AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN THE CORPORATE CULTURE OF SOUTH AFRICAN CONSTRUCTION FIRMS AND PERFORMANCE

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A research report submitted to the Faculty of Engineering and the Built Environment, School of Construction Economics and Management in partial fulfillment for the degree of Master of Science in Building

DECLARATION

I hereby declare that this is my own work.

It is submitted for the degree Master of Science in Building at the University of the Witwatersrand, Johannesburg. It has not been previously submitted for this purpose, or for any other degree or examination at any university.

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07 October 2009

ACKNOWLEDGEMENTS

A sincere thanks to my supervisor, Prof. A.A. Talukhaba for his invaluable knowledge, input and encouragement.

A special thanks to all the individuals who took time to participate in the survey, their input is much appreciated.

ABSTRACT

Poor capacity, poor quality, low productivity and low profit margins continue to characterize the majority of South African construction firms. These shortcomings are attributable to poor cultural practices that are often associated with construction firms. In an effort to devise strategies intended to improve the performance of South African construction firms, this research report investigates the relationship that exists between the corporate culture and performance of South African construction firms.

An in depth literature review that identified the key corporate culture dimensions that are critical for the success of construction firms was undertaken. Literature advocating for the existence of a positive relationship between corporate culture and business performance was also explored.

To ascertain the level of importance attached to the various corporate culture dimensions by South African construction firms, a survey was undertaken amongst senior employees of different sized construction firms in the Gauteng region. The survey revealed that the respondents from the different sized firms were largely similar in their level of appreciation of the various corporate culture dimensions.

The study found that there is generally a positive relationship that exists between the corporate culture and performance of South African construction firms. The degree or intensity of the relationship is largely dependent on the size of the organization. Small and medium sized construction firms demonstrated greater appreciation of the positive relationship between corporate culture and business performance.

To improve the performance of South African construction firms, the study recommends that research and development, innovation, benchmarking and customer orientation be prioritized. The study further recommends for the development and adoption of effective human resources retention strategies, this should be coupled with appropriate mentoring and career development programmes.

Keywords: corporate culture, business performance, construction firms, South Africa

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Chapter 1: Introduction

1.0. Introduction

The ushering in of a new democratic government in 1994 has substantially improved the economic prospects of South Africa. According to Rodrik (2006), South Africaôs real economic growth averaged 3.1% (1.1% in per capita terms) during 1995 ï 2004, this represents a substantial improvement on the 0.8% average growth rate (-1.3% in per capita terms) during 1985 ï 1994. The improved growth rate has gathered momentum: the average growth rate for the first five years after 1994 was 2.6%, and 3.6% in the following five years (Du Plessis and Smit, 2007). Aron and Muellbauer (2007) attribute these rising economic growth levels to the introduction of frameworks such as inflation targeting that have been credited with improving the credibility and effectives of macro-economic policy. Despite these achievements in the economic front, the country continues to face numerous challenges. Amongst the most critical and pressing of these challenges is the provision of adequate infrastructure.

Although South Africa is renowned for its infrastructure especially when compared to other African countries, underinvestment on infrastructure over the past 20 ï 30 years has led to the considerable deterioration of the older infrastructure base (Bogetic *et al*., 2005). An ailing power supply, chronic shortages of housing, schools, hospitals and other social facilities, and bulking road networks serve as a constant reminder of the immense obstacles the country has to overcome.

To counteract the effects of this infrastructure backlog, the government has embarked on an ambitious infrastructure programme. Government spending on infrastructure has increased by 15% since 2007 and this is expected to continue well beyond 2010 (Hunt *et al*., 2007). It is estimated that between 2006 and 2010 the Government would have invested more than R400 billion in the countryôs infrastructure ï from rail freight services to energy production, to communications, airports and other ports of entry (2010 Communication Project Management Unit). Although the government has committed financial resources to address the challenges outlined above; a resilient and vibrant construction industry is required to complement the government in its quest to improve

the lives of ordinary South Africans.

According to Ruddock (2007), a good construction sector will usually ensure a healthy level of business across the board, as the necessary infrastructure for such actions to occur will be in place. Evidently, the construction industry is critical to the growth and success of the South African economy. However, structural problems associated with the construction industry continue to have a negative impact on the performance of the industry thus preventing the industry from taking its rightful position in the economy.

1.1. Problem Statement

Despite the favorable economic conditions that have prevailed over the past five years the South African construction industry continues to under achieve. In the background of a buoyant economy the South African construction industry only managed to contribute less than 3% towards the Gross Domestic Product (GDP) in 2007 (Statistics South Africa, 2008).

According to Dlungwana *et.al*. (2002) the South African construction industryøs contribution to the GDP has shrunk to approximately 3%, compared to 7% in the 70øs. The Department of Public Works (DPW) (1999) articulates the following as being the major indicators of the industryøs poor performance:

- a sharp decline in employment in the last 20 years
- slow delivery of public sector projects due to poor capacity of contractors
- low productivity and poor quality workmanship
- low profit margins for contractors

Evidence of the South African construction industryøs poor performance is well documented. A research commissioned by the Construction Industry Development Board (CIDB) concluded that the South African construction industry is characterized by high levels of enterprise failure, poor levels of quality, and a lack of process and productivity improvement (SA Construction Industry Report, 2004). Smallwood (2000)

concluded that the causes of poor performance, as perceived by clients, were a lack of concern for the environment, inadequate or poor planning, poor management and low skill level amongst workers.

In contrast, the construction industries of other developing nations such as India contributed approximately 8.5% to the total of Indiaôs GDP in the 2008 financial year. The industryôs performance has been consistent since 2006 and has fuelled the creation of 33 million jobs (Indo ï Italian Chamber, 2008).

The Japanese construction industry is renowned as being one of the best in the world (Levy, 1990). In a study that sought to compare the performance of contractors from the United States (US), United Kingdom (UK) and Japan, Xiao *et al*. (2002) observed that Japanese contractors performed better than their US and UK counterparts. Japanese contractors achieved fewer defects on finished products, longer defects liability periods and were called fewer times after completion. They concluded that that this sterling performance is attributed to the deep rooted quality consciousness of Japanese contractors, close working relationships with subcontractors, and fully developed Total Quality Management (TQM) and Quality Assurance (QA) systems. Haley (1994) identified worker participation, superior quality and investment on research & development as the enduring qualities that characterize the corporate culture of Japanese construction firms.

A study aimed at ascertaining the corporate culture that characterizes South African construction firms has never been undertaken. Given the positive influence that corporate culture has had on the success of Japanese construction firms and the lackluster performance of the South African constructions firms, it is essential to investigate the corporate culture of South African construction firms. This will not only enable South African construction firms to identify deficiencies in their practices but will also contribute positively in the performance of the industry and upliftment of the society as a whole.

1.2. Research Questions

The main question the research seeks to address is:

What is the nature of the relationship that exists between the corporate culture and the performance of South African construction firms?

Flowing from the main research question are the following subsidiary questions:
(a) Is there a difference in perception regarding the importance of the various corporate culture dimensions amongst construction firms in South Africa?
(b) Which corporate culture dimensions are perceived to be the most important amongst construction firms in South Africa?
(c) Which corporate culture dimensions are perceived to be the least important amongst construction firms in South Africa?
(d) What is the impact of the various corporate culture dimensions on the performance of South African construction firms?

1.3. Hypothesis

The research report sets out to prove the following:

- That a positive relationship exists between the corporate culture and the performance of South African construction firms.

1.4. Objectives

The objectives of the report are intertwined with the main and subsidiary research questions that have been outlined above. The achievement of each objective is directly dependent upon the presentation of unambiguous responses to the research questions that have been posed above.

In essence the report seeks to;
(a) Identify corporate culture dimensions that are critical to the success of construction

firms.

(b) Identify corporate culture dimensions that are perceived to be very important by South African construction firms.

(c) Identify corporate culture dimensions that are perceived to be less important by South African construction firms.

(d) Evaluate the relationship that exists between the corporate culture of South African construction firms and their performance.

(e) Identify deficiencies in the corporate culture of South African construction firms.

1.5. Methodology

A literature review that identified and considered the importance of the various corporate culture dimensions in the context of construction firms was undertaken. The relationship that exists between corporate culture and business performance was also examined. A total of 57 construction firms in three different size categories were investigated with the intention of ascertaining the corporate culture that predominantly prevails amongst South African construction firms. The first category consisted of big reputable construction firms while the second and third categories consisted of medium and small construction firms respectively.

A comprehensive questionnaire was administered to various individuals who hold senior positions in construction firms. The results were analyzed and conclusions and recommendations were derived from the analysis. Details of the research methodology adopted in the study are discussed in Chapter 3.

1.6. Limitations

Due to time and budget constraints it was impossible to study the entire South African contractor population, however the sample that has been adopted for the purposes of this study is an acceptable reflection of the South African contractor population as it encompasses small, medium and large firms.

1.7. Significance

The role and influence of the construction industry in the South African economy is pivotal. Not only is the industry responsible for the provision of much needed infrastructure, it also provides income to thousands of people under its employ. Therefore it is in the interest of all construction industry stakeholders to devise strategies in an endeavor to improve the performance of the construction industry.

1.8. Report Structure

The first chapter highlights the importance of the construction industry in relation to the economy. The challenge of underperformance in the South African construction industry is introduced. The introduction also contains the problem statement, research question, hypothesis, objectives, methodology, limitations and significance.

In the literature review the different corporate culture dimensions that are critical for business success are discussed. The relationship that exists between corporate culture and performance is scrutinized. This is done by evaluating the corporate culture practices associated with some of the best performing construction industries in the world.

The third chapter discusses the methodology that was adopted in the attainment of research objectives.

The fourth chapter presents the results of survey. The findings of the research are presented in the fifth chapter while chapter six outlines conclusions and recommendations.

Chapter 2 - Literature Review

2.0. Introduction

The literature review aims to define clearly what is meant by the term ñcorporate cultureò. The literature will also reveal and provide an in-depth discussion of the most important corporate culture dimensions. Cognizance of the unique environment that construction firms operate under will also be considered. The relationship that is said to exist between corporate culture and business performance will also be explored. The latter part of the literature will focus on the various methods that are applicable in the measurement and assessment of business performance.

2.1. Defining corporate culture

Culture has proven to be a difficult concept to define and thus researchers have provided various definitions for this concept. Barthorpe *et al.* (1999) discovered that the word ócultureôhas many meanings which have changed over the past two generations. Tagiuri (1968) defines corporate culture as an enduring quality of an organization that is experienced by employees and influences their behaviour. Pheysey (1993) provides an almost similar explanation that defines culture as how enterprises work and how the people associated with them act. Bodley (1994) defined corporate culture as simply what people think, what they do and what they produce. Sherriton and Stern (1997) provided a more ideological view of corporate culture and eloquently defined it as ritualized patterns of belief, values and behaviors shared by members of an organization. The definitions above demonstrate that corporate culture is closely intertwined with peoplesôvalues and belief systems and how these manifest themselves in the work environment.

Brown (1995) contends that rarely do organizations possess a single homogenous culture. Instead, the majority of organizations tend to contain many identifiable subcultures, the beliefs, values and assumptions which may compete with the dominant culture. These could form for many reasons, perhaps due to functional differences in the organization (finance, sales, marketing), or to ethnic or geographic differences among employees (Sadri and Lees, 2001).

The academy, the club, the baseball team and the fortress were identified by Sonnenfeld (1988) as the four main types of corporate culture. The academy exposes employees to many different jobs so that they can move around within the organization. The club is very concerned with how people will fit in the organization. The baseball team consists of talented people that are rewarded heavily for the accomplishments but who will readily leave the organization when a better opportunity comes along. The fortress is an organization that is concerned mainly with survival.

In their research Goffee and Jones (1996) also identified four cultural types, namely: networked, mercenary, fragmented, and communal. A networked culture is distinguished by high sociability and low solidarity. Individuals in this type of culture feel like family and socialize often. A mercenary has low sociability and high solidarity. Individuals do not interact socially but are united in supporting strategic business objectives. A fragmented culture is characterized by low sociability and low solidarity. People in this type of organization rarely interact. Lastly, a communal organization has high sociability and high solidarity. Members of such an organization work closely together for long hours and will likely socialize together.

The literature review identifies mission, ethics, quality, health, safety and environment standards, sub-contractor relationships, research and development, innovation, management style, employee relations, customer orientation and benchmarking as the most influential components of corporate culture. The discussion that follows provides a clear assessment of each of the corporate culture dimensions mentioned above. The influence of each dimension in the construction environment context will also be considered.

2.2. Mission

The mission of any business organization is usually proclaimed through its mission statement. David *et al*. (2003) define mission statements as enduring statements of purpose that distinguish one organization from other similar enterprises. For an organization, a mission statement is expected to respond unequivocally to the following

questions, ñwhy do we existò, ñwhat is our purposeò, ñwhat are we trying to accomplishò? When these questions are properly answered, a mission statement captures an organizationôs unique and enduring purpose (Bart, 1998).

A criticism often leveled at mission statements is that they are vapid, ñwe love our customersò, ñwe love our employeesò, ñwe love our shareholdersò and are often too disconnected from the strengths and capabilities of the firm (Simpson, 1994). David and David (2003), asserted that mission statements should be inspiring, enduring, project a sense of worth, intent and shared expectations and should state the intrinsic value of the firmôs products / services. Pearce and David (1987) suggest that ideally a mission should allude to the following components.

- Customers (the target market)
- Products and services (offerings and value provided to customers)
- Geographic markets (where the firm seeks markets)
- Technology (the technology used to produce and market products)
- Concern for survival / growth / profits (the firmôs concern for financial soundness)
- Philosophy (the firmôs values, beliefs, ethics)
- Public image (the contribution the firm makes to communities)
- Employees (the importance of managers and employees)
- Distinctive competence (how the firm is different or better than competitors)

Mission statements can be used by business organizations for a variety of purposes. According to Germain and Cooper (1990) mission statements promote a sense of shared expectations amongst employees and communicate a public image of the firm to important stakeholders and groups in the companyôs task environment. This view is given further impetus by Analoui (2000) who concluded that a mission statement allows a firm to articulate a strong vision for the organization and to communicate that to its growing number of employees and professional managers. Bart and Baetz (1998) contend that a well crafted mission statement can provide the following advantages / benefits to a company:

- insure unanimity of purpose
- arouse positive feelings about the firm
- provide direction
- provide a basis for objectives and strategies
- serve as focal point
- resolve divergent views amongst managers

Although this area has not been fully explored by researchers, evidence suggests that a mission statement can have a positive impact on the performance of a firm. Pearce and David (1987) were amongst the first researchers to successfully demonstrate a link between three mission components (i.e. organizational philosophy, self concept and public image) and firm performance. Bart and Baetz (1998), introduced two new mission components (i.e. satisfaction with the mission and satisfaction with the mission development process) and found that positive correlations exist between the intermediary mission variables and firm performance. In his research, Falsey (1989) found that companies expressing a sense of responsibility to the community have performed well over a sustained period of time. The exact nature of the relationship between the various mission variables and performance has not been fully ascertained; however evidence suggests that a positive correlation characterizes the relationship between mission and firm performance.

2.3. Ethics

Phrases such as honesty, integrity, transparency and fairness often feature prominently in the mission statements of many business organizations and are held to represent the business ethics that the organization subscribes or conforms to. Ethics are a set of ñmoral principlesòthat govern the conduct of an individual or group (Allen, 1990). Bowen *et al*. (2007) citing Allen (1990) elaborates further and states that morals are concerned ñwith goodness or badness of human character or behaviourò or ñwith the distinction between right and wrongò or ñconcerned with accepted rules and standards of human behaviourò

The King Report (2002) states that the existence of ï and demonstrable adherence to ï established principles of ethical conduct provide a strong measure of organizational integrity. An enterpriseôs ethical principles represent a major motivator of stakeholder involvement with it and, as such, should permeate its culture, motivating its strategy, business goals, policies and activities. An enterpriseôs ethics programme should therefore involve both behavioural and structural aspects.

Good corporate governance forms the building blocks of an ethical culture. Using the United Nations Development Programme (UNDP) Principles of Good Governance as a benchmark, Van Wyk and Chege (2004) proposed a framework that incorporates all the essential ethical dimensions that need to be inculcated into the business enterprises of all construction industry participants. The framework is as follows;

Principal	**Core Value**	**Management Indicator**
Legitimacy	Participation	Promote collaborative partnerships with communities and work to build capacity
Direction	Strategic Vision	Have clearly stated and enacted corporate values. Understand and respect historical, cultural and social complexities.
Performance	Responsiveness	Recognise the legitimacy of interested and defined stakeholders. Ensure that construction activities are efficient and socially and environmentally responsible.
	Effectiveness & Efficiency	Engage with and share best practice. Build knowledge, skill and competence.

Accountability	Accountability	Perform undertakings with probity.
	Transparency	Ensure that processes and information on risks and impacts are directly accessible to those concerned with them.
Fairness	Equity	Engage in long term relationships. Respect the well being of employees treating them fairly and with cultural sensitivity.
	Rule of law	Adopt agreed codes to tackle corruption and persist in the enforcement thereof. Give due recognition to the respect of human rights.

Van Wyk and Chege (2004) concluded that this proposed framework aligns construction enterprises with global characteristics of corporate governance. In so doing, it proposes a paradigm shift by all participants in the construction industry to enterprise development and management, a shift based solidly on probity and respect.

In their research, Vee and Skitmore (2003) emphasized and reinforced the applicability of general concepts of ethics in business by asserting that businesses exist not solely for the benefit of certain individuals but business serves society in general, and in addition meets individual and collective needs. This is in stark contrast to Friedmanôs (1970) view that claims the primary purpose of a public corporation as maximizing the wealth of the owners of the firm ï the stockholders. This view holds that increasing profits made payable to owner ï stockholders, is the only social responsibility of business. Freeman (1994) refuted this view and developed a stakeholder analysis that

considers the additional role of management, employees, suppliers, and the community in which the company operates in addition to the stockholder as owner.

Unethical behaviour in the construction industry manifests itself in a variety of forms. Basing their study on the work done by Vee and Skitmore (2003), Bowen *et al*. (2007) found that South African contractors possess a reputation for unethical conduct. The study found collusion, bribery, negligence, fraud, dishonesty and unfair practices to be the most prevalent forms of unethical behaviour. Both Friedman (1970) and Freeman (1994) were scathing about the negative impact that unethical behaviour such as bid shopping and bid rigging. Moylan (2005) found that both practices undermine the integrity of the system that breaks the trust amongst the stakeholders in the execution of the work.

Positive correlations have been found to exist between ethical behaviour and business performance. In his research, Verschoor (2006) demonstrated that a company's ability to maintain an ethical corporate culture is key to the attraction, retention and productivity of employees. He proceeded to suggest that money invested in ethics education, help lines, assessment of ethics programs, and risk evaluation is money well spent. Webley and More (2003) found that a sample of companies with a code of ethics had performed better financially when compared to a similar sized group that did not have a code. They also concluded that companies with a code of ethics generated significantly more economic added value (EVA) and market added than those without a code.

2.4. The concept of "quality"

Juran (1986) defines quality as fitness to use while Crosby (1980) considers quality as the ability of a product to conform to requirements. Germain *et al*. (1998) define quality as the fulfillment of the expectations or needs of the user. Costin (1994) further reinforces the importance of the end user by asserting that quality is immeasurable, it is ultimately the customer who defines what is and what is not.

Rwelamila and Wiseman (1995) provide a definition from a different perspective. They

stress the importance of using a definition for quality that allows it to be managed and measured. Cornick (1991) concluded that the only definition that could be managed is that of conformance to or meeting requirements. Rwelamila (1988) further suggests that this definition provides an accurate base for measurement, i.e. the purpose defined in the brief or established requirements is either satisfied or not satisfied.

2.4.1. Quality in the South African Construction Industry

Evidence of poor quality by South African construction firms is widespread, Ballim (1991) alludes to the deterioration of quality associated with concrete structures in South Africa. The view expressed by Ballim is given impetus by Addis and Basson (1989) who identified an increased amount of major remedial work required to repair concrete structures. Hindle (1990) also raised concerns regarding the deteriorating quality standards of new housing developments in the Western Cape. This demonstrates that poor quality in the South African construction industry is widespread, and is not only confined to a particular geographical area.

The results of a study conducted by the Construction Industry Development Board (CIDB) in 2007 amongst a pool of selected contractors and clients indicated that 18% of facilities handed over at practical completion had õsomeò defects while 6% of facilities had major defects or were totally defective. The statistics quoted above are alarming, not only do they tarnish the image and reputation of the industry; they also have huge financial ramifications for contractors.

In their research of general contractors in South Africa, Smallwood and Rwelamila (1996) concluded that rework caused by poor levels of quality constituted 13% of the value of completed construction, this translated to the cost of rework amounting to R 6, 432,000.00 This conclusion is given impetus by Love *et al*. (1999) who discovered that costs associated with rework (having to redo a step or portion of construction due to poor workmanship) was as high as 12% of the total project costs and require as high as 11% of the total project working hours.

2.4.2. Quality Assurance and Quality Management Systems

The introduction or use of Quality Assurance (QA) and Quality Management Systems (QMS) has been identified as one of the mechanisms that can be utilized to address the quality problems currently plaguing the South African construction industry. Research conducted by Rwelamila and Wiseman (1995) amongst a pool of general contractors in the Western Cape revealed that only 40% of the contractors who participated in this research had a formal quality assurance programme in place.

When used effectively Churchill (1988) claims that quality assurance programmes have the effect of preventing errors to meet project objectives and checking / appraising that all requirements have been met or that failures which occurred have been detected and corrected. Vermeer (1992) maintains that the benefits that can be yielded from an effective Quality Management System (QMS) are two fold, one is the reduction in internal wastage and the second is the reduction in rework thus significantly lowering costs and better satisfying the customersô needs.

The dominant South African construction firms have recognized the benefits that could be derived from implementing Quality Management Systems. As a result such firms have relentlessly pursued and have subsequently been awarded ISO 9000 status. ISO 9000 is a mark of organizational and service excellence which is recognized internationally as proof of a companyôs ability and commitment to provide quality work (Straits Times, 1994). Sadly, the majority of sub-contractors (who are directly responsible for the execution of the works) have not been relentless in their pursuit of adopting and implementing Quality Management Systems thus negating the strides that have been achieved by main contractors.

2.4.3. Quality Costs

Quality Management Systems are often criticized for being expensive to initiate and develop. It was Feigenbaum (1961) who first identified the costs associated with the implementation of such systems and sought to classify such costs into four categories, namely: prevention, appraisal costs, internal failure and external failure costs. Quinn

(1989) defined these costs as follows:

- Prevention costs ï incurred to reduce, eliminate and prevent defects
- Appraisal costs ï incurred to detect errors and evaluate the quality of work done
- Internal failure costs ï incurred in correcting the errors (caught at appraisal) before handing over the completed facility to the client
- External failure costs ï incurred in correcting errors (not caught by the appraisal process) after handing over the completed facility to client.

The high initiation cost and implementation argument is particularly relevant for small and medium sized contractors who struggle to gain access to financial resources. Although this argument might be valid, it should be recognized that the benefits that can be yielded through the implementation of such systems far outweigh the initial input costs.

2.4.4. Quality Culture

The quality culture has not been fully embraced by South African construction firms. Inspections appear to be the dominant measure of addressing quality problems. It has been discovered that inspections are an inadequate control measure as they fail to address the root cause of the problem. Rust *et al*. (1994) reveal that one of the primary reasons that propel companies to address quality problems through inspections rather than prevention is that an inspection can merely be added to the end of the process, it does not induce a change in process.

The inculcation of a quality culture is pivotal for improving the performance of the South African construction industry. This has been evident in the Japanese construction industry where contractors have benefited financially through a strong quality culture as it enables them to maintain and improve the reputation of the company, retain customers, attract new customers and increase the market share of their organizations (Rust *et al*., 1994).

2.5. Health and Safety

Construction industries all over the world have long been associated with unacceptably high accident rates. According to Davis *et al*. (1990) the risk of a fatality in the construction industry is five times more likely than in a manufacturing based industry, whilst the risk of a major injury is two and a half times higher. Statistics provided by the Compensation Commissioner indicate that South African construction firms are struggling to achieve acceptable levels of health and safety. It is reported that in 1999, a total of 14 418 medical aid cases, 4 587 temporary total disablements, 315 permanent disablements, and 137 fatalities were reported (Compensation Commissioner in South Africa, 2005). At the root of the problem is ignorance that arises mainly from the absence or lack of a safety culture (Smallwood and Haupt, 2005).

Hodgson and Milford (2005) citing the findings of the Construction Industry Report (2004) highlighted the following issues regarding health and safety in the South African construction industry;

- there is very limited commitment to comply with basic requirements, let alone promote a culture of health and safety.
- small contractors can barely maintain tools and regard safety equipment as luxury items.
- even when protective clothing and equipment is provided, workers often avoid their use.

Accidents affect the bottom line or profitability of a project. Direct costs associated with an occupational injury or illness include; medical costs, premiums for workers compensation insurance, liability and property losses. Indirect costs include the cost of lost time for injured workers, loss of productivity, loss of supervisory time, decrease in labour morale and cost of damage to equipment (Smith and Roth, 1991). Indirect costs range from product and material, to legal costs (Crocker, 1995).

The lack of a controlled working environment and the complexity and diversity of the size of the organizations have an effect on the safety performance of the construction

industry (Sawacha *et al.*, 1999). Dester (1995) concluded that ôunsafe behaviourô is the most significant factor in the cause of site accidents and therefore provides proof of a poor safety culture. Inappropriate construction planning, inappropriate construction control and inappropriate construction operation were identified by Suraji (2006) as frequent contributory factors in construction accidents. Jannadi (1995) examined the safety challenge from a different perspective and concentrated largely on the impact of employee well being on safety performance. In his study, he concluded that competition among workers, fatigue, and working under pressure had a tremendous impact on safety. Workers who face deadlines which are almost impossible to meet, compete with other crew members, and work overtime have more injuries.

Taking into consideration the negative impact that a high accident rate can have on profits and employee morale, it is critical for South African construction firms to develop and implement effective health and safety plans. The primary characteristics of a successful safety programme include: management commitment, employee involvement, hazard identification and control, training and education and some form of programme evaluation. Accordingly such a system should yield the following results - reduce absenteeism, lower compensation costs and increase efficiency (Bluff, 2003).

Awareness is a pre-requisite for the development of an optimum Health and Safety (H&S) culture, and H&S education and training in turn, are a pre-requisite for an appropriate level of awareness relative to H&S. Furthermore, H&S education and training influences perceptions relative to *inter alia* the importance of H&S and therefore the constituents of H&S culture - the view of H&S as a value, the vision of a fatality, injury and disease free workplace, the goal of zero incidents and the mission to continually improve H&S (Haupt and Smallwood, 2005)

2.6. Main and Sub-Contractor Relationships

The use of subcontractors in the construction industry is a world wide phenomenon that has permeated the South African market as well. In the South African context subcontractors are mainly Small and Medium Sized Enterprises (SMMEôs) who are

largely dependent on the main contractors. Because of their specialization, and relatively low overheads, small and medium sized contractors form a good resource pool from which large, established contractors draw (Rwelamila *et al*., 2002).

There are numerous obstacles that subcontractors are confronted with. The White Paper on Creating an Enabling Environment for the Construction Industry describes the South African SME sector as largely underdeveloped and lacking the managerial and technical skills and the sophistication enjoyed by larger, well established contractors (Department of Public Works, 1991). As a result many of these contractors are not able to provide acceptable quality and a large amount of customer dissatisfaction can be attributed to their poor performance (Construction Industry Report, 2004).

The relationship that exists between main contractors and sub contractors is critical to the performance of any construction industry. Ideally, a mentor-protégé relationship should be cultivated and enhanced between main contractors and subcontractors. In their research Xiao and Proverbs (2002) found that the superior performance of Japanese contractors may be attributed to their closer working relationships with sub contractors. This is a direct result of the corporate culture in Japan being based on co-operation and the maintenance of long term relationships (Haley, 1994). In this instance subcontractors are treated fairly and are provided with opportunities to grow. In return, subcontractors strive everyday to deliver the agreed work, complete and exactly to the agreed standard (Bennett, 1991).

This is in stark contrast to the South African scenario where contractor and subcontractor relationships are largely characterized by short term financial goals, suspicion, dishonesty and mistrust. Evidently, the industry is in dire need of a culture that can foster co-operation and teamwork amongst contractors and subcontractors. ñUbuntuòforms the epicenter of the African culture and encourages individuals to act in unison (Rwelamila *et al*., 1999). This culture needs to be resurrected urgently in the South African construction environment.

The acrimonious relationships that largely characterize main contractor and subcontractor relationships stifle project communication considerable. The (PMBOK, 1996) defines project communication as the process required to ensure timely and appropriate generation, collection, dissemination, storage and ultimately disposition (disposal) of project information. It provides the critical links among people, ideas and information that are necessary for success.

Poor problem-solving, poor decision-making based on incomplete information, rework due to the shop floor using old drawings are just some of the complexities that may arise as result of communication failures (Burke, 2007). In their research, (Rwelamila and Wiseman, 1995) discovered that South African contractors lacked considerable in the communications sphere. Their research indicated that this was brought about by the fact that verbal and not written instructions were the most widely used form of communication.

Partnering has emerged as one of the measures that can be explored to mend the inefficiencies that often characterize main contractor and subcontractor relationships. Research indicates that partnering has been successfully applied in the US, UK, New Zealand and Australian construction industries. Partnering is not a contract but a recognition that every contract includes a covenant of good faith. Partnering attempts to establish working relationships among stakeholders through a mutually developed formal strategy of commitment and communication. It attempts to create an environment where trust and teamwork prevents disputes, foster a co-operative bond to everyoneôs benefit and facilitate the completion of a successful project (Stevens, 1993).

Partnering calls for providing as many opportunities for communication as possible. As a result a high-trust culture is developed where everyone feels free to express ideas and make contributions to a solution (Construction Industry Development Agency, 1993).

2.7. Research and Development

Good corporate culture emphasizes and prioritizes continuous learning amongst business organizations. This is usually manifested by a commitment and the establishment of versatile structures that support research and development (R&D). R&D allows organizations to develop and utilize the latest cutting edge technologies thus enabling organizations to produce products of the highest quality more cost effectively.

The overwhelming success of some of the worlds advanced construction industries is often attributed to a culture that encourages and rewards research initiatives. Through its research initiatives the US construction industry has had a major influence on the sector globally ranging from the development of construction technology through to the development of innovative procurement methods. Similarly, the Japanese construction industry has an outstanding research record. It is one of the few countries in the world where major construction firms in partnership with the government invest heavily in research and development (Haley, 1994). Bennett et al, (1987) also commended the Japanese construction industry for its unwavering commitment to research that has led to ground breaking work in the fields of robotics and intelligent buildings.

The area of research and development has largely been ignored by the construction fraternity in South Africa. The SA Construction Industry Report (2004) laments the state of research and development in the industry and urges industry stakeholders to adopt a culture that entrenches research as an integral part of the overall business. Seaden (2002) attributes the reluctance of construction firms to invest in R & D to the fact that construction R & D is known to be particularly ñleakyò and its benefits are difficult to appropriate at the individual company level.

Governments, as the most dominant and influential clients of construction industries can play significant role in improving the R & D capacity of the industry. Jay Na *et al*. (2007) advocated for the formation of a national body that unifies the various institutions and parties within the construction sector to spearhead an integrated and focused R & D

agenda for the construction sector in Singapore. In Britain, the Faircloughõs Review (2002) advocated for the development of a strategic R & D framework that should be facilitated by government as part of its sponsorship role.

The use of inefficient traditional procurement systems reflects the inability of South African contractors to research and recommend to clients new procurement systems that are adaptable to the ever changing nature of the modern construction industry. According to the CIDB process improvement is achieved when modern procurement methods are used to promote process improvement, teamwork and concurrent engineering methods that yield win-win benefit to all participants. A good example is in turnkey procurement processes where the contractor takes single point responsibility for the entire process and project.

The amount of leverage and benefits that can be derived by construction firms through the pursuit of research initiatives is demonstrated by the so-called ñBig Sixò Japanese construction firms. The ñBig Sixò find construction sites for clients, help to find the finance, and then design, construct and maintain high quality buildings and engineering products (Haley, 1984). This demonstrates that Japanese construction firms are not only involved in the construction phase but are active participants in the entire project life cycle. This has immense benefits for the contractor as well as the client concerned.

2.8. Innovation

Innovation, research and development are closely related. It is through investment in research and development initiatives that innovative products and processes are developed. Innovation is the implementation in a firm of significantly new processes, products or management approaches in order to increase its efficiency (Saeden *et al*., 2003). Slaughter (1998) provided a definition of innovation that is widely accepted industry and academics. She defined innovation as the actual use of nontrivial change and improvement in a process, product, or system that is novel to the institution developing the change.

Damanpour *et al*. (1989) distinguished between two types of innovation, namely; administrative and technical innovations. Administrative innovations are defined as those that occur in the administrative component and affect the social system of an organization. Technical innovations are defined as those that occur in the operating component and affect the technical system of an organization. Slaughter (1998) identified various categories of innovation that can be encountered in the construction industry, these categories are outlined below:

- *incremental* (small, and based on existing experience and knowledge)
- *radical* (a breakthrough in science or technology)
- *modular* (a change in concept within a component only)
- *architectural* (a change in links to other components or systems), or
- *system* (multiple, integrated innovations)

Price (2007) identified four qualities that distinguish an innovative firm, namely; awareness, intense motivation, a surfeit of skills and competence and a supportive infrastructure. Of the four characteristics of the innovative organization, Price (2007) maintains that awareness is by far the most influential and very difficult to engender.

When compared to firms in other economic sectors, South African construction firms lag behind in innovation (Van Wyk, 2007). This assertion supports the claim that is generally leveled at the construction industry, as a backward industry that fails to innovate in comparison to other sectors. While other sectors modernized through the introduction of interchangeable parts, then assembly lines, then automation, construction has retained its craft method of operation and fell further behind the rest of the manufacturing industry in terms of productivity, quality and hence value for money (Winch, 2003).

These low levels of innovation are attributed to the manner in which construction projects are managed by contractors. Bakens (1988) asserts that construction firms are not strategic in their management, in many instances the horizon of contractors is not beyond the moment of completion of a project. Sydow *et al*. (2004) echo the same

sentiment by suggesting that focusing entirely on the project leaves no room for external factors, which means that the project team risks becoming a knowledge silo, where the knowledge developed is not available for other members outside the team. Keegan and Turner (2002) also concluded that the short time horizon of contractors leaves no room for reflection on and documenting experiences of lessons learned. (Blayse and Manley, 2004) also alluded to the fact that construction firms often do not ćodifyô learnings and hence such knowledge is lost to future projects. In order to alleviate this challenge, Drejer and Vinding (2006) recommended two options, namely;

- the use of post project reviews and systematic evaluation and diffusion of experiences may aid in combining strategies of short ï term task performance with long term learning and knowledge accumulation.
- an increase in the ability to assimilate and utilize knowledge from other types of partners ï an ability that may be strengthened through the application of partnering and knowledge ï anchoring mechanisms.

Further to the recommendation outlined above, Blayse and Manley (2004) identified innovation strategies that can be adopted by contractors that are important to innovation outcomes, these include:

- building robust relationships with manufacturers supplying the industry, in view of their involvement in R & D programs.
- mobilizing integrated approaches to construction projects, in response to the fragmentation of the industry arising from the one ï off nature of most projects and the proliferation of small players.
- improving knowledge flows, by developing more intensive industry relationships to offset the disadvantages of production based on temporary coalition of firms.

The South African construction industry is dominated by small construction firms, any initiatives aimed at improving innovation at company and industry level should take this fact into consideration. It therefore means that, any innovation ï led performance improvement in the industry is significantly influenced by the innovation performance of small construction firms (Sexton and Barret, 2003).

The value and influence of innovation on business organizations cannot be overstated. According to Damanpour et al, (1989), the introduction of technical innovation is of primary importance for organizational effectiveness. The higher the levels of innovation in the construction industry, the greater the likelihood that it will increase its contribution to economic growth (Blayse and Manley, 2004)

2.9. Human Resource Development in the Construction Context

Management in essence is the ability to direct, guide and motivate people to perform their duties effectively, in unison and harmony, and to excel in the performance of those duties (Stoman, 1999). Construction firms, being project based organizations are faced with major challenges when it comes to employee motivation as employees are usually faced with additional challenges, such as:

- peaking work ï loads making it difficult to achieve a work ï life balance
- uncertainty about future assignments, including the nature of the assignment, its location and future work colleagues.
- Matching assignments to career development objectives (Turner *et al*., 2008)

The adoption of innovative management styles is essential to motivating those employed by construction firms. Barber *et al*. (1999) claims that the traditional or classic management control characterized by an authoritarian and adversarial manner is inefficient and outdated for construction. Anthony *et al*. (1992) advocates for a more flatter management structure that grants more autonomy to segments of a complex operation. This, he concludes, results in quicker responses to needs and improved motivation to succeed through identified responsibility. Barber *et al*. (1999) recommended that this proposed management style be accompanied by ña no blame cultureò to encourage sub ï ordinates to exercise fully their independence and more truthful reporting. In this new environment, the workforce is encouraged to make their own decisions, seek improved value for money and organize their own dayôs work.

Taking into account the very nature of the construction industry, the ability to motivate

employees is of paramount importance. Motivation centers around the satisfaction of needs, Mansfield (1991) grouped the different employee needs of construction employees in the following categories:

- **Employees' attitude** ï motivation is generated in the first instance by influencing the attitudes of workmen and their supervisors. This is done by creating an atmosphere which is based on trust, understanding and co-operation.
- **Achievement** ï to develop workers and staff in construction projects to be ôachieversõ they should be given assignments that are suited to their best skills. Also, it is important to include challenge as part of the job, for example by introducing new and more difficult tasks, as this reinforces the urge to work at, and enjoy overcoming difficulties in achieving success.
- **Responsibility** ï giving responsibility to employees keeps them interested in their jobs, allows the satisfaction of self ï fulfillment needs, and leads to the satisfaction of other needs such as freedom, recognition and advancement, all of which will result in improved motivation and performance. Competent workers and their supervisors who are denied responsibility feel dissatisfied, bored and frustrated. Meeting responsibility needs may be done by providing workmen with a task and letting them decide on the method of working as long as conditions of expected quality and finishing time are met.
- **Money** ï the use of incentive schemes has been in operation for a long time in the construction industry, and in many cases, it leads to adequate satisfaction for employees and managers alike.
- **Advancement** ï many employees in the construction industry are restricted with regard to the advancement ladder owing to the highly specialized nature of their jobs, and they tend to do the same work in all projects. In such situations, advancement may therefore be looked at from different angles. Advancement can be achieved via rewarding staff with special assignments or rewarding responsibilities, transferring them to new jobs or any other way that enriches experience and knowledge.
- **Participation** ï participation satisfies many needs, such as recognition, affiliation

and acceptance. Participation provides the engineer / employee with a feeling of importance, in that he has valuable information to offer that will improve the efficiency of the organization.

- **Competition** ï implementing competition in construction projects opens up the way for individuals with distinguished qualities to put their potential to work, which can then lead to opportunities for later promotion. There are many positive factors included in competition programmes, such as bringing the right king of challenge to site employees, to reduce boredom and make repetitive work more acceptable.
- **Social relationships** ï the development of a good social environment and harmonious relationships encourages cooperation and satisfies acceptance and friendship needs.

The importance of HRM is undisputed, many academics and practitioners have agreed that HRM is one of the most crucial elements of an organizationôs success (Cascio, 1999). Construction firms with higher levels of strategic, including human resource planning have achieved higher organizational performance, including higher productivity, greater cost effectiveness, and greater overall efficiency (Ferris *et al.*, 1990). Gratton *et al.*, (1999) seals the discussion by concluding that people and people processes are a source of competitive advantage for any company. Their skills and motivations result from an entire portfolio of õpeople policies, procedures, and processes which serve to train, develop and retain.

The role of the HRM department in many construction firms in South Africa is confined to recruitment and other administrative duties. This culture should be uprooted and discarded so the HRM can play a more meaningful role in the recruitment, development and retention of much needed skills.

2.10. Customer Orientation

It is critically important for any business concern to cultivate and develop good working relationships with its customers / clients. A healthy working relationship between the

client and a service provider improves significantly the chances of repeat business and invariably reduces the peculiarities associated with acquiring a new customer. Rosenberg and Czepiel (1984) put this issue into perspective and estimated that the cost of winning a new customer is five times higher than that of maintaining an existing customer.

Unfortunately construction firms are not renowned for being customer orientated. Research conducted by Edumï Fotwe *et al*. (1996) into the formulation of contracting firmsô strategies demonstrated a serious lack of clarity on the relevance of clients / customers to the firmôs strategy by the non-inclusion of any reference to clients / customers in the mission statement. The Egan Report (1998) found that the British construction industry is unpredictable in terms of delivery on time, within budget and to the standards of quality expected. Such issues are a great concern and a major source of dissatisfaction to clients. Similarly, the South African construction industry is faced with enormous challenges that often lead to client dissatisfaction. A survey conducted by the CIDB amongst clients in 1994 rated the quality of work and service of contractors as average to good. Although not a representation of the whole industry, the survey demonstrated that a high level of dissatisfaction with construction firms exists amongst public and private sector clients.

According to Butalla (2005) it is possible for contractors to achieve customer satisfaction through relationship building, expectation setting and better communication. Sims *et al*. (2001) outlined eight steps that a contractor can use to meet customer expectations and maintain a relationship that will lead to repeat business, as follows;

- identify your customer
- know the customer
- quantify the customerôs expectations
- prepare a rough draft of the plan
- review plan with your customer
- implement the plan and distribute copies
- benchmark progress: ñwhat gets measured gets doneò

- post project debriefing

Maloney (2002) emphasized that a contractor must have a detailed understanding of the customerôs expectations and be able, through his personnel, to satisfy those expectations. This point is further reinforced by (Winnie and Kanji, 2001) who concluded that companies equipped with customer information and knowledge have greater potential to make correct decisions, produce desirable products or services, and deliver true value to customers. Knowing what customers value most in a companyôs products or services helps companies optimize resource utilization in areas for continuous improvement based on their needs and wants (Hsu *et al*., 2006).

Management practitioners and scholars are unequivocal about the positive impact that customer satisfaction has on business performance. Kujala (2005) maintains that organizations which are more efficient in providing value for customers, leading to higher customer satisfaction are more likely to survive in a competitive situation. Higher customer satisfaction has significant implications on financial performance, since a positively correlates with lower customer satisfaction and the price a customer is willing to pay for products and services. Drucker (1954) alluded to the same point by stating that customer satisfaction and trust will bring repeat purchases to the firm and hence improve the firmsôorganizational performance.

The recent developments in the world economy will increase the competition amongst South African construction firms. It is only firms that are trustworthy and able to maintain long term relationships with clients that will be able to survive in challenging economic environments.

2.11. Benchmarking

A study conducted by the CIDB in 2007 revealed the following:

- clients were neutral or dissatisfied with the performance of the contractors on 26% of the projects.
- clients were neutral or dissatisfied with the quality of work delivered on 33% of

the projects.

- around 25% of the projects surveyed had levels of defects which were regarded as inappropriate.

These statistics are a grim reminder of the immense task that lies ahead for many South African construction firms wishing to improve their efficiency and performance levels. Benchmarking has prevailed as an effective way of helping organizations to deliver better services through continuous improvement (Lam *et al*., 2004). With specific reference to the construction industry, Luu (2008) regards benchmarking as the next step to improve the contractorsôefficiency and effectiveness of products and processes.

According to Bakens and Vries (2005), benchmarking is a process of making structured comparisons of the performance of firms or other bodies, either with their or with externally defined reference criteria. Camp (1989) simply defines benchmarking as the search for industry best practices that will lead to superior performance. Xerox, a pioneer in benchmarking, defines benchmarking as the continuous process of measuring products, services, and practices against the toughest competitors or those recognized as industry leaders (Rothman, 1992). Taking into account the definitions above, Holt and Graves (2001) held that benchmarking operates at two levels: a method for measurement and a focus of activity. As a method for measurement, benchmarking assesses relative performance (in terms of productivity, or profit, or speed) to establish metrics that reveal good and bad performance.

According to Camp (1995) benchmarking can be used to improve performance by helping managers understand the methods and practices required to achieve higher performance levels. Gavin (1993) concluded that the greatest benefits of the benchmarking process are that it allows for efficient work and it involves managers proactively in the process rather depending exclusively on results.

In a construction firm, Sherif (1996) argued that benchmarking manifests itself in the following three ways;

- *internal benchmarking* ï where a construction organization aims towards identifying improvement areas within its structure through comparing its business operations with those of others who do it better, thus setting new targets to meet.
- *project benchmarking* ï where a construction organization assesses the performance of projects in which it is involved with an aim to meet customer requirements, measure productivity rates, validate and maintain its estimating database.
- *external* benchmarking ï where the industry as a whole attempts increase its productivity through making tools and techniques, developed and successfully used by other industries, applicable to construction.

Costa *et. al* (2006) identified several barriers to the implementation of benchmarking programmes in the construction industry, due to the peculiarities of this sector. These barriers arise because (1) construction is a project oriented industry and each project is unique in terms of design and site conditions; (2) establishing a project performance measurement system and incorporating the measures into the company routine requires a fairly intense effort; (3) the responsibilities for data collection, processing and analyzing the results, in general, are not well defined at the beginning of the project; (4) each project usually has a different managerial team and the use of measures will depend on the motivation and capability of each manager. To combat these barriers, a benchmarking initiative demands a joint effort from several organizations such as government entities, construction clients, individual companies, research institutions and industry organizations (Costa *et al.*, 2006)

The South African construction industry is dominated by a few large firms that are at best able to compete with the worldsôbest. Unfortunately the bottom end of the market is dominated by many unsophisticated and inexperienced contractors; this inevitably results in the failure and closure of many firms. A benchmarking programme would be ideal for South African contractors; it would strengthen the competition amongst the dominant contractors and would also provide a healthy yardstick for the smaller sized contractors. Additionally, in the ever changing construction environment, benchmarking

could be a powerful tool in investigating and managing change on construction projects (Garnett and Pickrell, 1998).

The discussion above has primarily focused on identifying and discussing corporate culture dimensions that are critical for business success. The discussion that follows considers the most essential business performance indicators and also investigates the link between corporate culture and business performance.

2.12. Business Performance Measurement

Traditionally, financial or accounting measures have been used to assess the performance of business organizations. Financial accounting indicators such as profits, turnover, earnings per share (EPS) and return on investment (ROI) have long been utilized as a gauge for business performance. Increasingly financial indicators are coming under severe criticism, the prime reason being their failure to accurately reflect the health of the business.

Rapaport (1986) demonstrated that accounting numbers such as earnings per share, return on investment and return on equity are inappropriate performance measures. He successfully argued that the ultimate test of corporate strategy is whether it creates economic value for shareholders. Curtis (1985) further lambastes the use of accounting indicators and assets that accrual based performance measures are at best obsolete - and more often harmful. As a result business has woken to the realization that financial indicators are an ineffective measure of business health thus the use of operational measures such as quality and customer satisfaction has increasingly becoming popular. Eccles (1991) throws weight fully behind this argument by concluding that quality, customer satisfaction, innovation and market share often reflect a companyÕs economic condition and growth prospects better than its reported earnings do. Financial data can no longer be utilized in isolation in the assessment of a companyÕs health, other barometers such as quality and customer satisfaction should also be used to accurately reflect the performance of the business and reinforce competitive strategies.

2.13. Performance Measurement in Construction

The construction industry is characterized by its non standardization. The ñatureò of construction is a co-operative effort of several participants, each with their own perspectives and interests at hand, brought together to complete a project plan that typically changes several changes times while being constructed, while trying to minimize the effects of the weather / environment, occupation hazards, schedule delays, building defects etc (Hoonakker, 2002). Therefore due to its dynamic and volatile nature, the construction industry has been compelled not to rely heavily on financial indicators but rather to pursue and adopt unique performance indicators.

Time, cost and quality have steadfastly remained as the basic criteria to project success. Atkinson (1999) emphasizes the importance of these criteria and refers to them as the ñiron triangleò The emergence of the more quality conscious multi-national client as identified by McGeorge and Palmer (1997) has placed additional responsibilities on contractors thus resulting in the modification of the so-called ñiron triangleò

Pinto and Pinto (1991) suggested the introduction of soft measures such as the participantsô satisfaction levels. Safety in the construction is coming under severe scrutiny and this led Kometa *et al*. (1995) to advocate for the inclusion of safety as a measure to assess project success. Songer and Molenaar (1997) consider a successful project as a project that is completed on budget, on schedule, conforms to usersô expectations, meets expectations, attains quality workmanship and minimizes construction aggravation. Kumaraswamy and Thorpe (1996) also developed criteria for project success that included client and project managerôs satisfaction, transfer of technology, friendliness to environment and health and safety. This view is supported by Lim and Mohamed (1999) who claim that project success should be viewed from different perspectives of the individual owner, developer, contractor, user and the general public. Construction project success can no longer be viewed through a prism, instead internal and external factors have to be considered equally for an accurate reflection of project success.

2.14. Corporate Culture and Business Performance

Although a strong corporate culture is not the only ingredient that leads to superior performance, it contributes significantly to the attainment of competitive advantage by firms. When organization members identify with the culture, the work environment tends to be more enjoyable, which boosts morale. This leads to increased levels of teamwork, sharing of information, and openness to new ideas (Goffee and Jones, 1996). Additionally, research conducted by Greger (1999) and Sadri *et al*. (2001) illustrated that corporate culture has become a prerequisite for success, allowing companies to attract and retain top employees.

Denison (1995) suggested four different aspects of an organizationôs culture that influence an organizationôs effectiveness or performance. These were presented in four hypothesis as follows; involvement, consistency, adaptability and mission.

The involvement hypothesis states that organizational effectiveness is a function of the level of involvement and participation of an organizationôs members. Voluntary, bottom-up involvement and structured approaches for achieving involvement, have a positive impact on effectiveness. The argument here is that high levels of involvement and participation create a sense of ownership and responsibility. The result is greater employee commitment to the organization, reducing the need for formal systems of control thus leading to performance enhancement.

The consistency hypothesis states that a shared system of beliefs, values and symbols is an effective basis for reaching consensus and achieving co-ordinated action. This is collaborated by Peters and Waterman (1982) who demonstrated that a dominant and coherent culture is an essential quality of an excellent company.

Adaptability aids organizational effectiveness in three ways. First, it allows an organization to recognize and respond to its external environment. Second, it means an ability to respond to internal constituencies, such that different functions, departments, and divisions interact positively with each other. Third, in response to either internal or

external prompting it requires the capacity to restructure and reinstitutionalize behaviours and processes as appropriate. This hypothesis has also enjoyed support from Collins and Porras (1994) and De Geus (1997) in their research of successful financial companies.

The last hypothesis is the mission hypothesis. This states that a culture which provides a shared definition of the function and purpose of an organization will be positively associated with effectiveness. First, a sense of mission provides employees with non-economic reasons for investing their efforts in the well being of the organization, efforts which can surpass those normally expected of organizational employees, and second, a sense of mission provides both a direction and end goals which make it easier to identify appropriate courses of action for the organization. Saffold (1998) also contended that a strong culture characterized by a strong mission (long term vision) is crucial to the performance of any organization.

2.15. Relationship between Corporate Culture and Performance

In their ground breaking study Kotter and Hesket (1992) reached the same conclusion as Denison (1995) and advanced three arguments that support the link between corporate culture and organizational performance, these arguments are detailed below:

1. A strong organizational culture supports goal alignment. The idea is that because all employees share the basic assumptions they can agree not just on what goals to pursue but also on the means by which they should be achieved. As a result employee initiative, energy and enthusiasm are all channeled in the same direction.
2. A strong culture leads to high levels of employee motivation. A high level of motivation among employees translates into high organizational performance.
3. A strong culture is better able to learn from its past. The idea is that strong cultures characteristically possess agreed norms of behavior, integrated rituals, ceremonies and well known stories. The suggestion here is that an organization which is able to reflect on its development and which is able to draw on a stock of

knowledge encoded in stories and rules of thumb is likely to perform better than competitors unable to learn from their past successes and failures.

2.16 Corporate Culture – Business Performance Model

The relationship that exists between corporate culture and business performance has been discussed extensively in the literature review. According to Wiley (1996) the more present certain organizational or leadership practices are in a given work environment, the more energized and productive the workforce. In turn, the more energized and productive the workforce, the greater the satisfaction of customers and the stronger long ï term business performance of the organization. Taking into consideration the evidence provided by the literature review, the model that follows has been developed as a representation of the corporate culture business performance link as shown in Figure 2.1

The proposed model above is a summarized representation of the literature review. The model presents all the corporate culture dimensions that have been identified in the literature and the impact on the operations of the organization. The model suggests that ultimately the combined effect of the various corporate culture dimensions is improved business performance. The literature also asserted that financial measures should be used in conjunction with non ï financial methods to measure business performance.

2.17 Summary of the Literature Review

The literature review has revealed some of the most important corporate culture traits associated with successful construction organizations. Corporate culture flaws that appear to typify South African construction firms were highlighted and deliberated. The most appropriate methods of gauging firm performance were also considered.

The nature of the relationship that exists between corporate culture and business performance was examined thoroughly. The remainder of the report will evaluate how the various corporate culture dimensions manifest themselves in the South African construction environment.

Chapter 3 – Research Methodology

3.0. Introduction

This chapter aims to define the research methodology that has been adopted for this study, the advantages and disadvantages associated with the chosen research methodology will be highlighted. The population as well as the sample that the study focuses on will also be clearly identified. The various statistical tools that will be used to analyze and interpret the data will be clearly spelt out.

3.1. Research Methodology

Positivism prevails as the underlying paradigm that buttresses this research. According to Gephart (1999) positivism assumes an objective world and hence searches for facts conceived in terms of specified correlations and association among variables. Gephart (1999) further states that the positivist framework focuses on quantitative methods to test and verify hypotheses.

The tone of the argument adopted by the research is logical and deductive in nature. An overarching theory emanating from the literature review that firmly suggests that a positive relationship exists between a strong corporate culture and performance is adopted. The argument then narrows down by proposing hypotheses that can be tested. Eventually this culminates in the collection and analysis of data aimed at proving (or disproving) the original theory.

3.2. Research Strategy

Fellows and Liu (2003) differentiate between two types of research methods, quantitative and qualitative methods. Quantitative methods focus on numbers and frequencies rather than on meaning and experiences. Guba and Lincoln (1994) criticize the use of quantitative data and argue that quantitative measures often exclude members meanings and interpretations from data which are collected. Qualitative data is varied in nature and encompasses any information that can be captured that is not numeric in nature. This research method is often lauded for producing data that is more in depth and rich in description.

This study is predominantly quantitative in nature; it utilizes numerical methods to achieve the research objectives. Research questionnaires are adopted as the primary tool for gathering information. The research seeks to establish a relationship between two independent variables i.e. corporate culture and organizational performance. Statistical methods that can reliably be used to establish relationships between variables are best suited for this study. Therefore the quantitative method emerges as the most appropriate method as it provides data that is fairly easy to analyze statistically and fairly reliable.

3.3. Population

The register of contractors administered by the Construction Industry Development Board (CIDB) was adopted as the target population for this study. The CIDB is a public entity that was formed by an act of parliament to promote a regulatory and developmental framework for the South African construction industry.

The register provides a comprehensive list of all contractors that are eligible to undertake government projects in South Africa. The register is subdivided into various classes of works i.e. building, civil engineering etc. and the contractors are graded from an ascending scale of 1 ï 9. Financial and works capability are the main factors that are taken into cognizance when determining the grading of each contractor.

According to the CIDB, there were 65, 617 contractors that were registered as at Tuesday, the 30th of September 2008. This figure is adopted as the target population for this study.

3.4. Sample

Contractors registered with the CIDB in the Gauteng region with a grading ranging from 7 to 9 were used as the sampling frame for this study. Contractors with a grading ranging from 1 to 6 were not considered for this study. These are contractors that are relatively small in size and are only permitted to execute works up to the value of R10, 000,000.00. The ratio of management to employees in such firms is very small as the

use of casual employees is the norm. Therefore due to the severe lack or absence of entrenched relations between management and temporary employees, it is not possible to effectively measure the corporate culture that prevails in such firms.

3.4.1. Sample Size

As at Tuesday, 29 September 2008 there were 79 construction firms in the Gauteng region in the General Building (GB) category with a grade ranging from 7 to 9 that were registered with the CIDB. The composition of the sampling frame is as follows:

Grade 7 ï 47 contractors
Grade 8 ï 14 contractors
Grade 9 ï 18 contractors

Grade 7 ï represents small sized construction firms that are permitted to undertake government contracts to the value of R 40, 000, 000. 00
Grade 8 ï represents medium sized construction firms that are permitted to undertake government contracts to the value of R 130, 000, 000.00
Grade 9 ï represents big construction firms, there is no limit on the value of work that such construction can undertake.

The minimum sample size to be drawn from the sampling frame above can be interpolated from the formula below as advocated by Saunders et al., (1997).

MSS*req* = MSS*li* + [(TP*g* ï TP*l*) / (TP*u* ï TP*l*) × (MSS*ul* ï MSS*li*)]
MSS*req* = Required minimum sample size for the given target population
MSS*li* = Minimum sample size corresponding to the lower target population
MSS*ul* = Minimum sample size corresponding to the upper target population
TP*g* = Target population ï given
TP*l* = Target population ï lower limit
TP*u* = Target population ï upper limit

Through the application of the formula above, 57 construction firms are used as the

sample for this study. The sample is further divided into three strata, the first stratum representing firms with a grading of 7 while the second and third strata represents firms with a grading of 8 and 9 respectively. This is depicted in the table below:

Contractor Grading	Number of contractors per grade	Sampling Frame	Sample Required	Sample Per Stratum
Grade 7	47	79	57	34
Grade 8	14			10
Grade 9	18			13

3.4.2. Corporate Culture Measurement

The literature has shown that corporate culture is a difficult concept to measure. Many frameworks have been developed but none can claim to encapsulate all the different aspects of corporate culture. However it has emerged that in order to capture and understand the dynamics of corporate culture in the construction industry, due consideration to the following factors is of outmost importance: Mission, values, quality, health, safety and environment, subcontractor and supplier relationships, research and development, management style, employee relations, customer orientation and benchmarking.

A questionnaire containing four statements relating to each factor is developed (Appendix A). The interviewee is then requested to indicate whether this statement is a true reflection of the prevailing conditions in his or her organization. For this purpose, an ascending scale from 1 ï 5 is used, where a score of 1 indicates that the interviewee is in disagreement with the statement while a score of 5 indicates that the interviewee is in perfect agreement with the statement. This exercise provides a clear indication of the type of culture that resonates in a particular organization.

3.5. Performance Measurement

The study uses time, cost, customer satisfaction, safety and profit as the means of

assessing the economic health of the organizations participating in this study. These performance measures were consistently highlighted in the literature as the factors that encapsulate both financial and non ï financial performance measures. These factors are defined below:

Time performance ï percentage of the time that projects are delivered on or ahead of schedule

Cost performance ï percentage of the time that projects are delivered on or under budget

Customer satisfaction ï percent of repeat business customers

Safety performance ï number of fatalities on site. A fatality is defined as an injury sustained where the seriousness warrants medical treatment and serious enough to result in time off work for 14 days or more.

Profit ï net profit after tax as a percentage of total sales

The composite score that represents the performance of each organization is computed using the Data Envelopment Analysis (DEA) approach. The DEA is a non parametric method that accepts multiple inputs and regardless of units of measurement, outputs a single measure of productive efficiency (e.g. firm performance) for each firm relative to others in the sample.

El ï Mashaleh *et al*. (2006) explains that in this approach the most efficient firms score 1.0 or 100% and collectively form an efficient frontier in *n* space where *n* is the number of factors. Less efficient firms are scored by measuring the distance from the frontier, where a score of 0.85 indicates that the firm in question is 85% as efficient as the most efficient firms in the sample population.

3.6. Research Instrument

A questionnaire consisting mainly of three distinct parts was administered to individuals occupying senior management positions in construction firms. The first section of the questionnaire sought to acquire the relevant information about the person being interviewed and the organization that he/she works for. The second section contains

fifteen cultural dimensions that are used as the main tool for diagnosing and measuring the dominant culture, a five point Likert-type scale is used for this purpose. The third section contains the performance assessment criteria and adopts financial and non financial measures to achieve this goal.

3.7. Data Analysis

The study utilizes different statistical tools to analyze the data presented in the study. The mean score method was used to determine the relative importance of each corporate culture dimension. The mean is the average of all the observations in a given data, the formula for computing the mean is:

Mean = sum of all observations / total number of observations

This is denoted symbolically as;

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

Refer to Appendix B

The Kruskall ï Wallis Test was used to assess the existence of any similarities in the three samples (Grade 7, 8 and 9). The Kruskall ï Wallis Test is a non ï parametric test that can be used with ordinal as well as with interval or ratio data. Whenever the assumption of normally distributed populations is questionable, the Kruskall ï Wallis Test provides an alternative statistical procedure for testing whether the populations are identical (Anderson *et al*., 2003). The hypothesis test for the Kruskall ï Wallis test with k Ó 3 populations can be written as follows;

H_0: All populations are identical

H_a: Not all populations are identical

The Kruskall ï Wallis test statistic can be computed as follows.

$$W = \left[\frac{12}{n_T (n_T + 1)} \sum_{i=1}^{k} \frac{R^2}{n_i} \right] 3(n_T + 1)$$

where;
k = the number of populations (i.e. $k = 3$)

n_i = the number of items in sample i (i.e. Grade 7 n_i ï 34 contractors)
(i.e. Grade 8 n_i ï 10 contractors)
(i.e. Grade 9 n_i ï 13 contractors)

n_T = total number of items in all samples (i.e. n_T – 57 contractors)

R_i = sum of the ranks for sample (i.e. varies, refer to Appendix C)

In order to establish a relationship between the various corporate culture scores and organizational performance, the Spearman rank-order correlation coefficient was computed between each organization's culture scores and the composite financial performance score. The correlation coefficient is a measure of the linear association between two variables for which interval or ratio data are available. The Spearmanôs Rank Correlation Coefficient has been developed to calculate the measure of association between two variables when only ordinal data are available, it is derived as follows;

$$r_s = 1 - \frac{6 \sum d^2_i}{n (n^2 - 1)}$$

where;
n = number of elements or individuals being ranked (n= 11 corporate culture dimensions)
x_i = the rank of element i with respect to one variable (i.e. varies, refer to Appendix D)
y_i = the rank of element i with respect to a second variable (i.e. varies, refer to Appendix D)
$d_i = x_i – y_i$ (i.e. varies, refer to Appendix D)

To make an inference about the population rank correlation, the following hypothesis must be tested.

$H_0: \rho_s = 0$

$H_a: \rho_s \neq 0$

3.8. Summary

The discussion above has revealed that the research methodology in this study predominantly quantitative in nature. Research questionnaires supplemented by open ended questions have been adopted as the main data gathering instruments. A variety of statistical tools are used to evaluate and interpret the data.

The mean score method is used to evaluate the relative importance of the various corporate culture dimensions amongst the three contractor categories. Taking into cognizance the objectives of the study as proposed in Chapter 1, the Kruskall Wallis Test is computed to ascertain the difference / similarity in appreciation of the various corporate culture dimensions amongst the different contractor categories. Lastly, the Spearmanôs Rank Correlation Coefficient assesses the relationship between corporate culture and performance and in essence serves the purpose of proving / disproving the hypothesis.

Chapter 4 - Presentation of Survey Results

4.0. Introduction

This chapter sets out to present the results of the survey that was conducted amongst South African contractors with a CIDB grading of 7, 8 and 9 in the General Building (GB) class of works. In order to analyze, interpret and provide an accurate reflection of the results, the following statistical tools as defined in the previous chapter were utilized:

(a) Descriptive Statistics ï i.e. frequency counts
(b) Kruskall Wallis Test
(c) Spearman Rank Correlation

In all instances a non directional two tailed probability test at a 5% level of significance is used.

The research questions, key issues arising from the literature review as well as the main findings will form the epicenter of the discussion. The discussion commences by evaluating the response rate and by comparing the characteristics of the respondents. The mean scores of cultural dimensions per contractor category are examined, the implications of the results of the Kruskall ï Wallis test are also scrutinized. Through the results provided by the Spearmanôs Rank Correlation Coefficient the relationship between the different corporate culture dimensions and business performance is examined.

4.1. Response Rate

A total of fifty seven (57) questionnaires were distributed by hand and electronic mail during the month of October 2008. Thirty four (34) questionnaires were distributed to Grade 7 contractors while ten (10) and thirteen (13) questionnaires were distributed to contractors with a grading of 8 and 9 respectively.

Amongst contractors with a grading of 7, a 38% response rate was attained. A follow up that was conducted on a sample of non respondents did not have any significant impact

on the response rate especially for contractors in the Grade 7 category of works. In the Grade 8 and Grade 9 category of contractors, a response rate of 100% and 61% respectively was achieved. An overall response rate of 66% was achieved. The table below (Table 1) identifies the number of questionnaires distributed and received per contractor category.

Questionnaire Response Rate

Contractor Grade	Questionnaires Distributed	Questionnaires Received	Response Rate In Percentage Terms (%)
Grade 7	34	13	38%
Grade 8	10	10	100%
Grade 9	13	8	61%
Total			66%

Table 4.1: Questionnaire Response Rate

In surveys, it is imperative that high response rates are achieved to legitimize survey results. This ensures that the results are dependable, valid, reliable and are a true representation of the target population (Baruch, 1999). Ladik *et al.* (2007) noted that there are two reasons why it is necessary to maximize response rates when conducting surveys. First, optimizing the size of the sample can reduce problems experienced in conducting statistical analysis with inadequate sample sizes. Second, and more important, higher response rates help reduce problems associated with non response bias.

The response rate from Grade 8 and Grade 9 contractors was satisfactory, however the response rate of Grade 7 contractors was low when compared to the other contractor categories. The lower response rate amongst contractors in the Grade 7 category of works can be attributed to the overwhelming size of the sample when compared to other two contractor categories. This assertion is supported by Henderson (1990) who argued that a response rate of 20 ï 30% is fairly typical for a mail ï out survey to a large sample of firms. Therefore, despite the lower response rate of Grade 7 contractors, the results provided by the survey are credible and legitimate due to the fact that the majority of the people who did not respond to the survey have the same characteristics

as those who responded i.e. they are Grade 7 contractors, similar in size and have largely the same characteristics. Effectively, this means that the negative impact that might have been induced by non response bias is negated or eliminated.

It is important to note the low response rate of Grade 7 contractors highlights one of the prime disadvantages of surveys. Respondents who are not motivated or interested by the topic tend not to complete and return the questionnaire thus resulting in poor response rates.

4.2. Respondent Characteristics

In order to understand and distinguish between the respondents and the organizations they represent, the first section of the questionnaire was demographic in nature. This section of the questionnaire sought to ascertain the professional standing of the respondents as well as that of the organizations concerned. The discussion that follows and the accompanying graphs provide a detailed breakdown of the characteristics of the respondents and their respective organizations.

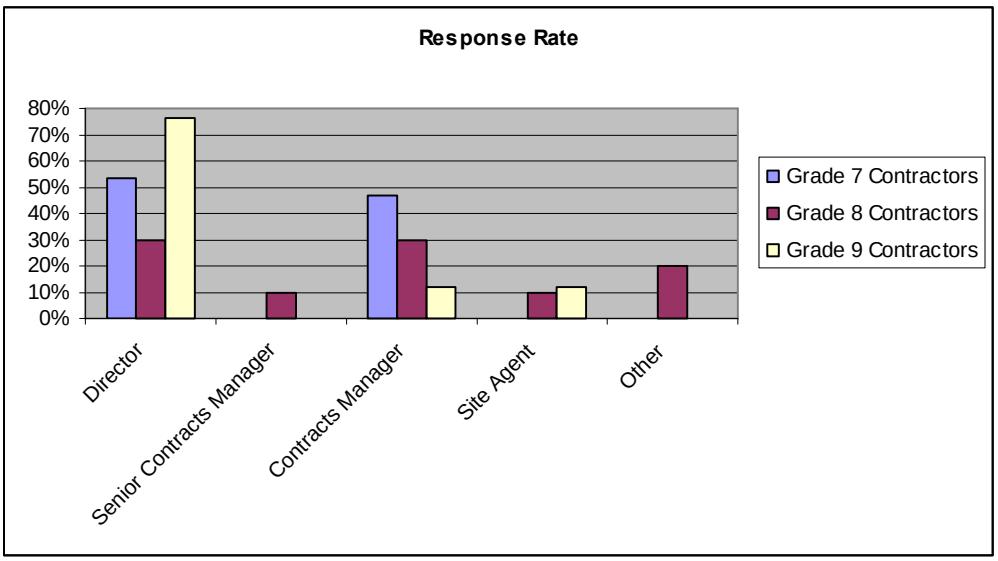
4.2.1. Position in the organization

The majority of the respondents in the survey were directors. In the Grade 7 category of contractors, 53% of the respondents were directors whilst 47% percent of the respondents occupied the position of contracts manager.

In the Grade 8 category of contractors, 30% of the respondents indicated that they occupy the position of director and another 30% were contract managers. The remainder of respondents in this category were split between the positions of senior contracts manager and site agent.

In the Grade 9 category of contractors, 76% of the respondents were directors. The remainder of the respondents in this category were split in equal proportions of 12% in the positions of contracts manager and site agent.

The respondentsô positions in their respective organizations are detailed in the graph below.



Graph 4.2.1: Position of respondents in respective organizations

As mentioned in Chapter 3, the graph above illustrates that the research questionnaires were distributed to individuals who occupy senior and middle management positions in construction firms. The reasoning being that such individuals by virtue of their standing in their organizations possess a wealth of knowledge about their organizations and hence would provide valuable and credible information for the benefit of the study. This further reinforces the legitimacy and credibility of the information yielded from the survey.

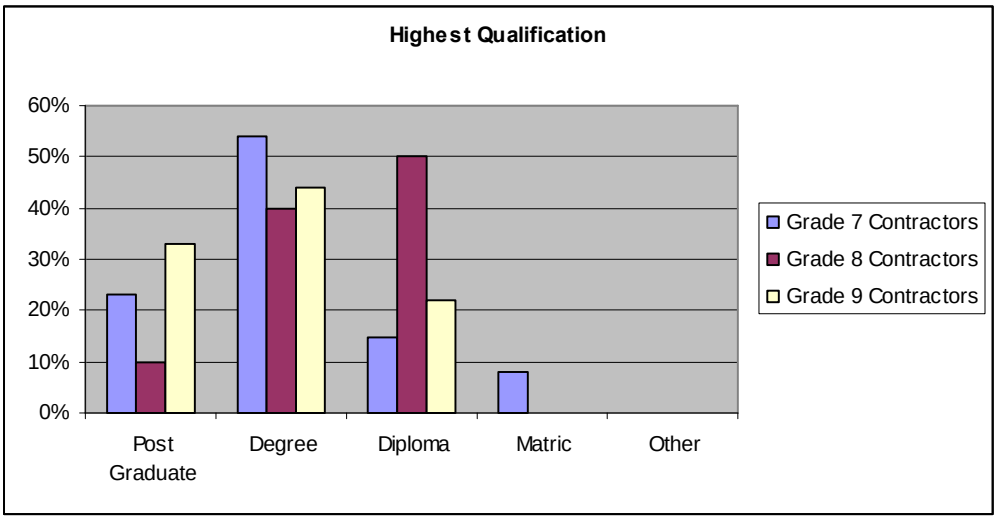
4.2.2. Highest Qualification

The results of the survey indicate that the academic credentials of the respondents are as follows;

- In the Grade 7 category, 54% of the respondents possessed degrees while 23% of the respondents possessed post graduate qualifications as well.
- Fifty percent (50%) of respondents in the Grade 8 category were educated up to diploma level while 40% and 10% possessed degrees and post graduate qualifications respectively.

- The majority of respondents in the Grade 9 category possessed degrees (44%) while 22% and 34% percent of the respondents held diplomas and post graduate qualifications respectively.

The graph below provides a detailed breakdown of the educational background of the respondents per contractor category.



Graph 4.2.2 Highest qualification of the respondents per contractor category

The results of the survey indicate that the majority of the respondents are educated up to degree / diploma level. This is not surprising given the level of responsibility attached to the positions occupied by the respondents. There were no marked differences between the educational levels of respondents in the different contractor categories.

Interestingly, the percentage of respondents with post graduate qualifications was low for all the contractor categories. This provides a clear indication that the majority of firms do not possess sufficient research capacity in their ranks. This is in agreement with the findings of the literature review that lamented the state of research and development in the industry and urged industry stakeholders to adopt a culture that entrenches research as an integral part of the overall business. The first in the quest to achieve this goal would be to encourage employees in responsible positions to actively pursue post

graduate studies so that they can learn and eventually apply much needed research skills in the work environment.

4.2.3. Number of years spent in the organization

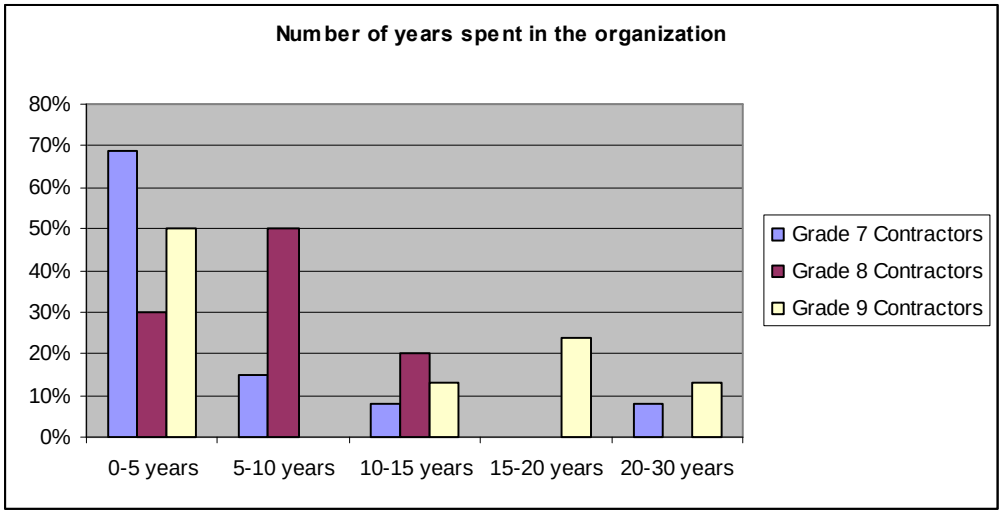
The respondents were requested to specify the number of years that they have been employed by their organizations in order to gauge the length of service to their respective employers.

Sixty nine percent (69%) of respondents in the Grade 7 category indicated that they had worked for the organization for a period not more than five years. Eight percent (8%) of the respondents indicated that their association with the organization spanned for more than twenty years. The remainder of the respondents indicated to have spent between five and fifteen years with their employers.

Thirty percent (30%) of respondents in the Grade 8 category indicated that they had worked for the organization for a period exceeding five years. Fifty percent (50%) and twenty percent (20%) of the respondents indicated a length of service ranging from 5 to 10 years and 10 to 15 years respectively. There were no respondents that indicated a level of service ranging from 15 to 30 years in this category of contractors

Fifty percent (50%) of respondents in the Grade 9 category indicated that they had worked for the organization for a period not exceeding five years. In the meanwhile thirteen (13%) of the respondents indicated a length of service between 20 to 30 years.

The tables below provide a comprehensive breakdown of the length of service of respondents per contractor category.



Graph 4.2.3 Number of years that the respondents have been in the service of their respective organizations

The results presented in the graph above are a clear indication of the high demand and mobility of skilled individuals that currently prevails in the South African construction industry. The fact that the majority of the respondents have been with their respective organizations for less than five years demonstrates that people with the requisite skills are on demand and are unlikely to stay with a single firm for a prolonged period of time. This presents two challenges for human resource practitioners in construction firms, firstly, firms are forced to develop strategies aimed at developing and harnessing the best talent in a very competitive market. Secondly, a firm that constantly changes its personnel struggles to align its values and ideals with those of its employees, this eventually results in the dilution of the corporate culture of the organization concerned. It takes time for an employee to appreciate and identify with the cause of the organization, therefore it is of outmost importance for construction firms to recognize this and develop counter measures to retain much need skills.

It is interesting to note that Grade 9 contractors demonstrated a greater ability to retain employees for periods exceeding 15 years. This may be attributable to the reputation, exposure and financial rewards associated with big construction firms.

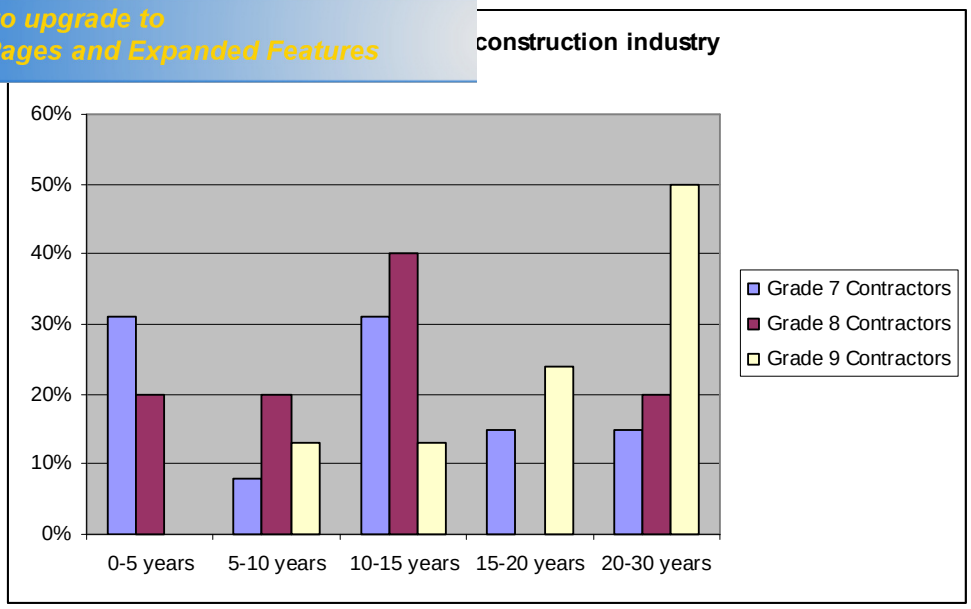
4.2.4. Number of years that the respondent has been involved in the construction industry

This question was posed in order to ascertain and compare the experience of the respondents. Thirty one percent (31%) of respondents representing Grade 7 contractors indicated to possess 0-5 years of experience in the construction industry. Fifteen percent (15%) of the respondents indicated to possess experience ranging from 20 to 30 years. Another thirty one percent (31%) had experience ranging from 10 to 15 years.

For respondents representing contractors in the Grade 8 contractors, twenty percent (20%) indicated to possess experience in the 0 to 5 years range while another twenty percent (20%) fell in the 5 to 10 year range of experience. The majority of the respondents (40%) in this category indicated to possess experience ranging from 10 to 15 years. The remaining twenty percent (20%) of respondents fell into the 20 to 30 year experience range.

In the Grade 9 category of contractors, there were no contractors who indicated to possess experience less than five (5) years. An overwhelming number of the respondents (50% to be precise) indicated to possess experience exceeding 20 years. Thirteen percent (13%) of the respondents fell in the 5 to 10 years experience category while another thirteen percent (13%) fell in the 10 to 15 years category. The remaining twenty four percent (24%) of respondents fell in the 15 to 20 years experience category.

The graph below provides a clear breakdown of the experience of the individual respondents in the three contractor categories.



Graph 4.2.4 Experience of the respondents in the construction sector

The results provided above are in agreement with the results presented in the preceding graph (Graph 4.2.3). Respondents in the Grade 9 category are far more superior in terms of experience when compared to their Grade 7 and Grade 8 counterparts. The dominance and the market share that Grade 9 contractors command may be underpinned by this wealth of knowledge and experience.

The graph also introduces another dimension into the discussion. Grade 7 and Grade 8 contractors tend to introduce employees into management positions at an earlier stage when compared to Grade 9 contractors. A firm that presents management opportunities at an early stage in the careers of employees is viewed as forward looking and is more likely to develop an enviable reputation in the industry. However, the introduction of inexperienced individuals in positions of responsibility poses the risk of under performance.

The literature review provided evidence of the poor performance levels associated with South African construction firms especially the smaller sized firms with limited resources. These poor levels of performance might be related to inexperienced individuals holding positions of responsibility. The only measure that can be adopted to mitigate or avert this risk is for firms to have functional mentorship programmes that provide professional support to young inexperienced managers.

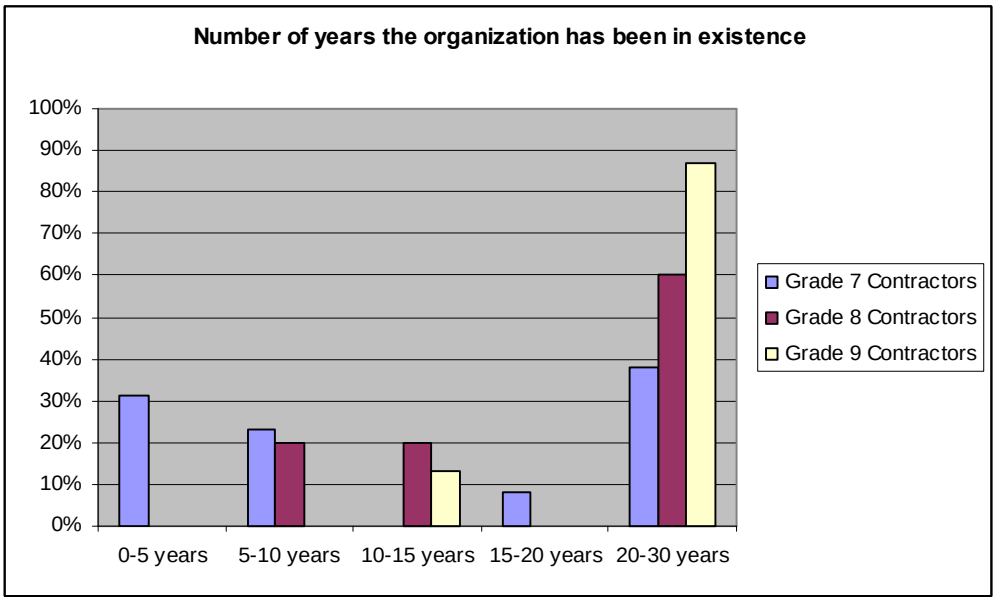
4.2.5. Number of years the organization has been in existence

This question sought to understand and compare the history of the organizations that took part in the survey. In the Grade 7 category of contractors, thirty one percent (31%) and twenty three (23%) of the respondents indicated that their organizations had been in existence for a period between 0 to 5 years and 5 to 10 years respectively. Thirty eight percent (38%) of the respondents indicated that their organizations have been in existence for a period exceeding 20 years.

There were no firms that had been in existence for less than five (5) years in the Grade 8 category. Twenty percent (20%) of the respondents indicated that their organization had been in existence for a period between five (5) to ten (10) years while another twenty percent (20%) fell in the ten (10) to fifteen (15) year range. The remaining sixty percent (60%) of the respondents indicated that their organizations had been in existence for a period exceeding twenty (20) years.

In the Grade 9 category of contractors thirteen percent (13%) and eighty seven (87%) of the respondents indicated that their organizations had been in existence a period between 10 to 15 years and exceeding 20 years respectively.

The graph presented below provides a comprehensive breakdown of the number years that each organization that participated in the survey has been in existence.



Graph 4.2.5 Number of years that the organizations involved in the survey have been in existence

The graph above represents an accurate reflection of the composition of the South African construction industry. The industry is dominated by a few large firms that have been in existence for long periods of time, these firms are dominant and enjoy considerable market share. The remainder of the market share is held by smaller sized firms, the lower end of the market is characterized by fierce competition that often results in the failure of many firms. As mentioned earlier in the discussion, the literature review revealed that smaller sized firms are often associated with poor workmanship, poor levels of quality and poor for health and safety practices.

The high number of small firms with no considerable experience can be explained by the fact that the South African construction industry is relatively easy to penetrate; there are no barriers to entry. Smaller sized firms have the innate ability of creating much need jobs, however a framework ensures that right caliber of individuals (or organizations) with the requisite skills and expertise are attracted to the industry needs to be explored.

4.3. Comparison of corporate culture dimensions amongst the various contractor categories

In order to compare the importance attached to each cultural dimension by the respondents in the three contractor categories, the mean score of each cultural dimension was computed.

The results obtained from the computation of the mean revealed that the relative importance of all the various cultural dimensions is largely similar in the three contractor categories. In all the contractor categories, research and development, innovation and benchmarking achieved the lowest mean scores and hence the lowest rankings.

The respondents were unequivocal in agreeing that good subcontractor and supplier relationships, quality and ethics are useful cultural dimensions and hence were rated highly in all three contractor categories. Employee relations and management style were rated almost similarly across the three contractor categories but achieved conservative mean scores as compared to the other cultural dimensions alluded to earlier in the discussion.

Differences in relative importance and hence ranking were experienced with customer orientation and health, safety and environment. While respondents representing grade 8 and grade 9 contractors placed a greater emphasis on health and safety, grade 7 respondents did not regard this cultural dimension as particularly important. In contrast, grade 7 and grade 8 contractors did not rate customer orientation highly while grade 9 contractors placed a significant level of importance on this aspect.

The table below depicts the mean value, the rank and hence the relative importance of each cultural dimension in the three contractor categories.

Note: 1 = lowest rank
12 = highest rank

Corporate Culture Dimension	Grade 7		Grade 8		Grade 9	
	Mean	Rank	Mean	Rank	Mean	Rank
1. Research & Development	3.00	1	3.28	3	3.29	1
2. Innovation	3.62	2	3.20	1	3.96	3
3. Mission, Values & Culture	3.81	3	4.04	7	4.29	5
4. Benchmarking	3.82	4	3.72	3	3.71	2
5. Customer Orientation	3.95	5	3.90	5	4.51	8
6. Management Style	4.03	6	3.76	4	4.22	4
7. Employee Relations	4.08	7	4.16	8	4.47	7
8. Health, Safety & Environment	4.08	7	4.32	12	4.67	10
9. Risk Management	4.12	9	3.94	6	4.40	6
10. Subcontractor Relationships	4.20	10	4.28	10	4.69	11
11. Quality	4.29	11	4.28	10	4.56	9
12. Ethics	4.35	12	4.22	9	4.69	11

Table 4.3 Relative importance of corporate culture dimensions

Amongst the three contractor categories, research and development achieved the lowest mean score and hence the lowest ranking. This ranking is in agreement with the findings of the literature review wherein it was found that South African construction firms do not commit sufficient financial resources to research and development. This further entrenches the belief that this aspect of the business has largely been neglected by the industry.

The respondents did not attach a high level of importance on innovation and hence a low mean score was achieved. This low ranking confirms the findings of the literature review that South African construction firms lag behind in innovation when compared to firms in other economic sectors. This suggests that South African construction firms do not have systems that encourage employees to introduce new ideas and ultimately introduce new innovative processes. This lack of innovation hinders the personal growth of employees as well as that of the organization as whole.

The results of the survey provided insight about the dominant management style in the construction industry. The low scores achieved by this cultural dimension in all the contractor categories suggest that the management style is predominantly autocratic in nature with management assuming the superior position. This management style

creates an uncomfortable buffer between management and the general workforce, in severe cases it may even alienate employees. The management in construction firms needs improvement, it needs to be reflective of the fact that people are the most important asset of any business organization.

The respondents in the three contractor categories held the view the exercise of comparing the performance of their organizations with that of their counterparts is not essential. Subsequently, benchmarking achieved one the lowest mean scores when compared to other corporate culture dimensions. The implication here is that South African construction firms have not yet full appreciated and assimilated the benefits that can be derived from implementing an effective benchmarking programme.

Respondents in the different contractor categories had the same level of appreciation for employee relations. Although the mean rank scores for this corporate culture dimension were not the lowest when compared to others, there is certainly room for improvement in this arena. Given the shortage of skills currently ravaging the construction industry, construction firms need to put more effort in improving relations with employees and thus retain critical skills.

The relative importance of Mission, Values and Culture was slightly different in comparison amongst the three contractor categories. The mean scores achieved by Grade 8 contractors for this cultural dimension is an indication that a reasonable level of importance is attached to this dimension. In contrast, the mean scores achieved by Grade 7 and Grade 9 contractors for this corporate culture dimension was significantly lower. This may be an indication that for Grade 7 and Grade 8 contractors, Mission and Values are not essential ingredients for business success. It is critical for the mission and values of an organization to be ingrained in every employee. The survey has revealed that this is not the case for the majority of South African construction firms, such a scenario can result in employees committing acts that are contrary to the values and ideals that the organization stands for.

As tabulated on Table 4.3 customer orientation only managed to achieve a rank of five (5) in both the Grade 7 and Grade 8 contractor categories. It should be borne in mind that the health of the order books of construction firms rely solely on the ability to cultivate and develop healthy working relationships with clients. The points allocated to this cultural dimension specifically by Grade 7 and Grade 8 contractors demonstrate that such contractors fail dismally to maintain harmonious relationships with clients. This correlates with the results of a survey that was conducted by the CIDB amongst public and private sector clients, the survey revealed high levels of dissatisfaction with construction firms. Comparatively, Grade 9 contractors attached a reasonable level of importance on customer orientation. This may be attributed to the fact that such firms have been in existence for long periods of time and hence have developed and cemented relationships with particular clients in the course of time.

The achievement and maintenance of high health, safety and environment standards was rated highly by the respondents. However, Grade 7 respondents expressed a low appreciation of this cultural dimension when compared to the other two contractor categories. The survey showed that the more established construction firms have a different outlook regarding health and safety when compared to the smaller sized firms. Grade 8 and 9 contractors have intensified their efforts in meeting the statutory health and safety requirements. In contrast the survey has revealed that Grade 7 contractors have not vigorously pursued such strategies hence the low mean score when compared with other contractor categories.

All the respondents regarded the maintenance of good subcontractor relationships as essential and hence a high ranking was attached to this cultural dimension in the three contractor categories. When comparing the mean scores across the different contractor categories, it is evident that Grade 9 contractors expressed the greatest appreciation for this particular cultural dimension. This is perfectly logical as Grade 9 contractors are more likely to outsource the majority of their work activities as compared to their smaller sized counterparts.

The literature review found that small and medium sized South African contractors have not developed effective Quality Management Systems, subsequently this has compromised the quality of the product produced by such contractors. Despite this finding, Table 4.5 shows that quality was rated highly by all the respondents. The inference in this instance is that small and medium sized South African contractors realize the importance of quality but have not followed in the footsteps of Grade 9 contractors in enforcing stringent quality assurance and management processes. The financial and human resources required to establish such systems and processes may be hindering small and medium sized firms from pursuing quality management initiatives.

The respondents were unequivocal in placing high value on ethics. This may be due to the realization unethical behavior reflects poorly on the organization and damages its image. This ranking is in line with the high level of appreciation attached to good subcontractor relationships expressed earlier in the discussion. The considerable high levels of appreciation attached to ethics demonstrate the eagerness of South African contractors to project a positive image of their organizations to fellow industry stakeholders and the public in general.

4.4. Similarity of populations – corporate culture and business performance

To complement the mean scores, the Kruskall ï Wallis test was conducted to confirm whether the three populations are identical in terms of perception towards the importance of the various corporate culture dimensions.

In all instances the W ï statistic proved to be less than the value of 5.99147 required to reject the null hypothesis that the three populations are identical. Owing to the values emanating from the Kruskall ï Wallis test, it was illustrated that the contractor populations are similar in their perceptions of the importance of the various corporate culture dimensions.

The table below outlines the W ï statistic associated with each cultural dimension. The W ï static for performance is also included in the table as well.

Corporate Culture Dimension	W Static
1. Mission, Values and Culture	-17.22
2. Ethics	-24.02
3. Quality	-20.76
4. Health, Safety & Environment	-17.74
5. Sub - Contractor	-19.01
6. Research & Development	-8.23
7. Innovation	-18.67
8.Management Style	-10.53
9.Employee Relations	-17.61
10.Customer Orientation	-10.98
11.Benchmarking	-14.95
12.Risk Management	-12.53
Performance Measurement	-20.09

Table 4.4 Results of Kruskall-Wallis Test

4.5. Spearman's Rank Correlation Coefficient

To assess the relationship between the various cultural dimensions and business performance, the Spearmanôs Rank Correlation Coefficient was computed between the average corporate culture scores as well as the average business performance scores.

For contractors in the Grade 7 category, the results provided by the Spearmanôs Rank Correlation Coefficient illustrated that a positive relationship existed between all the corporate culture dimensions and performance. Similar results were observed for contractors in the Grade 8 category with the only exception being that research and development, and innovation did not yield a positive relationship with performance. Mission, values and culture, ethics, quality, innovation, and management style were the only cultural dimensions that proved to have a positive relationship with performance for contractors in the Grade 9 category. The Spearman rank correlation coefficient for each contractor category is tabulated below.

	Grade 7	Grade 8	Grade 9
	r_s	r_s	r_s
1. Mission, Values and Culture	0.36	0.06	0.27
2. Ethics	0.65	0.31	0.14
3. Quality	0.53	0.48	0.09
4. Health, Safety & Environment	0.53	0.36	-0.09
5. Sub - Contractor & Supplier Relationships	0.67	0.42	-0.14
6. Research & Development	0.25	-0.78	-0.07
7. Innovation	0.31	-0.21	0.19
8.Management Style	0.71	0.47	0.05
9.Employee Relations	0.56	0.42	-0.39
10.Customer Orientation	0.67	0.53	-0.59
11.Benchmarking	0.28	0.05	-0.53
12.Risk Management	0.50	0.17	-0.60

Table 4.5 Spearman's rank correlation coefficient

The Spearmanôs Rank Correlation Coefficient was positive for all the various corporate culture dimensions for Grade 7 contractors. This indicates that for this particular category of contractors a positive relationship exists between all the various corporate culture dimensions and business performance. As shown on Table 4.5 a high coefficient value was attached to ñManagement Styleò, this indicates that amongst Grade 7 contractors, this cultural dimension is perceived to have the greatest impact on performance.

Table 4.5 has shown that for Grade 8 contractors, the Spearmanôs Rank Correlation Coefficient was positive for all the corporate culture dimension except for ñResearch and Development, and Innovationò The negative coefficient values encountered in this instance indicate that Research and Development, and Innovation are perceived not to have a significant impact on the performance of Grade 8 contractors. The negative coefficient values correlate perfectly with the low rankings that were allocated to both of these cultural dimensions as discussed earlier. The positive impact that ñResearch and Development, and Innovationò have on business performance will only become apparent once the importance and appreciation attached to these cultural dimensions is improved significantly.

For contractors in the Grade 9 category, the number of cultural dimensions that were identified as having a profound impact on business performance was far outweighed by those perceived not to possess such influence. Innovation, Mission, Values and Culture, Management, Quality and Ethics emerged as the only cultural dimensions characterized by positive Spearman Correlation Coefficients thus signaling the existence of a positive relationship between such corporate dimensions and business performance.

As discussed earlier and referring to Table 4.3, it is evident that Research and Development, and Benchmarking received one of the lowest rankings across the three contractor categories when compared to other corporate culture dimensions. It is therefore not surprising that these corporate culture dimensions attained negative Spearmanôs Rank Correlation Coefficients as shown on Table 4.5. This result further reinforces the notion that these corporate culture dimensions are not treated with any level of significance or importance and hence the contribution to business performance becomes negligible.

Table 4.3 indicated a high level of appreciation for ñCustomer Orientation and Sub Contractor Relationshipsò by Grade 9 contractors but Table 4.5 revealed a negative Spearmanôs Rank Correlation Coefficient for these two corporate culture dimensions. This means that although there is a reasonable level of importance attached to these corporate culture dimensions they are not perceived to wield a high degree of influence on the business performance of Grade 9 contractors. This is an indication that the more established construction firms have developed rigid and inward looking policies. Subsequently, such organizations have failed to identify, acknowledge and embrace external stakeholders such as subcontractors and clients as critical to the success of their organizations.

Through the negative Spearmanôs Correlation Coefficient (-0.39) shown on Table 4.5, Grade 9 contractors held that employee relations do not have an impact on the performance of their organizations. This is a very interesting observation especially in the backdrop of the skills shortage currently ravaging the construction industry. The

dormant and inactive nature of human resources departments of many construction firms as alluded to in the literature may be directly responsible for the lackluster attitude towards the contribution of employees to business success. The strike actions that took place in almost all the stadiums currently under construction for the World Cup spectacle are perhaps a clear indication of the sour relationship that typically characterize employer ï employee relations in the South African construction industry. Intertwined with this discussion is the fact that many construction firms have grown rapidly and human resource departments have not kept abreast with the growth. This sudden growth often diverts the focus away from employees and inevitably creates an uncomfortable vacuum between the management and employees.

Table 4.5 also presented a negative Spearmanôs Rank Correlation Coefficient regarding the relationship between Health, Safety and Environment for Grade 9 contractors. The implication here is that such firms do not view health, safety and environment as critical to the strategic direction of their organizations but rather as regulatory requirements that have to be met. This approach negates the possible business benefits that can be derived from adopting effective health, safety and environment systems.

4.6. Summary of survey results

The results of the survey can be summarized as follows;

- The response rate of Grade 8 and Grade 9 contractors was satisfactory. Although the response rate from Grade 7 contractors was low, it was held that the results provided by the survey are reliable and credible as the impact of non response bias is eliminated.
- The respondents to the survey were mainly individuals who occupy middle and senior management positions in their organizations. The intention to focus on middle and senior managers for the purposes of the survey was expressed on Chapter 3 of this report.
- The survey found that there were no marked differences in education levels amongst respondents in the various contractor categories. Additionally, the

results of the survey revealed that a small percentage of the respondents possessed post ï graduate qualifications.

- With the exception of the Grade 9 category, the results of the survey demonstrated the inability of contractors to retain skilled individuals for prolonged periods of time.
- The respondents representing Grade 9 contractors were found to be superior in terms of experience when compared to Grade 7 and Grade 8 respondents.
- It emerged from the survey that Grade 7 and Grade 8 contractors tend to introduce employees to management positions at an earlier stage in their careers.
- The three contractor populations were largely similar in their level or degree of appreciation of the various corporate culture dimensions identified in the study as critical to the success of construction firms.
- Research and Development, Innovation, Management Style and Benchmarking were not considered as essential and were ranked lowly across the three contractor categories.
- Subcontractor Relationships, Quality and Ethics were identified as the most important corporate culture dimensions across the three contractor categories.
- The level of importance attached to Health, Safety and Environment, Costumer Orientation and Mission, Values and Culture differed significantly across the three contractor populations.
- Contractors in the Grade 7 category of works held that all the corporate culture dimensions identified in the study have a positive impact on business performance. Grade 8 contractors also maintained the same view but discounted Research and Development, and Innovation as key to the success of their organizations.
- Grade 9 contractors differed significantly with their counterparts. Innovation, Mission, Values and Culture, Management Style, Quality and Ethics were identified as the only ingredients that are critical for business success. The remaining corporate culture dimensions identified in the study were not regarded as fundamental to the success of the organization.

Chapter 5 - Findings

5.0. Introduction

This part of the study presents the findings based on the survey results and on the information provided on the literature review. The research questions and the associated subsidiary questions posed in the first chapter of the study will be considered carefully. A comprehensive review of the objectives of the study will be undertaken and a determination of whether these objectives have been accomplished will be made. The discussion will also provide a verdict on the hypothesis that was proposed on page 4 of this study. The discussion will culminate by providing conclusions and recommendations taking into consideration issues arising from the literature review and survey results.

5.1. Main Research Question

The main question that the study sought to address was stated on Chapter 1 as follows:

5.1.1. What is the nature of the relationship that exists between the corporate culture and the performance of South African construction firms?

The literature review provided evidence that supports the assertion that a positive relationship exists between corporate culture and business performance. The survey results demonstrated that this assertion holds true for South African construction firms as well. Small sized contractors (Grade 7) held that all the corporate culture dimensions identified in the study have a positive impact on the performance of their organizations. Medium sized contractors (Grade 8) asserted that all the corporate culture dimensions under scrutiny except for two have a positive impact on the performance of their organizations. Out of the eleven corporate culture dimensions under discussion, Grade 9 contractors held the view that only five of the corporate culture dimensions identified in the study have a positive impact on performance. Although the three contractor populations held different views regarding the impact of the various corporate culture dimensions on performance, the study provided credible evidence that clearly indicated that a positive relationship prevails between the corporate culture and the performance of South African construction firms.

As a consequence of the main research question, the study also sought to address the following ancillary questions:

5.1.2. Is there a difference in perception regarding the importance of the various corporate culture dimensions amongst the construction firms in South Africa?

Through the use of the Kruskall Wallis Test, the survey found that the three distinct contractor populations were generally similar in the levels of appreciation of the various corporate culture dimensions. Therefore, regardless of the existence of various sized construction firms in South Africa, the level of appreciation attached to the various corporate culture dimensions identified in the study is largely similar.

5.1.3. Which corporate culture dimensions are perceived to be the most important amongst construction firms in South Africa?

The study found that South African firms consider Health, Safety and Environment, Sub-Contractor Relationships, Quality and Ethics as the most important corporate culture dimensions.

5.1.4. Which corporate culture dimensions are perceived to be the least important amongst construction firms in South Africa?

Research and Development, Innovation, Management Style and Benchmarking achieved the lowest mean scores and hence emerged as the least important corporate culture dimensions amongst South African construction firms.

5.1.5. What kind of an impact do the various corporate culture dimensions have on the performance of South African construction firms?

The Spearmanôs Rank Correlation was used to ascertain the relationship between the various corporate culture dimensions and contractor performance. In the Grade 7 category of contractors, all the corporate culture dimensions were found to have a positive impact on business performance. The result was largely similar for contractors in the Grade 8 category with the exception that Research and Development and Innovation were singled out as the only corporate culture dimensions that do not impact

significantly on business performance. Grade 9 contractors identified Innovation, Mission, Values and Culture, Management Style, Quality and Ethics as the only corporate culture dimensions that impact positively on business performance. Overall, the study found that the various corporate culture dimensions have a positive impact on the performance of South African construction firms. The magnitude of the impact is directly dependent on the size of the organization.

5.2. Hypothesis Testing

The study has proven correct the hypothesis that states that there is a positive relationship between the corporate culture and the performance of South African construction firms.

5.3. Objectives

The objectives of the research were outlined in Chapter 1 as follows;

(a) Identify corporate culture dimensions that are critical to the success of construction firms.

(b) Identify corporate culture dimensions that are perceived to be very important by South African construction firms.

(c) Identify corporate culture dimensions that are perceived to be less important by South African construction firms.

(d) Evaluate the relationship that exists between the corporate culture of South African construction firms and their performance.

(e) Identify deficiencies in the corporate culture of South African construction firms.

The objectives of the research report have been accomplished. The responses to the research questions have addressed the objectives of the research comprehensively.

Chapter 6 – Conclusions and Recommendations

6.0 Conclusions

The South African construction industry is pivotal to the success of the South African economy. Not only is the construction industry responsible for delivering critical infrastructure such as roads, bridges, hospitals, schools etc; it also serves as source of employment to thousands of South African citizens. Despite the global financial crisis currently ravaging the world markets, the South African government has embarked on an ambitious infrastructural programme and has committed billions of rands for this initiative. A construction industry capable of consistently achieving and maintaining high performance levels is key to bringing the governmentôs infrastructure aspirations into fruition. Corporate culture has been identified as one of the ingredients that can be used to improve the performance of South African construction firms.

Below is a summary of the conclusions arising from the literature review, survey and the findings:

- The majority of middle and senior managers of South African construction firms are educated up to tertiary level, a small percentage of the managers possess post graduate qualifications. This explains the poor research capacity and output of South African construction firms.
- A high demand for skilled individuals exists in the South African construction industry. As a result, small and medium sized firms struggle to retain skilled individuals in their ranks. The constant movement of personnel in and out of the organization dilutes the corporate culture of an organization and destroys its institutional memory.
- Small and medium sized construction firms introduce employees to management positions earlier when compared to big construction firms. This enhances the career prospects of employees but exposes the organization to the risk of underï performance due to the lack of managementôs business exposure and experience.

- The level of appreciation associated with the various corporate culture dimensions is similar throughout the South African contractor population. Health, Safety and Environment, Sub-Contractor Relationships, Mission and Values, Quality and Ethics are regarded as the most important corporate dimensions. At the other extreme, Research and Development, Innovation, Management Style, Benchmarking, Employee Relations and Customer Orientation were rated as the least important corporate culture dimensions.
- In the case of smaller sized contractors, a positive relationship exists between all the corporate culture dimensions and business performance. A positive relationship between corporate culture and business performance was also evident for medium sized contractors. The more established and dominant contractors identified particular corporate culture dimensions that have a positive impact on business performance, these were Mission and Values, Ethics, Quality, Innovation and Management Style. In essence the magnitude of the impact of corporate culture on the business performance of South African construction firms differs relative to the size of the firm. Amongst the small and medium sized construction firms, the influence of corporate culture is much more profound and pronounced than when compared to big construction firms.

6.1 Recommendations

Taking into consideration the information that has been gleaned through the literature review, survey results and findings, it is evident that there are particular corporate dimensions that have not been fully embraced and exploited by South African construction firms. These are: research and development, innovation, management style, employee relations, benchmarking and customer orientation.

The first part of this section will recommend on how the corporate culture dimensions outlined above can be inculcated into the operations of South African construction firms to contribute positively to their performance and success. The latter part of this section will provide recommendations on a broad range of issues that have emerged from the study.

6.1.1 Research and Development ï it is recommended that two options be pursued to improve the research capacity and output of South African construction firms;

- On a micro level, South African construction firms must dedicate resources and actively encourage those employees in technical and management positions to pursue post graduate studies and research topics relevant to the industry.
- On a macro level, the construction industry in partnership with the government should establish a research institute dedicated to construction research and excellence. A tax incentive could be introduced for firms who actively participate in the formation and running of such an institution. Ultimately, each and every construction firm must have a well functioning research and development department. Once this is achieved the true value of research and development on business performance will be realized.

6.1.2 Innovation ï at site level, South African construction firms must introduce ñInnovation Champions / Ambassadorsò These are individuals whose responsibility will be to ensure that new construction methodologies and techniques are recorded and properly documented.

At senior level, skilled managers who can spearhead and champion the cause of innovation need to be introduced. This will assist in aligning the innovation strategy with the corporate strategy and long term vision of the organization.

6.1.3 Management Style ï the tight inflexible management controls currently

characterizing the majority of South African construction firms must be removed. A new management style that is inclusive and less rigid should be introduced. This would narrow the gap between management and employees. It is further recommended that workplace forums aimed improving relations between management and employees be introduced at site level. Such forums would serve as key communication points between management and the labour force. An environment that allows employees to voice their concerns and grievances freely would eliminate the conflicts that often result in strikes and project delays.

6.1.4 Benchmarking ï South African construction firms must develop benchmarking programmes intended to improve the efficiency of internal processes of individual firms. This would stimulate competition in the industry and would inevitably improve the performance of the industry as a whole. It is also recommended that an overarching benchmarking programme for the construction industry be developed. This would ensure that the South African construction industry is perfectly positioned to compete and is on par with construction industries of other developing nations.

6.1.5 Customer Orientation ï pre ï project, construction and post contract interaction sessions should be introduced to create clear lines of communication between clients and construction firms. This would enable contractors to understand and clearly assimilate client requirements and expectations.

6.1.6 Although subcontractor relationships, quality and ethics were viewed positively by all the respondents, construction firms must reinforce these practices in their operations.

Long term relationships with subcontractors must be actively pursued, this should be supplemented by a pervasive quality and ethical culture.

6.1.7 Small and medium sized construction firms need to develop effective strategies to attract, retain and develop skilled individuals. This would entrench the corporate culture of such firms and ensure that the institutional memory is protected and maintained. Money should not form the epicenter of such strategies but should take into consideration other motivational factors such as achievement, responsibility, advancement and participation.

6.1.8 In order to mitigate against the risk that might be encountered through the introduction of inexperienced individuals into management positions, small and medium sized construction firms must develop appropriate mentoring and career development programmes to support such individuals.

6.1.9 In order to increase the knowledge base about the corporate culture of South African construction firms, it is recommended that studies focusing on the cultural diversity of employees in the construction field be undertaken. The effect of this diversity in culture on the relations amongst employees at site level, between employees and management should be scrutinized. Further studies that focus on how construction firms can harness the cultural diversity of their workforce to improve performance can also prove to be beneficial.

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2010 Communication Project Management Unit. Government Communication and Information System (GCIS).

APPENDIX A

University of the Witwatersrand
Faculty of Engineering and the Built Environment
School of Construction Economics
John Moffat Building

Dear Sir / Madam

RE: ASSISTANCE IN PROVIDING DATA FOR CORPORATE CULTURE STUDY

Mr Kgositsile Sidumedi is an MSc student at the School of Construction Economics and Management, University of the Witwatersrand, Johannesburg. He is currently undertaking a research entitled **"An Investigation into the corporate culture of South African construction firms and performance"**.

In this regard, we kindly request you to assist him by answering the attached questionnaire to the best of your ability. Please note that the information obtained will be used solely for academic purposes.

Thank you for your input

Yours faithfully

Prof A.A Talukhaba
Supervisor

Topic: An investigation into the relationship between the corporate culture of construction firms and performance

A. Personal and Company Information

1) What position do you occupy in your organization?

(a) Director ☐ **(b) Senior Contracts Manager** ☐ **(c) Contracts Manager** ☐

(d) Site Agent ☐ **(e) Other (Please specify……..)** ☐

2) What is your highest qualification?

(a) Post Graduate ☐ **(b) Degree** ☐ **(c) Diploma** ☐ **(d) Matric** ☐

(e) Other (Please specify……..) ☐

3) Please specify the number of years you have been with your organization.

(a) 0 – 5 ☐ **(b) 5 – 10** ☐ **(c) 10 – 15** ☐ **(d) 15 – 20** ☐ **(e) 20 – 30** ☐

4) Please specify the number of years that you have involved in the construction industry.

(a) 0 – 5 ☐ **(b) 5 – 10** ☐ **(c) 10 – 15** ☐ **(d) 15 – 20** ☐ **(e) 20 – 30** ☐

5) Please specify the number of years that your organization has been in existence.

(a) 0 – 5 ☐ **(b) 5 – 10** ☐ **(c) 10 – 15** ☐ **(d) 15 – 20** ☐ **(e) 20 – 30** ☐

6) What is the CIDB Grading of your Organization?

(a) Grade 7 ☐ **(b) Grade 8** ☐ **(c) Grade 9** ☐

B. Corporate Culture Assessment

Please consider the statements below and tick the box that best represents your organization. Please take into cognizance the scoring method detailed below:

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

1. MISSION, VALUES and CULTURE	1	2	3	4	5
The values and mission statement of my organization have a positive impact on performance					
My organization has a clearly defined mission statement					
A set of values guide the organization in the way it conducts its business					
These values are known, shared and practiced by each and every member of the organization					
The culture of my organization is intrinsically linked to these values					

2. ETHICS	1	2	3	4	5
The ethical values of my organization have a positive influence on performance					
The organization is founded on strong ethical values					
Corruption and unethical behaviour are strongly discouraged in my organization					
Good morals is the guiding principle in every transaction that my organization undertakes					
Members of my organization found to be involved in corruption are dealt with accordingly.					

3. QUALITY	1	2	3	4	5
High quality levels in my organization have a positive impact on performance					
My organization considers quality a priority in every project					
My organization uses effective quality management systems					
There are many benefits that can be derived from using quality management systems					
Quality is the responsibility of every employee in my organization					

4. HEALTH, SAFETY & ENVIRONMENT	1	2	3	4	5
High health and safety standards have a positive influence on the organizationôs performance					
My organization aspires to achieve high and maintain high health and safety standards					
All members of my organization share a common goal regarding health and safety					
Health and Safety training is conducted regularly					
It is the responsibility of my organization to protect the environment					

5. SUB CONTRACTOR & SUPPLIER RELATIONSHIPS	1	2	3	4	5
Good relationships with subcontractors and suppliers have a positive impact on the performance of the organization					
My organization maintains long term relationships with its subcontractors and suppliers					
It is important to have clear lines of communication with subcontractors					
Subcontractors are coached and are provided with guidance where necessary					
Subcontractors and suppliers are treated fairly and are paid on time					

6. RESEARCH & DEVELOPMENT	1	2	3	4	5
Research and development initiatives have a positive impact on the performance of the organization					
Research and development is an integral part of my organization					
The organization invests heavily on research and development					
A separate department in my organization is dedicated to research and development					
Research and development ensures that the organization is on the cutting edge of the latest technology					

7. INNOVATION	1	2	3	4	5
Innovation and risk taking have a positive impact on the performance of the organization					
My organization has established systems that encourage employees to be innovative					
My organization has established systems that encourage employees to take calculated risks					
My organization is a very controlled and structured place characterized by formal procedures					
Employees are not suppressed but are rather encouraged to display their entrepreneurial flair					

8. MANAGEMENT STYLE	1	2	3	4	5
The dominant management style in my organization is directly related to the performance					
The management style is very inclusive and democratic					
Managers communicate clearly, provide support and assistance to employees					
Employees are encouraged to voice their opinions without fear					
Management encourages employees to be responsible and accountable for their actions					

9. EMPLOYEE RELATIONS	1	2	3	4	5
The positive relationship between employees and the organization has a positive impact on performance					
Employees are the most important assets of the organization					
The development and upliftment of employees is important					
Employees are rewarded based on their commitment and performance					
Employees are provided with authority, freedom and independence in their jobs					

10. CUSTOMER ORIENTATION	1	2	3	4	5
The positive relationship between customers and the organization has a positive impact on performance					
Customer satisfaction is important to my organization					
My organization undertakes a satisfaction survey at the end of each project					
The views and opinions of customers are taken seriously in my organization					
My organization responds early and positively to criticism and complaints from customers					

11. BENCHMARKING	1	2	3	4	5
Benchmarking has a positive impact on the performance of the organization					
Benchmarking helps my organization improve internal processes / operations					
Benchmarking helps my organization compete effectively with other contractors					
Management in my organization understand and appreciate the value of benchmarking					
Employees in my organization understand and appreciate the value of benchmarking					

12. RISK MANAGEMENT	1	2	3	4	5
Effective risk management has a positive impact on the performance of the organization					
Risk management helps my organization to minimize its risk exposure					
Risk management helps my organization compete effectively with other contractors					
Management in my organization understand and appreciate the value of risk management					
Employees in my organization understand and appreciate the value of risk management					

C. Business Performance Measurement

Please rate your organization accordingly using the table below, please take into cognizance the scoring schedule provided below.
Note: All questions relate to the 2007 / 2008 financial year

1 = performance very low
2 = performance low
3 = performance acceptable
4 = performance high
5 = performance excellent

1. Time performance

Percentage of the time that projects are delivered on or ahead of schedule

Frequency	0-20%	20%-40%	40%-60%	60%-80%	80%-100%
Score Allocated	1	2	3	4	5

2. Cost performance

Percentage of the time that projects are delivered on or under budget

Frequency	0-20%	20%-40%	40%-60%	60%-80%	80%-100%
Score Allocated	1	2	3	4	5

3. Customer satisfaction

Percent of repeat business customers

Frequency	0-20%	20%-40%	40%-60%	60%-80%	80%-100%
Score Allocated	1	2	3	4	5

4. Safety performance ï number of fatalities on site. A fatality is defined as an injury sustained where the seriousness warrants medical treatment and serious enough to result in time off work for 14 days or more.

Number of fatalities	40-50	30-40	20-30	20-10	10-0
Score Allocated	1	2	3	4	5

5. Profit ï net profit after tax as a percentage of total sales

Profit Margin	0-5	5-10	10-15	15-20	20-25
Score Allocated	1	2	3	4	5

6. In the space provided below, please indicate any other measures that your organization uses to gauge success……

……
……
……
……
……

APPENDIX B

Grade 7 Contractors
Computation of Mean Values

1. Mission, Values & Culture		
31	**Total Value**	**Mean Value**
30	137	3.43
29		
22		
25		
2. Ethics	**Total Value**	**Mean Value**
29	162	4.05
30		
37		
30		
36		
3. Quality	**Total Value**	**Mean Value**
32	160	4.00
32		
27		
36		
33		
4. Health, Safety & Environment	**Total Value**	**Mean Value**
31	148	3.70
31		
29		
28		
29		
5. Sub Contractor & Supplier Relationships	**Total Value**	**Mean Value**
31	155	3.88
30		
34		
32		
28		
6. Research & Development	**Total Value**	**Mean Value**
26	101	2.53
22		
19		
13		
21		
7. Innovation		**Mean Value**
32	139	3.48
27		
25		
28		
27		

8. Management Style	Total Value	Mean Value
31	148	3.70
27		
27		
29		
34		
9. Employee Relations	**Total Value**	**Mean Value**
31	153	3.83
34		
32		
29		
27		
10. Customer Orientation	**Total Value**	**Mean Value**
31	148	3.70
31		
25		
30		
31		
11. Benchmarking	**Total Value**	**Mean Value**
30	144	3.60
30		
28		
28		
28		
12. Risk Management	**Total Value**	**Mean Value**
30	150	3.75
31		
31		
28		
30		
Time Performance	57.00	3.25
Cost Perfromance	56.00	3.29
Customer Satisfaction	68.00	4.00
Safety	80.00	4.71
Profit	46.00	2.71

Descriptive Statistics
Computation of Mean Values
Grade 8 Contractors

1. Mission, Values and Culture	
202	Total Value
4.04	Mean Value
2. Ethics	
207	Total Value
4.14	Mean Value
3. Quality	
214	Total Value
4.28	Mean Value
4. Health, Safety and Environment	
216	Total Value
4.32	Mean Value
5. Sub Contractor & Supplier Relationships	
216	Total Value
4.32	Mean Value
6. Research and Development	
162	Total Value
3.24	Mean Value
7. Innovation	
189	Total Value
3.78	Mean Value
8. Management Style	
188	Total Value
3.76	Mean Value
9. Employee Relations	
207	Total Value
4.14	Mean Value
10. Customer Orientation	
195	Total Value
3.9	Mean Value
11. Benchmarking	
182	Total Value
3.64	Mean Value
12. Risk Management	
198	Total Value
3.96	Mean Value
Average Corporate Culture Score	
43.38	
3.615	

Average Business Performance Score	Total Value	Mean Value
Time Performance	42	4.2
Cost Perfromance	45	4.5
Customer Satisfaction	47	4.7
Safety	46	4.6
Profit	27	2.7
		4.14

Grade 9 Contractors

1. Mission, Values & Culture		
36	Total Value	Mean Value
34	169.00	4.23
36		
30		
33		
2. Ethics		
	Total Value	Mean Value
36	189.00	4.73
37		
39		
38		
39		
3. Quality		
	Total Value	Mean Value
38	188.00	4.70
38		
38		
37		
37		
4. Health, Safety & Environment		
	Total Value	Mean Value
37	183.00	4.58
38		
35		
37		
36		
5. Sub Contractor & Supplier Relationships		
	Total Value	Mean Value
38	192.00	4.80
39		
38		
38		
39		
6. Research & Development		
	Total Value	Mean Value
31	132.00	3.30
27		
25		
21		
28		
7. Innovation		
	Total Value	Mean Value
34	156.00	3.90
32		
28		
29		
33		

8. Management Style			
	Total Value	Mean Value	
35	172.00	4.30	
32			
34			
34			
37			
9. Employee Relations			
	Total Value	Mean Value	
38	184.00	4.60	
39			
37			
35			
35			
10. Customer Orientation			
	Total Value	Mean Value	
39	185.00	4.63	
38			
32			
39			
37			
11. Benchmarking			
	Total Value	Mean Value	
32	152.00	3.80	
31			
30			
30			
29			
12. Risk Management			
	Total Value	Mean Value	
37	178.00	4.45	
37			
35			
37			
32			
	Total Value	**Mean Value**	
Time Performance	33.00	4.13	
Cost Perfromance	31.00	3.88	
Customer Satisfaction	32.00	4.00	
Safety	33.00	4.13	
Profit	15.00	1.88	
		3.60	

APPENDIX C

Kruskall Wallis Test

1. Mission, Values and Culture			W = -17.22
Contractor 1	20	11	
Contractor 2	20	11	
Contractor 3	15	2	
Contractor 4	16	5	
Contractor 5	16	5	
Contractor 6	13	1	
Contractor 7	21	19	
Contractor 8	16	5	
Contractor 9	24	28	
Contractor 10	25	31	
Contractor 11	24	28	
Contractor 12	23	23	
Contractor 13	15	2	
3.815384615	**248**	**171**	

Contractor 1	20	11	
Contractor 2	21	19	
Contractor 3	20	11	
Contractor 4	21	19	
Contractor 5	15	2	
Contractor 6	20	11	
Contractor 7	25	31	
Contractor 8	23	23	
Contractor 9	18	8	
Contractor 10	19	10	
4.04	**202**	**145**	

Contractor 1	20	11	
Contractor 2	23	23	
Contractor 3	20	11	
Contractor 4	23	23	
Contractor 5	18	8	
Contractor 6	20	11	
Contractor 7	23	23	
Contractor 8	22	22	
Contractor 9	24	28	
4.288888889	**193**	**160**	

2. Ethics			W = -24.01
Contractor 1	21	9	
Contractor 2	23	17	
Contractor 3	21	9	
Contractor 4	18	3	
Contractor 5	14	1	
Contractor 6	20	5	
Contractor 7	25	23	
Contractor 8	20	5	
Contractor 9	25	23	
Contractor 10	25	23	
Contractor 11	25	23	
Contractor 12	25	23	
Contractor 13	21	9	
4.353846154	**283**	**173**	

Contractor 1	22	13	
Contractor 2	22	13	
Contractor 3	22	13	
Contractor 4	21	9	
Contractor 5	14	1	
Contractor 6	23	17	
Contractor 7	25	23	
Contractor 8	24	22	
Contractor 9	20	5	
Contractor 10	18	3	
4.22	**211**	**119**	

Contractor 1	25	23	
Contractor 2	25	23	
Contractor 3	20	5	
Contractor 4	23	17	
Contractor 5	23	17	
Contractor 6	25	23	
Contractor 7	25	23	
Contractor 8	23	17	
Contractor 9	22	13	
4.688888889	211	**161**	

3. Quality

W = -20.76

Contractor 1	19	5
Contractor 2	22	14
Contractor 3	22	14
Contractor 4	20	8
Contractor 5	19	5
Contractor 6	14	1
Contractor 7	25	24
Contractor 8	19	5
Contractor 9	24	21
Contractor 10	25	24
Contractor 11	25	24
Contractor 12	24	21
Contractor 13	21	13
4.292307692	**279**	**179**

Contractor 1	20	8
Contractor 2	23	18
Contractor 3	22	14
Contractor 4	20	8
Contractor 5	17	2
Contractor 6	24	21
Contractor 7	25	24
Contractor 8	23	18
Contractor 9	22	14
Contractor 10	18	4
4.28	**214**	**131**

Contractor 1	20	8
Contractor 2	25	24
Contractor 3	25	24
Contractor 4	23	18
Contractor 5	25	24
Contractor 6	25	24
Contractor 7	20	8
Contractor 8	25	24
Contractor 9	17	2
4.555555556	**205**	**156**

4. Health, Safety & Environment

W = -17.74

Contractor 1	20	7
Contractor 2	21	12
Contractor 3	23	19
Contractor 4	20	7
Contractor 5	13	2
Contractor 6	9	1
Contractor 7	24	25
Contractor 8	19	6
Contractor 9	20	7
Contractor 10	23	19
Contractor 11	25	28
Contractor 12	25	28
Contractor 13	23	19
4.076923077	**265**	**180**

Contractor 1	22	13
Contractor 2	22	13
Contractor 3	22	13
Contractor 4	20	7
Contractor 5	17	3
Contractor 6	23	19
Contractor 7	23	19
Contractor 8	22	13
Contractor 9	22	13
Contractor 10	23	19
4.32	**216**	**132**

Contractor 1	18	4
Contractor 2	25	28
Contractor 3	20	7
Contractor 4	22	13
Contractor 5	25	28
Contractor 6	25	28
Contractor 7	24	25
Contractor 8	24	25
Contractor 9	18	4
4.466666667	**201**	**162**

5. Sub - Contractor Relationships

W = -19.00

Contractor 1	19	7
Contractor 2	20	9
Contractor 3	25	24
Contractor 4	18	3
Contractor 5	15	2
Contractor 6	14	1
Contractor 7	24	20
Contractor 8	19	7
Contractor 9	22	14
Contractor 10	25	24
Contractor 11	25	24
Contractor 12	22	14
Contractor 13	25	24
4.2	**273**	**173**

Contractor 1	21	12
Contractor 2	24	20
Contractor 3	24	20
Contractor 4	20	9
Contractor 5	18	3
Contractor 6	21	12
Contractor 7	25	24
Contractor 8	23	16
Contractor 9	18	3
Contractor 10	20	9
4.28	**214**	**128**

Contractor 1	25	24
Contractor 2	25	24
Contractor 3	23	16
Contractor 4	23	16
Contractor 5	23	16
Contractor 6	25	24
Contractor 7	24	20
Contractor 8	25	24
Contractor 9	18	3
4.688888889	**211**	**167**

6. Research & Development

-W = -8.23

Contractor 1	13	8
Contractor 2	13	8
Contractor 3	16	17
Contractor 4	15	13
Contractor 5	11	4
Contractor 6	7	1
Contractor 7	24	31
Contractor 8	19	22
Contractor 9	19	22
Contractor 10	21	28
Contractor 11	15	13
Contractor 12	8	2
Contractor 13	16	17
3.030769231	**197**	**186**

Contractor 1	15	13
Contractor 2	14	11
Contractor 3	13	8
Contractor 4	11	4
Contractor 5	20	25
Contractor 6	11	4
Contractor 7	20	25
Contractor 8	17	20
Contractor 9	24	31
Contractor 10	19	22
3.28	**164**	**163**

Contractor 1	10	3
Contractor 2	22	30
Contractor 3	14	11
Contractor 4	18	21
Contractor 5	12	7
Contractor 6	21	28
Contractor 7	15	13
Contractor 8	20	25
Contractor 9	16	17
3.288888889	**148**	**155**

7. Innovation

W = -18.67

Contractor 1	14	2
Contractor 2	19	11
Contractor 3	19	11
Contractor 4	19	11
Contractor 5	14	2
Contractor 6	12	1
Contractor 7	24	32
Contractor 8	17	8
Contractor 9	21	25
Contractor 10	20	18
Contractor 11	16	5
Contractor 12	21	25
Contractor 13	19	11
3.615384615	**235**	**162**

Contractor 1	20	18
Contractor 2	18	9
Contractor 3	19	11
Contractor 4	16	5
Contractor 5	14	2
Contractor 6	19	11
Contractor 7	23	31
Contractor 8	20	18
Contractor 9	19	11
Contractor 10	21	25
3.203389831	**189**	**141**

Contractor 1	21	25
Contractor 2	20	18
Contractor 3	16	5
Contractor 4	20	18
Contractor 5	20	18
Contractor 6	18	9
Contractor 7	20	18
Contractor 8	21	25
Contractor 9	22	30
3.955555556	178	**166**

8.Management Style

W= -10.53

Contractor 1	20	12
Contractor 2	24	27
Contractor 3	25	29
Contractor 4	19	9
Contractor 5	12	2
Contractor 6	11	1
Contractor 7	22	22
Contractor 8	15	4
Contractor 9	25	29
Contractor 10	25	29
Contractor 11	22	22
Contractor 12	17	6
Contractor 13	25	29
4.030769231	**262**	**221**

Contractor 1	19	9
Contractor 2	19	9
Contractor 3	21	17
Contractor 4	20	12
Contractor 5	13	3
Contractor 6	21	17
Contractor 7	22	22
Contractor 8	20	12
Contractor 9	16	5
Contractor 10	17	6
3.76	**188**	**112**

Contractor 1	22	22
Contractor 2	23	26
Contractor 3	20	12
Contractor 4	21	17
Contractor 5	21	17
Contractor 6	21	17
Contractor 7	24	27
Contractor 8	20	12
Contractor 9	18	8
4.222222222	**190**	**158**

9.Employee Relations

W = -17.60

Contractor 1	20	8
Contractor 2	22	15
Contractor 3	20	8
Contractor 4	19	5
Contractor 5	16	3
Contractor 6	11	1
Contractor 7	23	20
Contractor 8	22	15
Contractor 9	24	27
Contractor 10	23	20
Contractor 11	23	20
Contractor 12	22	15
Contractor 13	20	8
4.076923077	**265**	**165**

Contractor 1	20	8
Contractor 2	24	27
Contractor 3	20	8
Contractor 4	21	14
Contractor 5	14	2
Contractor 6	23	20
Contractor 7	24	27
Contractor 8	23	20
Contractor 9	19	5
Contractor 10	20	8
4.16	**208**	**139**

Contractor 1	25	31
Contractor 2	23	20
Contractor 3	22	15
Contractor 4	22	15
Contractor 5	18	4
Contractor 6	23	20
Contractor 7	25	31
Contractor 8	24	27
Contractor 9	19	5
4.466666667	**201**	**168**

10.Customer Orientation

W = -10.97

Contractor 1	16	3
Contractor 2	21	15
Contractor 3	25	28
Contractor 4	19	11
Contractor 5	18	7
Contractor 6	10	1
Contractor 7	12	2
Contractor 8	17	5
Contractor 9	25	28
Contractor 10	23	21
Contractor 11	23	21
Contractor 12	23	21
Contractor 13	25	28
3.953846154	**257**	**191**

Contractor 1	20	13
Contractor 2	22	17
Contractor 3	18	7
Contractor 4	16	3
Contractor 5	17	5
Contractor 6	23	21
Contractor 7	22	17
Contractor 8	19	11
Contractor 9	18	7
Contractor 10	20	13
3.9	**195**	**114**

Contractor 1	22	17
Contractor 2	21	15
Contractor 3	25	28
Contractor 4	25	28
Contractor 5	22	17
Contractor 6	23	21
Contractor 7	24	27
Contractor 8	23	21
Contractor 9	18	7
4.511111111	**203**	**181**

11.Benchmarking

W = -14.95

Contractor 1	10	1
Contractor 2	15	4
Contractor 3	23	28
Contractor 4	19	12
Contractor 5	20	17
Contractor 6	12	3
Contractor 7	19	12
Contractor 8	19	12
Contractor 9	22	26
Contractor 10	25	31
Contractor 11	20	17
Contractor 12	21	24
Contractor 13	23	28
3.815384615	**248**	**215**

Contractor 1	20	17
Contractor 2	21	24
Contractor 3	20	17
Contractor 4	15	4
Contractor 5	17	9
Contractor 6	16	7
Contractor 7	19	12
Contractor 8	23	28
Contractor 9	18	11
Contractor 10	17	9
3.72	**186**	**138**

Contractor 1	10	1
Contractor 2	20	17
Contractor 3	16	7
Contractor 4	20	17
Contractor 5	20	17
Contractor 6	22	26
Contractor 7	19	12
Contractor 8	25	31
Contractor 9	15	4
3.711111111	**167**	**132**

12.Risk Management

W = -12.53

Contractor 1	15	2
Contractor 2	20	12
Contractor 3	24	25
Contractor 4	23	22
Contractor 5	13	1
Contractor 6	15	2
Contractor 7	25	29
Contractor 8	19	7
Contractor 9	21	18
Contractor 10	25	29
Contractor 11	25	29
Contractor 12	19	7
Contractor 13	24	25
4.123076923	**268**	**208**

Contractor 1	20	12
Contractor 2	22	19
Contractor 3	20	12
Contractor 4	19	7
Contractor 5	17	4
Contractor 6	18	5
Contractor 7	23	22
Contractor 8	20	12
Contractor 9	19	7
Contractor 10	19	7
3.94	**197**	**107**

Contractor 1	18	5
Contractor 2	25	29
Contractor 3	20	12
Contractor 4	24	25
Contractor 5	22	19
Contractor 6	22	19
Contractor 7	24	25
Contractor 8	23	22
Contractor 9	20	12
4.4	**198**	**168**

APPENDIX D