskela, 2011: 5). Based on the aforementioned, it is imperative to conduct this study so that lasting solutions can be found and proposed to the construction industry stakeholders.

1.9 ORGANISATION OF THE REMAINDER OF THE STUDY

The sustainable growth of contractors in the construction industry is hinged on securing enough funds to successfully complete their project on time. However, late payment from clients, especially public sector clients, has derailed their sustainability to the extent that some firms have been liquidated. Lean construction sees this as a 'waste' that can be eliminated through efficient and effective payment procedures 'workflow'. This study uses the lean construction philosophy to identify the causes of late payment and recommend possible ways to reduce late payment to contractors in order that stakeholders might reap the true benefit of their projects without time and cost overruns.

To achieve this research intent, this treatise is set out in five chapters. Chapter one deals with identifying the problem at stake with the hypotheses that will be later tested to determine the extent of the problem. The chapter also defines the objectives of the research and the benefit to be accrued if the research is undertaken. Chapter two deals with a review of literature pertaining to late payment and lean construction principles. The literature review discusses the existing data concerning late payment that defines the problem, and the use of lean construction principles in identifying the probable solutions to the problem. Chapter three sets out the methodology used in securing the data for the research, whilst chapter four is used to interpret the primary data collected from industry professionals. Finally, chapter five draws conclusions and makes recommendations for construction industry stakeholders and for future studies.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter introduced the research problems, and highlighted the importance of the current research. In this chapter, literature related to lean construction and delayed payment that was reviewed is presented in several sections. The chapter addresses lean construction principles that can be used to promote timely payment to contractors. An overview is provided of the literature surrounding these issues in a construction industry environment.

2.2 LEAN PROJECT DELIVERY SYSTEM

Although several elements such as quality, price and more subjective elements such as design must be managed to increase value, the concept of NVAAs reduction that forms a key principle in lean management has emerged as a robust intervention in the manufacturing industry (Meiling, Backlund & Johnson, 2012: 142). The intervention makes the relevance of the lean philosophy to value delivery to stakeholders a tool worth promoting in the construction industry. It is worth noting that even though lean philosophy began in the manufacturing environment, its application has proliferated into the construction environment, which is dynamic and project-based. Despite the difference in the production environment, the objective of 'lean thinking' remains the same: the improvement of processes with a view to removing wastes and optimising value for the benefit of customers or end-users (McCabe, 2010: 108).

According to Smith, Mossman and Emmitt (2011: 3), after World War II, Eiji Toyoda visited the Ford motor manufacturing plants in the United States of America (USA) in 1950 and returned with a mission to extend Toyota's impact globally by taking on the super manufacturers of the day, such as Ford. Toyoda maintained that using the American system of manufacturing methods, with an output of 700 cars per day which was considered to be the world's most efficient rate of production, would be better than Toyota's production of 15 cars per day at the time (Forbes & Ahmed, 2011: 47). Toyota needed to take the best from Ford's mass production and adapt it to achieve high quality, low cost, and flexible outputs. Liker (2004) cited in Smith, Mossman and Emmitt (2011: 3) and Forbes and Ahmed, (2011: 47-48)

assert that Toyoda realised that the best way to accomplish this was to remove waste such as overproducing, idle time, transporting, processing, inventory, operator motion and producing defective goods from their production stream. Toyoda implemented the strategy of waste removal by involving all participants in a new philosophy of avoiding waste of any type without the introduction of a new technology. Good results were achieved to the extent that real time for car manufacturing was reduced from 15 days to one day per car (Forbes & Ahmed, 2011: 49).

Today, the principles of what became the Toyota Production System (TPS) that provided a competitive advantage through outstanding levels of production that yielded high quality outputs at a lower cost, give stakeholders consistent goal achievement in terms of cost reduction (Forbes & Ahmed, 2011: 49). These principles, known widely as 'lean production', have facilitated developing leaner ways to design and build capital projects efficiently in the built environment (Smith et al, 2011: 3).

2.3 LEAN CONSTRUCTION

The Construction Industry Institute (CII), cited in Forbes and Ahmed (2011: 45), has defined lean construction as "…the continuous process of eliminating waste, meeting or exceeding all customer requirements, focusing on the entire value stream and pursuing perfection in the execution of a construction project". According to McCabe (2010: 107) and Forbes and Ahmed (2011: 18-19), lean construction is a management approach that aims to develop methods of working that are both sensible and logical, but which are not imposed by senior managers and stakeholders who believe their view of rationality is unquestionable. The lean construction method looks at the overall process to establish the interdependency of activities in order to identify obstacles and blockages impeding flow so as to synchronise activities, in pulling the product from inception, through design, to production, so that it meets end user expectations and creates the expected value for complex, uncertain and quick projects (Forbes & Ahmed, 2011: 18-19; McCabe, 2010: 107). The principles of lean construction provide the necessary tools that focus on managing flows in the construction process, reducing flow variations from the schedule and using buffers to limit the impacts of any remaining variability in these flows (Forbes & Ahmed, 2011: 54).

In doing so when delivering a construction project, various activities are encountered in the supply chain which have built-in wastages. According to Ma (2011: 127), these wastes are part of the daily work hassles, either in the office or on the construction site, and their impact is substantial on the financial, social and environmental elements of sustainability. The threshold of lean construction is based on the premise of conducting business or delivering projects with the objective of maximising value and minimising waste, with the use of four process levels or the 14 principles as defined in Liker's *The Toyota Way* (Forbes & Ahmed, 2011: 51). On-time payment can be seen as bringing value to contractors within the construction delivery stream by playing a pivotal role as a lubricant to make sure that the right resources are available at the right time and in the right quantity. Furthermore, it ensures that works will be executed at the right time to meet the clients' expected time(s) and that the contractors' resources are released for other projects. This will assist in eliminating waste that will be incurred by the loss of additional funds by the contractor through salaries and material cost escalation for the works completed at an extended date. The client, on the other hand, will save on the costs incurred in securing alternative placement in the case of accommodation or loss of rental income from contracted or potential clients.

The process levels with their relative principles are shown in Table 2.1. In applying the lean construction principles shown in Table 2.1, success has been seen with forms of contracts that reward cooperation and collaboration between the parties that are actively involved in delivering design and construction: office construction costs have been reduced by 25 per cent within 18 months whilst schematic design time has been reduced from 12 to 11 weeks (Forbes & Ahmed, 2011: 18-19). This reinforces the contention of Ma (2011: 15) that lean construction principles could engender the attainment of sustainability through the effective management of economic, social and environmental considerations. Koskela (1992: 85) attributed the prominence of NVAAs to three root causes: design, ignorance and the nature of production.

Table 2.1: Lean principles

	Process level	Principles
1	Problem solving (continuous improvement and learning)	Continual organisational learning View the situation first to thoroughly understand it Make decisions slowly by consensus – consider all options: Implement rapidly
2	People and partners (respect challenges and grow them)	Grow leaders who live the philosophy – respect, develop, and challenge and create teams Respect, challenge and help suppliers
3	Process (eliminate waste)	Create process 'flow' to reveal problems Use pull system to avoid over production Level out workload Stop when there is a quality problem Standardise tasks for continuous improvement Use visual control – transparency Use only reliable, tested technology
4	Philosophy (long-term thinking)	Base management decision on a long-term philosophy, even at the expense of short-term financial goals

Source: Liker, 2004: 51

The lean construction principles as shown in Table 2.1 promote certain heuristic principles. These principles include the following (Forbes & Ahmed, 2011: 54):

- NVAAs can be reduced by identification, measurement, and redesign;
- Output value can be improved by identifying the supplier and customer for each activity and clarifying customers' value needs;
- Variability of construction activity duration increases the relative volume of NVAAs. The adoption of procedures can streamline both conversion and flow processes;

- Process control requires measurement and designated controlling authority; that authority may be cross-functional process owners or self-directed teams. Team building and cooperation with suppliers are proposed for optimising total flow when multiple organisations are involved; and
- Flow improvement and conversion improvement should be considered above complex production processes; improvement of flow (NVAAs) has a higher payback than seeking technology-based enhancement to conversion activities.

In implementing the aforementioned principles based on the concept of reducing hierarchical layers of construction management, field-based actors will be empowered in the construction process to optimise the allocation of available resources in planning, scheduling and the execution of work more efficiently. The enormous amount of waste in the flow activities are of such magnitude that role players become demoralised through meaningless bureaucratic activities in their efforts to implement innovation (Ma, 2011: 117-120). On the economics side of construction, the financial obligations of the organisation that include managing working capital, cash flow and attaining suitable profits of construction firms have deteriorated (Ma, 2011: 16-17). This has been attributed to poor management practices (NVAAs) related to design, procurement, material handling time, operations and safety (Forbes & Ahmed, 2011: 5).

Considering the success that could be harnessed through lean construction principles in eliminating wastes, the aforementioned NVAAs could belong to the past. According to Forbes and Ahmed (2011: 57), the benefits that are envisaged to be achieved in the use of lean construction principles include, among others, the following:

- Lower cost in project execution;
- Fewer delays during project execution;
- Eliminating the presence of uncertainty in planning to cost administration;
- Less waste by ensuring that activities progress as planned with minimal or no delays;
- More efficient buildings/facilities through the use of quality materials and construction systems at the first instance; and
- Higher user satisfaction.

In addition to the aforementioned benefits, the adaptation to lean construction principles will unearth better short-term planning, flexibility and controls that improve the timely completion of job tasks, reducing the variability of work output that tends to happen with traditional project management methods. This will ensure that workflow between crews is without interruption, and is well enhanced through cooperation (Forbes & Ahmed, 2011: 59).

2.4 LATE PAYMENT

Judi and Rashid (2010: 68) define payment as "…the consideration to the contractor, in terms of money, for the work that a contractor has carried out in accordance with the contract plus the materials delivered to site". Seeing that "cash flow" (CIDB, 2010: 2-4) has been considered as the very life-blood of all enterprises for a successful project delivery, most construction contracts incorporate two main stages of payments to the contractor, namely interim and final payments (Judi & Rashid, 2010: 69). The purpose of the interim payment is to ensure that the contractor is regularly paid throughout the progress of the work and thus any deficit payment down the supply chain which may affect the smooth running of the project is minimised.

The predominant standard form of construction contracts used in South Africa, namely the Joint Building Contracts Committee (JBCC), the General Conditions of Contract for Construction 2004 (GCC) and the International Federation of Consulting Engineers 1999 (FIDIC), contain provisions for payments to be made against interim certificates issued periodically by the architects, superintending officer (SO), the client's representative or contract administrator as the case may be (CIDB, 2004: 3-4). The provisions give the contractor the right to be paid upon the issuance of the interim certificate and compel the employer to pay the contractor the certified amount within a stipulated time. In other words, the employer must pay the contractor the right amount at the right time (Judi & Rashid, 2010: 72). However, some construction clients have not strictly adhered to these provisions. Mthi, Emuze and Shakantu (2012: 5) observe from a study that was conducted among contractors that certain construction clients intentionally delay payment to their contractors. If this is found to be true, it is at variance with the law governing contracts in South Africa.

As Baloyi and Bekker (2011: 55) maintained, "If South Africa's surviving emerging construction companies were a patient, the ambience in the hospital ward would be intensely uptight because construction clients tend to delay payment, a situation made worse by the global financial crisis" (Jacks, 2012). Jacks (2012) of Fin24 reports that a reputable construction company listed on the Johannesburg Stock Exchange (JSE) filed for liquidation because the firm is owed millions of rand by the Free State and Limpopo provinces. This insolvency then led to the sacking of almost 2500 employees in the firm.

In the supply chain of construction products such as houses, shopping complexes, and public infrastructure and amenities, constant cash flow is a necessary lubricant in ensuring that the parties achieve their intended goals. According to AlSehaimi and Koskela (2008: 99), 'financial issues' are ranked third among other factors that lead to delays in construction project delivery. This is reinforced by Baloyi and Bekker (2011: 55), who argue that one of the causes of construction cost and time overruns in South Africa is late payment to contractors by clients. Assaf and Al-Hajji (2006: 356) observe that financial problems could act as a barrier to early project completion because of contractors' inability to access enough capital to undertake the job at hand. Often clients who are the source of project finance may be silent when they fail to provide the needed finance as planned (CIDB, 2010: 2-4). Most importantly, Hanid, Siriwardena and Koskela, (2011: 5) assert that in certain situations, contractors should not always be held accountable for project failures in terms of late delivery, but rather clients' consistent late payments may encourage contractors to act negatively because of the resultant cash flow problems. Koskela (2002), cited in AlSehaimi and Koskela (2008: 103), also realised that in delivering full value to the customer, there has to be transformation of efficient value-adding activities. One such activity to be transformed is late payment to the contractor.

2.5 QUANTITY SURVEYORS AND LEAN CONSTRUCTION TOOLS

Kenley (2003: 3) suggests that improved cash flow enhances the profitability of contractors' project delivery, which could potentially lead to reduced costs to clients through improved contractor performance. This will imply that QSs' involvement must go beyond a re-active service, to include a service that takes the following aspects of value into account (Verster, 2006: 3):

- Real quality: cost effective but with specifications that fit the purpose;

- Durability: taking life-cycle costs and whole-life costs into account;
- Design: design-to-cost, cost design and appearance;
- Affordability: budget and returns are important; and
- Timelessness: short-term fashions as opposed to design that will withstand the pressures of current whims.

The QS with financial and cost management skills is well positioned to play an integral role in ensuring that clients actually consider all value- and cost-related aspects of construction, as well as design specification and development options in their endeavours (Verster, 2006: 4). One such consideration is the effect of late payment on project delivery. The QS plays an integral role in the processes involved in payment to the contractor. The role begins with the preparation of accurate cost estimates at the various project development stages. The estimate forms the foundation for eliminating some of the root causes of late payment to the contractor when the client has not been able to secure additional finance, a precursor for non-excusable delays to a project (Ibironke, Oladinrin, Adeniyi & Eboreime, 2013: 10).

2.6 PAYMENT CYCLE: A SOUTH AFRICAN ILLUSTRATION

Construction contracts have project specific data requirements that may or may not be an amendment to the standard provisions of the contract in relation to payment to the contractor. However, the CIDB (2009: 1) notes that payment processes for most of the construction contracts go through three phases, namely certification, authorisation and processing between the contractor and the client and/or its agent. Payment certification is the evaluation of works and preparation of certificates, which is normally undertaken by the employer's agent (services manager, engineer, project manager) or representative (works inspector, project manager). Service and supply contracts make provision for monthly payments based on the value of the services or goods provided. Engineering and construction works contracts make provision for interim payments (commonly on a monthly basis) for works executed in terms of the contract. Each form of contract contains specific provisions for the procedures associated with the initiation and processing of payments (CIDB, 2009: 3).

On the date of periodic monetary evaluation of the progress of the works, the contractor's QS generates an invoice of claim based on the prices provided in the contract of the services or

works completed or goods supplied. The claim invoice with accompanying supporting information is then sent to the client's QS, or its appointed agent, for review of its correctness for payment. The correct amount due is certified and sent back to the contractor as a certificate of payment for invoicing by the contractor (CIDB, 2009: 5-6). Except for the final certificate, all payment certificates in construction work contracts are interim certificates as any errors or oversights in one certificate can be rectified in the next certificate (CIDB, 2009: 7). Upon receiving the certified invoice from the contractor, the employer's agent or contract administrator, hence the QS, confirms that the contractor is due the amount shown in the payment certificate in terms of the contract (CIDB, 2009: 7). Payment authorisation thus confirms that the amount payable is within the amount authorised for the contract, in terms of the employer's financial management system; the necessary paperwork for the payment has been completed; all the attachments to the claim for payment have been provided; the VAT invoices, if relevant, are valid; the payment claim is certified, and the expenditure incurred is within the approved transaction amount for the contract (CIDB, 2009: 7).

The authorised person (QS) from the client's side is usually responsible for performing a quality assurance check on the completeness of the documentation that is submitted for payment by the contractor. The quality assurance check involves the following (CIDB, 2009: 9):

- A comparison of the projected final contract amount with the approved transaction amount, to know whether the authorised amount, if the amount paid to date, is within the approved transaction amount.
- Where the projected final contract amount is expected to exceed the approved transaction amount, the person responsible for authorising payment needs to either obtain timeous authority to exceed this amount so as to avoid interest on late payments, or alternatively the scope of the works, services or supplies need to be reduced to keep expenditure within the approved transaction amount

Payments that have been authorised need to be released by the employer into the contractor's bank account, either through a non-transferable cheque or an electronic bank transfer. Procedures need to be put in place to write out the cheque or to upload the payment particulars on an electronic transfer system. Such procedures need to show that the details of the payee and the amount are correct and the release of the payments needs to be signed or authorised

(CIDB, 2009: 9). Consideration should also be given to releasing payments on a given day. This enables the process to be managed. For example, if payment is released on the 28th day of the month and payment is in terms of the NEC3 Engineering and Construction Contract, the project manager must assess the work by the 7th of the month and certify payment by the 14th of the month, while the person responsible for authorising payment needs to do so by the 21st of the month to allow seven (7) days for processing, so that payment can be released on the 28th of the month (CIDB, 2009: 9). However, the illustrated cycle is beset with a number of challenges that the CIDB acknowledges. Such challenges include long periods for the completion of the payment cycle; double-handling of certain authorisation actions; limited delegations to authorise payments; financial systems are often being off-line; lack of systems integration resulting in double capturing of the same information during different stages of payment or contract management, and lack of capacity within the delivery chain processes included in the payment cycle.

2.7 REMEDIES FROM THE LEAN CONSTRUCTION PERSPECTIVE

According to Forbes and Ahmed (2011: 66), the aforementioned challenges can, however, be mitigated by thinking lean in terms of the following:

- Creating process flow to reveal problems: Identify collaboration among parties to secure best decisions quickly that will identify and implement solutions that are best for the overall project, as opposed to meeting only the self-interest of specific team members.
- Standardising tasks for continuous improvement: Assessments have to be made at intervals that provide actionable information, discovering deficiencies in aligning to the project goals of quality goods at economical cost in real time.
- Using the pull system to avoid over production or waste: The focus is on stakeholders' common objectives in committing to collaboration and streamlining processes, in order to secure project success.

This is necessary as various activities that have inherent wastages are encountered in the supply chain when delivering a construction project. However, the deployment of lean construction in the context of this study can be considered through an appropriate process level to be adopted will eliminate waste. According to Forbes and Ahmed (2011: 66), these process levels are to:

- create process flow to reveal problems;

- use pull systems to avoid over-production;
- level out workload;
- stop when there is a quality problem;
- standardise tasks for continuous improvement;
- use visual control–transparency; and
- use only reliable and tested technology.

For example, bureaucratic activities can be a hindrance in the payment process, especially concerning public sector projects that are mostly cited as the worst in terms of payment delays in South Africa (CIDB, 2004:8) and (CIDB, 2010:53).

It can thus be argued that the payment cycle would benefit from lean construction principles that are value adding. Such principles include the following (Forbes & Ahmed, 2011: 54):

- Identification of waste and redesign of the payment cycle;
- Identification of the actor for each activity in the payment cycle so as to clarify their value needs for improved output value purposes;
- Reduction of variability in the payment cycle so as to streamline conversion and flow processes;
- Enhancement of team building and cooperation with clients and their agents; and
- Balancing flow improvement and conversion improvement where it is possible to so do.

Taking the process view has led to a record of success in many areas of construction. For instance, Garret and Lee (2011: 89) reported that lean thinking resulted in a streamlined submittal process when a case study was undertaken in a typical levee construction project. The results of this case study show that the application of lean concepts to the construction submittal review process can reduce NVAAs. Measurable improvements were obtained in the amount of lead-time, process time, and the number of activities. By using electronic versions of the submittals, part of the coordination effort was eliminated. The number of activities in the process was reduced from eight to five, the lead-time decreased by an estimated 40 per cent and process time decreased by an estimated 25 per cent (Garrett & Lee, 2011: 89). The researchers noted that the use of e-copies affected the overall review time of the submittal. Not only were the mailing activities positively affected, but immeasurable residual effects could be claimed for all the activities by using electronic submittals.

Although lean construction principles have focused on the site production activities in construction, its tools are now being used to drive the 'more for less' agenda in non-site activities such as the design process. Construction management researchers (CMR) have reported a marked improvement in the design management process when 'lean thinking' is put to the test (Hansen & Olsson, 2011: 78; Tribelsky & Sacks, 2011: 94). Based on case studies of two hospital projects, Hansen and Olsson (2011: 78) argued for flexibility in the design process and design in relation to lean principles. They demonstrated the importance of seeing the design process and design model as two integrated parts to which lean thinking can serve as an enabler by focusing on reducing NVAAs and increasing value. Further, Tribelsky and Sacks (2011: 94) collected extensive data that described the communication of design documents between design team members in the detailed design phase of 14 civil engineering projects, all of which were part of a major airport construction project. The researchers measured participants' evaluations of the success of the degree of effectiveness of the design documents, as well as the extent to which budget and schedule targets were met. After analysing the findings, Tribelsky and Sacks (2011: 97) observed a positive correlation between the quality of information flows and the effectiveness of design documents, and confirmed that unstable information flows are associated with unpredictable project outcomes.

The results of an empirical study that was conducted in Ghana, however, revealed that there appears to be a generally low recognition of the sources of NVAAs in the building design process and little awareness of waste reduction tools such as design structure matrix, hatch size reduction and set-based design (Kpamma & Adjei-Kumi, 2011: 109). It was also discovered that inadequate familiarity with the firms with lean thinking was among a number of limitations to the application of waste reduction tools in Ghana. This suggests lean design management awareness should be enhanced in Ghana and in similar developing countries, such as South Africa.

2.8 ON-TIME PAYMENT AS A VALUE-ADDING ACTIVITY TO THE CLIENT

Projects are value streams where articulations between activities are uniquely networked as commitment among many participants that form a project team. These commitments bind team members to increase transparency in the value stream, and to manage and direct projects in real

time (Forbes & Ahmed, 2011: 66). The commitment results in project leaders pushing aggressively to maximise speed and minimise cost. In so doing, numerous challenges are encountered in keeping commitments and executing work in a leaner way. Reliable promises such as on-time payment from upstream to downstream enable others to make reliable promises as well, in anticipation of predictable workflow from the lean perspective (Forbes & Ahmed, 2011: 88; Kerzner, 2011: 143). Tapping and Shuker (2003: 33) define value from the lean construction perspective as creating something of value that a customer is willing to pay for. This definition echoes the basis of this research: "Do construction clients see value in terms of on-time payment to the contractor from this perspective"? In the researcher's opinion the value stream creation should also focus on the construction client, who has a contractual obligation with the contractor to make prompt payment as a lubricant for the continuous value stream to both parties. This view is upheld by Kerzner (2011: 144) who postulates that the value component of a project should be a joint agreement between the customer and the contractor during the initiation stage of a project, which should form the basis of hiring the contractor to provide the value they expect to receive and the price they are prepared to pay to the contractor for the perceived value of these services.

Current documented data in the use of lean philosophies such as, and not limited to, the Kaban system, Just-in-time, line balancing, standardised work that assists in building employees' skills and capabilities through teamwork, ownership and communication spirit, and canvassing management buy-ins in creating lean construction value streams are geared towards a continuous flow of evenly distributed work to the customer's benefit (Tapping & Skuker, 2003: 34). This continuous flow ensures that there is effective use of human resources and capital to achieve the required product, at the right time and in the right quantity to meet the customer's demands. Furthermore, the flow creates a value stream, a lean tool comprising sequential flow of valuable activities needed to create work units that are highly esteemed by the construction client, with the willingness to pay for this (Tapping & Skuker, 2003: 33). The application of the value stream tool also visualises all activities (including value-added and waste) in a process using a current state map, identifies areas of improvement, and suggests a future or idea state map incorporating those improvements (Garrett & Lee, 2011: 85).

Hinged on the survival of construction firms through the judicious use of the flow resources in meeting the client's demands, the lean value philosophy has been evolving around satisfying

the construction client, as emphasised by Tapping and Shuker (2003: 83), who stated that "the customer is number one", to the extent that construction firms devise strategies which are not limited to securing enough finance to provide the best product or service at a reduced cost. Among the flow is the payment process, one of the non-value adding production administration processes consuming 60 to 80 percent of the cost associated with production, which can be streamlined to make work move faster in the value stream (Tapping & Skuker, 2003: 35). With reference to the work of Tapping and Shuker (2003: 36), Forbes and Ahmed (2011: 51) and Garrett and Lee (2011: 86) propose that waste in the administrative payment process can be streamline through the following:

- Identifying any immediate customer concern;
- Performing work unit routing analysis;
- Prioritising target value streams; and
- Updating team charter on continuous catch ball.

2.8.1 Identify any immediate customer concern

It is important to identify and assist in eliminating procedures that cause the customer to not issue early or on-time payment instructions. It should be noted that customers find it easier to justify resource commitment if they can feel an improvement in activities that are geared to meeting their needs in terms of their product or service being the right quality, at the right time and in the right quantity (Tapping & Shuker, 2003: 83). In Figure 2.1, the current situation shows (from stages 1 to 3) that it takes at least ten working days for payment documentation among the client agents and the contractor to be prepared, and if documentation is not in compliance, then an additional five days are required to fix it. All these hours spent are being paid by the client as part of the project cost.

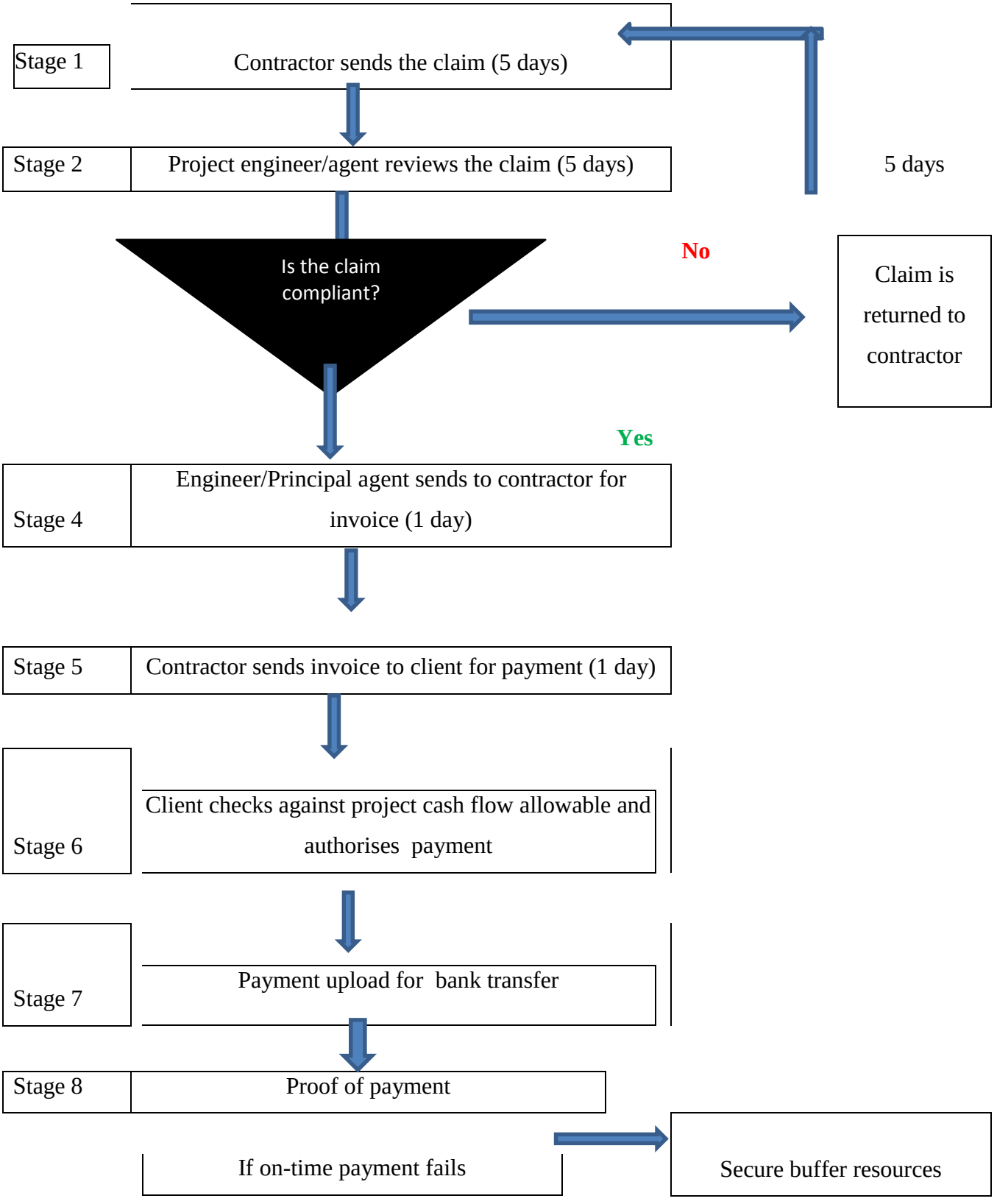

Figure 2.1: Process flowchart for existing current payment process

2.8.2 Perform work unit routing analysis

The routing analysis involves targeting work in such a way that the customer travels through the same sequence of administrative procedures or process each time by the different parties, and then seeing which process can be streamlined by the customers coming together to perform once off. The futuristic proposal is that if the parties for claim preparation and certification can agree at stage 1 of Figure 2.1, then stages 2 and 3 will be completed and this should shorten the documentation process. This will also help to eliminate the following:

- Over-processing waste whereby redundant activities such as checking someone else's work repeatedly, obtaining multiple signatures or excessive reviews that the customer does not want to pay (Tapping & Skuker, 2003: 46). Using this method and in relation to the provision of the construction condition of contract for payment procedures, the contractor can meet the client representative on a set date to agree on the value/quantity of work done, before the contractor prepares his or her claim. This is as opposed to the situation where the contractor prepares the quantity, sends it to the client who agrees or disagrees, re-organises a meeting to then agree before the claim is prepared. In eliminating this waste, Tapping and Shuker (2003: 46) suggest that the review of value-added steps in each process should be streamlined whenever possible.
- Time wasted on waiting whereby waste is created from idle time spent by the contractor waiting for the client's people, money, information and instructions that cause workflow stoppages. These have cost implications which are passed onto the client for payment. In eliminating this waste, it is proposed that parties should review and standardise the required signatures to eliminate those that are unnecessary, cross-train employees to allow workflow to continue whilst someone is out and to make sure enough capital is available before a project commences (Tapping & Skuker, 2003: 46).
- Defects or correction waste arising from defective work causing productive losses associated with disrupting a normal process to deal with defects or rework. This can be eliminated by standardising work procedures and office norms in securing a consensus.

Assisting the process flow will be the use of lean construction tool of *Takt time* that regulate the pace of customer demand fulfilment. The contractor using this tool can determine the date and time that all the necessary documentation for payment needs to be in place to enable the client agents and the contractor to set sufficient time to prepare and issue payment instructions

(Tapping & Skuker, 2003: 84). This will create the required value stream for both parties and help eliminate stage 3 (Figure 2.1) of returning claims not meeting requirements. Besides the collaboration of the parties in achieving on-time documentation, the client should also secure buffer resources that would have been allowed for at the cost estimating stage by the QS to enable the customer's demand to be met when ordering and delivery patterns or *Takt time* changes (Forbes & Ahmed, 2011: 59). The buffer provision strategy overrides administrative scheduling or budgetary haggling and enables a continuous flow of resources immediately, when required (Tapping & Skuker, 2003: 87), to meet a temporary transition to a future state.

2.8.3 Prioritise target value streams

By implementing the primary measurable and stratification method of waste elimination through the use of total order cycle time, order-entry, on-time delivery and total number of errors, as well as standardisation of activities that are required to add value in the value stream, the goal of achieving 100 percent on-time and accurate service can be fulfilled (Tapping & Skuker, 2003: 70). In delivering the value stream to the contractual parties, the pull system tool of lean construction can be used to determine the amount of cash flow that will be progressively required by the contractor to enable the client to have limited cash at lower interest payments. This means that the client's financial agent, the QS, must be in constant touch with production downstream to keep upstream management aware of the downstream requirements and vice versa (Tapping & Skuker, 2003: 102).

2.8.4 Update team charter on continuous catch ball

A give-and-take activity should be performed between different levels of the organisation on an ongoing basis to make sure that critical information on goals and objectives as well as feedback, collaboration, acknowledging others contributions and new ideas are passed back and forth and between stakeholders. It will also include providing the benefit of early payment to the client in terms of the quality of the work, the cost saving to be incurred and the level it will assist in ensuring the clients meets their objectives (Tapping & Skuker, 2003: 138). Construction firms in today's global financial down turn are playing it safe in finding the right customers, developing the right relationship with these customers, and retaining the customers' loyalty through value creation, trust and stakeholder relationship management (Kerzner, 2011:

152). Litigation has implications for future projects with the clients; contractors are therefore reluctant to demand compensation through the legal system.

2.9 SUMMARY

Beside the numerous problems related to poor workmanship, inadequate human capital, health and safety (H&S) failures and other anomalies that are bedevilling the construction industry; none has had a greater impact on profitability and longevity of firms when compared to late payment (CIDB, 2010: 2-4). The effects of late payment include diversion from sequenced operations, business closures, reduced competiveness, and erosion of clients' confidence in the abilities of stakeholders in the industry. Standardising tasks for continuous improvement by using the pull system to avoid wastes, respecting, and helping suppliers, mapping flow activities through value streams and collaborating with stakeholders provide a major avenue for addressing poor payment cash flow problems that endanger the existence of construction firms, especially small contractors. When all the parties keep their promises, waste is reduced, productivity is increased, tied up scarce capital is released timely, and projects can be completed more rapidly.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

In this chapter, the methodology and general procedures used in the data collection are explained. These include methods used for data collection, the sample frame of the study and the actual procedure followed to obtain the necessary data. Du Plooy (2001, cited by Asianoah, 2011: 28) notes that research methodology refers to a research strategy that the researcher employs to conduct a study. The purpose of the adopted methodology for this research is to describe and explore what is common with respect to late payment and to provide information in areas where a lack of knowledge exits (Kumar, 2005: 10). This strategy enables the researcher to obtain data about the current situation and to conduct analyses and draw conclusions from the issues.

3.2 THE PRIMARY DATA

The study adopted a mixed method approach, as questionnaire surveys (quantitative) and interviews (qualitative) were used as the primary means of gathering the primary empirical data (Creswell, 2009: 4). Jick (1979) cited in Creswell (2009: 15), and Cameron (2009: 148) in recognising the limitations and biases inherent in any single method, propose triangulating data sources as a means of seeking convergence across qualitative and quantitative methods that could cross-validate, neutralise or cancel the biases of other methods. The researcher utilised the mixed method approach primarily to provide a liberal, broader, diverse and a more credible understanding to inquire about the subject matter (Cameron, 2009: 145). Furthermore, the use of mixed method draws a comparison from the modern day use of computer technology ability to analyse complex models for social science research. The method also uses sequential, concurrent and transformative procedures to articulate new procedures for multiple data collection and analysis that cross-validate the data (qualitative and quantitative) collected (Cameron, 2009: 145).

Sequentially, this research began with a quantitative method (close-ended questionnaire) in which theories or concepts were tested, followed by a qualitative method (open-ended

interviews) involving detailed exploration with a few cases or individuals (Creswell, 2009: 16). In addition, the approach enabled inferences to be made and integrated using the qualitative methods which either confirm or contrast the new data (Tashakkori & Teddlie, 2010: 273).

Views of built environment professionals in the Eastern Cape Province of South Africa were solicited by the use of a structured survey and interview questionnaire. The designed questionnaires were distributed to respondents involved in payment issues. These include consultants, implementing agents working for public sector clients, and contractors. The questionnaires were given to heads of quantity surveying sections of construction firms; professionals directly involved in the processing of payments in construction firms; professionals involved in payment procedures on behalf of public sector clients, and public sector administrators responsible for payments for work done by contractors.

3.3 SECONDARY DATA

Secondary data provide insights into the underlying issues surrounding a research problem. Through this data, various sources of information in the fields of lean construction, quantity surveying, and payments to construction firms have been examined to unearth some of the rooted traditions in the built environment. Information was sourced from both online and library sources. Databases consulted included Emerald, Wily, Sage, CIDB, and Acta Structilia.

3.4 THE SAMPLE FRAME

A sample is a number of observations from a universe (Ford, 2000: 550). Leedy and Ormrod (2010: 207), in providing guidelines for the identification of a sufficient sample size for a study, assert that:

- for a small population, less than 100 people, there is no need for sampling;
- if the population size is around 500, 50 per cent of the population should be sampled;
- if the population size is around 1500, 20 per cent of the population should be sampled; and
- beyond a certain point (approximately 5000 and more), a sample size of 400 people is adequate.

There were around five hundred (500) active registered quantity surveying, civil engineering consulting, construction project implementing agents and construction firms in both the private and the public sector in the Eastern Cape Province at the time of the survey with capacity to handle construction projects of over R4 million. Owing to the constraints of time and budget, a random sample of one hundred and twenty two (122) professionals from these firms in the built environment, comprising engineers, project managers, quantity surveyors and architects, were randomly selected and supplied with questionnaires. With random selecting/sampling, each individual has an equal probability of being selected from the population (Creswell, 2003: 164).

Within the geographic limit of the study, contractors and professionals from both consulting and client agencies were administered with questionnaires. The main criterion was the extent of the activities of each firm with an annual turnover of above R4 million in the construction sector during the last five years. The aim was to avoid the selection of inactive firms. With a purposive selection method that relies on the researcher's perceptions of representativeness of a sample, 102 contracting and 20 consulting professionals were approached to participate in the study.

3.5 QUESTIONNAIRE DESIGN AND ADMINISTRATION

The quantitative questionnaire was designed under the direction of the research supervisor. The matrix style of questioning was employed as a format for the questionnaire design. According to Cohen, Manion and Morrison (2007: 331), the matrix question is the style that enables the same kind of response to be given to several questions. The main advantage of this style is to provide a consistent layout and save space. It also enables the respondent to answer the questions rapidly. The self-administration of questionnaires and email distribution were chosen to overcome constraints of time and budget.

3.5.1 The structure of the questionnaire

The questionnaire was divided into three sections. Section one addressed the demographic information of the respondents, providing the size of their firm, how long their firm has been

in operation, the respondents' qualifications and personal experiences in the construction sector. This enables the users of the findings to evaluate the source and credibility of the information obtained.

Section two addressed the respondents' knowledge of the presence of waste in their administrative construction activities and how these wastes can be identified through the use of lean construction principles. The researcher wished to determine whether sub-problem one being 'on-site production experience obstacles in construction' exists in the sector, and to test hypothesis one.

Finally, section three covered the contractor payment process, the problems encountered in the process and the intervention that can be used to improve the process. This section helps to obtain information in support of sub-problems two and three whereby 'contractors often deviate from activity sequence and schedule' and 'projects are marginalised by slow operational decision-making processes' respectively, and also to enable the researcher to test hypotheses two and three.

3.6 DATA ANALYSIS

The collected data was analysed using descriptive statistics. The use of descriptive statistics generated frequencies, percentages and mean scores based on responses that were received. The principal feature affecting ranking of the views of the respondents was identified using mean scores (MSs) and standard deviations. Microsoft Excel software was used to analyse the data received.

3.7 ETHICS

Ethical issues were key considerations in undertaking this research. The principle of voluntary participation was upheld. This suggests that people were not coerced into participating in the research, while those involved were briefed regarding the nature of the study in order for them to willingly and knowingly give consent. Hence, the participants were informed that the study will not expose them to unnecessary harm. In protecting respondents' right to privacy, contributions of participants have been treated confidentially.

CHAPTER 4
ANALYSIS OF THE RESEARCH RESULTS

4.1 INTRODUCTION

This chapter presents the results and discussions of the findings. Both surveys and interviews were used in the data collection, and the chapter is thus divided into two sections. The first section presents the responses obtained from the interviews that were conducted, whilst the second section concentrates on the structured questionnaire that was developed to study the problems relating to late payments.

4.2 SURVEY DATA

One hundred and two (102) questionnaires were circulated to collect data for the study. In response to 58 questionnaires sent by hand delivery, 32 were returned completed, and in response to 44 questionnaires delivered by e-mail to respondents, 26 were returned. The recorded total response is therefore 58, which equates to a 57 per cent response rate. All the questionnaires were completed properly; hence none were rejected for analysis. The low response rate to the questionnaires was due to certain reasons cited by the potential respondents. These include the following:

- Respondents do not have time to complete the questionnaires and they have more pressing issues to attend to; and
- Respondents do not want to meddle in government payment process 'politics' as they will be painting their superior in a bad light.

In order to realise a higher response rate to questionnaires that were circulated, the following strategies were adopted:

- A cover letter was included to promote the legitimacy of the research and its purpose;
- The respondents were assured that their responses would be treated confidentially and were given the option to remain anonymous;
- The questionnaire was simple and short so as to be completed easily; and
- Reminder e-mails and telephone calls were conducted repeatedly.

4.2.1 Section One: Demographic information

The demographic profile of the respondents is detailed in Table 4.1 below. The profile has been grouped into organisation and personal details. This exercise was necessary to determine the respondents' background which gives an indication of the basis for the answers provided.

Table 4.1 : Demographic information

Organisational						
No.	Question	Response (%)				
1	CIDB Grading	<3	≥ 4 < 6	≥ 7 < 9		
		5.0	60.0	35.0		
2	Category of construction work	Engineering		General building		
		24.0		76.0		
3	How long has your organisation been involved with construction (years)	< 5	≥ 5 < 10	≥ 11 < 20	≥ 20	
		7.0	33.0	31.0	29.0	
4	What is the value of projects in which you are mostly involved (million)	< 10m	≥10m <30m	≥ 30m <80m	≥80m<150m	≥ 150
		34.0	36.0	19.0	2.0	9.0
Personal						
No.	Question	Response (%)				
1	Gender	Male		Female		
		71.0		29.0		
2	Age (years)	< 25	≥ 25 <30	≥ 31 <40	≥ 40	
		2.0	22.0	54.0	22.0	
3	Personal experience in construction (years)	≤ 5	≥ 5 <10	≥ 10 <15	≥ 15	
		12.0	36.0	34.0	18.0	
4	Educational qualification	Matric	Diploma	Postgraduate diploma	First degree	Hons
		7.0	29.0	10.0	28.0	26.0
5	Organisational position	MD	Senior executive	Senior staff	Supervisor	
		3.0	17.0	76.0	4.0	

4.2.2 Organisational information

Question one: What is your current CIDB grading?

Five percent of the respondents have a Construction Industry Development Board (CIDB) grading of less than or equal to three, whilst 60 percent are in the category of four to six and 35 percent in the category of seven to nine. This shows that the majority of the respondents are in the middle category, with contracting capacities from R4 000 000 upwards.

Question 2: What category of construction work do you mainly do?

The majority of the respondents (76%) undertake general building works, whilst 24 percent undertake engineering construction works.

Question 3: How long has your organisation been involved with construction?

Twenty-nine per cent of the respondents have been involved with construction activities for over 20 years, and on average 64 percent have been in the industry for more than seven (7) years. It is, however, notable that 7 percent of the respondents have been involved for fewer than five (5) years.

Question 4: What is the value of projects in which you are mostly involved?

The majority of the respondents (70%) have undertaken projects that have values ranging from R10 to R30 million, and the remaining 30 percent have been involved with projects that are valued at more than R80 million.

4.2.3 Personal information

Question 1: Please indicate your gender

The male gender dominated the responses with 71 percent, whilst 29 per cent of the respondents were female.

Question 2: Please indicate your age

It was observed that 22 percent of the respondents were older than 40 years, whilst 22 percent were within the 25 – 30 year age bracket. In addition, 54 percent were within the 31 – 40 year age bracket, and only 2 percent were below 25 years. This shows a fair and cross distribution of the youth and matured respondents in the construction industry.

Question 3: Please indicate the length of time you personally have been involved in the construction industry

It was observed that 52 percent of the respondents have been involved in the construction industry with over 15 years personal working experience, whilst 48 percent have between one (1) to ten (10)years' working experience in the industry. This shows that experience respondents with capacity to provide in-depth information participated in the data collection.

Question 4: Please indicate your highest formal qualification

In terms of the highest academic qualifications, 54 percent of the respondents have graduated with a degree, whilst 39 percent have a diploma qualification. A further 7 percent have a Matric certificate. This shows that academically qualified respondents with capacity to provide in-depth information participated in the data collection.

Question 5: Please indicate your status in the organisation

The majority of the respondents (76%) are in a senior staff position, whilst 17 percent are in a senior executive position. Of the remaining 6 percent of respondents, 4 percent were managing directors and 3 percent held supervisory positions. Managers with authority responded to the information request, providing credibility to the information gathered.

4.2.4 Utilisation of lean construction principles

Question 1. How often do you study your project deliverables to identify possible future problems?

As shown in Figure 4.1, 44 percent of the respondents mentioned that they often study their projects to identify possible problems to be encountered, while 41 per cent always study their projects to identify problems. A small percentage, namely 7 percent and 8 percent, occasionally and sometimes perform this task respectively.

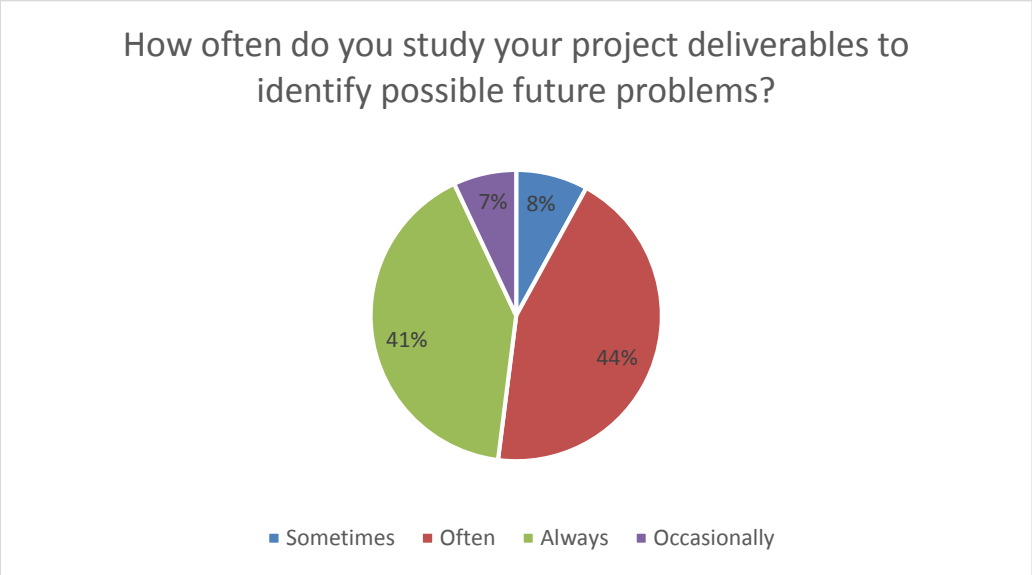

Figure 4.1: Project problem identification

A Likert scale was used to collect, analyse, and interpret the data in this section. A scale of 1= 'Never' to 5= 'Always' was used. The range set for the mean scores (MSs) is as follows: 'Never' ($1.00 \leq MS \leq 1.80$), 'Rarely' ($1.80 < MS \leq 2.60$), 'Sometimes' ($2.60 < MS \leq 3.40$), 'Often' ($3.40 < MS \leq 4.20$) and 'Always' ($4.20 < MS \leq 5.00$). Generally, the respondents disagree with the issue under consideration if $1.00 \leq MS < 3.00$. They, however, agree with the issue under consideration if $3.00 \geq MS \leq 5.00$. The mean score (MS) is calculated using the formula; $MS = \sum f^{x} / \sum f$.

Questions 2.1 to 2.6: On a scale of 1 (Never) to 5 (Always), which of the following problems do you encounter while delivering projects?

Six causes of waste from the lean construction perspective were listed as problems encountered by professionals while delivering their projects. Using the mean and mode of the results from the respondents, importance ranking has been derived to deduce problems that require

increased attention. Table 4.2 indicates that inadequate finance by the contractor and wrong specifications are ranked highest as the biggest/most significant problem hindering effective project delivery. Delay in supplier delivery was ranked third, whilst inadequate time for construction and inadequate finance by the client were ranked fourth and fifth respectively. Also, inadequate cost or budget allowed in the bills of quantities is the least of the problems for effective project delivery.

Besides the importance ranking of the problems, with mean scores of MS=3.84 and MS=3.60 the majority of respondents agree that inadequate finance by contractors and delays in supplier delivery sometimes cause delays in their projects. Also, respondents acknowledged that wrong specifications (MS=2.34), inadequate time for construction (MS=2.31), inadequate finance by the client (MS=2.29) and inadequate cost or budget allowed in the bills of quantities (MS=1.93) rarely pose problems during their projects delivery.

Table 4.2: Problems affecting project delivery

Problems	Never				Always	Mean Score
	Response (%)					
	1	2	3	4	5	
Inadequate finance by contractor	9.0	9.0	7.0	41.0	34.0	3.82
Delays in supplier delivery	12.0	7.0	21.0	29.0	31.0	3.60
Wrong specifications	14.0	45.0	28.0	10.0	3.0	2.43
Inadequate time for construction	31.0	26.0	29.0	9.0	5.0	2.31
Inadequate finance by client	45.0	19.0	7.0	20.0	9.0	2.29
Inadequate cost/budget allowed in BoQ	48.0	26.0	14.0	9.0	3.0	1.93

4.2.5 Late payment

Question 1: How long does it normally take the client representative to certify a payment claim?

Table 4.3 below reveals that 38 percent of the respondents claimed that it takes 28 days for payment claims to be certified, whilst 25 percent maintained that it takes seven (7) days.

Twenty-one percent said that it takes 14 days whilst 16 percent were unsure of the number of days it takes to certify payment claims by the client's agent. This means that the majority (38+21 = 59%) of the respondents receive their payment claim from the clients' representative after 14 days before invoices are submitted to the client.

Table 4.3: Late payment frequency

	Respondents (%)					
Length to certify payment claim	Unsure 16.0	7days 25.0	14days 21.0		28days 38.0	
How long does it normally take you to receive certified payment from the client?	14-21days 5.0	21-30 days 12.0	30-45 days 24.0		45-60 days 16.0	>60 days 43.0
Do private clients normally promptly authorise payment to contractors in good time?	Never 3.0	Rarely 17.0	Some-times 22.0	Often 36.0	Always 22.0	Mean Score 3.57
Do public clients normally promptly authorise payment to contractors in good time?	19.0	41.0	16.0	22.0	2.0	2.47
Do you think construction clients intentionally delay payment to contractors?	16.0	7.0	27.0	33.0	17.0	3.28

Question 2: How long does it normally take you to receive certified payment from the client?

Forty-three percent of the respondents stated that it takes more than 60 days for them to receive certified payments from the client while, 24 percent and 16 percent said it takes between 30 to 45 days and 45 to 60 days respectively. Seventeen percent of the respondents also stated that it takes less than 30 days to receive payment from the client.

Question 3 to 5: On a scale of 1 (Never) to 5 (Always), do construction clients promptly authorise payment in good time to contractors?

As shown in Table 4.3, 36 percent of respondents with a mean score of MS=3.57 perceive that private clients often promptly authorise payment to contractors, whilst 41 percent (MS=2.47)

asserted that public clients rarely authorise prompt payment to contractors in good time. In addition, slightly more than half of the respondents (36+22%) receive payment in good time from private clients, while the majority (19+41%) do not receive payment in good time from public clients. However, a high number of respondents (33%) (MS=3.28) reported that construction clients will often intentionally delay payment to contractors.

Questions 2.1 to 2.7: On a scale of 1 (Minor) to 5 (Major), to what extent do these bottlenecks manifest in late payment of money to contractors (Please note the 'unsure' option)?

As can be seen in Table 4.4, the majority of respondents agree that lack of system integration among payment certifying and authorisation agents (33+48%) with MS=4.17, lack of capacity for handling payment processing by clients (62+17%) with MS=3.77, and inadequate finance by clients (42+28%) with MS=3.65 are the main bottlenecks from clients' operations that contribute to late payment to contractors.

Table 4.4: Extent of bottlenecks in payment processing

Bottlenecks that manifest in late payments of money to contractors	Minor				Major	Mean Score
	Response %					
	1	2	3	4	5	
Lack of system integration among payment certifying an authorising agents	5.0	2.0	12.0	33.0	48.0	4.17
Lack of capacity for handling payment processing by clients	5.0	9.0	7.0	62.0	17.0	3.77
Incomplete submission of claim supporting documents	7.0	9.0	19.0	43.0	22.0	3.64
Inadequate finance by client	15.0	2.0	14.0	42.0	28.0	3.65
Delay in contractor submission of invoices	2.0	16.0	22.0	55.0	5.0	3.45
Contractors failure to meet monthly progress targets	41.0	40.0	5.0	9.0	5.0	1.97
Inadequate project cost estimate by client agents	64.0	7.0	19.0	3.0	7.0	1.82

Furthermore, respondents also agreed that from the contractors' operations, incomplete submission of claim supporting documents (43+22%) (MS=3.64) and delays in contractor submission of invoices (55+5%) (MS=3.45) are hold-ups to on-time payment to contractors. However, (41+40%) and 64 percent of respondents with mean scores of MS=1.97 and MS=1.82 disagree that contractors' failure to meet monthly progress targets and inadequate project cost estimates by client agents respectively contribute to delayed payments by the client.

Questions 3.1 to 3.9: On a scale of 1 (Never) to 5 (Always), how often do the following problems occur due to late payment to contractors (Please note the 'unsure' option)?

As can be seen in Table 4.5, respondents agree that loss of expected profit due to high interest payment on overdue accounts (MS=4.17) and loss of trade discounts from suppliers (MS=4.08) are the main consequences of late payment to contractors. Also, the respondents agreed that late payment often results in contractors not securing enough materials to deliver the project (MS=3.24). A situation that leads to change in the sequence of programmed work (MS=3.42), slowing down the progress (MS=3.22) on site and delaying the completion of all activities (MS=3.44). However, respondents are not of the opinion that late payments to contractors rarely causes low morale to their employees (MS=2.68), to the extent of losing key personnel due to delayed wages/salaries (MS=2.74) and abandoning the work (MS=1.93).

Table 4.5: Problems caused by late payment

How often do the following problems occur due to late payment to contractors?	Never		Response %		Always	Mean Score
	1	2	3	4	5	
Loss of expected profit due to high interest payment on overdue account	4.0	4.0	13.0	29.0	50.0	4.17
Loss of trade discount from suppliers	8.0	4.0	14.0	20.0	54.0	4.08
Delay in the completion of activities	12.0	12.0	22.0	28.0	26.0	3.44
Change in sequence of programmed work	8.0	22.0	19.0	22.0	29.0	3.42
Inability to secure enough materials to deliver the project	19.0	16.0	11.0	30.0	24.0	3.24
Slowdown in the progress of work	17.0	12.0	18.0	38.0	15.0	3.22
Loss of key personnel due to delayed wages/ salaries	25.0	17.0	29.0	17.0	12.0	2.74
Low employee morale	33.0	21.0	8.0	21.0	17.0	2.68
Abandonment of the work	54.0	25.0	8.0	0.0	13.0	1.93

Questions 5.1 to 5.10: On a scale of 1 (Minor) to 5 (Major), to what extent would the following interventions assist the client quantity surveyor to eliminate or reduce payment delays to contractors (Please note the 'unsure' option)?

There is an agreement among respondents, as seen in Table 4.6, clients' actions that can be implemented are that, payment authorisation agents' capacity should be enhanced for payment purposes (MS=4.25) and also that the client should empower the QS to certify financial values (MS=3.64) and authorise payment to eliminate double handling (MS=3.77). In doing so, professionals consultants should provide adequate cost estimates (MS=4.34) that will enable the client to set out clear budgetary allowances to cover uncertain financial obligations (MS=4.29) and as much as possible, the contractor should be involved in design and cost reviews to assist in eliminating waste (MS=3.23).

Table 4.6: Late payment intervention strategies

What extent would the following interventions assist the client QS to eliminate or reduce delay payments to contractors?	Minor				Major	Mean Score
	Response (%)					
	1	2	3	4	5	
Provide adequate cost estimate for the client to make adequate budgetary provision	2.0	7.0	10.0	17.0	64.0	4.34
Set out clear budgetary allowances to cover uncertain financial obligations	2.0	10.0	5.0	23.0	60.0	4.29
Build authorisation agent's capacity for payment	0.0	5.0	12.0	36.0	47.0	4.25
Contractor and client payment certifying agent should meet to prepare monthly evaluation	7.0	0.0	17.0	31.0	45.0	4.07
Client QS to partner with the contractor to jointly evaluate the progress of the works	9.0	0.0	14.0	43.0	34.0	3.93
CIDB should standardise payment procedures for all construction works	9.0	3.0	12.0	47.0	29.0	3.84
Client to empower the QS to authorise payment to eliminate double handling	7.0	9.0	10.0	48.0	26.0	3.77
Client QS to partner with the contractor to arrange the payment process	9.0	3.0	12.0	55.0	21.0	3.76
Client to empower the QS to certify financial values for payment	9.0	5.0	7.0	71.0	8.0	3.64
Contractor should be involved in design and cost reviews to assist in eliminating waste	12.0	17.0	31.0	16.0	24.0	3.23

Furthermore, it is also noted that there is an agreement (MS=3.84) that partnership between client agents and the contractor in document standardisation can play a pivotal role in solving some of the problems. The majority of the respondents (31+45%), (MS=4.07), agreed that the contractor and client payment certifying representatives should meet to prepare monthly eval-

uations. The view that client QSs are to partner with the contractor to jointly evaluate the progress of the work had a MS of 3.93, as indicated by (43+34%) of respondents, while (55+21%) of respondents (MS=3.76) indicated that the Client QS to partner with the contractor to arrange the payment process.

4.3 INTERVIEW DATA

4.3.1 Interview schedule and response rate

Interview schedules were designed based on the literature reviewed and the responses obtained from the survey research. The interview schedules were sent to specifically identified construction professionals via email and/or hand delivery, and then followed up with telephone calls to set up the interview dates suitable to the participants. Participants were assured of the confidentiality of their response. Out of the twelve (12) interviews scheduled, a total number of seven (7) interviews were conducted. The following reasons were given for not honouring the interview invitation:

- Interviewees had a busy schedule and would not be able to grant the researcher interview time;
- Some professionals were just not interested in granting the researcher an interview; and
- Interviewees see the problem of research as a never ending one.

Table 4.7 and Table 4.8 show the demographic distribution of the interview participants. Two respondents are the contractor and consultant quantity surveyor sampled, whilst the remaining three are the clients sampled. All the respondents have considerable working experience and appropriate membership with a professional body. It is significant to note that out of the seven respondents, one is a female project manager from the client sample with appropriate membership with a professional body.

Table 4.7: Interview schedule and response rate

Organisation / Discipline	Role	Scheduled interviews	Actual interviews
Implementing agent offices	Client	4	3
Consultant Quantity Surveyors	Client Consultant	4	2
Contractors	Construction team	4	2
Total		12	7

Table 4.8: The demographics of the participants

Number	Gender	Age group	Highest level of education	Experience	Designation	Professional affiliation
1	Male	31 – 35	BSc-Hons Engineering	5 – 10	Contractor	SAICE, Professional
2	Male	31 – 35	Diploma Building Engineering	5 – 10	Contractor/ Quantity Surveyor	NAFCOC
3	Male	21 – 30	B-Tech Q.S	1 – 5	Quantity Surveyor	SACQSP, Candidate
4	Male	21 – 30	BSc-Hons. Quantity Surveying	1 – 5	Quantity Surveyor	SACQSP, Candidate
5	Male	31 – 35	B-Tech Construction Management	11 – 15	Project Manager – Implementing Agent	SACPCMP, Professional
6	Female	31 – 35	B-Tech Civil Engineering	5 – 10	Project Manager – Implementing Agent	ECSA, SACPMP Candidate
7	Male	31 – 35	Diploma Building	5 – 10	Project Manager - Implementing Agent	PRINCE2

4.3.2 Interview questions and responses

The interviews commenced with the researcher expressing gratitude to the participants for their willingness to share their valuable time and experience, thereby contributing to the success of the research. Open-ended questions that had previously been sent to the participants were used to generally obtain respondents' views on the subject matter. Unclear questions were explained to respondents for better understanding and responses noted by voice recording and writing, with the assurance that voice recordings were merely meant lest the researcher miss responses and to shorten the duration of the interview. The responses to the respective questions that are consistent and relevant to the research have been summarised as follows:

4.3.4 Waste in the payment process

Question 1: On a scale of 1(Poor) to 5(Excellent), how effective is the payment process on your projects?

Responses include the following:
Six interviewees have experienced an average performance of the payment process by their clients, whilst two of them have good payment performance on their projects.

Question 2: What activity group constitute a bottleneck in the payment process?

Responses include the following:
The authorisation stage has been identified as problematic in ensuring on-time payment to contractors. The issues surrounding the process are mainly due to the following:

- Long duration for budget verification and documentation approval for budget adjustment when there are cost overruns.
- Random auditor-general's verification of the financial and progress status of the projects; changes in documentation requirements by client implementing agents e.g., VAT vendor search by contractors; and changes in payments days by clients without enough prior time notices.
- Bureaucratic authorisation processes that are employed by client intermediary agents before the funds are released. For instance, if the contractor's client is Coega Development

Corporation (CDC) implementing a school project on behalf of the Provincial Department of Education (DoE), the payment authorisation has to go through the CDC, then the Programme Management Team (PMT), then to the DoE. Each intermediary takes at least 7 days to authorise the payment, hence causing payment duration to be 45 days. However, if the client to the contractor is the National Department of Roads and Public Works (DRPW), being the only intermediary to the DoE, then the payment takes 21 days and a maximum of 30 days.

- Non-availability of funds for payment.

Question 3: When payment is delayed, what administrative measures do you employ to facilitate the process?

Responses include the following:

- Contractors send correspondence in the form of emails and letters to inquire from the client agents why payment has been delayed.
- Client agents then send correspondence and telephone calls to the responsible person of the client to ascertain the cause of the delay.
- When the correspondence yields no result, the contractor employs the client agents to organise a meeting with the client to ascertain when payment will be made, after which the contractor then sends contractual letters to enforce payment and to explain to the client the contractual implications of the delayed payment. This action is then followed by claims for extension of time and interest claims due to delayed payment, as remedial action.
- When funds are available, invoice dates are revised to reflect the current dates before payments are released. However, the payment certificate dates are not revised in order not to limit the contractor's rights.

Question 4: How do you address the reworking of documents to facilitate payments?

Responses include the following:

- Most of the time the documents are in order by the contractual date of authorisation. The problem is that the client does not have the money at the particular time to pay. However, due to the delayed date of payment, certain supporting documents such as the tax certificate

and insurances will expire and money is unavailable. These documents are sent back to the contractors to submit valid ones for the payment to be processed.

- When documents are found to be incomplete, consultant quantity surveyors and principal agents are notified to modify the documents to conform to the new client requirements. Such changes include the right positioning of date, contract numbers and VAT numbers on the payment certificate and contractors' invoices.

Question 5: When a payment is delayed, what are the types of 'waiting period' or 'hold ups' that occur in your process that you have to address?

Responses include the following:
The main hold ups experienced are:

- Loss of interest by suppliers and financiers to commit additional resources to the project, resulting in black listing of the company on their high risk profile, affecting the credit-worthiness and fortunes of the company in future projects; and
- Slow progress on site, delaying the completion time of the project and leading to notification from the contractor to the client of its breach of the contract and the right for them to cancel the contract.

Question 6: When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?

Responses include the following:

- Contractors have established openness with their employees, such as when payments are delayed workers continue without wages, and when payments are made all wage arrears are paid immediately;
- However, in dire situations contractors secure overdraft finance from banks to pay for wages and, in addition, reduce and or relocate the labour force to other project sites to save on the labour cost, and mitigate against strike action.

Question 7: When payment is delayed, how do you address 'waiting for materials' to be used on site?

Responses include the following:

- Contractors secure overdrafts with their banks to pay for materials to avoid the loss of trade discount from suppliers;
- Overdraft interest are usually never factored into tender prices since there is a contractual commitment of on-time payment by the client. In extreme cases the cost of supporting finances are brought to the attention of the client for re-imbursement through interest payment on overdue accounts; and
- Since clients acknowledge bureaucratic processes as a challenge to on-time payment, clients usually assist contractors by supporting them with a payment guarantee cession to the suppliers for a direct payment of all materials supplied on site, certified by the quantity surveyor and the contractor. This has helped to alleviate stoppages of the works onsite, strikes and community unrest, as the contractors use their own funds to pay for wages. The disadvantage with the payment guarantee cession is that where there are limited suppliers for the materials for mass rollout programmes, demand will outstrip supply and suppliers turn to default, causing longer delays to project completion times.

Question 8: When payment is delayed, how do you address 'waiting for activities' which demand significant investment to commence?

Responses include the following:

- During this period, contractors rely on the established good relationships with their suppliers to secure enough resources for works to proceed with the available labour force and to concentrate on meaningful activities that are on the critical path, whilst supporting finance in the form of loans and overdrafts are secured, so that when payment is made all the other activities can be completed;
- Also, financial resources from other clients are shuffled around from one project to the other to minimise the waiting period for the performance of activities. But, when the delays are excessive the contractor suspends the works until payment is made. In certain situations, extensions of time claims with or without costs are then applied for the additional duration that will be required to complete the works;
- Contractors complain that this stop and go can affect the profit margins of the project and the contractor's firm as a whole. For example, in the case of a project of six months with a team of employees to complete to gain a 10 percent profit, if the project drags on for an

additional six months, that team will have to be kept for 12 months to earn 10 percent profit. This effectively causes the profit margin to be halved to 5 percent. However, if the project is completed within the required duration, then the team will have completed two different projects at 10 percent profit each, in a year;

- Contractors also confirm that clients usually assist by supporting them with a payment guarantee cession to the suppliers for a direct payment of all materials supplied on site, certified by the quantity surveyor and the contractor; and
- The other disadvantage of this assistance is that there is a limited amount of cash-flow through the company's accounts, limiting the potential upgrade of the contractor's CIDB grading for a higher work category.

4.3.5 Quantity surveyors' influence on the payment process

Question 1: Do you understand the role of the professional quantity surveyor?

Positive responses from both Contractor's and Client's QS include the following:

- Contractors prepare a claim for payment certificate and submit to the quantity surveyor, who verifies, certifies and then prepares an evaluation in support of the claim, recommending for payment by the client; and
- Reconciles the progressive value of the works with the budget, and ensures that the costs of works are within the approved budget.

Question 2: Please explain or describe how a quantity surveyor can ensure that payment is not delayed.

Responses include the following:

The quantity surveyor is central to the preparation of the payment certificate, hence the QS in conjunction with the client agents should:

- set dates and durations as to when the value of the works will be assessed for the preparation of payment certificate;
- set dates and duration as to when payment documentation from the contractors is to be delivered to the QS for inclusion into the payment certificate; and
- establish dates as to when payment documents are to be processed by other parties to ensure that defaulting parties will be held responsible for payment delays.

Currently, the majority of contractors rely on the evaluation of the professional QS, without their input, hence when evaluation dates are approaching, the QS should ensure the following:

- Timeously notify the contractor of the due date of valuation and all the documents required that will enable the payment to be approved; and
- Schedule meetings with the contractors on site to agree on the progressive value of the works to avoid dispute on the value of the works.

Question 3: Please explain how the quantity surveyor can ensure that the evaluation of interim payment certificate does not form a reason for payment to be delayed.

Responses include the following:

- The timeline for the evaluation of interim payment certificate, and the supporting document submission should be established at the onset to enable the contractors enough time to adhere to these requirements;
- The QS should undertake the evaluation of the progress of the works as an on-going process as early as possible to ensure that no delay is encountered, should the contractor not have the capacity to submit a claim. In such situations, the client's QS should submit his evaluation of the progress of the works in good time to the contractor's QS for agreement before forwarding to the client;
- Prior to the evaluation date, the contractor's QS should submit a claim to the client's QS indicating the expected amounts that will form the basis for evaluation/verification of the progress of the works; and
- On the day of evaluation, both the contractor's and the client's QSs are to meet onsite at an agreed time for measuring and agreeing on the progress value of work done. This will reduce the duplication of the works being undertaken by the individual QSs, and will avoid any confusion on the values for the certificate preparation.

Question 4: Please explain how the quantity surveyor can ensure that the cash-flow and recovery statement does not form a reason for payment to be delayed.

Responses include the following:

- The client asserts that these documents do not usually pose a problem for payment certification, hence they can be submitted after the authorisation stage for the payment to be processed. This is the main reason that contractors are reluctant to assist the QS with the preparation of the document;
- However, where the recovery statement is found to be fundamental to certification and authorization, then the document should be requested as early as possible to avoid their delaying the payment;
- In project instances whereby cession for guarantee to a supplier for payment has been issued by the client, the recovery statement should accurately be prepared and agreed with the contractor to recover the cost incurred by the client for the payment made to the suppliers; and
- The cash-flow document should be submitted after the agreement of the value of the works to enable an accurate projection to be made.

Question 5: Please explain how the quantity surveyor can ensure that the Labour data report does not form a reason for payment to be delayed.

Responses include the following:

- The labour data report requirements should be relayed to the contractor from the onset, as a pre-requisite for payment processing;
- This document should be requested as early as possible to avoid their delaying the payment;
- Contractors agree that they turn to default on this document, and will employ the client agents to constantly remind them during their payment certificate submission;
- When these documents are not forthcoming to the QS, then the client project managers are informed so that they can remind the contractors of their contractual obligation, and the effect of delayed payment if the documents are not received; and
- Problems associated with the document delay can be attributed to the constant changes of the requirement by the auditor general for the information of a valid labour report. The auditor general wants the individual workers to sign their report, verifying that they have been on site, and have earned such as a salary. Workers refuse to sign these reports as the

report captures accruals of the employees' wages, since actual payment will be done at the end of the month.

Question 6: Please explain how the quantity surveyor can ensure that the tax invoice does not form a reason for payment to be delayed.

Responses include the following:

- The QS should know what a valid tax invoice looks like;
- Poor communication between the consultant and the contractor has been identified as the cause of the delay for submitting the tax invoice;
- Workshops should be organised by the client implementing agents from the onset to educate the contractors on the standard of document (tax invoice, with samples) required. At this workshop, all the specific tax invoice requirements should be communicated to the contractor in time to ensure that compliance is met before submission, for example, client's tax name, number, colour print out, and stamped as well, if required; and
- Tax invoices must be accompanied with a valid tax clearance certificate, without which no payment will be processed.

4.3.6 Improvement of the payment process

Question 1: In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?

Responses include the following:

- There should be a timeline for payment at the various stages of the project to which all the parties should adhere;
- There should be a client responsible person or a project manager who checks where payment is at each stage of the process, and ensures that all hold ups are immediately resolved to avoid payment delays;
- Each party should attend regular site meetings and inspections to assess the progress of the works in order to eliminate all doubts about the value of work for payment certificates;

- The intermediary institution (implementing agents) usually cause delays in the payment process for most provincial departments;
- Long bureaucratic processes are attributed to long client approval processes. For example, on a provincial project, payment processes from an implementing agent have to go through PMT, to the client, and then to the Treasury. And then the released funds from the Treasury have to go through client, then implementing agent and then to the contractor. However, on a national project, payment processes go to the national public works and to Treasury, and then funds are released from the Treasury and go to the public works and then to the contractor. The latter should be implemented on all projects with fewer or no intermediary institutions;
- Payment authorisation and the release of funds should be made straight from the Treasury/client to the contractor and proof of payment sent to the implementing agents to avoid further delays since the documentation has already gone through a lengthy process of verification;
- Computerised/electronic systems that can be easily accessed by all the parties should be employed for preparing and issuing a payment certificate. This will enable all parties to have access to the documentation at all times so that defaulting parties can be easily tracked;
- Contractors should form partnerships with all the project parties to fast track and facilitate the easy flow of documentation for approval; and
- Human resource capacity should be improved, since some implementing agent project managers are not available when documents are submitted for authorisation, thereby causing delays.

Question 2: In your view, what are the mechanisms/ways of addressing problems within the payment process so that delayed payment is curtailed?

Responses include the following:

- Finance departments always find problems with authorised payment documents. Therefore, finance departments should be involved in the contractor appointments and training workshops to set out their requirements during the contractor's appointment. This will enable compliance issues to be met during the payment documentation phase;

- Contractors and the clients should explain to the finance departments the implications of delaying payment under JBCC being the grounds for the cancellation of the contract and in GCC for the suspension of the works;
- The party that is found to be in default and causing the delayed payment, should bear the full cost of interest and overheads claimed by the contractors;
- Most tenders are priced with trade discounts of the contractors from their suppliers on payment on time, hence all parties should be made aware of this trade discount by the contractors. Therefore, financial loss claims will be made by the contractors for the forfeiture of their suppliers' trade discount if payments are not made on time;
- Some client project managers are often on leave, or attending courses, thereby delaying the certification process. In such situations assistants or deputies should be given powers when senior managers are not available to process the documents;
- Since authorisation has financial or cost implications should things go wrong, this could possibly be the reason why managers with authority are being sanctioned to finally authorise for the release of funds. In that case more managers with financial authorisation authority are to be employed to support each other;
- Electronic forms of payment capturing and authorisation should be implemented to enable other managers to access the entire document in order to authorise payment when the substantive manager is not available. Also, it will enable the managers to access information that has been captured for them to sign electronically for the funds to be released. For example, the electronic financial management system (EFMS) being implemented by the Department of Education is a step in the right direction. However, most implementing agents tend to not use the system: only the professional service providers are using the system, and then printing out reports for the implementing agents to verify;
- Standardisation of the payment process by all implementing agents will help reduce these problems;
- Training and workshops are to be organised by clients and their implementing agents for contractors and consultants on current and new requirements when the need arises to fast track the payment process; and
- Clients should use the projected cash-flow to advance three months' payment to implementing agents for on-time payment to the contractors and then when actual claims are

done by the contractors, reconciliation of accounts will be done by the client with the implementing agent to avoid delay.

Question 2: Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?

Responses include the following:

- The payment cycle duration time for contractors should be reduced from 30 days to 10 days after certification. The reason for this is that many families depend on the payment for their livelihood, hence the ripple effect of delayed payment does not just go beyond delayed project completion, but becomes a burden for families who have to make alternative plans in the case of delayed payment;
- Training should be provided by the client and his/her implementing agent for all professional service providers for the adoption of the electronic payment and documentation system;
- Computerised systems of payment certificates should be implemented at implementing agent and the client department levels, to enable payment to be done in real time;
- The system should enable a first stage for the capturing of the data by assistant managers, and the second stage for processing and final authorisation for the release of the funds;
- Release of the funds from the client to the contractor has been found to be a problem, since there are steps that have to be followed before the funds are released. In this situation portions of approved budgets for projects should be released upfront, so that urgent payments can be made by the implementing agents, and then later reconciliation statements can be prepared with the client for the advance payment made by the client; and
- Currently the process flow of payment documentation approval is: Contractor–Consultant–Implementing agents–PMT–DPW–User Department Client. And the funds release process is: User department Client–DPW–implementing agents–contractor. However, it is proposed that funds released for payment should be User-Department-Client to contractor, because the other intermediary agents tend to hold up the funds before the contractor is paid due to their own internal processes, causing further delay to the contractors.

4.3.7 Summary of interview findings

The problems that were identified as contributing to delay (waste) in payment to contractors include the following:

- Long bureaucratic and authorisation processes for budget documentation and verification;
- Random documentation changes and verification of the financial progress status of projects by the auditor general's department;
- Lack of standardised documentation requirements by intermediary authorisation agents (implementing agent);
- Non-availability of the required funds when payment is due;
- Reworking of expired payment documentation when funds become available;
- Lack of human and logistical capacity by client to handle payment authorisation;
- Communication breakdown between the contractor and the consultant for submitting in-complete payment documentation;
- Delay in finance department documentation requirements relayed to the contractor from the start of the project;
- No punitive measures in place for consultants and client implementing agents when pay-ment is delayed;
- Timelines for the evaluation, certification and authorisation of payment certificates not being adhered to by the parties;
- The contractor and client QSs tend to work independently during the contract period for payment evaluation and certification; and
- Contractors default in timeous submission of supporting documents for claims.

However, the following measures are employed to facilitate the payment process and the progress of work on site:

- Contractors spend time and financial resources in the form of sending emails, letters, mak-ing telephone calls and organising meetings to ascertain the cause of the delay;
- Extensions of time claim with or without costs are submitted by the contractor to compen-sate for the delay; and
- Expired supporting documentation, when payment is ready, is sent back to the relevant parties to be amended.

The effects of the delayed payment to contractors include the following:

- Loss of interest by suppliers to continue financing the project without any meaningful payment, affecting the credit worthiness and fortunes of the company in future projects;
- Loss of trade discount from suppliers;
- Reduced profit margins of the firm due to high cost of interest on bank loans and overdraft facilities;
- Slow progress on site delaying the completion time of the project;
- Frequent strike action on the project site;
- Suspension of work, which leads to longer project completion times; and
- The supplier payment guarantee cession causes limited cash flow through the contractor's account, limiting the potential upgrade of the contractor's CIDB grading for a higher work category.

Strategies that contractors are using to address late payment to their projects include the following:

- Contractors have established open and good relationships with their employees, suppliers and subcontractors so that when payments are delayed, workers continue without wages and when payments are made all wages are paid immediately;
- In dire situations contractors secure overdrafts from banks to pay wages, or relocate or reduce their labour force;
- Contractors employ clients to assist with payment guarantee cession for material supplied with suppliers, which is gladly supported by the client;
- Claim for interest on overdue accounts;
- Claim for extension of time with or without cost to compensate for the delay; and
- When delays are excessive, contractors suspend work until payment is made.

The influences that the consultant QS may have over on-time payment (in conjunction with other client agents) are the following:

- Set dates and duration as to when the value of the works will be accessed for payment certification;

- Set dates and duration as to when payment documentation from the contractor is to be delivered to the QS for inclusion into the payment certificate;
- Timeously notify the contractor of the due date of valuation, and the entire necessary documentation that will be required for payment to be processed at the various stages;
- Scheduling meetings onsite with contractors to agree on the progressive value of the work to avoid duplication of tasks and disputes on the evaluation;
- Undertake the evaluation of the progress of the works as an on-going process as early as possible to ensure that no delays are encountered, should the contractor not be in a position to submit a claim;
- Establish documents such as recovery statements, tax invoice/tax certificates and labour reports that are fundamental to the processing of payment certificates to accompany the submission for evaluation and certification, whilst the rest such as cash flow can be submitted at a later stage during authorisation; and
- Organise workshops with the client implementing agents to train contractors on their specific payment documentation requirements.

A summary of the views obtained in this study as to how the payment process can be improved are the following:

- Setting payment timelines with dedicated responsibilities at the various stages of the project to enable all the parties to adhere to, and be held accountable for delays;
- Consolidating the bureaucratic processes involved with the client and implementing agents roles in the evaluation, certification and authorisation through computerisation and partnership;
- Involving parties in the day-to-day progress inspection of the project to avoid confusion on the value of work done;
- Implementing a computerised or electronic system for payment evaluation, certification and authorisation to enable all the client agents together with clients to have access to the documentation at the same time. This will also enable defaulting parties to be easily identified for performance improvement;
- Making final release of payment funds directly into the contractor's accounts by the client (user department) and not through bureaucratic processing by the implementing agents;

- Improving human resource and logistical capacities of client and its implementing agents to address large volume payments;
- Involving finance departments in the training of project parties on the payment documentation requirements and revisions thereof;
- Making party(s) that is/are found to be in default of causing payment delays bear the cost of the delay (interest and overheads);
- Standardising all payment processes by the client and its agents;
- Advancing payment by client (user department) to implementing agents on cash flow bases to avoid delay payment to contractors when certified claims are done; and
- Reducing payment cycle durations from 30 days to 10 days after certification.

4.4 EVALUATION OF THE RESEARCH HYPOTHESES

This section presents the descriptive evaluation of the postulated hypotheses with the survey data. The evaluation contributes to the concluding remarks and recommendations found in chapter 5.

Hypotheses 1*: Delays in the release of funds to contractors lead to incessant disruptions in the flow of on-site production activities.*

According to Table 4.9, the respondents agree that inadequate finance by the client poses problems during the project delivery stage. Furthermore, 54 percent of the respondents agree that delayed funding has a ripple effect on payments to suppliers, which causes disruptions in their supply chain and unintentionally increases construction time for projects. The majority (59%) of the respondents indicated that payments are being received after 45 days, and clients' representatives are taking more than 14 days to certify a payment claim. These perceptions confirm past reports that contractors are receiving payments for work done late. Similarly, the survey respondents agree that to eliminate time wastage during monthly certificates, payment documentation should be standardised by the client. The contractor and client payment certifying agent should meet to prepare monthly evaluations, and the client's QS should partner with the contractor to jointly evaluate the progress of the works and to arrange the payment process. The hypothesis is supported from the above results, as all the mean scores (MS) are greater than 3.00.

Table 4.9: Hypotheses Test 1

Hypotheses 1*: Delays in the release of funds to contractors lead to incessant disruptions in the flow of on-site production activities.*	Mean Score	Decision Rule
Contractor and client payment certifying agent should meet to prepare monthly evaluation	4.07	Supported
Client QS to partner with the contractor to jointly evaluate the progress of the works	3.94	Supported
CIDB should standardise payment procedures for all construction works	3.84	Supported
Client QS to partner with the contractor to arrange the payment process	3.76	Supported
Inadequate finance by client	3.62	Supported
Delay in the completion of activities	3.44	Supported
Inability to secure enough materials to deliver the project	3.24	Supported
Do public clients normally promptly authorise payment to contractors in good time?	2.47	Supported

Hypotheses 2*: The non-availability of required funds results in deviation from activity sequence and schedule in construction.*

According to Table 4.10, the survey respondents agree that delayed payment often causes them not to secure enough materials to deliver their projects. The non-availability of materials in turn leads to a change in the sequence of programmed work, which slows down the progress on construction site and delays the completion of all activities. This situation is fairly under control due to the contractors using bank overdraft and loans to settle wages, whilst the client supports them with material guarantee cession to their suppliers. In addition, the majority (85 %) of the respondents observe the situation around their projects before payment issues become major problems. This is done to implement remedial actions. The hypothesis is supported from the above results, seeing that the majority of the mean scores (MS) are greater than or equal to 3.00.

Table 4.10: Hypotheses Test 2

Hypotheses 2*: The non-availability of required funds results in deviation from activity sequence and schedule in construction.*	Mean Score	Decision Rule
Delay in the completion of activities	3.44	Supported
Change in sequence of programmed work	3.42	Supported
Inability to secure enough materials to deliver the project	3.24	Supported
Slowdown in the progress of work	3.22	Supported

Hypotheses 3*: Inconsistency in the release of project funds leads to slow operational decision-making processes that marginalize projects benefits.*

The respondents as shown in Table 4.11, agree that the inconsistency in the release of funds is leading to a loss of expected profit owing to high interest payment on overdue accounts and loss of trade discounts from suppliers, which is affecting their sequence of work. These matters contribute to late project completions, which hold up their available human and plant resources for future investment. The respondents also agree that operational issues that are causing funds to be released late by the client are mainly due to the lack of system integration among payment certifying agents, lack of capacity for handling payment process by clients, non-standardised payment procedures and non-availability of an effective computerised system in streamlining the payment process. Apart from incomplete submission of supporting documents for payment claims, the delay in submission of invoices by the contractors may contribute to late payment. Moreover, with a mean score of, the majority of respondents report that the client will sometimes intentionally delay payment to contractors, exacerbating the situation. The hypothesis is supported from the above results, seeing that the majority of the mean scores (MS) is greater than or equal to 3.00.

Table 4.11: Hypotheses Test 3

Hypotheses 2*: The non-availability of required funds results in deviation from activity sequence and schedule in construction.*	Mean Score	Decision Rule
Build authorisation agent's capacity for payment	4.25	Supported
Loss of expected profit due to high interest payment on overdue account	4.17	Supported
Lack of system integration among payment certifying an authorising agents	4.17	Supported
Loss of trade discount from suppliers	4.08	Supported
CIDB should standardise payment procedures for all construction works	3.84	Supported
Lack of capacity for handling payment processing by clients	3.77	Supported
Incomplete submission of claim supporting documents	3.64	Supported
Delay in contractor submission of invoices	3.45	Supported
Delay in the completion of activities	3.44	Supported
Change in sequence of programmed work	3.42	Supported
Do you think construction clients intentionally delay payment to contractors?	3.28	Supported

4.5 SUMMARY

The majority of the factors for hypotheses one, two and three as shown Tables 4.9, 4.10 and 4.11 had MS ratings above 3.00, implying that all the hypotheses were supported. The interview findings also reflect the same perceptions of the survey respondents. These perspectives lead to the conclusions and presentation of chapter 5.

CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Central to the sustainable and competitive growth of the South African construction industry is a predictable cash flow through on-time payment by clients to contractors. Timeous payment will enable contractors to fulfil their obligations to clients, suppliers, subcontractors and employees. This research project is premised on the reduction of payment delays that contractors appear to encounter in the construction industry, especially in relation to public construction projects. The review of related literature provides robust insights into the contributing factors that appear to be perpetrating the malaise, and the empirical data collection was conducted based on the findings of past research projects in South Africa and beyond. These survey and interview data are complementary by confirming and extending the factors discovered in the literature. In particular, sections 5.2, 5.3, 5.4 and 5.5 are informed by the primary data gathered.

5.2 SUMMARY

Findings from both the interview and the survey conducted shows that inadequate finance by the client, long duration for payments documentation processing, non-standardised payment documentation, random documentation changes and verification of the financial progress status of projects by the Auditor General's and finance departments; lack of system integration among payment certifying agents, lack of capacity for handling payment process by clients, non-standardised payment procedures and non-availability of an effective computerised system in streamlining the payment process are contributing to delayed payments to the contractor. Furthermore, the situation is being compounded by contractors' incomplete submission of supporting documents for payment claims, and the delay in submission of invoices by the contractors for payments to be processed.

The delayed funding has a ripple effect on payments to suppliers, which causes contractors not to secure enough resources to deliver their projects, disrupting the contractor's supply chain and unintentionally increases construction time and cost of projects. This situation is fairly under control due to the contractors using bank overdrafts and loans to settle wages, whilst the

client supports them with material guarantee cession to their suppliers. Also, contractors are being compensated contractually by extension of time claims with or without cost. It was found that to eliminate time wastage during monthly certificates, payment documentation should be standardised by the client. The contractor and client payment certifying agent should meet to prepare monthly evaluations, and the client's QS should partner with the contractor to jointly evaluate the progress of the works and to arrange the payment process. Timelines for the evaluation, certification and authorisation of payment certificates are to be established and adhered to by the parties, and punitive measures are to be put in place for consultants and client's implementing agents and other defaulting parties when payments are delayed.

5.3 CONCLUSION RELATIVE TO THE HYPOTHESES

Hypotheses 1: ***Delays in the release of funds to contractors lead to incessant disruptions in the flow of on-site production activities.***

On-time payment to contractors has a considerable effect on the smooth delivery of construction projects. It enables project parties to achieve their strategic goals and objectives. The processes and documentation involved in the preparation, certification and authorisation of a contractor's payment are multi-layered. There is a long (14-45 days) approval process for evaluation and certification by the client appointed agent and intermediary institutions (that is contractor–consultant–implementing agent–programme management team–DPW–client) for budget verification as against the contractual 14-day period. Contractors have been found to be in default of timeously submitting complete claim documents. In addition, the duration for evaluation and certification has been found to be extensive. Parties to the contract independently undertake their evaluation prior to the certification date. This is found to be adverse to achieving consensus on the values of the works for authorisation.

The random documentation and verification, a requirement from the auditor general's office, also adds to the mix of issues that may cause delays. Different labour reports, tax invoices, tax certificates, and cash flow statement requirements have been found to hold up the authorisation of payment, which was communicated to the contractor late. The documentation process are not electronically networked among the various authorisation bodies, and beside their low capacity in handling cyclical payment documents, the task becomes duplicated among the

various departments. All these issues confirm that payment delay is a real problem in the sector. It is thus important to bring this issue to a close in the sector. Construction clients agreed to the bureaucratic documentation process in payment, evaluation, certification and authorisation, and hence assist contractors with material supplier payment guaranteed cessions when payment is delayed. However, this assistance has its disadvantages of not allowing enough cash flow through the contractor's account for a higher CIDB contractor grading for future higher grade projects. Also, the QS has been found to be central in ensuring that the payment time line is strictly adhered to. Partnership among contracting parties and their agents in establishing dates and responsibilities is seen as vital in ensuring that payment documentation is processed with minimal hold ups.

Hypotheses 2: ***The non-availability of required funds results in deviation from activity sequence and schedule in construction.***

When payments are delayed, contractors use their meagre resources for telephone calls, emails, and to schedule meetings with the client to ascertain when payment will be made. During such times, the client makes it clear to the contractor that there are insufficient funds to make payment. However, when funds are available, documentation such as tax certificates has to be revised to reflect the current date of authorisation for payment to be released. The delayed payment causes the contractor's suppliers and financiers to stop committing additional resources to the project. This sequence of events should also be addressed.

Hypotheses 3: ***Inconsistency in the release of project funds leads to slow operational decision-making processes that marginalise projects benefits.***

Though overdraft funding is being used to alleviate late payment situations, delayed payment is causing contractors to lose credibility with their suppliers, financiers and employees in terms of future viable projects. The situation is causing contractors to reduce staff, or rotate employees from one site to another. Furthermore, contractors are losing on their profit margins through overdraft interest payments, loss of supplier trade discounts and higher wage bills for their projects. Labour forces are resorting to strikes and go-slows. The delay in payments is causing contractors to resort to claims for extension of time with or without cost, interest claims for overdue payments, and suspension of the works or cancelling of the contract as a last resort,

causing clients to not have the full benefit of their project. It is also noted that contractors' delay in the timely submission of payment documentation is one of the root causes of the problem. The delays on the part of the contractor in effect affect the time line for claim evaluation, certification and authorisation.

5.4 APPLICATION OF LEAN CONSTRUCTION TOOLS TO ELIMINATE OR REDUCE LATE PAYMENT

The primary data collected has shown that certain lean construction principles can be employed to reveal problems in the payment processes and to standardise tasks for continuous improvement. These principles include the following:

- Identification of waste and redesign of the payment cycle: There is an independent evaluation payment process by the contractor's and the client's QSs, before and on the date of evaluation. After this there is a separate certification process by the client's QS for the verification of the contractor's claim. This certification process tends to produce amounts with which the contractor disagrees and therefore prolongs the duration of the project, affecting the period for authorisation. This study proposes that the QSs of the contracting parties should jointly evaluate and certify the claims to further avoid the duplication of the task. Parties should undertake an on-going evaluation and certification process for all payment documentation at the various stages of the project to avoid disputes regarding the claim documents. This will allow for incomplete and expired payment supporting documents to be detected at an earlier stage, when payment is delayed, so that when payment is ready to be effected they are promptly rectified, without limiting the contractor's rights.
- Identification of the actor for each activity in the payment cycle so as to clarify their value needs for improved output value purposes: The key actors in the payment cycle identified during the primary data collection stage are mainly the contractor–client consulting agents–implementing agent–PMT–DPW–client. In the current practice, payment evaluation is undertaken by the contractor and the client consulting agents, followed by certification which is partly undertaken by the client consulting agents, the implementing agents and PMT. Finally, authorisation is collectively undertaken by implementing agents, PMT, DPW and client user departments. These actors are in different entities with specific requirements that are not electronically integrated. The findings of this study show that the various intermediary authorisation agents are causing payment to be delayed by as much as 45 days.

Payment documentation requirements and the time line for submissions should be made available to the contractor and all other contracting parties to enable full compliance from the onset.

- Reduction of variability in the payment cycle so as to streamline conversion and flow processes: The auditor general's random verification and documentation requirements should be formalised. Buffer funding should be secured by client implementing agents to absorb erratic payment situations. It is also believed that if defaulting parties to delays are held personally accountable for payment delays, the level of cooperation would be higher. Since the payment evaluation, certification and authorisation go through contractor–consulting agents–implementing agents–PMT–DPW–user department, the funds released for payments should not go through user department–DPW–implementing agents–contractor, but should rather be user department–contractor. This could reduce the payment duration significantly.
- Enhancement of team building and cooperation with clients and their agents: The bureaucratic payment processes can be consolidated by the various authorisation agents through documentation standardisation and an integrated computerised system. Furthermore, time lines for evaluation, certification and authorisation should be established with responsible persons to discharge each stage. At the beginning of the project, contractors together with clients and their agents are to be educated on the various documentation requirements that will enable payment to be processed efficiently. Partnership among the contracting parties is to be enhanced through dedicated communication channels to ensure that any breakdown in other forms of communication is quickly resolved.
- Balancing flow improvement and conversion improvement where it is possible to so do: When payments are delayed, contractors are to be assisted with cession for material supply guarantee by the client to enable the limited resources of the contractor to be used for settling wages and plant hire. Human resource skills capacity building and integrated electronic payment processing systems should be implemented among the evaluation, certification and authorisation agents to enable on-time processing to be effected and also to assist and track defaulting parties for a more efficient process. Also, user departments should advance payments for implementing costs against a project on a cash flow basis to reduce the long payment delay effects to contractors.

5.5 RECOMMENDATIONS

Having identified inadequate construction documentation, prolonged payment claim documentation approval processes, a lack of capacity by clients, multiple points of payment authorisation processes and inadequate finance by the client as the problems causing delayed payment, the following recommendations are made:

- Client agents should partner with the contractor in regular design and documentation reviews to eliminate waste that may occur due to incorrect supplier identification, inadequate construction time allocation, wrong specifications, inadequate cost or budget allowed in the bill of quantities and inadequate finance by the client. This will ensure that the adequate cost allowable is reviewed periodically to enable the client to secure enough funds for on-time payment to the contractor so that the contractor does not have to deviate from scheduled activities.
- The contractor and client payment certifying agent should partner in arranging the payment process as well as meet to jointly prepare monthly evaluations to reduce the prolonged payment documentation process cycle.
- Contractors should be guided or mentored from the onset of the project as to all the necessary documentation and supporting documents that will be required by the client to ensure that payment approvals are not delayed
- The payment authorisation agent's capacity should be enhanced through training and improved powers as a singular point of control performed efficiently in order to eliminate double handling of the process.
- Payment authorisation agents' systems and processes are to be integrated to ensure that all parties are implementing the same protocols.

5.6 FURTHER RESEARCH

This research focused on the use of lean construction principles to evaluate delayed payment to contractors in the East London, Port Elizabeth and surrounding areas. The study was able to identify the causes and their effect on contractors and the possible remedies to ensure that payment are not delayed to contractors. However, further research is to be conducted into the contractual remedies that will ensure that contractors do not lose their projects' intended benefits. Given the limited surveys that were conducted, a larger study should seek to

understand the issues from a wider population and then use triangulated data to propose policy revision where needed, especially for public sector projects.

REFERENCES

Aiyetan, A., Smallwood, J. & Shakantu, W. 2011. A systems thinking approach to eliminate delays on building construction projects in South Africa. *Acta Structilia,* 18(2), pp. 19-39.

AlSehaimi, A. & Koskela, L. 2008. What can be learned from studies on delay in construction? *16th Annual Conference of the International Group for Lean Construction proceedings*, 16-18 July, Manchester, UK, pp. 95-106.

Asianoah, R. 2011. Improving property development in Mahikeng Local Municipality. Unpublished postgraduate diploma dissertation, North West University, Mafikeng.

Assaf, A. & Al-Hajji, S. 2006. Causes of delay in large construction projects in Saudi Arabia. *International Journal of Project Management*. 24(4), pp. 349-357.

Ballard, G. 2008. The lean project delivery system: An update. *Lean Construction Journal*, 2008 Issue, pp. 1-19.

Baloyi, L. & Bekker, M. 2011. Causes of construction cost and time overruns: The 2010 FIFA World Cup stadia in South Africa. *Acta Structilia,* 18(1), pp. 51-67.

Buys, F. 2006. Payment certification problems: Who is to blame? *Acta Structilia,* 13(2), pp. 114-126.

Cameron, R. 2009. A sequential mixed model research design: Design, analytical and display issues. *International Journal of Multiple Research Approaches,* 3(2), pp. 140-152.

Cohen, L., Manion, L. & Morrison, K. 2007. *Research methods in education. 6th ed.* United Kingdom: Routledge

Construction Industry Development Board. 2004. *Construction Contracts - an Introduction: 3Rs Basic Guide for SME's*. CIDB: Pretoria.

Construction Industry Development Board. 2009. *Streamlining payment processes* (Practice note No. 19 version1). CIDB: Pretoria.

Construction Industry Development Board. 2010. *Notes on the CIDB workshop on delayed payments in the construction industry.* CIDB: Pretoria.

Creswell, J.W. 2003. *Research design. 2nd ed.* London: Sage Publications.

Creswell, J.W. 2009. *Research design: Qualitative, quantitative and mixed methods approach. 3rd ed*. London: Sage Publications.

Cunningham, T. 2013. *Will the Construction Contracts Bill improve subcontractor cash flow? Other Resources.* Paper 10. Available online at: http://arrow.dit.ie/beschreoth/10. [Accessed 10 March 2013].

Forbes, L. H. & Ahmed, S. M. 2011. *Modern construction: Lean project delivery and integrated practices*. Boca Raton: CRC Press.

Ford, E. D. 2000. *Scientific method for ecological research*. Washington: Cambridge University Press.

Garrett, D. & Lee, J. 2011. Lean construction submittal process - A case study. *Quality Engineering*, 23(1), pp. 84-93.

Hanid, M., Siriwardena, M. & Koskela, L. 2011. What are the big issues in cost management? *19th Annual Conference of the International Group for Lean Construction proceedings*, 13-15 July, Lima, Peru, pp. 280-289.

Hansen, G. & Olsson, N. 2011, Layered project - layered process: Lean thinking and flexible solutions. *Architectural Engineering & Design Management*, 7(2), pp. 70-84.

Ibironke, O.T., Oladinrin, T. O., Adeniyi, O. &. Eboreime, I. V. 2013. Analysis of non-excusable delay factors influencing contractors' performance in Lagos State, Nigeria. *Journal of Construction in Developing Countries*, 18(2), pp. 33-47.

Jacks, M. 2012. Construction pay drain. Available online at: http://www.fin24.com/Opinion/Columnists/Construction-pay-drain-20120803. [Accessed 1 November 2012]

Judi, S. S. & Rashid, R. A. 2010. Contractor's right of action for late or non-payment by the employer. *Journal of Surveying, Construction & Property*, 1(1), pp. 65-95

Kenley, R. 2003. *Financing construction: Cash flows and cash farming*. London: Spon Press.

Kerzner, H. 2011. *Project management metrics, KPIs and dashboards: A guide to measuring and monitoring projects performance.* New York: Wiley & Sons.

Koskela, L. 1992. *Application of the new production philosophy to construction*. Technical Report No. 72, Centre for Integrated Facility Engineering (CIFE), Stanford University.

Kpamma, Z. & Adjei-Kumi, T. 2011. "Management of waste in the building design process: the Ghanaian consultants' perspective. *Architectural Engineering and Design Management*, 7(2), pp. 102–12.

Kumar, R. 2005. *Research methodology: Step-by-step guide for beginners. 2nd ed.* London: Sage Publications.

Leedy, P. D. & Ormrod, J. E. 2010. *Practical research: Planning and design. 9th ed*. Merrill, New Jersey: Pearson Education Inc.

Liker, J.K. 2004. *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*. New York: McGraw-Hill.

Ma, U. 2011. *No waste: Managing sustainability in construction*. Farnham, England: Gower Publishing.

McCabe, S. 2010. *Corporate strategy in donstruction: Understanding today's theory and practice.* Oxford: Wiley-Blackwell Publishers.

Meiling, J., Backlund, F. & Johnson, H. 2012. Managing for continuous improvement in off-site construction: evaluation of lean management principles. *Engineering, Construction and Architectural Management,* 19(2), pp. 141-158.

Mthi, V., Emuze, F. A. & Shakantu, W. 2012. The impact of late payments on the competitiveness of regional contractors. Proceedings of the *3th International Conference on Construction in Developing Countries* (ICCIDC-III), 3-5 August, Bangkok, Thailand, pp.138-145.

Simonsson, P., Björnfot, A., Erikshammar, J. & Olofsson, T. 2012. 'Learning to see' the effects of improved workflow in civil engineering projects. *Lean Construction Journal,* 2012 Issue, pp. 35-48.

Smith, R. E., Mossman, A. & Emmitt, S. 2011. Editorial: Lean and integrated project delivery special issue. *Lean Construction Journal,* 2011 Issue, pp. 1-16

Tapping, D. & Shuker, T. 2003. *Value stream management for the lean office: Eight steps to planning, mapping and sustaining lean improvements in administrative areas.* New York: Productive Press.

Tashakkori, A. & Teddlie, Ch. 2010. Putting the human back in "human research methodology": The researcher in mixed methods research." *Journal of Mixed Methods Research,* 4(4), pp. 271-277.

Tribelsky, E. & Sacks, R. 2011. An empirical study of information flows in multidisciplinary civil engineering design teams using lean measures. *Architectural Engineering & Design Management,* 7(2), pp. 85-101.

Verster, J. J. P. 2006. *Managing cost, contracts, communication and claims: A quantity surveying perspective on future opportunities*. Department of Quantity Surveying and

Construction Management, Faculty of Natural and Agricultural Science, the University of the Free State, Bloemfontein.

APPENDICES

Appendix A – Survey Research Instrument

Survey Questionnaires

Faculty of Engineering, the Built Environment and Information Technology Department of Building

Tel: 0833461667,

Email: ayesuntow27@yahoo.com

25 August 2014

Dear MBA Member,

RESEARCH SURVEY: EVALUATING LATE PAYMENT INDUCED WASTE IN SOUTH AFRICA THROUGH LEAN CONSTRUCTION PRINCIPLES

I am currently conducting research on the above topic towards my MSc Built Environment (Project Management) degree.

The treatise includes a survey to be conducted among randomly selected registered construction professionals from a data base within the Construction Industry nationally. Your participation is of particular importance to the success of the survey – without sufficient participants the study will not be able to attain the desired objectives.

This is to kindly request you to assist me by setting aside approximately 15 - 20 minutes of your valuable time in completing the attached questionnaire. The completed questionnaire must please be emailed to me ayesuntow27@yahoo.com by 15 September **2014**. Alternatively, I will collect from your office; please contact me for collection (Cell: 0833461667).

The assurance is given that your responses will be treated in the strictest confidence. Should you be interested, a copy of the findings of the study can be made available to you once the study has been completed.

Your support is highly appreciated; thank you very much for your time.

Yours faithfully

Eric Akuffo-Ntow — Student

Prof F Buys — Supervisor

Section One: Demographic Information

Organizational

1. What is your current CIDB grading?

≤ 3	≥4 ≤ 6	≥ 7 ≤ 9

2. What category of construction work do you mainly do?

☐ Engineering (All classes) ☐ General Building

3. How long has your organization been involved with construction?

≤ 5years	≥5≤10years
≥ 11 ≤ 20years	≥ 20years

5. What is the value of projects that you are mostly involved in

≤ R10m	≥R10m ≤R30m	>R30m ≤R80m
≥R80m ≤ R150m	≥ R150m	

Personal

1. Please indicate your gender:
   ☐ Male ☐ Female

2. Please indicate your age :

≤ 25years	≥25≤ 30years
≥ 31 ≤ 40years	≥ 40years

3. Please indicate the length of time you personally have been involved in the construction industry:

≤ 5years	>5<10years
≥ 10 ≤ 15years	≥ 15years

4. Please indicate your highest formal qualification:
   ☐ Matric Certificate ☐ Diploma ☐ Postgraduate Diploma

   ☐ Bachelors Degree ☐ Honours Degree ☐ Masters Degree ☐ Doctoral Degree

   ☐ Other (Please Specify):_____

5. Please indicate your status in the organisation:

   ☐ MD/Managing member/Principal ☐ Director/ senior executive

   ☐ Manager Senior staff ☐ Supervisor Trainee/Intern

   ☐ Other (Please Specify):_____

Section Two: Lean Construction Principles Utilization

1. How often do you study your project deliverables to know possible future problems?
   ☐ Never ☐ Rarely ☐ Sometimes ☐ Often

2. On a scale of 1 (never) to 5 (always), which of the following problems do you encounter while delivering projects (please note the 'unsure' option)?

	Waste identification	**Unsure**	**Never …….……Always**				
			1	**2**	**3**	**4**	**5**
2.1	Wrong specifications	U	1	2	3	4	5
2.2	Inadequate time for construction	U	1	2	3	4	5
2.3	Inadequate Cost/Budget allowed in the BoQ	U	1	2	3	4	5
2.4	Inadequate finance by the client	U	1	2	3	4	5
2.5	Inadequate finance by the contractor	U	1	2	3	4	5
2.6	Delays in supplier delivery	U	1	2	3	4	5

Section Three: Late payment

1.1 How long does it normally take the client representative to certify a payment claim?

☐ 7days ☐ 14days ☐ 21days ☐ 28days ☐ Not sure

1.2 Do Private clients normally promptly authorize payment to the contractor in good time?

☐ Sometimes ☐ Often ☐ Always ☐ Occasionally

1.3 Do Public clients normally promptly authorize payment to the contractor in good time?

☐ Sometimes ☐ Often ☐ Always ☐ Occasionally

1.4 Do you think construction client intentionally delay payment to contractors?

☐ Sometimes ☐ Often ☐ Always ☐ Occasionally

1.5 How long does it normally take you to receive certified payment from the client?

≤ 14days	>14≤21days	≥ 21 ≤ 30days
> 30 ≤ 45days	≥ 45 ≤ 60days	≥ 60days

2. On a scale of 1 (minor) to 5 (major), to what extent do these bottlenecks manifest in late payment of money to contractors (please note the 'unsure' option)?

	Bottleneck	**Unsure**	**Minor….. ……Major**				
			1	**2**	**3**	**4**	**5**
2.1	Inadequate finance by client	U	1	2	3	4	5
2.2	Inadequate project cost estimate by the client 's agent	U	1	2	3	4	5
2.3	Contractors' failure to meet monthly progress targets	U	1	2	3	4	5
2.4	Delay in contractor submission of invoice	U	1	2	3	4	5
2.5	Incomplete submission of claim supporting document	U	1	2	3	4	5

2.6	Lack of capacity for handling payment processing by clients	U	1	2	3	4	5
2.7	Lack of system integration among payment certifying and authorization agents	U	1	2	3	4	5

3. On a scale of 1 (never) to 5 (always), how often do the following problems occur due to late payment to contractors (please note the 'unsure' option**)**?

	Problem	**Unsure**	**Never …….……Always**				
			1	**2**	**3**	**4**	**5**
3.1	Change in sequence of programmed work	U	1	2	3	4	5
3.2	Slowdown in the progress of work	U	1	2	3	4	5
3.3	Delay in the completion of activities	U	1	2	3	4	5
3.4	Abandonment of the work	U	1	2	3	4	5
3.5	Low employee morale	U	1	2	3	4	5
3.6	Loss of key personnel due to delayed wages/salaries	U	1	2	3	4	5
3.7	Loss of trade discount from suppliers	U	1	2	3	4	5
3.8	Inability to secure enough materials to deliver the project	U	1	2	3	4	5
3.9	Loss of expected profit due to high interest payment on overdue account	U	1	2	3	4	5

4. On a scale of 1 (minor) to 5 (major)**,** to what extent would the following interventions assist the Client Quantity Surveyor to eliminate or reduce payment delays to contractors (please note the 'unsure' option **)**?

	Intervention	**Unsure**	**Minor …….……Major**				
			1	**2**	**3**	**4**	**5**
5.1	Provide adequate cost estimate for the client to make adequate budgetary provision	U	1	2	3	4	5
5.2	Set out clear budgetary allowances to cover uncertain financial obligations	U	1	2	3	4	5
5.3	Client to empower the QS to certify financial values for payment	U	1	2	3	4	5
5.4	Client to empower the QS to authorize payment to eliminate double handling	U	1	2	3	4	5
5.5	Client QS to partner with the contractor to jointly evaluate the progress of the works	U	1	2	3	4	5
5.6	Client QS to partner with the contractor to arrange the payment process	U	1	2	3	4	5
5.7	Contractor and client payment certifying agent should meet to prepare monthly evaluation	U	1	2	3	4	5
5.8	Contractor should be involved in design and cost reviews to assist in eliminating waste	U	1	2	3	4	5

5.9	CIDB should standardized payment procedures for all construction works	U	1	2	3	4	5
5.10	Build authorization agent capacity for payment	U	1	2	3	4	5

Please provide me with your company details to contact you if any queries arise regarding the questionnaire [this is optional if you want to remain anonymous).

Name: _____

Company Name: _____

Contact Number: _____

Email address: _____

Thank you very much for completing the research questionnaire

Appendix B – Interview Instrument

Interview Protocol

A – Demographic information

1. Please state, is your gender (Male, Female)?
2. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)?
3. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)?
4. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)?
5. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)?
6. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)?

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects?
2. What activity group constitute a bottleneck in the payment process?
3. When a payment is delayed, what administrative measures do you employ to facilitate the process?
4. How do you address the rework of documents to facilitate payments?
5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?
2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?

3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement does not form a reason for payment delay?
5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?
6. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?

Appendix C – Interview Transcripts

Interviewee 1

Coega Development Corporation: Project Manager 1

A – Demographic information

1. Please state, is your gender (Male, Female)?- *Male*
2. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)? - *31-35*
3. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)? -*Diploma*
4. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)? - *5-10*
5. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)? - *Implementing agent*
6. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)? -*Prince 2*

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects? - *3*

   Reasons:

   - *Process flow is clear, and it has been designed to track back*
   - *It enables each individual to take responsibility of their actions within the time frames for document processing*

2. What activity group constitute a bottleneck in the payment process? –

   - *Problems has been found with the contractors not submitting adequate information and supporting document for their monthly claims;*
   - *Client problems being that many times there are no funds because treasury sometimes wants to verify the execution of the project;*
   - *Randomly auditor general and treasury will want to verify the existence and the stage of the project;*
   - *Timeline for deadlines are sometimes not adhered to by the contractor and the client agents in submitting payment certificate;*
   - *Payment runs days are sometimes changed by the client, within short notice, causing submission dates to be missed*

3. When a payment is delayed, what administrative measures do you employ to facilitate the process? -
    - *First the cause and the responsible person is ascertained*
    - *Some document submitted by the QS's are found to be incomplete*

4. How do you address the rework of documents to facilitate payments?
    - Comments are prepared on the incomplete document, then sent back to the client agent and contractor to rectify before they are finally submitted.

5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
    - *Client implementing agents also has its own internal process that causes hold up in the release of the funds*
    - *The released funds from the client has to be processed through Coega's internal financed processes that also takes at least a week for the funds to be paid into the contractors account*

6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
    - *Implementing agent thinks: Contractors should focus on activities that requires less material and plant resources. Human capital should be concentrated on labour intensive activities in order to reduce their negative financial impact on the project*.

7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
    - *The client usually assist the contractors by supporting them with a cessation to the suppliers for the direct payment from the client of all material supplied to the contractor.*

8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?

- *Since materials forms almost 70% of the project, the client usually provide cession to the suppliers for the guarantee of payment to the contractor.*
- *The contractor then has to concentrate on activities that are on the critical path, to enable use the available labour meaningfully, so that when payment are made all other activities can be completed.*

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?
   - *Evaluating and certifying the progress of the work done*
   - *Reconciliation of the value of the works to the allowed budget.*

2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?
   - *Timeously notifying the contractor of the due date of valuation*
   - *Notifying the contractor of all the document required that will enable the payment to be approved*

3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
   - *Propose that the Client QS should meet up with the contractor's QS on site to progressively accesses the value of work done*

4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement does not form a reason for payment delay?
   - *Not sure*

5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?
   - *Notifying the contractor of all the document required that will enable the payment to be approved*
   - *Delay report should be escalated to the client for them*
   - *Auditor general want the individual workers to sign their report proving that they have been onsite and earn so much a salary. Workers refuse to sign these report*

since, the report captures the accruals of their wages before the fortnight for the wages to be paid

6. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?
    - *QS Should ensure that the correct client tax number, invoice number, date, and amount are reflected on the tax invoice*

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
    - *Parties should be aware of the dates for producing, processing and authorization of the payment certificate*

2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
    - *The party that is found to be in default, causing the delayed payment, should bear the full cost of interest claim by the contractors.*
    - *Computerized/electronic payment certification and authorization should be implemented, to enable document to be process from any part of the office,*

3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?
    - *Released of the funds from the client to the client has been found to be the problem, since there are steps that the funds must go through before they are released.*
    - *Portions of approved budget for projects should be released upfront, so that payment can be made urgently by the implementing agents, and then later reconcile their statement with the client.*

Interviewee 2

Coega Development Corporation Project manager 2

A – Demographic information

1. Please state, is your gender (Male, Female)? - *Female*
2. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)? - *31-35*
3. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)? -*BTech Civil*
4. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)? *5-10*
5. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)? - *Implementing*
6. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)? - *ECSA, SACPMP*

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects?
   - *2 years back the situation was bad= Level 1*
   - *2014 and 2015, the situation has marginally improved level 4. It does not take more that 21days* for contractors to receive payment
2. What activity group constitute a bottleneck in the payment process?
   - *2 years back the client was not paying on time, and contractors were being compensated for through interest claims.*
   - *Currently the client has been paying on time and therefore contractors are receiving payments on time*
   - *The only problem is the new requirements for all invoices to be accompanied by Vat Vendor search and the Tax clearance certificate, which contractors find it difficult to provide on a monthly basis.*
   - *Some contractors submit expired tax clearance certificate*

3. When a payment is delayed, what administrative measures do you employ to facilitate the process?
   - *Contractors claim for extension of time due to late payment*
   - *Interest claim for delayed payment.*

- *This is a lengthy process, and usually finality of claim is not determined until practical completion*

4. How do you address the rework of documents to facilitate payments?
   - *Expired tax clearance certificate are sent back to contractors to obtain renewed ones. This usually takes long and cause the document processing to be delayed*

5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
   - *CDC usually advices contractors to use the liquid cash on the payment of wages.*
   - *CDC then undertook material supply cession undertaken with suppliers to make direct payment on behalf of the contractors in order to ensure progress on site.*

6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
   - *The arrangement of direct payment of MOS on site to suppliers mitigated the situation and help the contractors to use their own funds to pay wages.*

7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
   - *Contractors send request for direct payment of all materials supplied on site direct by the client to the suppliers. (The arrangement is between the contractor and the supplier and CDC only guarantee payment of materials onsite to the supplier) This arrangement help a lot to alleviate stoppages of the works and to avoid strike and community on rest during the contract duration*

8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?
   - *The arrangement helped very well since contractors from 5GB/PE and lower always struggle to sustain cash flows when payment is delayed. It solved lots of financial problems and will recommend it use on future projects.*

- *The only disadvantage is that the there is a limited amount of cash flow through the company's accounts, limiting the potential upgrade of the contractor's CIDB grading to a higher level.*

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?
   - *Yes: Evaluate and certify the progressive value of the works and prepare payment certificate*

2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?
   - *Set dates as to when value of the works will be accessed for the preparation of payment certificate*
   - *QS should meet with the contractor onsite to agree on the value of the works*

3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
   - *QS usually request the contractor to do his/her own evaluation/claim before the agreed date.*
   - *QS and contractor then meet on site to check/verify and discuss the claim, and then agree on the final values that will be included in the payment certificate.*
4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement does not form a reason for payment delay?
   - *Cashflow and recovery statement has never been a problem on my project to delay payment certificate*

5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?
   - *Contractors sometimes delay in the submission of the labour report to the PA for onward submission to the client.*
   - *When this is detected the client project managers then intervenes and put the contractors under their contractual obligation to submit the document. This takes two*

days for the problem to be rectified, which usually do not delay the payment processing.

7. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?
    - *Communication breakdown between the contractor and the consultant principal agent/quantity surveyor has been identified as a problem for the prompt submission of the tax invoice.*

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
    - *CDC has the system in place that administer the payment process.*
    - *All payment are first registered at document control for capturing.*
    - *Then CDC project manager will distribute it to the client (DoE) and CDC finance requesting for the finance.*
    - *CDC finance releases the funds to the contractor and then sends a proof of payment via email to the project manager and an SMS to the contractors.*
    - *2 years ago, the transfer of the funds by the client was the biggest problem. But now this problem has been resolved*
    - *This can be seen in the minimal contractors claim for EoT due to delayed payment currently.*

2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
    - *2 years ago my proposal will be that the client should use the projected cash flow to advance 3months payment to CDC for on time payment to the contractors and then when actual claims are done by the contractor, reconciliation of account will be done by CDC*

3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?

- *Currently the problem is 70% solved the system is working much better than, but there is still room for improvement*

Interviewee 3

The Mvula Trust Project Manager

A – Demographic information

1. Please state, is your gender (Male, Female)? - *Male*
2. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)? - *31-35*
3. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)? - *BTech*
4. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)? - *11-15*
5. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)? - *Implementing agent*
6. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)? -*SACPCMP*

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects?- *3 (average)*

2. What activity group constitute a bottleneck in the payment process?
   - *Authorization*
   - *In accuracies in the documentation submitted by consultant usually causes delays to authorization.*
   - *Client authorization agent/managers also have further requirements as to how payments are to be processed and packaged*

3. When a payment is delayed, what administrative measures do you employ to facilitate the process?
   - *Email and additional time are spent in following up on delayed payment.*
   - *Also the root cause of the delay is investigated to ascertain the delay*
   - *It is as part of the contract that the contactor should receive payment by 30day period after invoicing*

4. How do you address the rework of documents to facilitate payments?

- *Document that are found to be inadequate for authorization are sent back to the relevant parties for rectification*
- *Contractors are given part payment of their accounts with, however when it comes to payment reconciliation from the client side it becomes a nightmare*

5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
   - *Contractors have the right to receive payment within 30day period as per the stipulated contract*
   - *Contractors see delayed payment as a breach of the contract, and tend to stop investing in additional funds to undertake the works*
   - *Contractors abandon the site since they don't know when payment will be effected*
6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
   - *Contractors are made part payment to enable them to source vital human resources to keep the work going*

7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
   - *Contractors resort to credit for materials from suppliers.*
   - *However, when their credit ceiling is reached, and no payment are forthcoming, contractors end up being black listed by their suppliers.*

8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?
   - *Resources from different client are shuffled around from one project to the other to minimize the waiting period for the performance of activities*

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?
   - *QS Evaluate the progress of the works and agrees with contractor on the amounts.*

- *Currently contractors depends on the evaluation of the client QS to prepare progress evaluation without the contractors input.*
- *Previously contractors does their own evaluation of the progress of the works, send to the client QS for certification. If the client QS has any doubt of the contractors claim then a meeting is arranged to solve the differences.*
- *Upon the agreement of the amounts, the JBCC/GCC certificate is prepared by the PQS.*
- *And then all the supporting document are included for onward submission to the client for approval.*

2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?
   - *Timeline for the evaluation of payment certificate should be established at the onset of the project*
   - *Contractors should submit the necessary documentation as early as possible to enable the process to be as smooth as possible.*

3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
   - *Timeline for the evaluation of payment certificate should be established at the onset of the project*
   - *Contractors should submit the necessary documentation as early as possible to enable the process to be as smooth as possible.*

4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement does not form a reason for payment delay?
   - *The cash flow document has to be requested from the contractor on-time immediately after the certified amount has been agreed.*
   - *Recovery statement should be prepared on time by the QS for inclusion into the certificate*

5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?

- *The labour report has become inimical to government project.*
- *Government is creating these projects to provide jobs for its citizenry, hence labour data showing employment are being request for statistical purposes to enable government to report on the progress of the economy.*
- *Client payment agents tends to hold back payment to contractors if these labour data information are not submitted*

6. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?
    - *The tax invoice should clearly indicate the payer and recipient tax numbers, to enable the receiver of revenue to collect its taxes accordingly*
    - *The tax amount must be shown separately on the tax invoice as well*

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
    - *Accuracy in the submission of document should be at the top most.*
    - *Deadlines for submissions should be adhered to.*
    - *Willingness of all the parties from the contractor, consultant and the client to fast track the process to be the goal*

2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
    - *Training and workshops*
    - *Contractors must be workshopped as to how to prepare and submit claim document to the consultant. The workshop is to be conducted by the client or the clients implementing agents with contractors to school or inform them of what is required for a payment certificate to be ready for approval. Some implementing agents are undertaking this training process on a smaller scale at the moment.*

3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?

- *The QS is required in the process to keep track of the financial obligation of the client.*
- *Currently the process flow of payment documentation approval is – Contractor – Consultant – Implementing agents – Client.*
- *And the funds release is Client- implementing agents- contractor.*
- *However it is being proposed that funds released for payment should be Client to contractor, because implementing agents tends to hold up the funds in due to their own internal processes before the contractor is paid, causing further delay to the contractors.*

Interviewee 4

RQS Quantity Surveyor

A – Demographic information Please state, is your gender (Male, Female)? - *Male*

1. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)? - *21 to 30*
2. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)? - *BSc Hons*
3. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)? - *1-5*
4. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)? - *QS*
5. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)? - *SACQSP*

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects? - *3 (average)*
2. What activity group constitute a bottleneck in the payment process?
    - *Most cases authorization.*
    - *Release of the funds by the client. The client always has a set budget or contract order amount to verify with the certificate claim. When it is found that the claim amounts exceed the budget, then a budget adjustment order need to be prepared by the client to revise the budget, which usually takes a long process before the payment are authorized*
    - *This also makes the invoice to be returned to the contractor for revision*

3. When a payment is delayed, what administrative measures do you employ to facilitate the process?
    - *Since dates of payment as per the invoice date has elapsed, the contractor is then notified for them to revise the invoice date to conform with the latest revised client budget dates, however the payment certificate date is not revised.*
    - *This revised invoice will still have to go through the normal process again for the funds to be authorize for payment*

4. How do you address the rework of documents to facilitate payments?
    - Since dates of payment as per the invoice date has elapsed, the contractor is then notified for them to revise the invoice date to conform with the latest revised client budget dates, however the payment certificate date is not revised.
    - This revised invoice will still have to go through the normal process again for the funds to be authorize for payment

5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
    - *Not very clear*

6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
    - *No certificate is really revised, hence employees time are not wasted in the preparation of documentation.*
    - *Until payment is processed, cash flow finalisation are held up*
    - *Calls from sub-contractors in finalising their claim*

7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
    - *Not Sure*

8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?
    - *When payment is not done, there is a pause of process until the payment is gone through since most client does not favour advance payments to contractor.*
    - *This means that the contractor can put in an application for Extension of time claim for additional time with or without cost to compensate for the time lost and overheads*

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?
    - *Yes,*

- *QS value the work, to ensure that the work is done, and then recommend the amount for the issue of the payment certificate within the shortest possible period*

2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?
   - *QS to value the progress of the work as an ongoing process, as early as possible to ensure that no delay is encountered in the process.*

3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
   - *QS to value the progress of the work as an ongoing process, as early as possible to ensure that no delay is encountered in the process.*
   - *QS to submit his evaluation to the contractor on time for acceptance or objection. This will provide enough time for*

4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement does not form a reason for payment delay?
   - *Depending on the client supporting documents requirements, some client want these documents to accompany the certificate, some also want it afterwards at the authorization stage.*
   - *Consultant must ensure that these documents are readily available for the client*

5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?
   - *Labour report are submitted at site meetings for some client, hence if it is identified as a supporting document for authorization, then it will be readily prepared for inclusion. Emails are also sent to contractors as a reminder for the these document*

6. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?
   - *The tax invoice must be accompanied with a valid tax certificate. If the tax certificate has expired, the tax invoice end up being withheld until the proper one is submitted.*

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
    - *Cash flows should be as accurate as possible to enable both the QS and the client to make available the necessary funds for payment when required.*
    - *QS must collaborate with the contractor in preparing the payment certificate to avoid any delays, and the client department should endeavour as much as possible to make the payment at the stipulated time.*
2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
    - *When certificate are ready, project managers in the implementing department that oversee the final authorization before the finance department makes payment tends to be not available at the time, hence authorization takes additional two weeks in some cases.*
    - *Electronic and Additional authorization capacity is required, that will enable the capturing of information electronically for managers to authorize, when they are away from the office.*

3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?
    - *Computerised system of payment certificate should be implemented at implementing agent and the client department to enable payment to be done in real time.*
    - *The system should enable a first stage for the capturing of the data by assistant managers, and the second stage for processing and final authorization for the release of the funds*

Interviewee 5

Lakhanya QS – Quantity Surveyor

A – Demographic information Please state, is your gender (Male, Female)? - *Male*

1. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)? - *21-30*
2. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)? *Btech*
3. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)? *-1-5*
4. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)? - *QS*
5. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)? - *SACQSP*

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects?
    - *IDT/Provincial department- 2, National - 4*

2. What activity group constitute a bottleneck in the payment process?
    - *Authorization-*
    - *Payment runs from the provincial department takes 30days from the day of submission and hence tends to take effectively 45days-*
    - *Long period is attributed to payment document goes to PMT, to Client, to Treasury. Released of funds then comes from Treasury to client to IDT and then to Contractor*
    - *Payment runs from national department only takes 7days*
    - *Process is payment document goes to National Public works and to Treasury. Funds released comes from Treasury to Public works and then to contractor.*
3. When a payment is delayed, what administrative measures do you employ to facilitate the process?
    - *Follow up on where the payment document is sitting from the implementing agent.*
    - *Sometimes document are delayed at the implementing agents office. Necessary to know where the document is sitting to enable you to effectively adjudicate the claim for extension of time due to non-payment, and interest calculation.*

4. How do you address the rework of documents to facilitate payments?
    - *Different format for payment at the various implementing agents, and changes that occurs due to client change requirements. Some of the changes that do occur are Date to be rectified, contract numbers, vat numbers.*

5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
    - *The small and medium contractor's struggles to attain meaningful progress on site, this causes then to slow up the progress on site until funds are secured*

6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
    - *Most cases contractors keep their employees on site, even for over 6months when no payment has been received*

7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
    - *Contractors usually have a good relationship with their suppliers with a 30day delay payment*
    - *Does not support cession, because it was a failure in most of the project that he was undertaking.*
    - *Reason being there was a specified face brick for most of the schools in the province. There was only one supplier who had more demand than supply. This resulted in a backlog for the schools that took cession from the client, when client paid the money into the suppliers account, the suppliers could not meet the delivery deadline for the various contractors for 6months. Since money has been paid to the supplier, it made it difficult for refunds for sourcing alternative bricks elsewhere, hence causing the contractors to delay. It finally caused over 2 years for a 9months project*

8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?

- *Contractors usually have a good relationship with their suppliers with a 30day delay payment*
- *Materials which have long lead times such as roof sheeting will usually require the good supplier relationship for production to commence whilst waiting for payment*

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?

   Yes, we evaluate and verify what is being claimed by the contractor, prepare back-up claim document/payment certificate. Submit to the client for payment.

2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?
   - *Establish payment submission dates and ensure that contractors submit claim or supporting documents by this date.*
   - *Agree with contractor on claim and certified amount, prepare payment certificate and submit on or before time*
   - *Also dates for processing payment certificate should be established by all the agents' i.e. implementing agent, PMT, Client Department (DBE or DoE) and then Treasury.*
   - *This will enable all the parties to work towards achieving this dates.*
   - *The delays are usually related to provincial contracts which has lots of bodies in between for monitoring and auditing contracts as compared to national department which has no bodies in between to administer contracts.*

3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
   - *Timeously being on site to ensure that*
   - *On a project where there is a contractors QS, Will prefer that contractors submit claims prior to the QS going to site to check the progress of his claim, in order to rectify any anomalies that will be picked up from the contractors.*
   - *Also it provide the first basis of the contractor's expectations that will help to satisfy quantities.*

4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement *does not form a reason for payment delay?*
    - *Most contractors don't like assisting or supplying the QS with cash flow, they just don't care.*
    - *QS prepares and submit on behalf of the contractor, but turns to wrong most of the time, even though the cash flow is a projection.*

5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?
    - *All these information or supporting document should be relayed to the contractor form the onsite.*
    - *And the QS should not process any claim when this document is not attached to the claim.*

6. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?
    - *Workshop should be organised by the implementing agent to school the contractors on the standard of document (tax invoice) required. all the information to be displayed by the contractor on a tax invoice should be given to the contractor at this workshop to avoid confusion at a later stage.*
    - *The problems that have been identified are that some implementing agents want the tax invoice to be colour printed, date tax number etc., displayed in a certain way, and some also want the tax invoice to be stamped.*

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
    - *The intermediary institution (implementing agent) are usually causing delay in the payment process for most provincial department. At the moment*
    - *Long period is attributed to payment document goes to PMT, to Client, to Treasury. Released of funds then comes from Treasury to client to IDT and then to Contractor*
    - *Payment runs from national department only takes 7days*

- *Process is payment document goes to National Public works and to Treasury. Funds released comes from Treasury to Public works and then to contractor.*
- *Computerized/electronic system should be employed for preparing and issuing payment certificate. The system should be able to be accessed by all the various department that are involved in the processing of payment certificate.*
- *This will enable all the parties to verify the information at the same time before the hard document are submitted to avoid delays.*
- *Contractors should form partnership with the consultant QS to draw up a programme for the re-measurement of the works. There should be done progressively so that any problem encountered in previous evaluation will be rectified progressively.*
- *Should the contractor have problem with any payment certificate, the QS attention should be drawn for correction in the next month*

- *When payment is authorized to be released, it should be done straight to the contractors account and not through the implementing agent to avoid the delay of the release of funds, as the process for the documentation has gone through a lengthy process of verification*

2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
    - *Majority of the building contract are in JBCC, hence*
    - *All implementing agent should standardise their process and document to be in compliance with the JBCC, to enable a uniform format to be applied.*
    - *For example the Electronic financial management system (EFMS) being implemented by the DBE is a step in the right direction, however, most agent tend not to use the system, it's only the professional service providers that are using the system, and then printing out report for the implementing agents to verify.*

3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?
    - *Training should be provided by client and its implementing agent to all professional service providers to adopt the electronic payment and documentation system.*

Interviewee 6

Tzar Construction - Contractor

A – Demographic information

1. Please state, is your gender (Male, Female)? - *Male*
2. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)? - *31-35*
3. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)? - *BSC Hons*
4. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)? - *10*
5. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)? - *Contractor*
6. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)? - *SAICE*

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects?
   Mvula Trust = 1, Chrishani = 3, ADM Amathole = 3, BCM = 4

2. What activity group constitute a bottleneck in the payment process?
   - *Authorization*

3. When a payment is delayed, what administrative measures do you employ to facilitate the process?
   - *Call and email, Engineer/Quantity Surveyor and the Client project managers/finance to find out what is holding up the payment*
   - *Hold meetings with the Engineer/Quantity surveyors and the Client managers/finance to find out what is holding up the payment.*
   - *During such meetings client explain themselves as to the reasons why payment has been delayed.*
   - *Contractor will then draft contractual letters to enforce payment, and to explain to the client the contractual implications of the delayed payment*

4. How do you address the rework of documents to facilitate payments?

- *Most of the time the document are in order, but the client just does not have the money at the particular moment to pay.*

5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
   - *When delays in payment are excessive, suppliers stops from providing you with necessary materials. Since they know that the client has not paid and it is affecting their business.*
   - *Contractor then will result to slow pace of progress on site, to reduce the number of labour force to minimise the cost of the losses*
   - *This usually affects the completion time of the project. In such cases, the contractor will apply for Extension of time due to delayed payment through the principal agent or the engineer*

6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
   - *On big projects the contractor usually reduces the progress, and then apply for Extension of time with the adjustment of time related P&G to cover the extra time required to undertake the works.*
   - *Employees are usually not relocated to other sites, however their additional salaries are covered under by the client under the time related P&G items.*

7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
   - *Suppliers only stop when there is excessive non-payment from the contractor's side.*
   - *Overdraft are also used to secure enough material to ensure progress on site.*
   - *The cost of the overdraft are brought to the attention of the client for re-imbursement (interest on overdue account) due to non-payment*

8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?
   - *Contractor just stop the work until payments are made.*

- *Extension of time claim are then applied for the additional duration that will be required to complete the works.*
- *The stop and go of the activities has serious effect on the profit margins of the project and on the company as a whole.*
- *For example a project of six month with a team of employees to complete to gain a 10% profit. If the project is dragged for additional six months meaning that the team will have to be kept for a 12months duration for a 10% profit, effectively making the profit margin to be halved to 5%*
- *However, if the project is completed within the required duration, then the team will have been used for another project with 10% additional profit*

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?
   - *Contractor prepares payment certificate, he submit to the QS.*
   - *The Qs verifies, certifies and then prepares his valuation in support of the claim to be submitted to the client for payment.*
2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?
   - *There must be a clear set and agreed dates of the payment cycle, i.e. when the claim is to be submitted by the contractor*
   - *A clear time frame as to when evaluation is to be done by the QS and the contractor is to be set.*
   - *The duration and the responsible person for the certification of the payment certificate is to be established by the client.*
   - *The duration for authorization and the responsible person by the client should also be established to avoid any confusion.*

3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
   - *Both the Contractor's and the client QS are to meet onsite at a predetermined and agreed dates for measuring and agreeing on the values.*

- *This will reduce the duplication of the works being undertaken by the Consultant QS and contractor QS that will have been done on the same day at the same time on the site.*

4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement does not form a reason for payment delay?
   - *There should be a check list of the supporting document that will be submitted by the contractor to ensure that the payment certificate is not delayed.*
   - *After the agreement of the final evaluation amounts by the parties, the cash flow can then be submitted by the contractor to avoid the revision of the document before the agreement of the payment certificate.*

5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?
   - *Contractor agrees that it is their responsibility to submit their labour report with all certificate claims, however they turn to default on this requirements and will employ the QS to always hunt them for this documents.*

6. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?
   - *The QS should know what a valid tax invoice looks like. Also all the specific tax invoice requirements should be communicated to the contractor in time to ensure that he complies with requirements before submission.*

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
   - *There should be timeline for payment at the various stages of the project.*
   - *There should be a responsible person who will check where the payment is at each stage of the process, and to ensure that all hold ups are immediately resolved to avoid payment delays.*

2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
    - *The finance department who are not usually involved at the project planning and execution stage should be involved when the contractor is appointed.*
    - *The finance depart must spell out in clear terms what they want from the technical department and the contractor to ensure that the final release of the funds is not delay due to incomplete documents.*
    - *Contractors should explain to the finance department the implication of delaying payment under JBCC being the grounds for the cancellation of the contract and in GCC for the suspension of the works.*
    - *Most tenders are priced with trade discount of the contractors from their suppliers on payment of time.*
    - *Also the finance department should be made aware of this trade discount by the contractors, and therefore financial loss claims will be made by the contractors for the forfeiture of their suppliers' trade discount if payment are not made on time.*

3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?
    - *Contractor does not know what can be done specifically to improve the system. However if all the information given above is followed, it help to improve the system*

Interviewee 7

Yondesakeni Trading Construction - Contractor

A – Demographic information Please state, is your gender (Male, Female)? - *Male*

1. Please indicate your age group (21 – 30, 31-35, 36-45, Over 45)? - *31-35*
2. Please indicate your highest level of education (BTech, BSc, BSc (hon), MSc, MTech, PhD)? *Diploma Building Engineering*
3. Please indicate the length of your professional experience (1-5, 5-10, 11-15, Over 15)? - *5-10*
4. Please state your designation (Contractor, Quantity Surveyor, Implementing Agent)? *Contractor/QS*
5. Please indicate your professional affiliation, if any (SACQSP, ECSA, SACPCMP, SACAP)? *NAFCOC*

B – Theme 1: Waste in payment process

1. On a scale of 1 to 5, how effective is the payment process on your projects?
   - *2 - depending on department*
   - *Some department are performing good and some are bad*

2. What activity group constitute a bottleneck in the payment process?
   - *Authorization and releasing funds by client is the problem*

3. When a payment is delayed, what administrative measures do you employ to facilitate the process?
   - *Contractor makes calls and send emails and letter correspondence from the Bottom*
   - *Call the QS first to find out whether the claim has been to the PA*
   - *Call PA to find out where the claim is sitting*
   - *Call client project manager to find out the status of the invoice*
   - *Call the client finance department to find out why payment has not been since the claim has been long overdue*

4. How do you address the rework of documents to facilitate payments?
   - *Contractor makes calls and send emails and letter correspondence from the Bottom*
   - *Call the QS first to find out whether the claim has been to the PA*

- *Call PA to find out where the claim is sitting*
- *Call client project manager to find out the status of the invoice*
- *Call the client finance department to find out why payment has not been since the claim has been long overdue*

5. When a payment is delayed, what are the types of 'waiting period' or 'hold up' that occurs in your processes and you have to address?
   - *Slow progress on site: Funds used to purchase material, to pay labourers are not forth coming, so quantity of labour force and materials are reduced to wait for more funds injection*

6. When payment is delayed, how do you address 'waiting for people' to be deployed for the execution of critical activities?
   - *Depending on when payment is made.*
   - *Employee are relocate to other site to perform activities, and when payment are rectified*
   - *Contractor has established a family relationship with his employees, and therefore they understand the locational shuffling for work execution process.*
   - *It's not always cost efficient to move employees around, but the situation calls for one to do so*
   - *Bank overdraft is secured to avoid strike issues by employees for non-payment of wages,*
7. When payment is delayed, how do you address 'waiting for materials' to be used on site?
   - *Contractor has resulted to the use overdraft with banks to ensure that materials are always available.*
   - *Overdraft interest are being borne by the contractors and it is killing their business. The interest are never factored into the contract, since all have contractual commitment that payment will be done on time*

8. When payment is delayed, how do you address 'waiting for activities', which demand on significant investment to commence?
   - Contractor uses bank overdraft to ensure that minimal waiting is encountered in the execution of activities.

- The cost of the bank overdraft is a big financial problem to their operation, since these funds are difficult to recoup.
- Build good relation with banks and suppliers, and when payment is made, then all debt are quickly settled to gain the trust/relationship of the business partners, otherwise your company will be bankrupt within two years

C – Theme 2: Quantity Surveyors' influence on the payment process

1. Do you understand the role of the professional Quantity Surveyor in the payment process?
   - *Yes*

2. Please explain or describe how a Quantity Surveyor can ensure payment is not delayed?
   - *Each contract/project has a timeline for when claim evaluation is done and submitted for payment*
   - *QS must establish a clear date to meet with the contractor on site to measure the progress of the works.*
   - *Set a clear date when the tax invoice from the contractor will be required to be submitted*
3. Please explain how the Quantity Surveyor can ensure that the evaluation of interim certificate does not form a reason for payment delay?
   - *QS should meet the contractor on site to measure the progress of the works in order to agree on the value of work done to date.*
   - *Separate measurement from the QS and Contractor should not be entertainment, since different value of work done are calculated by each party, forming the basis of argument and delay to evaluation and certification.*

4. Please explain how the Quantity Surveyor can ensure that the cash flow and recovery statement does not form a reason for payment delay?
   - *Contractor only submit cash flow at the start of the project and does not revise the cash flow afterwards*

5. Please explain how the Quantity Surveyor can ensure that the contractors' labour report does not form a reason for payment delay?
    - *Labour report should be requested by the QS way in advance before or on the evaluation date to ensure that the document is ready*

6. Please mention and describe how the Quantity Surveyor can ensure that the tax invoice does not form a reason for payment delay?
    - *QS must request the tax invoice on time.*
    - *The QS should check that the Rands and Cents on the tax invoice matches with payment certificate, to ensure that no queries are raised on the payment certificate documentation from the client*

D – Theme 3: Improvement of the payment process

1. In your view, how can project parties ensure the effective flow of the payment process from stage one to final payment?
    - *Each party should attend meetings, regular site visit to ascertain the progress of the works in order to alleviate all doubts about the value of work for payment certificate*
    - *Client project managers should also be involved on the time line for the timely approval of the documentation*
2. In your view, what are the mechanisms / ways for addressing problems within the payment process so that delayed payment is curtailed?
    - *Most problems are that cause the delay are related to the client for example*
    - *Client project managers who are to approve payment document (authorization) are usually found to be unavailable to do so. Either they are on leave or attending workshops.*
    - *Solutions: Assistants or deputies should be given powers with senior managers are not available.*
    - *Since authorization has financial implication, don't you think that is the reason why managers with authority are being sanctioned to finally authorize for the release of funds. – In that case more managers with financial authorization authority are to be employed to support each other*

- *Electronic form of payment capturing and authorization should be implemented to enable other managers to access history of the works in order to authorize payment when the substantive manager is not available. Also it will enable the managers to access information that has been captured anywhere for them to sign electronically for the funds to be released*

3. Based on your experience, how can the payment process in a traditional procurement system be improved in South African construction?
    - *The payment time for contractors should be reduced from 30days to 10days after certification.*
    - *Lots of families depend on the payment for their livelihood, hence the ripple effect of delayed payment goes not just beyond delayed project completion, but hanger for families who have to make alternative plans for delayed payment*