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Changing procurement culture to enable the successful adoption of collaborative practices in construction: A model for client change

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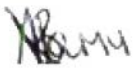
May 2021

Declaration

I declare that this Research Report is my own, unaided work. It is submitted in partial fulfilment of the degree of Doctor of Philosophy in the field of Project Management at the University of the Witwatersrand, Johannesburg.

It has not been submitted before for any degree or examination in any other university.

Signature of Candidate:



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Date: 19 May 2021

Dedication

I can’t begin to say what a wonderful family I have. Shepherd my darling husband, I am so grateful for how you have stepped up during this journey, loving and supporting me, staying up with me when I needed help, reminding me to take it a day at a time and watch my health. Thank you for understanding and supporting my dreams. Emma my sweet daughter, you came right in the middle of this journey, my perfect gift. Thank you for all those hugs and kisses, no matter how frustrating the work, your sweet smile made it all better.

Shepherd and Emma, I dedicate this work to you, can’t imagine how I would have managed without both of you. Love you guys from here to the moon and back ❤️

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I have such beautiful friends. Prisca, that Pta-Jhb route held so much laughter, venting and encouragement, Tally, thanks for all the girl talk, Rebecca and Thembi, I am so grateful for you my prayer sisters, Calistus, always encouraging me, Chipozya you were such an inspiration, Mli, all the jokes. Pretoria Eastern Suburbs, my church family, thank you for the prayers and love, Ps Wes thank you for being a good friend. All my friends named and unnamed, thank you for your support.

My thanks would not be complete without mentioning the lovely members of our School. Prof Laryea, thank you for being at the start of my journey. Ruth, all those chats, you made me feel so welcome, Claudia, I cannot thank you enough for always being there and helping no matter how late I came, maTiny, the gentle pushes and encouragement, Sheila your patience, Ray, your willingness to help. Thank you for all the help you have provided over the years.

Abstract

Collaboration has been touted as a solution to construction procurement problems reflected in fragmentation, poor quality, delayed completion, project overruns, scope creep, reworking, adversarial and slave/master relationships. While it has been proven that collaboration works in mitigation of these problems, there is limited information available on the actual process of implementing collaborative change successfully. The aim of the research was thus to determine the process through which clients can change to a more collaborative procurement culture which would enable successful adoption of collaborative practices. The research specifically dealt with such change in Higher Education Institutions (HEIs) in South Africa.

In modelling the problem, various theories were considered. Principal Agent theory was utilised as a representation of the traditional state of construction procurement. Stewardship theory depicted the coveted state of collaboration while stakeholder theory emphasised one manner in which collaboration could occur. Of note was Elite theory which spoke to the existence of an elite that has power to change a society. In this particular case, expert clients were determined to be the elite class best equipped to enable change in construction procurement.

The research followed a post positivist philosophy with an abductive approach. An embedded case study was utilised focusing on Wits Campus Planning and Development (WCPD). The particular case was chosen as it was proven to be a critical case; they managed to successfully change to a more collaborative construction procurement culture. In addition to this, WCPD was hand-picked by THE Department of Higher Education and Training (DHET) to oversee the management of the first phase of the development of the New Universities. In essence they managed to replicate the successful results from their own projects. Data collection was in the form of semi-structured interviews and document analysis with samples collected from WCPD stakeholders (e.g. management, project team members) and senior management in other public HEIs.

The study found that there are prerequisites to the implementation of change. These are a portfolio of projects, management buy in and a team to actually shape the change. Of vast

importance is a change leader within the team who understands and can push the change agenda. In the case of HEIs, the major processes for implementing change are in two parts; administrative change and capacity change. A model was developed from the data which depicted this change process. Administrative change includes the development of a construction procurement policy separate from that of goods and services, an improved financial system that pays stakeholders efficiently and on time, standardized procurement documentation and a dedicated document controller to deal with the extra paperwork from setting up procurement systems. In terms of capacity, for collaborative working the use of Project Managers is preferable and there is need for the increased use of inhouse consultants. While collaborative procurement is not dependent on the use of a single type of contract, the use of a contract such as the NEC reflects a move to being more collaborative. The study also made it clear that change is not easy especially when project stakeholders are used to working a certain way with a specific type of dynamic; treating each other as equals was one of the most difficult behaviours to adopt.

The major contribution of this study was the development of a model for change for HEIs in South Africa. WCPD implemented its change all at once in reaction to their circumstances. While they did succeed in implementing change, there was no specific model available for them to follow and they implemented change as the circumstances dictated. The developed model looks at a structured implementation of change. It would especially be of use for HEIs who want to adapt to the changes in legislation and the directives from DHET. The model is generic in that it provides guidance on how to approach change and highlights the possible issues that could be encountered in implementing change.

One troubling issue that surfaced was that of reduced funding from government in terms of infrastructure development. Further work would be necessary on how to implement change and remain collaborative with limited resources and infrastructure programs. It would also prove useful to further investigate how decentralised Facilities Management (FM) departments can implement lifecycle collaboration as integration between the capital projects divisions and operations and maintenance was found to be lacking.

Key Words: Collaboration, Culture, Procurement, Procurement Culture, Client Change, Higher Education Institutions, NEC

Preamble

Publications:

Kamudyariwa, X.B. & Root, D. Using a bottom up approach to implement changes in construction procurement. (CIDB research conference, Port Elizabeth 2018)

Ayegba, C, Kamudyariwa X.B & Root, D. Reconceptualization of the concept of Collaboration and Long-term Relationships. (CIDB research conference, Port Elizabeth 2018)

Kamudyariwa X.B. & Root D. Barriers to the implementation of procurement change in Higher Education Institutions (CIDB research conference, Johannesburg 2019)

Kamudyariwa, X.B. & Root, D. Collaborative procurement in South African HEIs through culture change (Cancelled COBRA Conference 2020)

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List of Abbreviations

Abbreviation	Description
CIDB	Construction Industry Development Board
CVF	Competing Values Framework
DHET	Department of Higher Education
DPW	Department of Public Works
ECI	Early Contractor Involvement
ESI	Early Stakeholder Involvement
FA	Framework Agreement
FIDIC	International Federation of Consulting Engineers
FMD	Facilities Management Department
FMF	Fees Must Fall
GCC	General Conditions of Contract
HEI	Higher Education Institution
JBCC	Joint Building Contracts Committee
KPI	Key Performance Indicator
MIF	Macro Infrastructure Framework
NEC	New Engineering Contract
PA	Principal Agent
PICC	Presidential Infrastructure Coordinating Committee
PIMD	Property and Infrastructure Management Division
PM	Project Manager
SCM	Supply Chain Management
SIPDM	Standard for Infrastructure Procurement and Delivery Management
UK	United Kingdom
USA	United States of America
WCPD	Wits Campus Planning and Development
Wits	University of the Witwatersrand

List of Definitions

Term	Definition
Collaboration	A process in which autonomous or semi-autonomous actors interact through formal and informal negotiation jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions (Thomson et al., 2009)
Culture	The shared values and basic assumptions of an organisation that are manifested in organisational practices (Ankrah et al., 2009a)
Determine	To ascertain or establish exactly by research or calculation (Oxford University Press, 2019a)
Procurement culture	The values, practices and behaviours of an organisation in terms of its procurement

1 Introduction

This chapter provides an introduction to the study. It provides background to and substantiates the problem, highlights the primary research question and the objectives of the study. In essence this chapter summarises the need for the study and the conditions under which it was carried out.

1.1 Background to the Study

> *Universities are key to developing a nation. They play three main functions in society. Firstly, they educate and train people with high-level skills for the employment needs of the public and private sectors. Secondly, universities are the dominant producers of new knowledge. Universities also set norms and standards, and determine the curriculum, languages and knowledge, ethics and philosophy underpinning a nation's knowledge-capital. South Africa needs knowledge that equips people for a society in constant change. Thirdly, given the country's apartheid history, higher education provides opportunities for social mobility and simultaneously strengthens equity, social justice and democracy. In today's knowledge society, higher education underpinned by a strong science and technology innovation system is increasingly important in opening up people's opportunities. (National Planning Commission 2012:262)*

1.1.1 The history of Higher Education in South Africa

From 1958 till 1994, South Africa was governed through apartheid laws (Kalantzis and Cope, 2012). These laws created a system that discriminated among races, viewing one race as above all others. In that era, white people were granted privileges not available to non-whites who included Blacks, Indians and Coloureds. The government at that time saw the schooling system as a means of propagating apartheid (*ibid*).

The government implemented a divided system of learning, with each race classification given its set of privileges, curricula and geographical areas for schooling. It did not take long for

these divisions to spill over into higher education with segregation enforced through law. Disparities in terms of funds and education existed between historically "white institutions" (hereafter referred to as Historically Advantaged Institutions (HAIs)) such as the University of Witwatersrand (Wits), University of Pretoria (UP), University of Cape Town (UCT) and Stellenbosch University (SU) and historically "black institutions" (hereafter referred to as Historically Disadvantaged Institutions (HDIs)) such as University of Fort Hare (UFH) and the University of the Western Cape (UWC) (Carrim, 2006).

To compound the funding woes for HDIs, four different departments were set up to deal with education with different funding formulas (*ibid*). While government was supposed to assist with education, funds to HDIs were allocated through a model that made the black population pay towards education (*ibid*). Considering that they were in mostly menial jobs, this resulted in minimal available funds. In contrast, the HAIs received funding from either the state or the international community dependent on whether they were Afrikaans or English speaking. This resulted in a Higher Education system where HDIs were neglected and deprived of funds to enable their sustainability and growth. (*ibid*)

The then government provided funds for education and development using a legally discriminatory formula (*ibid*). Funds were allocated based on e.g. research output which the privileged universities were able to produce because of the resources they had access too. HDIs were thus neglected and unable to compete with their well-equipped counterparts.

The change in government in 1994 brought about a new dispensation as leaders sought to redress the inequalities of the past. The legislation of the Higher Education Act in 1997 paved the way for substantial changes in higher education as it in essence repealed the Bantu Education Act of 1953 and The Extension of **University** Education Act, Act 45 of **1959** which legislated the segregation of universities according to both race and ethnicity i.e. everyone had only specific places of study open to them unless express permission was granted by the Minister of Internal Affairs. Equal basic education was now available as a human right with government tasked with enabling access to Higher Education to those who deserved it.

It is of note that during this period, globally there was long-standing belief in the supposedly "negligible" contribution of Higher Education to the economic development of African countries in comparison to primary and secondary school education (Ministerial Committee,

2013). The resulting under-funding of higher education compromised the existence of universities as knowledge institutions while also depriving them of making any meaningful contribution to the development of their countries (*ibid*). Studies also found that student numbers increased faster than any capacity planning or financing, critical infrastructure was neglected, and academics migrated to greener pastures (*ibid*). Recognition of the falsity of the belief had countries scrambling to correct the deficiencies in their education systems. A well-known developed country model is that of Finland (Cloete et al., 2011). Following a recession in the 1990's, Finland "selected knowledge, information technology and education" as priorities for its development policy. Countries such as Denmark, Singapore, South Korea, Australia and New Zealand successfully followed a similar route (*ibid*). China grew substantially through huge investments in education and research while India accomplished its turnaround through research and "deft use of knowledge assets" (*ibid*).

South Africa was not exempt from this trend; higher education gained importance to the South African government as it encapsulated the hope of a brighter future especially for the younger generation. At the Education Africa, Presidential and Premier Education Awards in 1997, then South African president Nelson Mandela commented on how the awards highlighted the importance of education to realising the nation's goals; there was a growing recognition of education as central to the success of many human endeavours (Mandela, 1997). In 2003, he echoed similar sentiments at the launch of the Mindset Network; "Education is the most powerful weapon we can use to change the world" (Mandela, 2003). The establishment of education as critical to the nation's success, pushed the development of Higher Education Institutions to priority status, and this was reflected in various interventions such as NSFAS and Block Grants

1.1.1.1 The National Student Financial Aid Scheme

The National Student Financial Aid Scheme (NSFAS) which was enacted through the NSFAS Act in 1999, contributed to the prioritization of education by allowing poor students access to higher education. In their 2014 annual report, NSFAS defined their mission as follows (NSFAS, 2014):

- "NSFAS exists to provide financial aid to eligible students at public TVET colleges and universities

- NSFAS identifies eligible students, grants loans and bursaries and collects student loan repayments to replenish the funds available for future generations
- NSFAS supports access to and success in higher education training for students from poor and working-class families who would otherwise not be able to afford to study"

In essence their role has been that of a facilitator to provide the underprivileged with an opportunity to further their higher education with an expectation of reciprocity from those who have been assisted through reimbursing loaned funds to enable future generations the same funding opportunities. The funds were initially distributed by the Department of Education (DoE) before the Department of Higher Education and Training (DHET) took over in 2009 due to the splitting of the DoE into DHET and Department of Basic Education (DBE) (Ministerial Committee, 2013).

1.1.1.2 Block Grants

Although funding was available, the racial disparity in participation in higher education participation was still of great concern. Participation of African and Coloured students remained below 15% compared to that of Whites and Indians at 59% and 46% respectively (Ministerial Committee, 2013). Expansion of funding levels and the capacity of the Higher Education system was needed to open access to those who were previously discriminated against. Block grants were given to institutions to improve their teaching and resources (*ibid*). This was especially helpful to the HDIs as it provided means previously denied them to expand their staff base and provide better quality education.

1.1.1.3 The National Development Plan

This need for expansion in higher education was prioritised as a National Development goal working towards higher enrolment of black and coloured students in HEIs (National Planning Commission, 2011). The National Development Plan released in 2001 provided further guidance on what the government intended to achieve. While HEI enrolment in 1994 sat at 495 356, the target for 2030 was set at 1 500 000.

More recent ongoing targets involve moving from just below the one million mark recorded in 2011 to 1.6 million graduates by 2030, reflecting a 300% graduate increase in a period of thirty years (Ministerial Committee, 2013).

1.1.2 Meeting development goals in Higher Education

HEIs have made substantial inroads into meeting government set enrolment targets. This is reflected in the vast increase in student enrolments since 1994 where enrolments were at 495 396 students. By 2010, there was an almost 70% increase in enrolments to 837 779 (Presidential Commission, 2016). Five years later, this had increased to 985 212 reflecting almost double the enrolment in 1994 (Department of Higher Education and Training, 2016).

In order to create a more robust HE system where various institutions could share resources and improve on output quality, from 2004, a decision to merger some institutions was implemented. These mergers were varied, involving both Universities and Technikons (Carrim, 2006).

The increase in enrolment and the mergers revealed a capacity problem in institutions. With higher enrolment comes a corresponding need for the expansion of lecture theatres, labs, accommodation and even land for universities to grow. The mergers also revealed similar shortcomings as campuses needed to accommodate a higher number of students and in some cases also develop additional campuses to meet the growing needs (DHET, 2012).

1.1.2.1 Reports on the state of HEIs

Numerous examples are available of the capacity problems faced. It is important to note that not only HDIs face capacity problems, HAIs are also facing their own brand of problems. The DHET Green Paper of 2012 reported on the following problems:

- Those in rural areas have challenges relating to the uneven distribution of institutions. Where HE provisions are available, the infrastructure is of generally lower quality. There are backlogs in developing available institutions
- While leading universities are internationally respected, HDIs continue to face severe financial and infrastructure constraints including inadequate libraries, laboratories and accommodation
- Mergers have created single institutions with marked inequalities between campuses. Structural and systematic challenges still need to be addressed
- Expansion and improvement of student accommodation a priority for DHET and a feature of government's infrastructure development programme

- Numerous backlogs in academic infrastructure and accommodation
- There is an urgent need to upgrade infrastructure and facilities at poorer institutions to enable them to meet agreed standards

Reports prior to this had also painted a grim picture on the state of infrastructure in HEIs. The National Development 2030 report from 2001 highlighted that infrastructure was poorly located, inadequate and under-maintained. The Ministerial Committee on the Provision of Student Housing in 2011 additionally revealed a shortage of approximately 207 800 beds if bed capacity targeted at 50%-80% Full Time Equivalent students.

After the release of the Green Paper, The Ministerial Committee on the Review of Funding for Universities in its 2013 report had the following recommendations (Ministerial Committee, 2013):

1. An investigation into the condition of buildings and infrastructure shortages at HEIs for informed decision making
2. Encouraging universities to submit comprehensive maintenance plans and set aside funds for maintenance
3. Encouraging HEIs to build reserves for infrastructure renewal

Examination of these recommendations reflects the following problems:

1. Shortage of buildings and infrastructure
2. Lack of comprehensive maintenance plans and ongoing provision for maintenance by Universities
3. Lack of reserves by universities for the renewal of infrastructure

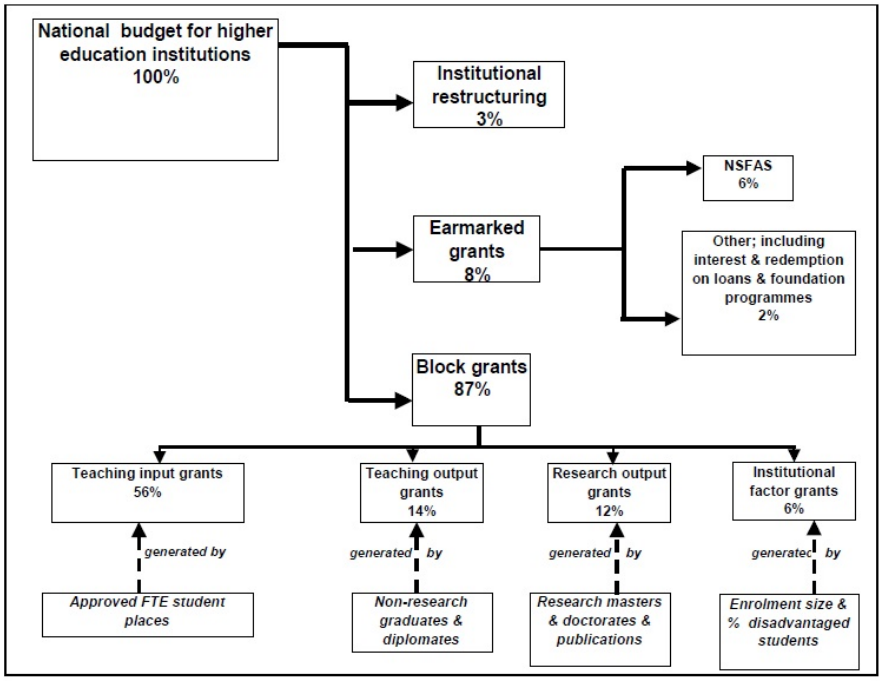
As can be concluded from these problems, while enrolment figures have been meeting the set development goals, the infrastructure is ill equipped to handle the number of students. To counter this government has implemented interventions to reduce the strain on university infrastructure and enable HEIs to start working on maintenance backlogs.

1.1.2.2 DHET Funding Models for Infrastructure

Government noted that one reason behind the current infrastructure development problems was the lack of an infrastructure development budget for HEIs from 1997/98 – 2007/2008

(Ministerial Committee, 2013). While government played catch up with HEI needs, infrastructure was neglected, had deteriorated and was woefully inadequate to meet the needs of the students.

This neglect was reflected in the 2003 funding model for HEIs; its focus was on enrolment, learning and research with no budget for infrastructure development. Figure 1.1 below highlights the prioritised grants for the model (Ministry of Education, 2004).



Based on (Ministry of Education, 2004)

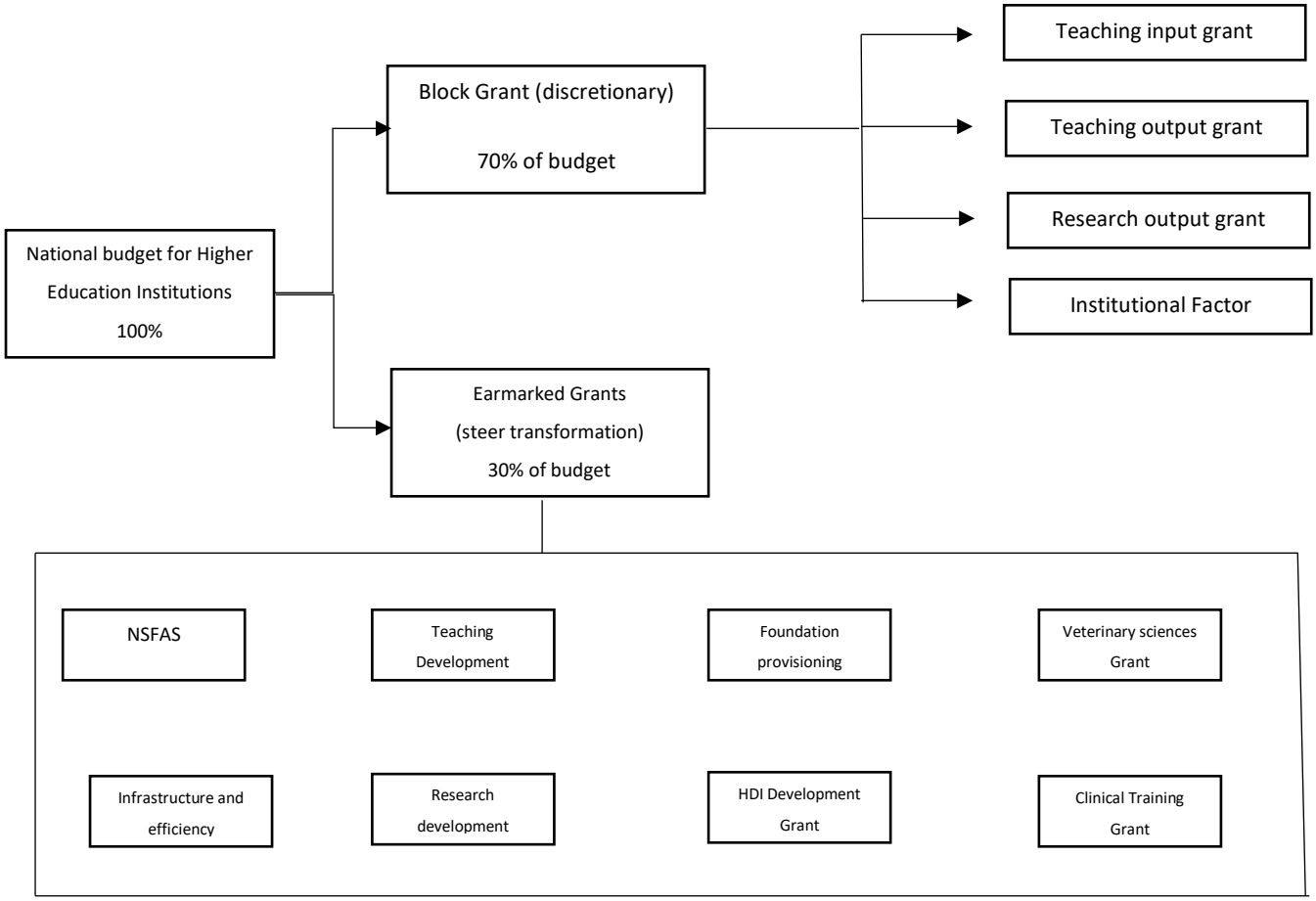
Figure 1.1 - The 2003 University Funding Model

As can be noted, funds from government are mostly allocated to HEIs as Block and Earmarked grants with the Minister of Higher Education having the power to determine the proportions allocated to each (Ministerial Committee, 2013). In this model, Block grants received 87% of the funds with only 2% earmarked for everything that was not NSFAS related.

In 2007, the government recognised the financial pressures HEIs were facing in terms of infrastructure development. An amended funding model (hereafter referred to as the 2007 model) that included an earmarked infrastructure development grant was then implemented (Ministerial Committee, 2013). The grant targeted specific fields of study such as engineering and science and also developments such as the provision of student accommodation (*ibid*).

In 2013, the Minister announced a new Earmarked grant, the HDI Development Grant. The grant was from additional funds and did not affect any previous funding of HEIs. These funds were earmarked for improving levels of development and efficiency of HDIs (*ibid*).

The breakdown of the amended funding model is shown in the Figure 1.2 below (Presidential Commission, 2016)



Based on (Presidential Commission, 2016)

Figure 1.2 - The 2007 University Funding Model

Block grants are intended to cover expenses from day-to-day operations which are linked to the core activities of an Institution i.e. teaching, learning and research. The funds are spent at the discretion of the Institution's Council with reporting on the use of the funds then done through a report submitted to the DHET (Ministerial Committee, 2013).

In contrast to Block grants, Earmarked grants are funds that can only be used for the specific purposes designated by the Minister (*ibid*). These purposes tend to reflect policy objectives such as increasing research capacity or access of disabled students. The grants are crucial for steering the system and have been successful in increasing access and enhancing teaching

and research outputs (*ibid*). Reporting for this grant is through annual progress reports and audit certificates to the DHET (*ibid*).

As can be seen in the Figure 1.2, DHET reduced Block Grants (BGs) from 87% down to 70% while the Earmarked Grants (EGs) increased to 30%. Although the EG is spread across 8 different grants, it represents a marked change in priority; with various development objectives coming to the fore.

1.1.2.3 Efficacy of DHET Funding

Since implementation of the 2007 model, government has steadily maintained HE as a priority. In 2012, due to the effects of the global economic downturn, all government departments were informed of the need to cut their baseline allocations. It is interesting to note that HE was spared the proposed budget cuts and instead functioned as a critical budget.

Despite the yearly increases in grants, the funding is not keeping up with current infrastructure needs. The 2013 review on funding Universities confirmed that while amounts from government may be increasing, in real terms they have been declining over the years (Ministerial Committee, 2013). An example is illustrated in Figure 1.3 using a screenshot of the DHET budget tabled in December 2016 (DHET, 2016a).

Budget category	Budget totals for the university sector				Increase in budget from previous financial year			
	2015/16 (R'000)	2016/17 (R'000)	2017/18 (R'000)	2018/19 (R'000)	2015/16	2016/17	2017/18	2018/19
1 Block grants for universities	**20 538 361**	**21 678 098**	**25 322 874**	**26 915 052**	**5.0%**	**5.5%**	**16.8%**	**6.3%**
1.1 Teaching inputs	13 141 519	13 753 540	16 220 201	17 252 089	3.4%	4.7%	17.9%	6.4%
1.2 Institutional factors	1 170 372	1 225 710	1 445 538	1 537 499	6.1%	4.7%	17.9%	6.4%
1.3 Actual teaching outputs	3 213 301	3 512 017	4 310 654	4 584 887	8.0%	9.3%	22.7%	6.4%
1.4 Actual research outputs	3 013 169	3 186 831	3 346 481	3 540 577	8.8%	5.8%	5.0%	5.8%
2 Earmarked grants for universities	**5 666 037**	**6 246 374**	**8 701 418**	**9 193 017**	**21.0%**	**10.2%**	**39.3%**	**5.6%**
2.1 Infrastructure & output efficiencies	2 301 200	2 422 013	2 541 903	2 688 063	4.6%	5.3%	5.0%	5.8%
2.2 Two new universities								
Capital funds	1 000 000	974 736	978 482	1 000 542	100.0%	-2.5%	0.4%	2.3%
Operational funds	201 014	290 429	360 736	416 489	26.4%	44.5%	24.2%	15.5%
NIHE Northern Cape Pipeline Students	12 000	10 000	6 500	0		-16.7%	-35.0%	-100.0%

Based on (DHET, 2016a)

Figure 1.3 - DHET Budget 2016

(Note that budgets are done on a three-year rotation so budget at end of 2016 would be up to 2019)

1.1.2.3.1 DHET vs CPI

Stats SA defines the CPI as a measure of monthly changes in prices for a range of consumer products with changes in the CPI recording the rate of inflation (Stats SA, 2019). The CPI can also be used as a cost-of-living index (*ibid*). Table 1.1 reflects the CPI vs. DHET Funding.

Table 1.1 - Average CPI values 2015 – 2018

Year	**2015**	**2016**	**2017**	**2018**
CPI	4.51	6.59	5.19	4.50
Block Grant Increase	5.0	5.5	16.8	6.3
Earmarked Grant Increase	21	10.2	39.3	5.6

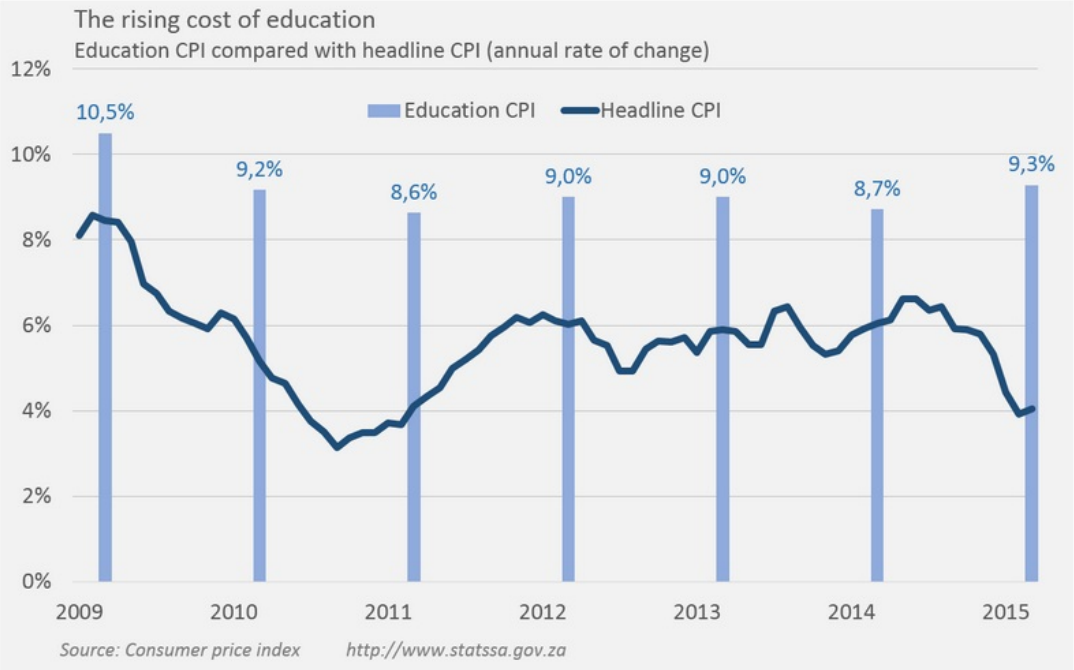
Adapted from (Stats SA, 2019)

A comparison of the DHET budget to inflation rates in Table 1.1 shows that they have been maintaining allocations that are on par with the CPI however, the figures do not reflect the increase in students which by default results in less total funds spent per student. Comparison of the figures for the Block Grant and the Earmarked grant show a difference in percentage increments. The Earmarked Grants, due to the increase in Infrastructure Development Grant have at least doubled increases in Block Grants. The anomaly in both grants in 2017 is due to the additional funding DHET had to provide in the wake of protests in HEIs (This will be fully addressed in Chapter 3).

1.1.2.3.2 DHET Funding vs. HEPI

Another important measure of efficacy of funding is that of the Higher Education Price Index (HEPI) generated by Universities South Africa. The HEPI is a measure of the inflation rate for higher education calculated by taking into account the typical spending patterns of universities. Its key drivers include the following; “academic salary increases, utility costs (especially electricity), foreign exchange-based expenses (book and scientific journal costs, computer hardware, software, research equipment, experimental consumables, etc.) and security and cleaning contracts” (Universities South Africa, 2016a).

Stats SA provides a graphic representation of recent trends for HEPI vs CPI in Figure 1.4



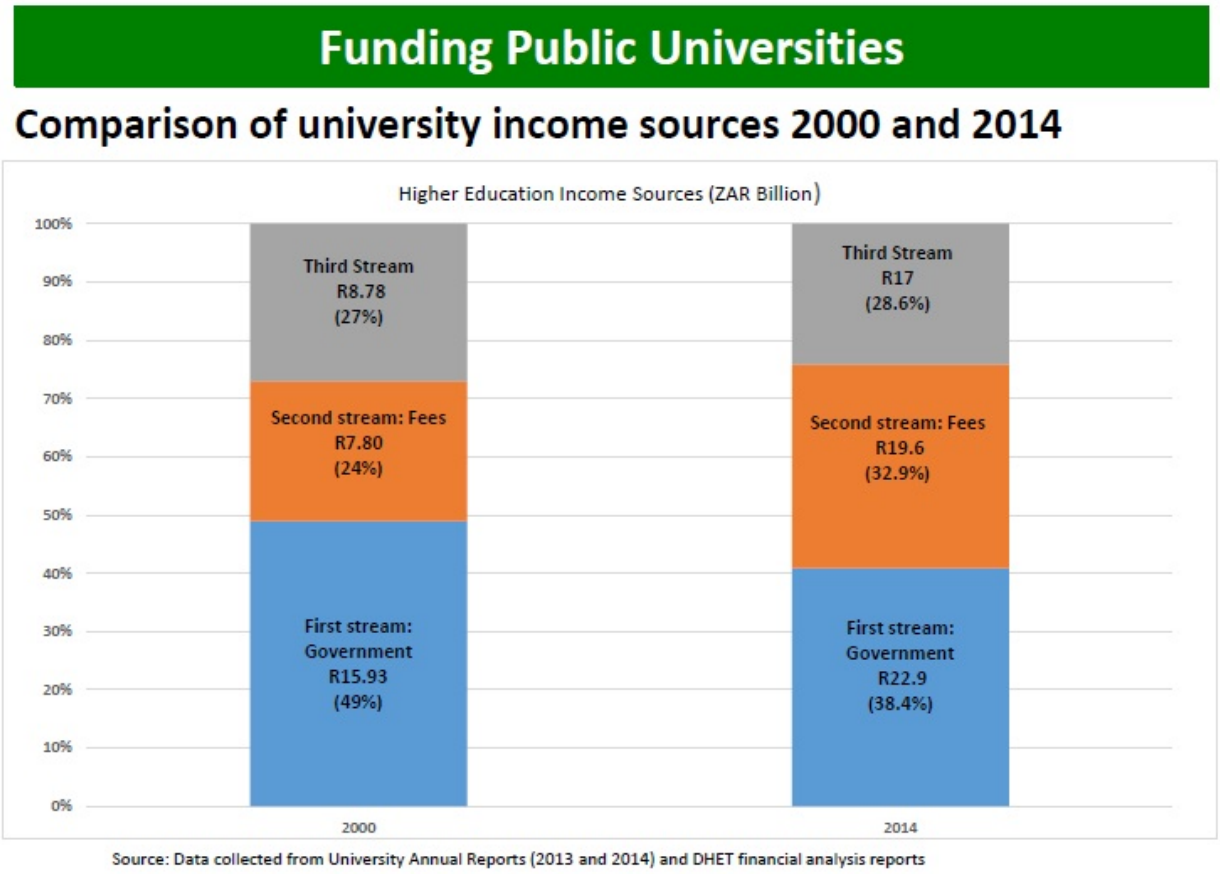
Based on (Stats SA, 2019)

Figure 1.4 - HEPI vs. CPI

As can be seen in Figure 1.4, the HEPI tends to be way higher than the headline CPI implying that the funds government provides are reduced in value because of how expensive education actually is. One reflection of this expense is the fee increases that HEIs have been implementing. On average increases were at about 7-8% annually. Other figures show that as government funding fell by 1.1% per student, university fees increased by 2.5%. Such disparities are a major reason why funding is of great concern to HEIs.

Figure 1.5 explores this reduction in government contributions to HEIs (Presidential Commission, 2016). The comparison from 2000 - 2014 shows that while government did contribute to universities yearly, there was a reduction in their expenditure. Universities have had to rely more on student fees and donors.

This presents a difficulty especially considering the fees freeze that occurred in 2016 and the unexpected zero fees policy that has been implemented since 2018 (Further explained in Chapter 3).



Based on (Presidential Commission, 2016)

Figure 1.5 - Funding of Public Universities

This policy was a result of protracted student action over annual increments in fees when education was already expensive. While the zero fees policy was implemented as a means of trying to address genuine concerns from students it has also resulted in the reduction of funds available to HEIs. This has prompted greater concern over ensuring value within the infrastructure development program; HEIs cannot afford to continue as usual as they are faced with serious financial constraints.

1.1.2.4 Infrastructure Needs

In-spite of the reduced value of provided funds and its inability to close all the financial gaps in HEIs, DHET has been unwavering in its commitment to infrastructure development. It allocated R1.6 billion between 2013 and 2016 for infrastructure development specifically for student accommodation (van Wyngaardt, 2015) and the establishment of two new public universities (Sol Plaatje University and University of Mpumalanga) which opened their doors

in 2014. These universities increased the number of public universities in South Africa from twenty-six to twenty-eight.

In further pursuit of its commitment to HEIs, in 2017/2018, the DHET committed to investing R6.9 billion to HEI infrastructure (Kilian, 2017). The funds were to be broken up as is shown in Table 1.2 (*ibid*):

Table 1.2 - DHET Infrastructure Commitment

Project	**Amount**
Student accommodation	R2.1 billion
Refurbishment of current infrastructure	R1.47billion
Refurbishment of buildings at Sol Plaatje University	R2.9 billion
Historically Disadvantaged Institutions	R248 million

Adapted from (Kilian, 2017)

While these amounts may seem substantial in absolute terms, they do not begin to cover the actual outstanding infrastructure needs. Table 1.3 below provides some examples:

Table 1.3 - Outstanding Infrastructure Needs

Project	**Amount**
Deferred maintenance at HEIs (Presidential Commission, 2016)	R25 billion
Accommodation maintenance and refurbishment (Ministerial Committee, 2011)	R2.5 billion
Modernising current accommodation (*ibid*)	R1.9 billion
Overcoming bed shortage in 10 years (for 50% contact students) (*ibid*)	R82.4 billion
Overcoming bed shortage in 15 years (for 50% contact students) (*ibid*)	R109.6 billion

Adapted from (*ibid*)

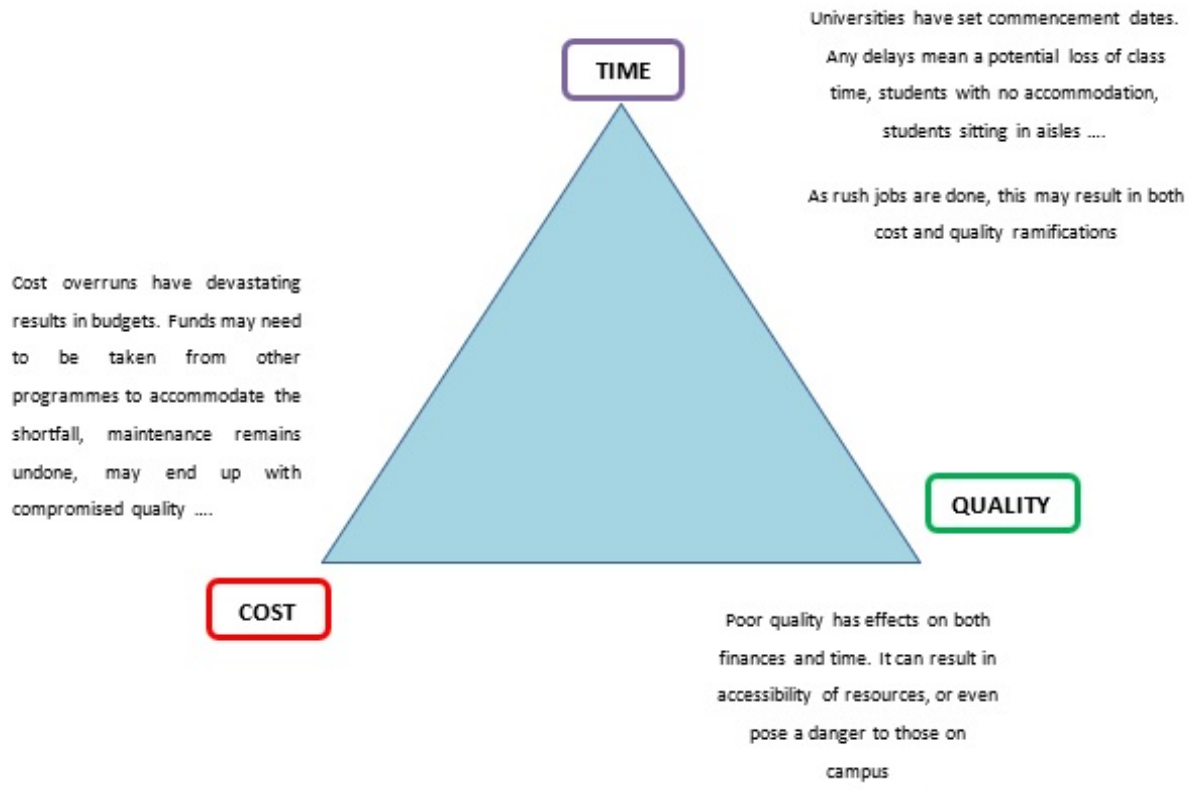
As can be seen from the numbers above, HEIs are faced with extreme challenges in ensuring well maintained infrastructure adequate to meet education mandates. Limited as it may be the availability of funding has pushed HEIs to be proactive about their infrastructure needs since funding from DHET comes with the condition of providing maintenance and spatial plans. Continued funding from DHET has ensured that capital projects in HEIs are definitely a long-term venture.

As HEIs take stock of their needs, they are finding themselves relying more on fundraising and sponsors to generate funds. The inadequacy of available funds has brought to the fore the need for due diligence especially in infrastructure projects that command vast funds. HEIs find themselves in a position where they have less resources but still need to produce excellence.

DHET notes the most common problems institutions face in their capital programs (DHET, 2017a):

- Too many tenders to manage and evaluate
- Too many separate contracts and supervising professionals to manage
- Poor quality, delayed completion and project overruns
- Under-expenditure of infrastructure budgets
- Work having to be redone due to poor specifications
- Project delays due to delayed information from the design team and poor contractor performance; particularly in respect of smaller contracts
- Scope creep leading to cost increases and time overruns
- Constant claims from contractors
- A lack of continuity of work for small and emerging local suppliers, with little skills development and limited or no growth and empowerment
- Declining competence of contractors and consultants
- Disruptions to the core business of the university arising from construction activities

The effect of these problems is illustrated in Figure 1.6 below.



Adapted from (DHET, 2017a)

Figure 1.6 - Effect of construction problems on the Iron Triangle

HEIs are unique in the manner in which they function e.g. the failure to complete a residence in time for the commencement of the semester means there are students who have no place to stay, which can affect them in various ways and impact their studies. HEIs are sensitive to all points of the iron triangle.

DHET further states that the problems noted in institutions tend to pertain to procurement (DHET, 2017a). Institutions need to procure in a manner that keeps close control on both time and budget while ensuring Value for Money (VFM). As seen from the problem above, there is lax management of both time and money and a lowest price focus which does not guarantee value.

1.1.2.5 HEIs vs. The South African Construction Industry

A simplistic view of the Construction Industry and its sectors is provided in Figure 1.7. Ideally it is assumed that HEIs should be able to assimilate the best characteristics of both the Private and Public sector, while procuring in a manner that reflects their values and utilises current beat practice knowledge from research.

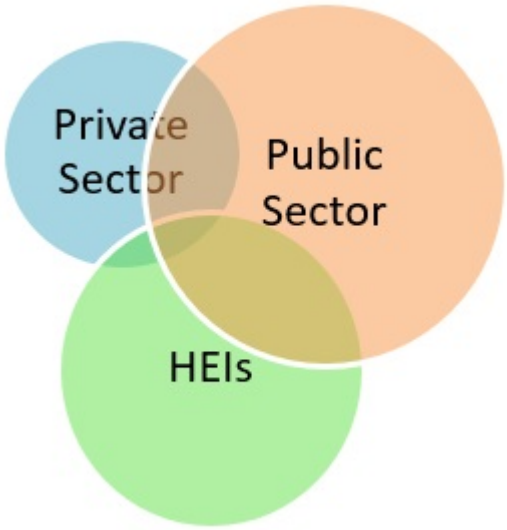


Figure 1.7 - The South African Construction Industry

Unfortunately, in South Africa this has not been the case. HEIs tend to fall in line with mostly Public sector characteristics while sacrificing their values and utilising virtually no current best practices. Since Public sector characteristics are most dominant in the industry, HEIs tend to reflect these characteristics which include the following:

- limited skills capacity (Thwala, 2012; Bowen et al, 2012)
- constant late information and changes (*ibid*)
- creation of islands of information (*ibid*)
- low productivity (*ibid*)
- reworking (*ibid*)
- slow/poor service delivery (*ibid*)
- fragmentation (*ibid*)
- master/servant relationships (Watermeyer, 2012b)
- dependence on lowest price tendering (Hindle, 2012)
- adversarial relationships (Doree, 2004; Rust and Koen, 2011; Watermeyer, 2012a)
- late payments (*ibid*)
- low profit margins for contractors (*ibid*)
- wide use of traditional procurement regardless of project (*ibid*)

A comparison shows clear similarities between the problems faced by HEIs and the SACI. These are detailed in Table 1.4 below (Bowen et al., 2012; DHET, 2017a; Doree, 2004; Hindle, 2012; Rust and Koen, 2011; Thwala and Mofokeng, 2012; Watermeyer, 2012a, 2012b):

Table 1.4 - HEIs vs. SACI

HEIs	South African Construction Industry
Poor quality, delays, overruns	Low productivity
Too many separate contracts and professionals to manage	Creation of islands of information
Constant claims	Adversarial relationships
Lack of continuity, no development, empowerment or growth	Master/Servant relationships
Declining competence of contractors and consultants	Limited skills capacity
Work having to be redone	Reworking
Project delays due to delayed information	Constant late information and changes
Traditional Procurement	Dependence on lowest price tendering
Poor contractor performance	Low productivity
Scope creep	Scope Creep

Adapted from (Bowen et al., 2012; DHET, 2017a; Doree, 2004; Hindle, 2012; Rust and Koen, 2011; Thwala and Mofokeng, 2012; Watermeyer, 2012a, 2012b)

With future infrastructure development running into billions of Rands, it is imperative that HEIs find a means of investing in best practice procurement with sustainable results. While funding for infrastructure is substantial, unfortunately it is not excessive; meaning value for money is a priority. The following conditions highlight the clear role HEIs have to play in seeking alternative means of procurement and also as proponents of best practice. It is assumed that HEIs:

- are sources of knowledge, both improved and new
- have an inherent innovative culture
- are faced with perpetual infrastructure development work
- have limited/constrained funds

Current procurement practices are falling short of what is expected in such institutions. Access to knowledge means HEIs are essentially “Expert Clients” and as such, are in a position to revise the manner in which they have been procuring as a means of protecting their interests together with their infrastructure and financial future. Reduced government funding, a new fees policy, and massive maintenance backlogs mean solutions to the procurement problems are needed sooner rather than later.

1.2 Substantiation of the Problem

The rapid increase in the number of enrolled students has lent impetus to an extensive and expensive infrastructure development plan in universities. Infrastructure development includes new infrastructure, refurbishments, upgrading and maintenance on campuses.

As noted before, one pertinent weakness of the SACI is the wide use of traditional procurement (Rust and Koen, 2011; Watermeyer, 2012a) even when it is inappropriate. Procurement is defined as the process that creates, manages and terminates contracts making it in essence a process concerned with activities preceding and following the signing of a contract (Govender and Watermeyer, 2000). It is a process which when done correctly is central to a successful project (Tookey et al., 2001).

Considering the centrality of procurement to the success of a project, it is a cause of concern that although the pitfalls of traditional procurement are well documented, it remains a rather dominant procurement type. These pitfalls include limited skills capacity, constant late information and changes, creation of islands of information (Thwala, 2012; Bowen et al, 2012), master/servant relationships (Watermeyer, 2012b) and dependence on lowest price tendering (Hindle, 2012). In fact, the SACI has experienced a staggering number of projects that did not go as well as planned because the industry is too comfortable using what is "tried and tested". Summaries of some of these projects are provided in Table 1.5 below to provide a snapshot of well documented project challenges (Adapted from (Baloyi and Bekker, 2011; Donnelly, 2012; Gigaba, 2012; Gosling, 2019; Groenwald, 2017; McKinley, 2010; Njobeni, 2017; Tech Central, 2014)).

Table 1.5 - Infrastructure Project Challenges

	Medupi & Kusile	**Transnet**	**World Cup Stadia**
Details of Project	Coal power plants to provide and extra 9600 MW of power	555km pipeline for transporting diesel from Durban to Johannesburg	Upgrading and new construction of stadia for the 2010 FIFA World Cup
Time	Started in 2007, currently 10 years behind schedule	Took 9 years to complete in 2017, was supposed to be complete by 2012	While not ready for the curtain raising Confederations cup in 2009, were on time for the FIFA World Cup in 2010
Cost	R70 bn & R80 bn. Costs now at 208bn & 239 bn	Jumped from R12.7 bn – R30.4 bn	Estimated at R11.667 bn, came in at approximately R16.426 bn

	Medupi & Kusile	Transnet	World Cup Stadia
Source of problems	Lack of oversight and control, lack of capacity to manage projects, corruption	Lack of sufficient project management capacity and depth of experience, contractor performance, contract management	Delayed payments, design related factors, shoddy project management
Status	Ongoing	Completed	Completed

Adapted from (Baloyi and Bekker, 2011; Donnelly, 2012; Gigaba, 2012; Gosling, 2019; Groenwald, 2017; McKinley, 2010; Njobeni, 2017; Tech Central, 2014)

As can be noted from Table 1.5, the problems experienced were all related to procurement in some way. These projects serve to highlight the importance of a sound procurement strategy especially when public money is used and has to be accounted for.

Procurement has been a global concern for over twenty (20) years with various countries releasing reports on improving the state of their construction industries (Gardiner, 2014a). Since the SACI is modelled after that of the UK industry (Ofori et al., 1996) , the evolution of their construction industry is of great interest to South Africa.

In 1994, the Latham report was released in the United Kingdom (UK). The report recognised that challenges in the construction industry were due to procurement issues. These challenges were extensive, including fragmentation, open tendering and escalating litigation (Latham, 1994). Latham suggested the use of NEC, engaging in partnering and reduction of adversarial relationships (*ibid*). In 1998, the Egan report looked at improving the quality and effectiveness of the UK construction industry (Egan, 1998). His focus was on industry and government working together with other clients to revamp the processes being used in the construction industry. Both reports intimated the need for a change in procurement strategy with identification of the client as the best stakeholder suited to spearheading the change (Egan, 1998; Latham, 1994).

The idea of a client-driven change makes sense especially since they can be the most influential stakeholder in any project. This means though, there is a need for more expert clients who actually understand the construction process and can take an active role in the management of projects.

In the UK, government as the biggest client took an active interest in revamping procurement. While the UK started off by showing preference for certain strategies, by 2016 all companies wanting to tender for public projects were required to utilise BIM. Companies wanting to stay

in business with government had to adjust or risk losing out on public tenders (Gardiner, 2014a). This is a clear case of a client driving change. Another case is that of the USA that has mandated the early use of contractors (ECI) for all it highway projects (Pearman, 2006).

These examples show how within a project the client wields considerable influence as they can mandate the use of specific strategies or tools. Learned clients will be cognisant of the fact that procurement is not limited to traditional contracts like the JBCC and lowest price tendering; they will procure as best suits the project.

Studies by Latham and Egan pointed to the importance of relationships in projects. Both encouraged the concept of stakeholders working together cordially with Latham focused on partnering while Egan focused on government and industry working together. This idea of working together materialised into a contrast between arms-length contracting and more relational/obligational contracting.

A few examples are provided on the differences between the two types of relationships in Table 1.6 (Sinclair, 2011):

Table 1.6 - Contractual Relationships

Arms-Length Contracting	**Relational/Obligational Contracting**
Fragmentation as each stakeholder has their part to do and it ends there	Stakeholders work together, e.g. contractor with designer
Silos as no one is interested in sharing or learning together	There is information sharing and transparency
Adversarial relationships	Cordial relationships built on trust
Constant overruns	Stakeholders work together to ensure schedule and budget are kept under control
Claims from the contractor	Reduced claims due to working together and preservation of relationships

Based on (Sinclair, 2011)

This relational contracting comes about as a result of collaboration within projects. Collaborative procurement has been touted as an alternative to traditional procurement. Thomson et al define collaboration as a process in which autonomous or semi-autonomous actors interact through formal and informal negotiation jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions (Thomson et al., 2009). Collaborative procurement thus focuses on using relationships strategically to benefit parties in the project. It also engenders greater involvement of clients in projects and

encourages them to procure in a manner that does not alienate stakeholders (Boughzala and De Vreede, 2015; Osipova, 2015).

Collaboration comes in different forms e.g. partnering, alliancing, framework agreements, early contractor involvement and integrated project delivery. Each form promotes the idea of working together for mutual benefit to accomplish a similar goal.

As noted previously, countries like the UK have mandated the use of collaboration procurement. Of note in the UK's experience is how organisations would revert back to old habits and practices if collaboration was not enforced (Gardiner, 2014a). The implication of this was that organisations had changed practices but not really internalised the change. Nummelin confirms this view, stating that change should not merely encompass adoption of new systems and methods; it should include changing underlying assumptions and values which in essence implies a change in organisational culture (Nummelin, 2006). For change to be permanent, attitudes, beliefs and values need to change too.

In order to be more efficient and get VFM, HEIs need to adjust the manner in which they procure. As suggested above, collaboration makes a difference in the manner in which projects are run and in so doing creates a cordial environment for everyone to work towards a shared goal. By virtue of being in HE and as repeat builders due to the boom in infrastructure development, HEIs also have the ability to be expert clients. As clients, they have influence to insist on projects functioning in a particular manner. Before asserting themselves in projects though, HEIs as clients need to understand and believe in the spirit of collaboration otherwise, they end up using collaborative practices traditionally, defeating the means for cordial working. In essence, HEIs need to change their procurement culture so they can successfully collaborate. In this context, procurement is defined *as the values, practices and behaviours of an organisation in terms of its procurement.*

HEIs have the opportunity to procure differently, ensuring better management and efficiency of their projects. While traditional procurement has its place, it should not be used at the exclusion of everything else; collaborative procurement is a viable alternative for a smoother infrastructure development process.

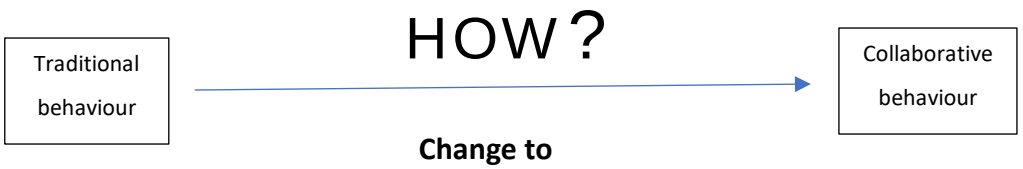


Figure 1.8 - How to change?

While clients or HEIs in this case may take it on themselves to drive change, they know where they are and where they need to be but are lacking enough information on how to actually get to where they need to be.

1.3 Problem Statement

From the above, the following problem statement can be posed:

While clients have been identified as best able to drive procurement change in construction projects, there is limited knowledge on the process they need to follow in order to successfully implement change to a more collaborative procurement culture

1.4 Primary Research Question

The primary research question emanates from the need to determine how construction clients can change to a more collaborative procurement culture in order to successfully adopt collaborative practices.

The research question is as follows:

How do clients change to a more collaborative procurement culture in construction projects?

1.5 Secondary Research Questions

From the primary question, the secondary research questions were identified as:

1. *What constitutes change to a more collaborative procurement culture?*
2. *How can clients drive change?*
3. *What are the pre-existing conditions that contribute to change?*
4. *What are the processes involved in implementing change?*
5. *What is the resulting influence on major stakeholders of change?*

1.6 Research Aim

The aim of this research is to determine[1] the process that clients can follow to change to a more collaborative procurement culture in construction projects within Higher Education Institutions.

1.7 Research objectives

From the aim the following research objectives are identified:

1. *Determine what constitutes change to a more collaborative procurement culture*
2. *Determine how clients can initiate change*
3. *Determine the prerequisites for change*
4. *Determine the processes involved in implementing change*
5. *Determine the impact of change on major stakeholders*

1.8 Propositions

The following premises were identified as pertinent to the study

a) *Certain pre-existing conditions are necessary for the implementation of collaboration*
b) *There is a clear generic process for changing to successful collaborative procurement*
c) *A culture change is necessary for collaboration to be successfully adopted*

1.9 Scope and Limitations

The following scope was defined for this study:

- *This study only considered South African Public Universities*
- *This study was only looking at capital projects in HEIs*
- *This study considered only capital projects since 2007 after DHET made infrastructure funding available to HEIs*

[1] Determine – Ascertain or establish exactly by research or calculation
Definition from Lexicon powered by Oxford

1.10 Constraints

Not all universities could provide information on their procurement practices. After a year of trying to obtain data, a small representative sample was utilised instead (further addressed in Chapter 5)

1.11 Assumptions

The following assumptions were made in this research

- The same types of changes are necessary regardless of the type of collaborative practice adopted
- The type of culture in an organisation determines whether collaborative practices can be adopted
- Procurement culture can be determined through an examination of an organisation's culture

1.12 Ethics

1.12.1 Ethical Considerations

While the research was conducted in such a manner as to prioritise both confidentiality and anonymity, the HEI in question and the key participants of the research are well known. Care had to be taken to ensure no reputational damage while maintaining the integrity of the research.

The Legal Office of the institution was consulted on the research and as a safeguard to both the institution and the participants requested access to the final report in order to determine if a moratorium will be needed. As an extra precaution, the research also utilised coding as a means of protecting participants.

Care also had to be taken to keep confidentiality requests even if information provided off the record had direct bearing on the research. This confidentiality did not have a negative effect on the veracity of the final conclusions of the research

1.12.2 Ethical Processes

Before data collection commenced, the research followed a two-pronged ethical process.

The first process involved receiving permission from the University of Witwatersrand's legal office to conduct the research. As noted above, permission was confirmed upon condition that the research be submitted to the legal office before open publication to ensure no reputational damage to the University and participants.

This process also included an application for Ethics clearance from the University's Ethics Research Committee. A copy of the research instruments was sent for evaluation with notations on issues of anonymity, confidentially and protection of the collected data. On completion of the process and approval, the researcher received an Ethics Clearance Certificate – **Protocol Number: H16/05/32**

The second process was that of applying for Ethics clearance to conduct research with senior staff from Facilities Management Departments at the various public universities. The processes were different for each university and obtaining permission from the university did not mean easy access to participants as evidenced by the number of participants (further addressed in Chapter 5)

1.13 Methodology

The research is post positivist under the specific context of Higher Education Institutions. Participants did not perceive the changes that occurred in a singular way, each perceived reality in their own way. Their perceptions though were not necessarily contradictive resulting in a collective perception of reality allowing a combined portrayal of how change occurred.

The research was conducted in two phases. Phase 1 was that of validation of WCPD as a critical case through semi structured interviews with senior personnel in Facilities Management Departments of various HEIS.

Phase 2 on the other hand was a single embedded case study with data sourced from semi structured interviews and document analysis. Thematic analysis was done on collected data.

The analysed data was used to create a model of change for HEIs. This model was then validated by a group of experts who gave suggestions and criticisms in order to make the

model robust. A final model was then developed after this consultation with the experts. The methodology framework is provided below.



Figure 1.9 - Methodology Framework

1.14 Summary of Chapters

Chapter 1 provides an introduction and overview of the research conducted. It details the history behind Higher Education Institutions in terms of apartheid and the need to improve the Higher Education system post-independence in South Africa. In highlighting the need for new and refurbished infrastructure it touches on the focal point of this research – the need for client driven change in order to efficiently and successfully implement change in infrastructure procurement.

Note on Chapters 2 & 3

The combination of Chapters 2 & 3 constitutes the Literature Review. Where Chapter 2 delves into issues around procurement, collaboration and culture, Chapter 3 focuses on the history behind Higher Education Institutions in South Africa and various interventions in the sector. It was necessary to separate the chapters in order to provide a comprehensive overview of why the sector is in its current state in terms of infrastructure and how the construction industry in general fits into the narrative.

Chapter 2 delves into procurement in the construction industry. It highlights the need for collaboration in the industry and makes an argument for the necessity of culture change in line with similar calls within the construction industry globally. It examines the procurement issue within the South African context, relying on local expertise on the current state of procurement in the country.

Chapter 3 provides background on the state of Higher Education in South Africa. It details the process of change from apartheid era education to the change in government in 1994. It then considers the interventions Government has put in place to redress the inequalities of the past. The results of redress are explored with the identification of problems and successes. The DHET intervention in the infrastructure crisis is finally detailed with a conclusion on recent legislature and what it means for public projects.

Chapter 4 expands on the research methodology for the research. This includes the philosophy, type of research, data collection and data analysis techniques. It provides a comprehensive overview of how the research was conducted, including justification for the choices that were made.

Chapter 5 validates the availability of a single critical case. This is accomplished through analysis of interviews conducted with various HEIs to determine how collaborative they are in their infrastructure procurement. The conclusion of this chapter validated the use of WCPD as a critical case

Chapter 6 presents the results from the research and discusses these findings. Multiple themes emerged from the research and these richly provided the means by which change took place in WCPD and how it could possibly be replicated in other HEIs seeking to shift to more collaborative procurement. The embedded cases of the New Universities also assisted in determining how to implement successful collaborative change

Chapter 7 presents the model for change that was developed as part of the research. It also shows how this framework was validated by local industry experts. This framework assumes the presence of a generic process for change, implying that any HEI can utilise it to implement its own procurement change

Chapter 8 concludes the research by detailing how the objectives were met, providing recommendations, reflections on the research process, the contribution of the study to both the body of knowledge and to practice and finally possible further research related to the study.

2 Construction Procurement

This chapter reviews available literature on construction procurement. The aim of this chapter was to provide a detailed critical review of the state of procurement globally and in South Africa. It was necessary to investigate what specific issues South Africa faces and how these have been addressed or what attempts have been made to address them. Of importance was how procurement issues have been countered globally, providing a critical assessment of what is considered best practice. This led to a focus on collaboration, culture and clients as critical to improvements in procurement.

The systematic review was based on the following keywords: Procurement, Collaboration, Culture and Change.

2.1 Introduction

The need for change in the Construction Industry (CI) has been discussed on a global scale. Discussions into what needs to change have spanned the last quarter of a century since the Latham Report (Latham, 1994). Recognition that procurement needs to change has seen a shift from more traditional design, bid and build models to more collaborative models involving stakeholders such as the contractor from the design stage of the project.

This review examines how the industry has evolved over the years, the changing dynamics in project relationships and the perceived ideals on the functioning of the industry. The term “procurement culture” is introduced as a means of defining the difference made by collaborative working.

South Africa’s CI is modelled after that of the UK. The review delves into how the UK has evolved and where the shortcomings of the SA industry are. Legacy issues influencing the rate of change are also considered, culminating in an examination of Higher Education Institutions and their procurement strategies. The new framework developed by the Treasury Department is examined and used as a yardstick measuring where Treasury expects capital projects to be.

In examining procurement, this review looks at Principal Agent Theory and Stewardship Theory. It considers the specific role clients have in initiating change and reveals how even

though collaboration is not perfect, it makes a considerable difference in addressing the ills currently faced by the construction industry.

The key concepts to be examined are summarised below:

- Evolution of the construction industry
- Theories pertaining to procurement in construction (Principal Agent and Stewardship Theory)
- Traditional Procurement vs. Collaborative Procurement
- Changing to a more collaborative Procurement Culture
- The role of clients in change
- Higher Education Institutions and the Department of Higher Education and Training
- The envisioned future of HEI construction procurement

2.2 Procurement Processes in Construction

Procurement is defined as the process that creates, manages and terminates contracts making it in essence a process concerned with activities preceding and following the signing of a contract (Govender and Watermeyer, 2000). It is a process which when done correctly is central to a successful project (Tookey et al., 2001)

In construction, procurement can be defined in terms of intrinsic strategy. Strategy is defined as the practice of determining the best way to get from the current state to some ideal state (Undercurrent, 2012). It is in essence about choices made in determining the best manner to achieve objectives and best value for money in a project (Watermeyer, 2012b). Procurement therefore becomes a combination of delivery management strategy, contracting arrangements and procurement arrangements (CIDB, 2010).

Delivery management includes key activities such as gathering and analysing information about the project, formulating procurement objectives, making strategic delivery decisions and determining how to package the work (CIDB, 2010; Watermeyer, 2012b).

Contracting arrangements deal with both the contracting and pricing strategies. A number of contracting strategies exist with the most common shown in Table 2.1 *(CIDB, 2010)*.

Table 2.1 - Tender Contracting Strategies

Contract Strategy	Description
Design, Bid and Build	Design is by the employer and construction by the contractor
Develop and Construct	The contractor is given a baseline for the design by the employer and develops then constructs
Design and Construct	The contractor is briefed on the project and designs and constructs it
Construction Management	A construction manager manages the work through trade contractors
Management Contractor	The management contractor manages the construction through work contractors

Based on (CIDB, 2010)

There are various pricing strategies which commonly fall into two categories i.e. Price based contracts and Cost based contracts. The strategies are shown in Table 2.2 *(CIDB, 2010; Watermeyer, 2012b)*.

Table 2.2 - Tender Pricing Strategies

Pricing Strategy		Description
Price Based Contracts	**Activity Schedule / Lump Sum**	The scope of work is broken down into activities and priced as lump sum paid on completion of activity.
	Bill of quantities	The items of work are listed and estimated quantities and rates for each item tallied so contractor can be paid regularly at agreed rate.
	Priced Contract with Price List	The price list contains lump sum prices for each service with quantities and associated rates, so contractors can be paid for services provided.
Cost Based Contracts	**Cost Reimbursable**	The contractor is paid for actual expenditure plus a percentage or fee.
	Target Cost	A cost reimbursable contract where target cost is estimated and on completion of the project the difference between target cost and actual cost is shared between the client and the contractor on an agreed rate.

Adapted from (CIDB, 2010; Watermeyer, 2012b)

There are 4 types of contracts widely used in South Africa i.e. JBCC, GCC, FIDIC and NEC (Govender and Watermeyer, 2000). Local contracts such as JBCC are formulated around the client as the designer. Multinational banks have harmonised their contracts around FIDIC which is also framed around the client contracting strategy (Watermeyer, 2012b). The NEC contract though especially facilitates the implementation of sound project management principles, defines legal relationships and aims for collaboration between members of the project so as to create a better product (Watermeter, 2013). Design by employer is appropriate for use with all contracts except GCC, Design and Build/Develop can be used with all contracts and the Management contract can be used with only the NEC and FIDIC contracts (CIDB, 2010)

Procurement arrangements on the other hand look at procurement procedures. They consist of three types of procedures that are shown in Table 2.3 below *(CIDB, 2010; Watermeyer, 2012b)*.

Table 2.3 - Tender Procedures

Procedure		**Description**
Negotiation		A tender is solicited from a single contractor
Competitive Negotiation	**Open**	The scope of work is broken down into activities and priced as lump sum paid on completion of activity.
	Restricted	The items of work are listed and estimated quantities and rates for each item tallied so contractor can be paid regularly at agreed rate.
Competitive Selection	**Nominated**	Contractors satisfying prescribed criteria are invited to tender
	Open	Contractors can submit a tender in response to an advertisement
	Qualified	Call for expression of interest is advertised and those satisfying the criteria are invited to tender
	Quotation	Tender offers solicited from no less than 3 contractors in fair and transparent manner
	2 Envelope	Contractors submit technical and financial proposals in two separate envelopes. If technical submission meets the criteria, then financial submission opened
	2 stage Tendering	First tenders are based on partially developed design where chosen contractor then assists with final development of design and is eligible to tender for the construction phase

Adapted from (CIDB, 2010; Watermeyer, 2012b)

Tender evaluation is then done using one of four methods shown in Table 2.4 below *(CIDB, 2010; Watermeyer, 2012b)*.

Table 2.4 - Tender Evaluation

Evaluation Method	**Description**
Financial Offer	Offers are ranked from highest to least favourable and highest ranked is recommended
Financial Offer and Quality	Quality is scored and those below a prescribed minimum are rejected then finance is scored, and the highest tender evaluated is recommended
Financial Offer and Preference	Finance is scored then submissions scored on preferences claimed with highest tender evaluated being recommended
Financial Offer, Quality and Preference	Quality scored first then finances then finally preference from which highest tender evaluated is recommended

Adapted from (CIDB, 2010; Watermeyer, 2012b)

In essence, the choices made at various stages are what determine the procurement strategy. Considering the number of strategies available, it can be assumed that the strategy employed should depend on the type of project and the needs of the project. For the purposes of this study, the strategies are divided into two groups - traditional and collaborative.

2.2.1 Traditional Procurement

Traditional procurement is best described using its most common results. It is defined by a legacy of adversarial relationships, fragmentation, working with insufficient information and limited value for money (Ng et al., 2002). This is due to the extensive use of Design, Bid and Build contracts such as JBCC and open tender procedures that focus on the lowest price.

The escalation in adversarial attitudes has been closely linked to the competitive nature of traditional procurement (Ng et al., 2002). It has also been argued that the failure of traditional methods is at the root of construction efficiency and performance problems (Gadde and Dubois, 2010).

The use of contracts such as JBCC (in South Africa) creates the need for a higher degree of specification prior to contractor procurement because the entire design needs to be complete before the contractor is chosen (CIDB, 2010). The Design, Bid and Build process tends to result in a distinct separation between the design and construction phases. This separation results in long project durations, decreased innovation, lack of joint problem solving and lack of a holistic perspective (Eriksson and Westerberg, 2011a; Lingguang Song et al., 2006; Song et al., 2009).

The challenges occuring through the use of traditional procurement have led to the need for a shift from its use. Collaborative procurement has emerged as a viable alternative to traditional procurement.

2.2.2 Collaborative Procurement

Thomson et al define collaboration as a process in which autonomous or semi-autonomous actors interact through formal and informal negotiation jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions (Thomson et al., 2009). Extrapolating from this definition, collaborative procurement would focus on using relationships strategically to benefit parties in the project creating what can be referred to as relational transactions.

Collaboration engenders greater involvement of clients in projects and encourages them to procure in a manner that does not alienate stakeholders (Boughzala and De Vreede, 2015; Osipova, 2015).

In contrast to the traditional antagonism, conflict and disputes, a culture of collaboration, open interaction, trust, commitment, mutual advantage, learning, innovation and productivity is developed with expertise transmitted from project to project (Ankrah et al., 2009a).

Collaborative involvement of stakeholders has proven beneficial in the industry in the form of relational transaction practices which are used as an alternative to more traditional practices which separate the various stakeholders and their roles.

These practices are found to be a suitable way for nurturing relationships, achieving better project performance and increasing end user satisfaction (Ning and Ling, 2013). The public sector is likely to have greater difficulties adopting them compared to the private sector due to stringent procedures and tedious decision-making processes (*ibid*).

Forms of collaborative procurement include partnering, alliancing, framework agreements and integrated project delivery. These are explained below.

2.2.2.1 Partnering

Partnering is described as a management tool aimed at reversing the negative effects of adversarial relationships in construction using a shared culture with no regard to organisational boundaries (Gadde and Dubois, 2010). Two forms of partnering exist namely

once off partnering for e.g. single projects and strategic partnering that is on a long term, serial basis (*ibid*).

Its key elements include commitment, trust, preparation, understanding, equity, development of mutual goals, inclusion of appropriate parties, continuous joint evaluation, use of project partnering tools and procedures, empowerment of stakeholders, evaluation methodology and willingness to accept mistakes (Ng et al., 2002). Its potential benefits include increased productivity and reduced costs, reduced project times, improved quality, improved client satisfaction and greater stability (Gadde and Dubois, 2010).

2.2.2.2 Alliancing

Alliancing is defined by Mistry and Davis as a cooperative arrangement between two or more organisations working towards achieving common goals and objectives for a specific project (Raisbeck et al., 2010a). It reflects joint rather than shared commitment between partners with partner selection based on performance rather than only price (*ibid*). It involves open book sharing among partners and a gain-share, pain-share model.

2.2.2.3 Framework Agreements

Framework Agreements are defined as an agreement between an employer and one or more contractors, the purpose of which is to establish the terms governing contracts during a given period in particular with regard to price and where appropriate the quantity envisaged (Watermeyer, 2013). They are basically a means of procuring goods, services and construction work on an instructed basis over a term without commitment to the quantum of work instructed and in the absence of a detailed scope of work (Watermeyer, 2012a).

Framework Agreements reduce the need for re-advertising, provide programming flexibility and enable the development of collaborative relationships (*ibid*). They also enable lessons learnt in one package to be applied to the next and an integrated approach to working (*ibid)*.

2.2.2.4 Integrated Project Delivery (IPD)

IPD is defined by the American Institute of Architects as a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimise project

results, increase value to owner, reduce waste and maximise efficiency through all phases of design, fabrication and construction (Raisbeck et al., 2010a).

Project team integration has been cited as a possible way of coping with cultural inconsistencies, distrustful relationships and the design-construct divide (Cicmil and Marshall, 2005). These collaborative practices are thus a means of bringing stakeholders together, working together and focusing on best value as opposed to lowest price procurement through redefining of processes and methods (Aapaoja et al., 2013). It must be noted that they are not necessarily always the ideal for every project, projects need to be analysed and the best procurement strategy utilised to ensure the best results.

A summary of collaboration characteristics is provided in Table 2.5:

Table 2.5 - Collaboration Characteristics

Collaborative Practice	**Author**																				
	(Davis and Walker, 2004)	(Bröchner et al., 2002)	(Walker, 2002)	(Gottlieb and Storgaard, 2006)	(Tookey et al., 2001)	(Watermeter, 2013)	(Raisbeck et al., 2010b)	(Mullins, 2011)	(Ng et al., 2002)	(M. Shelbourn et al., 2007)	(Cicmil and Marshall, 2005)	(Kwawu and Hughes, 2005)	(Watermeyer, 2012a)	(Gadde and Dubois, 2010)	(Kent and Becerik-Gerber, 2010)	(Ingirige and Sexton, 2006)	(Wamuziri and Seywright, 2005)	(Emuze, 2011)	(Kumaraswamy et al., 2005a)	(Challender et al., 2014)	(Crowe and Fortune, 2012)
Long term relationships	X				X							X	X	X		X					
Joint problem solving	X			X							X									X	
Shared goals	X						X		X												
Sharing of rewards	X		X	X			X		X						X		X		X		
Leveraging technology	X				X		X	X		X					X					X	X
Increased coordination	X																				
Information sharing	X						X	X	X							X				X	X
Trust	X		X									X		X		X		X	X	X	
Informal dispute resolution		X					X		X												X
Close relationships		X	X						X				X		X			X	X	X	
Innovation			X															X		X	
Learning			X			X					X			X		X					
Strategic relationships				X						X		X			X						
Using preferred contractors					X	X															
Use of KPIs					X																

Collaborative Practice	Author																			
	(Davis and Walker, 2004)	(Bröchner et al., 2002)	(Walker, 2002)	(Gottlieb and Storgaard, 2006)	(Tookey et al., 2001)	(Watermeter, 2013)	(Raisbeck et al., 2010b)	(Mullins, 2011)	(Ng et al., 2002)	(M. Shelbourn et al., 2007)	(Cicmil and Marshall, 2005)	(Kwawu and Hughes, 2005)	(Watermeyer, 2012a)	(Gadde and Dubois, 2010)	(Kent and Becerik-Gerber, 2010)	(Ingirige and Sexton, 2006)	(Wamuziri and Seywright, 2005)	(Emuze, 2011)	(Kumaraswamy et al., 2005a)	(Challender et al., 2014)	(Crowe and Fortune, 2012)
Value based procurement					X													X			
Flexibility					x	X							X	X					X		
Use of NEC						X							X		X		X		X		X
Use of Framework Agreements																					
Joint communication										X		X				X		X			X
Early involvement of Contractors							X	X	X		X		X		X		X			X	
Equitable allocation of risk							X						X		X		X		X		
Joint evaluation and monitoring									X			X									
Interdependence of parties												X							X		
Structured documentation													X								
Less competitive tendering											X		X	X						X	
Sharing resources														X		X					

2.3 Theories and Models of Relationships

A consideration of the challenges faced in construction procurement shows an underlying theme of relationships at the root of a number of problems. Relationships worth considering are:

- Those among stakeholders
- Those between clients and the industry

These tend to cover the important aspects of relationships in construction projects. In terms of stakeholder relationships, four theories will be considered; Principal Agent theory (Agency theory), Stewardship theory, Relational Contracting theory and Stakeholder theory with Elite theory covering the relationship between clients and the industry.

2.3.1 Principal Agent theory

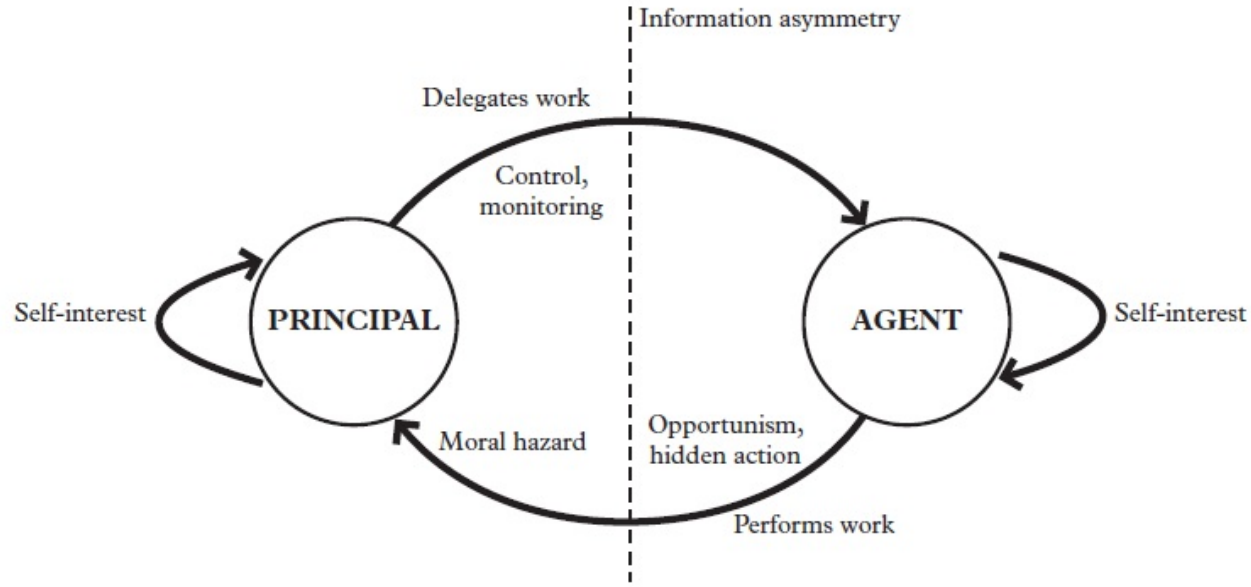
A Principal Agent relationship is defined as a contract under which one or more persons (Principal) engage another person (Agent) to perform some service on their behalf (Caers et al., 2006). This service involves delegating some decision-making authority to the agent (*ibid*).

Agency theory assumes conflict in the interests of the two parties (Caers et al., 2006). Individuals and organizations are assumed to be solely interested in maximising self-interest and personal gain (Lambright, 2009; Snippert et al., 2015). Agents are assumed to be motivated by extrinsic, tangible rewards with measurable market value.

Problems faced in this type of relationship are two-fold:

Adverse selection (Pre contractual opportunism) – in this case the agent has information that the principal does not have which would affect principal's decision making (Lambright, 2009). The principal has no way of knowing if the agent has used this information in a manner that is beneficial to the principal's interests (*ibid*). The principal is thus at risk because of lack of information (Snippert et al., 2015).

Moral Hazard (Post contractual opportunism) – in this case it is difficult for the principal to observe and evaluate all the agent's actions (Lambright, 2009). The agent is in a position to use information and their expertise to act opportunistically in their own interest instead of in good faith with agreed contractual goals (Snippert et al., 2015). Snippert portrays this in Figure 2.1.



Based on (Snippert et al., 2015)

Figure 2.1 - Agency Theory Relationships

Typically, relationships in the construction industry have taken on the form encapsulated in Principal Agent theory. The client is not as knowledgeable as the agent who in this case is the consultant or contractor. Distrust exists, and disputes are the order of the day.

It has been recognised that this conflict in goals between the principal and the agent needs to be replaced by contractual behaviour that focuses on goal convergence (Snippert et al., 2015).

2.3.2 Relational Contracting theory

A viable alternative to adversarial relationships is found in relational contracting. In such contracts, collectivist behaviour is the priority and higher value is placed on cooperation of stakeholders (Davis et al., 1997). Relationships are expected to create value, improvement, alignment and implement the most cost effective solution (Constructing Excellence, 2009). Focuses on goal convergence between agent and principal instead of self-interest while using responsibility and autonomy to limit opportunistic behaviour (Snippert et al., 2015).

It is found to be a suitable means of nurturing relationships among contracting parties, achieving better project performance and higher end user satisfaction (Ning and Ling, 2013). Practices include partnering, alliancing and integrated project delivery. In these transactions, the parties adopt relational contracting behaviours such as flexibility, compromise and

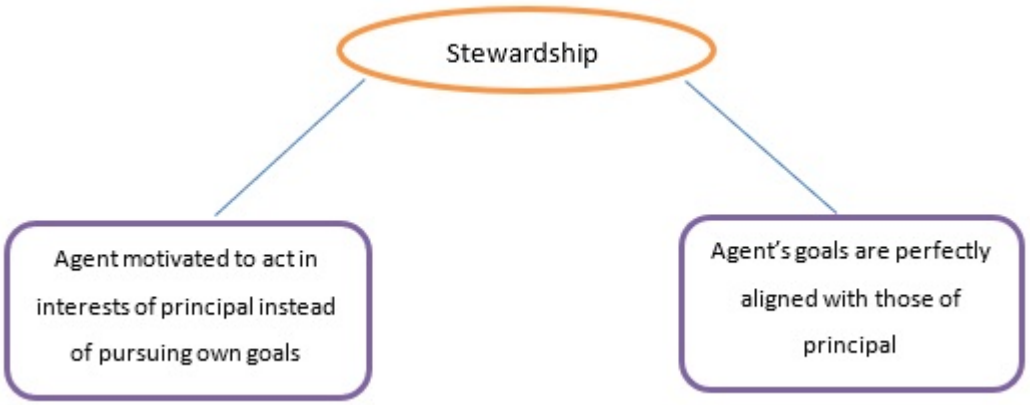
sharing of information (*ibid*). Relational Contracting is based on Relational Contracting (RC) theory that emphasises the existence of informal agreements and unwritten codes of conducts between contracting parties which are sustained by value of future projects (*ibid*). RC's primary goal is to establish the working relationship between parties through a mutually developed, formal strategy of commitment and communication aimed at win-win outcomes for all parties (Kumaraswamy et al., 2005b)

2.3.3 Stewardship theory

Relational contracting behaviours are further reflected in Stewardship Theory. Some argue it is the complete opposite of Agency theory while others believe it complements it. In this study, it is proposed that stakeholder relationships need to reflect more stewardship behaviour.

Where stewardship is practiced, individuals and organizations are interested in achieving collectivist goals (Lambright, 2009). Contractual behaviour focuses on goal convergence between the principal and agent instead of self-interest (Snippert et al., 2015).

Caers et al define the two branches of stewardship as shown *(Caers et al., 2006)*:

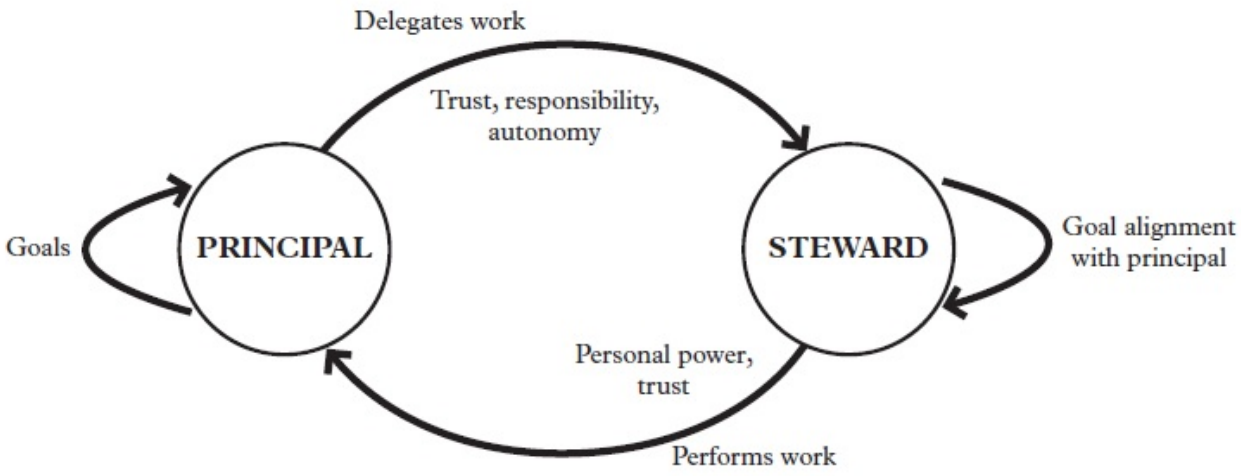


Adapted from (Caers et al., 2006)

Figure 2.2 - Branches of Stewardship

Stewardship assumptions include the following; long term relationships developed through trust, reputation, collective goals and involvement where alignment come about as outcome from mutual relations (Snippert et al., 2015). The steward is concerned with being accountable for something larger than individual gain (*ibid*). The steward also focuses on intrinsic, intangible rewards. These include opportunities for growth, achievement, affiliation,

self-actualization (Lambright, 2009), trust, reputation, enhancement, discretion, autonomy, responsibility, satisfaction in job, stability and mission alignment (Snippert et al., 2015). Snippert et al describe the relationships as shown in Figure 2.3.



Based on (Snippert et al., 2015)

Figure 2.3 - Stewardship Theory Relationships

Table 2.6 details the differences between Agency Theory and Stewardship Theory as adapted from Snippert et al.

Table 2.6 - Agency Theory vs. Stewardship Theory

	Agency Theory	**Stewardship Theory**
Model of Man	Emphasizes a self-interested actor which searches in a rational manner for maximization of their own personal (economic) gain.	Emphasizes an actor as a steward whose behaviour is ordered in such a manner that pro-organizational, collective behaviour with higher utility than individualistic, and self-serving behaviour is created and sustained.
Central Notions	Goal incongruence: assumes goal divergence based on self-interested rational actors.	Goal alignment: mutual goals and objectives.
	Initial position is to distrust.	Trust develops over time; initial trust position can be absent. Involvement-oriented management philosophy. Theoretical assumptions derived from organizational behaviour, psychology, and sociology.
	Control-oriented management philosophy. Theoretical assumptions are derived from economics.	
Theoretical Concepts	Use of incentives and sanctions to foster goal alignment.	Responsibility.
	Assign risk to the agent to ensure goal compliance.	Autonomy.
	Monitoring and control mechanisms.	Shared culture and norms.
	Reward systems.	Personal power and trust.

	Agency Theory	Stewardship Theory
	Use of bonding threat to reputation.	Other governance mechanisms.
	Short term.	Long term.
Applications	Eliminate opportunistic behaviour.	Goal alignment based on shared goals and trust.
	Provide the level of incentives and sanctions which reduces the threat of information asymmetry. Correct, through specific contract requirements, for asset specificity and moral hazard. Uses reputation as an incentive and sanction.	Reward workers through non-pecuniary mechanisms.
		Reduces the threat of opportunistic behaviour through responsibility and autonomy. Reduces the threat to the organization of information asymmetries, moral hazard, and asset specificity.
	Ensure goal alignment.	Reduces dependence on legal contracts to enforce behaviour.
		Uses reputation as an incentive and sanction.

Adapted from (Snippert et al., 2015)

2.3.4 Stakeholder theory

Since relationships are at the core of procurement it is expected that stakeholders play a major role. Stakeholder theory holds that incorporation of stakeholder views in decision making processes enhances an organisation's performance and commitment (Sinclair, 2011) in other words if organisations want to be effective they have to pay attention to all and only those relationships that can affect or be affected by the achievement of the organisation's purposes (Heugens et al., 2002).

Two approaches exist for dealing with stakeholders 1) Arms-Length Contractual Relations (also known as Buffering) which is a traditional approach aimed at curbing the influence of stakeholders by creating boundaries (Heugens et al., 2002; Sinclair, 2011) and 2) Obligational Contractual Relations (also known as Bridging) which involves forming strategic partnerships with stakeholders (Sinclair, 2011). Sinclair through an adaptation of Svendson, notes the differences between the two as shown in Table 2.7.

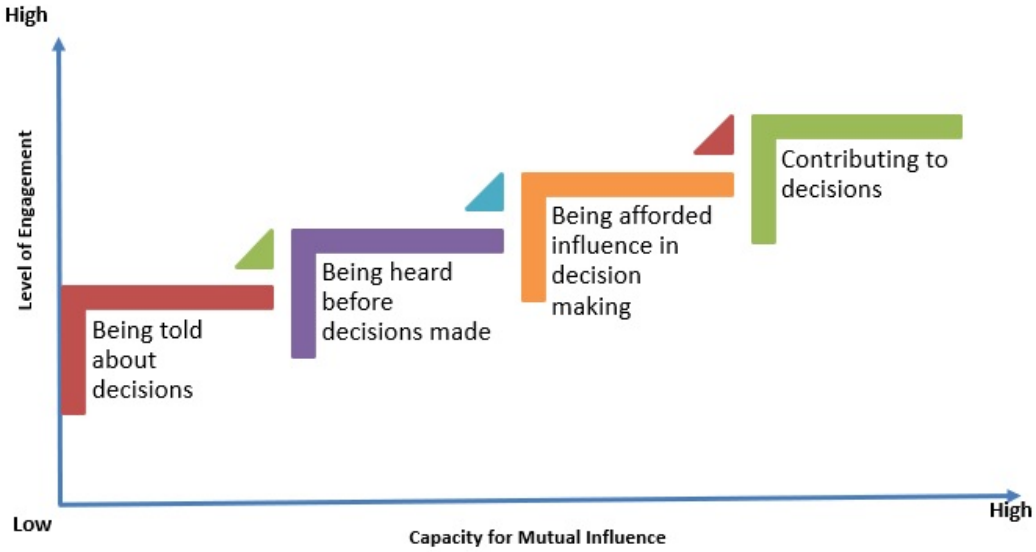
Table 2.7 - Arms-Length vs Obligational Contracting

Traditional	Emerging
Fragmented	Integrated and Systematic
Issues based	Ongoing
Focus on managing relationships	Focus on building relationships
Emphasis on buffering the organisation	Emphasis on creating opportunities and mutual benefits

Linked to short term business goals	Linked to long term business goals
Idiosyncratic implementation dependent on division interests and personal style of managers	Coherent approach driven by business goals, mission, values and corporate strategies

Adapted from Svendson (Sinclair, 2011)

It has been found that the best practice approach to stakeholder engagement involves moving from the tactical towards the strategic and from project-based interventions to organisation wide stakeholder collaboration (*ibid*). Influence is greatest when stakeholders can contribute to decisions as depicted by Sinclair's adaptation in Figure 2.4. Depending on the type of procurement, contractors can still find themselves as merely builders with no chance provided for them to give meaningful input in a project.



Adapted from Svendson (Sinclair, 2011)

Figure 2.4 - Levels of engaging stakeholders

One of the cornerstones of establishing relationships in a project is through Early Stakeholder Involvement (ESI) (Aapaoja et al., 2013). This means that simply involving the stakeholders is not enough, they need to be involved at a stage where their contributions can be beneficial. ESI thus allows for creative solutions and an exchange of ideas with clients using the stakeholder knowledge base to find alternate means of accomplishing their objectives (*ibid*). It is found to improve construction operations and stakeholder efficiency, lower the likelihood of developing poor designs and lead to synchronised procedures (*ibid*).

One specific form of ESI is Early Contractor Involvement (ECI) which is used as a collaborative practice in construction. ECI can be defined as a relationship between a contractor and an

owner/designer/client that engages the contractor at the early design stage and allows the contractor to contribute their wisdom, creativity, construction knowledge and experience to the design as a means of optimizing this stage (Lingguang Song et al., 2006).

It can be concluded that it is possible for stakeholders to work well together and to involve all relevant parties from the start to ensure better relations and likely better project results.

2.3.5 The Elite Model

The norm in the construction industry has been that of an asymmetrical relationship between clients and the industry professionals. Clients are re-emerging as active participants in the construction process shown by the fact that motivation for quality improvement in construction has come about through client dissatisfaction and government action (Thomas et al., 2002). This type of client is referred to as an expert client. Their re-emergence bolsters the concept of an elite in the construction industry.

All industries tend to have a dominant culture. This dominant culture implies that there is a driving force behind it (Billington et al., 1991). T.S. Eliot recognised the existence of elite class in every culture (*ibid*) These are those who have special knowledge and skills within a class society (*ibid*). Althuisser in his reinterpretation of Marxism also alluded to culture being determined by the ruling class (Billington et al., 1991, p. 11) with Matthew Arnold concurring by advocating for an elite to create consensus and safeguard culture (Billington et al., 1991, p. 11).

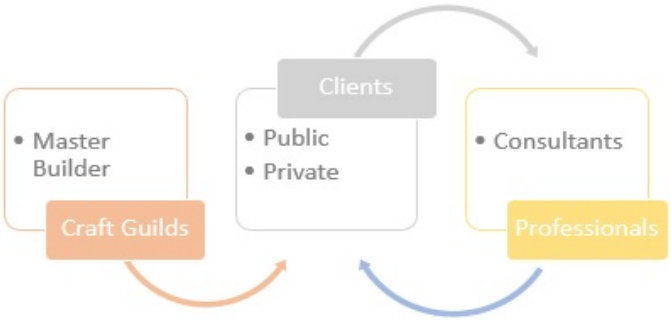


Figure 2.5 - The evolution of power in the Construction Industry

Consideration of the history of the construction industry points to the presence of an elite class that has evolved over time. The craft guild gave way to clients who then handed responsibility to industry specialists. In the modern age of construction, clients are becoming more aware and better informed with their role in projects evolving again. This evolution of the elite class is depicted in Figure 2.5 above.

This phenomenon has been observed globally, with various countries shifting the power dynamic back to the client, especially the biggest public client – government. As the global construction industry changes, major stakeholders are also evolving in their behaviour. Clients as the elite, are now in a unique position of being able to influence the industry

2.4 Evolution of the Construction Industry

The Construction Industry is an integral part of most global economies. Unfortunately it is regarded as a hostile environment that tends to create stakeholders who prioritise their interests above all else (Babic and Rebolj, 2016; Holley and Ben Farrow, 2012; Memon et al., 2015; Osipova, 2015; Van Marrewijk et al., 2014). This is exacerbated by industry characteristics such as the separation of the design phases from construction phase, the organisation of the construction process and the methods used for price determination (Ankrah et al., 2009a; Barthorpe et al., 2000). The industry has not always been this way. Several factors influenced the change as explained below.

The history of the UK's construction industry as depicted in Figure 1 is reflective of the process of change within construction industries. The industry shifted from the craft guilds of the middle ages that worked as a sharing collective (Epstein, 1998) with cultural cohesion (Thomas et al., 2002) to more fragmented relationships with a myopic focus on cost and short

term goal attainment (Thomas et al., 2002) by the 19th century. This resulted in a loss of openness, trust, respect and the development of long- term relationships all of which are essential for the strong cultures necessary for successful projects (*ibid*).

While change tends to be inevitable, the construction industry managed to remain steeped in century old practices (Babic and Rebolj, 2016). By the late 1980's, Design & Build which was originally intended for simple procurement matured into various design, build and management systems (Constructing Excellence, 2009). The lack of cohesion in the industry, preoccupation with lowest price (Babic and Rebolj, 2016; Osipova, 2015) and increase in levels of claim culture are what eventually led to the commission of the Latham and Egan reports which iterated the need for change in the industry.

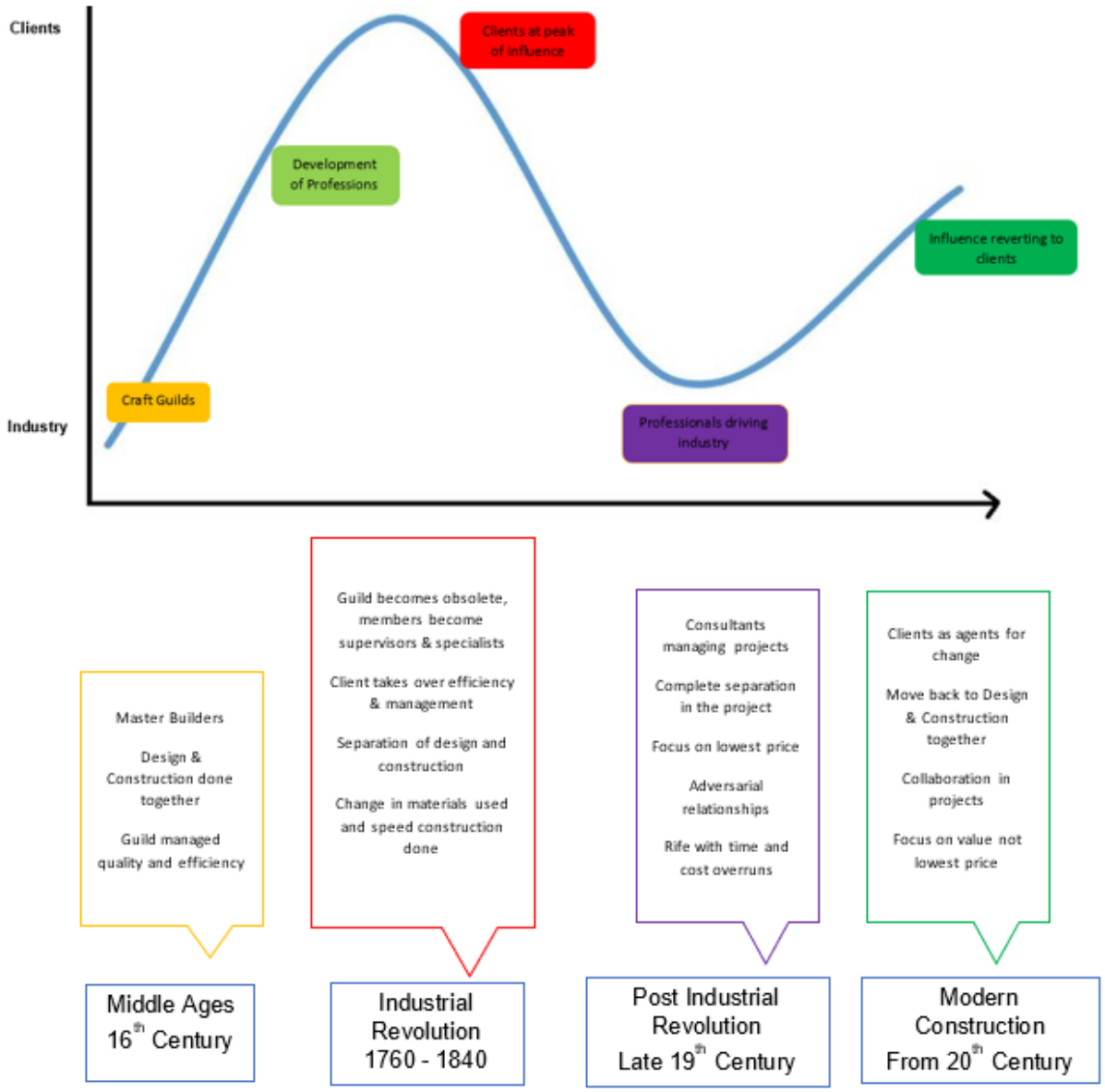


Figure 2.6 - A Timeline of Construction

2.5 Global Construction

Detailed research has been conducted by various countries into ways of improving the industry and shifting from the hostile environment. Most common is the United Kingdom (UK) report by Latham that emphasised the need for client involvement, partnering in projects and the use of relational contracts such as the NEC which emphasised working more collaboratively within the industry (Latham, 1994). He advocated for cutting down adversarial construction and encouraged collaboration between clients, contractors and consultants for the good of the project (Gardiner, 2014b). This came at a time when the industry was fraught with rapid de-skilling, fragmentation, cutthroat open tendering, escalating litigation suits and

contractors declaring bankruptcy (*ibid*). He also recognised procurement as the area where change could be most effective with government in the best position to be at the forefront of change.

The Egan report four years later (1998) subsequently looked at improving the quality and effectiveness of the UK construction industry. Egan stressed that the report was not about inviting the industry to examine itself and decide how to work better but was about industry and government working together with major clients to do things completely differently (Egan, 1998). In the years since both the reports improvements have been made though the work is still ongoing.

In 2005, the UK was still cited as having projects that predominantly used traditional procurement with a focus on lowest price tendering (Kwawu and Hughes, 2005). This focus failed to promote best value in projects. By 2007, though changes had not occurred on as great a scale as imagined, some agencies in the UK such as Highways Agency and Network Rail were exclusively using collaborative practices such as ECI in their public projects (Nichols, 2007). Exceptional results were also observed in projects such as the Olympic Velodrome and the Eden Project which were completed under time and budget using Early Contractor Involvement and Framework Agreements (Fitzpatrick, 2012; Mosey, 2009) .

While strides were being made in terms of change, it should be recognised that the 2009 recession had a lingering impact on the construction industry. Reports showed that some industry players had reverted back to traditional strategies (Gardiner, 2014b). To compound this, a progress review by Wostenholme found stagnation in change since Latham and Egan's reports, (Wolstenholme, 2009).

He found that while the industry seemed to be moving in the right direction, it was unfortunately falling far short of the set targets, with Egan commenting that what could have been a revolution had instead resulted in a bit of improvement (*ibid*). Wolstenholme also noted that commitment to change was rather superficial and while collaboration had become widespread, adoption of best practice was usually on flagship projects (*ibid*). Where change did take place, it was found that practices failed to filter down to the supply chain (*ibid*). In essence, the industry was still struggling with fragmentation, short term relationships and poor integration in the supply chain (*ibid*). In this report, Wolstenholme concluded that the

client led change era was over and it was time for the supply chain to step up in terms of change (*ibid*). This is interesting to note as the premise of this research is that South Africa is still at a stage where the client can still drive change effectively in the industry.

By 2012 the UK was no longer promoting the use of traditional procurement unless it could be clearly shown that it offered the best value for money (Watermeyer, 2012a). April 2016 marked the mandated use of BIM Level 2 for all centrally procured construction projects in the UK (NBS, 2016). This was a stride in the right direction regarding the recommendations given by Latham and Egan.

It must be noted though, that the UK industry continued having problems as another report was released in 2016 by Farmer where a review of the UK Construction Labour Model was carried out, concluding that the industry needed to modernise or die (Farmer, 2016). Again, collaboration was noted as something missing from the industry. The industry while making improvements has not managed to fully attain what was envisioned by Latham and Egan.

The UK is not the only country that has released reports and implemented changes. The USA has mandated use of ECI for all it highway projects (Pearman, 2006), while Singapore is urging the adoption of progressive procurement methods that integrate the activities of various industry players to achieve synergy and attain productivity breakthrough (Kwan and Ofori, 2001). The previous preoccupation with lowest price is also being replaced with a focus on maximum value (Aapaoja et al., 2013).

Various reports are shown in Table 2.8 with a summary of their conclusions

Table 2.8 - Various Construction Industry Reports

Country	Report	Conclusion
UK (1994, 1998)	Constructing the Team Rethinking Construction	Value procurement, partnering, NEC, better relationships
Singapore (1999)	Construction21	Value procurement, skills enhancement, integrated approach to construction
Hong Kong (2001)	Tang Report	Focus on partnering, alliancing and NEC
New Zealand (2011)	Valuing the Role of Construction in the NZ Economy	Value procurement, PPPs and alliancing

Adapted from from (C21 Committee, 1999; CIRC, 2001; Egan, 1998; Latham, 1994; PWC, 2016)

In essence, global construction industries have woken up to the fact that new procurement and risk management procedures when aligned with modern partnering arrangements and integrated delivery schemes can improve project success (Snippert et al., 2015). This

emphasises the need for adaptation to the changing landscape in construction (Cheng and Liu, 2007).

2.6 Studies into Collaboration

Studies into collaboration have been conducted in various disciplines. Within construction these studies have focused on the broadly defined themes provided below.

2.6.1 The advantages of using collaboration

The advantages of collaboration have been highlighted in a number of studies. Greenwood and Wu found a positive relation between collaborative working and construction project performance (Greenwood and Wu, 2012). This is in line with a study by Lozano who found that collaboration is a pathway for sustainability (Lozano, 2007).

In a study on procurement routes, Tookey et al found that procurement is about figuring out how best to mitigate risk and adding a component of flexibility in rigid procurement systems (Tookey et al., 2001). This is in line with expectations of collaboration practices. While collaborations tend to broadly work in a similar manner, Raisbeck et al found that not all collaboration are equal, IPD for example has improvements making it at times a better fit for new technologies (Raisbeck et al., 2010a).

Closer to home, Emuze's study found that non-collaborative practices have a detrimental effect on project delivery in South African construction (Emuze, 2011). Issues causing problems in the industry include lack of trust in project teams, poor analysis of issues and their impact, apathy to ideas, non-inclusive decision making and closed, single-directional communication.

2.6.2 Challenges with the use of collaboration

Collaboration is not perfect and as such has challenges associated with its use and implementation. Several studies have looked at these challenges.

Mason in a study on specialist contractors found that with collaboration clients need to show more commitment and be participative in team building (Mason, 2007). Specialists found themselves excluded as partnering does not filter down the supply chain. The study also found that it is difficult to coordinate partnering with specialist contractors as they were on site for

a short period. Ng et al previously conducted a study that found similar results in terms of client commitment (Ng and Skitmore, 2002). They found that ineffective partnering was due to clients being unwilling to fully commit to agreements. They also found that in order for contractors to be more willing to partner, clients needed to adopt more flexible administration procedures.

A study by Challender et al found that collaboration can be affected by the economy (Challender et al., 2013). The study identified how downturns in the economy affect the way individuals operate, as individuals look for job security, organisations revert to traditional working in which they feel they have more control as lowest price set at bid level.

Studies such as those by Ning and Ling looked into drivers and barriers to relational transactions (Ning and Ling, 2013). They determined the various difficulties contracting partners may face when trying to implement relational transactions.

Gottlieb and Storgaard found that being a pioneer is a challenge (Gottlieb and Storgaard, 2006). Few want to go through the challenges of setting up new systems, they prefer to adopt existing products and concepts.

2.6.3 Implementing of collaboration

Implementation of collaboration requires specific attitudes and practices; several studies have looked into these and a brief overview is provided in Table 2.9.

Table 2.9 - Studies on Collaboration

Study By	Study about	Findings
(Bresnen and Marshall, 2000)	Building partnerships	It is possible to engineer collaboration in the short term using formal mechanisms such as incentives and team building Formal team building does not guarantee collaboration
(Walker, 2002)	Enthusiasm, commitment and project alliancing	Enthusiasm and commitment are achieved by an environment that is both collaborative and cooperative
(Kwawu and Hughes, 2005)	The impact of relational contracting on the construction industry	The research was a means of justifying the need for empirical research. It was found that there was no research on interpretation and enactments (implementation) of relational contracting at the strategic and operational management levels

Study By	Study about	Findings
(Nikas et al., 2007)	The antecedents and drivers affecting the adoption of collaboration technologies in the construction industry	The study distinguished between antecedents and drivers in terms of collaboration adoption factors
(Shelbourn et al., 2007)	Planning and implementation of effective collaboration in construction projects	There is need for a focus on soft issues such as business process and people instead of only technology to plan and implement more effectively Exclusive focus on organisational and cultural issues does not reap benefits derived from the use of technology especially in distributed teams – there is a need for balance
(Chen, 2010)	The role of antecedents and processes in producing well-functioning interorganizational collaborations for social service delivery	Understanding dynamics between antecedents, processes and outcomes of collaboration helps organizations take proactive steps to address potential problems in formation and functioning of interorganizational networks Sharing resources plays an essential role in contributing to building trust, development of partners and achieving collaboration goals
(Crowe and Fortune, 2012)	Classifying contractual behaviour in higher education construction projects	Contracts are perceived as restricting the ability to move from reactive adversarial practice to proactive, collaborative approaches. The research though found no direct correlation between contractual mechanisms and perceived collaborative approaches
(Watermeyer, 2013)	Value for money in the delivery of public infrastructure	It is important to understand what value for money is and how it can be determined. This enables a strategic approach to design and implementation of a procurement and delivery management system for infrastructure Current systems in the South African construction industry need to be reviewed and possibly redesigned to ensure they deliver on 3 Es – Economy, Efficiency and Effectiveness while being mindful of Equity There is a need for a culture and mindset change in the industry to be able to embrace new and emerging procurement practices
(Alam et al., 2014)	Shifting from a contractual to a collaborative public management strategy	Success dependent on processes and actions used to co-create managerial social capital, building mutual trust by sharing risk, responsibility and experience The study also identified key factors necessary for collaborative management strategy.

2.6.4 Measuring of collaboration within an organization

It is useful for organizations to be able to measure the fact that they are collaborating and to what extent they actually are collaborating; this provides reflection and the ability to make improvements. Some studies have looked into this very issue coming up with possible measures for collaboration

Amirkhanyan's study looked at determinants of collaboration (Amirkhanyan, 2009). The study also found that government with in-house professional capacity and collaborative attitudes more likely to rely on contractor input.

In the same year, Thomson et al did a study on conceptualising and measuring collaboration (Thomson et al., 2009). They found support for a Structural Equation model of collaboration with five dimensions. They found that collaboration exists as an independent phenomenon not just as a subjective interpretation of reality.

Woodland and Hutton developed the Collaboration Evaluation and Improvement Framework (Woodland and Hutton, 2012a). This framework can be used to define, describe collaboration, measure organizational collaboration attributes over time. It can also increase stakeholder ability to engage in efficient and effective collaboration

2.6.5 Concluding collaboration studies

The studies shown are for a broad spectrum of issues dealing with collaboration. Both advantages and challenges have been identified, with some studies looking into measuring collaboration. The studies show that regardless of possible challenges, collaboration can be successfully adopted in construction projects

2.7 Changing to Collaborative Procurement

Advocacy is widespread for partnering arrangements and integrated delivery systems which include designing and construction especially for high risk projects (Bowles and Morgan, 2016; Holley and Ben Farrow, 2012). They encourage the sharing of risk and create opportunities for shared gains (Bowles and Morgan, 2016; Memon et al., 2015; Nukic and Huemann, 2016; Osipova, 2015).

2.7.1 Lag and resistance to change

In spite of advocacy and the fact that use of collaboration is not new to construction (Bowles and Morgan, 2016; Holley and Ben Farrow, 2012; Memon et al., 2015) change has not been easy in the industry (Thomas et al., 2002). It has a conservative and sometimes laggard approach to new ideas mainly due to its fragmented nature and lack of ability to invest time and money into innovation, research and development (Barthorpe et al., 2000). Change has historically been met with scepticism, resistance and a reluctance to move away from well-established work practices and procedures (Babic and Rebolj, 2016; Van Marrewijk et al., 2014).

It has been suggested that the industry is subject to historical, industrial and market forces that perpetuate its existing culture and management style (Kwan and Ofori, 2001). These inhibit the industry's ability to initiate change and makes it especially unwilling to invest in technology (ibid).

While some construction professionals may appreciate the changes that have occurred in other industries, they have difficulty envisioning how to harness these advantages to benefit the construction industry (Thomas et al., 2002). The types of relationships in the industry also imply that some professionals could be happy with the current status quo and not willing to lose out on their advantage in the industry.

2.7.2 The need for in-depth change

Where change has been accomplished it has focused on the use of various tools and techniques. While these are great to utilise, they do not produce a change in attitudes from industry stakeholders; they simply enable stakeholders to change practices.

Nummelin asserts that change should not merely encompass adoption of new systems and methods; it should include changing underlying assumptions and values which in essence implies a change in organisational culture (Nummelin, 2006). Höök and Stehn refer to this as a focus on the mind (Höök and Stehn, 2008). In their study on knowledge management, Fong and Kwok found that besides utilising new technologies, there is a need for understanding and integration of human aspects as well as determination of the right culture to operate (Patrick S. W. Fong and Kwok, 2009). The clear implications are that transformation has to go

deeper than using particular tools and techniques. Instead of changing only practices, behaviour, attitudes and values also need reassessment (Ankrah et al., 2009a) . Changing culture is a means of internalising and entrenching change (Babic and Rebolj, 2016). A more robust conception of culture is necessary for change in the industry to be understood and responded to appropriately (Barthorpe et al., 2000)

Change is therefore possible through individual organisations (Department of Public Works, 1997) with the client in the most influential position to effect it (Mason, 2007; Tookey et al., 2001; Watermeyer, 2012a) and in the case of public projects, government is most influential (Department of Public Works, 1997).

Organisational change is defined as the movement of an organisation from an existing plateau to a desired future change in order to increase efficiency and effectiveness (Pryor et al., 2008). As organisations face an increasingly dynamic environment they are required to adapt, change and sometimes totally transform (*ibid*). The most prevalent causes of change include the economic, political, technological and altering demographic and social structures (*ibid*). Organisations need motivation for change and unfreezing from existing mindsets (Weiner, 2009). Usually the pain of the present is the prime impetus for movement into the future.

There are several drivers of improvement. A summary adapted from Rhydderch is shown in Table 2.10 (Rhydderch, 2004).

Table 2.10 - Improvement Drivers

Driver	**Description**
Systems driven	Based on achieving competence against set standards
Organisational Development driven	Based on achieving long term adaptability through teamwork
Complexity driven	Based on continuous paths of modification as the future unfolds
Social Worlds driven	Based on recognising the shifting political and managerial context

Based on (Rhydderch, 2004)

Using Table 2.10, the need for change in South Africa can be considered to be Systems driven. According to Watermeyer, improvements in the industry would be twofold. Clients would implement changes in their procurement culture in order to adopt collaborative practice and this in turn would have a ripple effect on stakeholders such as contractors who would have to adopt the changes implemented by the clients. The former would require transformational change while the latter would require reformative change.

Watermeyer identified specific areas in which the CI needs to change (Watermeyer, 2012a). These represent a move from more traditional working to more collaborative working. These changes are provided in Table 2.11.

According to Watermeyer, while changing practices does improve procurement, there is a need for a corresponding culture change in construction procurement. The change in culture makes a vast difference in internalising and maintaining change.

Table 2.11 Construction Procurement Changes

From	To
Master-servant relationship of adversity ("them" and "us")	Collaboration towards shared goals (integrated project team approach)
Fragmentation of design and construction	Integration of design and construction
Constructability and cost model determined by design team and quantity surveyor/cost consultant only	Constructability and cost model developed with contractor's insight
Short-term "hit-and-run" relationships focused on one-sided gain	Long term relationships focused on maximising efficiency and shared value
Risks are allowed to take their course	Active risk management and mitigation
Develop the project in response to a stakeholder wish list	Deliver the optimal project within the available budget
"Pay as you go" approach to delivery	Discipline of continuous budget control
Rigid, bespoke, ill-defined and disjointed procurement system	Flexible, predictable, integrated, documented and auditable procurement system
Poorly structured procurement documents based on bespoke or local standards and forms of contract with reliance placed on local knowledge	Structured procurement documents based on international/national standards and forms of contract with minimal customisation/amendments and clear and unambiguous requirements
Project Management focused on contract administration	Decisions converge on the achievement of the client's objectives
Standard delivery stages prescribe the contracting arrangements and are unrelated to a portfolio of projects	Delivery is managed and controlled through stages which permit the full range of contracting arrangements and commence at portfolio level
Ill-defined end of stage deliverables and acceptance procedures	Well defined end of stage deliverables and acceptance procedures which enable informed decisions to be made
Design and construction developed in isolation from operation and asset management considerations	Design and construction aligned with operation and asset management requirements
Procurement strategy focused on selection of form of contracts as all other choices are predetermined	Selected packaging, contracting, pricing and targeting strategy and procurement procedure aligned with project objectives
One project, one contract	Works packaged appropriately to achieve objectives and efficiencies
Project delivery takes place within predetermined parameters without any conscious thought to objectives	Projects deliver on documented primary and secondary objectives in a measurable and quantifiable manner

Based on (Watermeyer, 2012a)

It therefore becomes important to understand what culture actually is and the means available for changing it.

2.8 The Issue of "Culture"

Culture has no single definition (Barthorpe et al., 2000). In Stuart Hall's simplistic terms it is the practices which characterise a particular society (Billington et al., 1991, p. 11). There is consensus though on culture being the shared values and basic assumptions of an organisation that are manifested in organisational practices (Ankrah et al., 2009a). Culture is so powerful it can prove to be a barrier to productivity if it is not adaptive and congruent with organisational structures and the prevailing environment (Zhang and Liu, 2006).

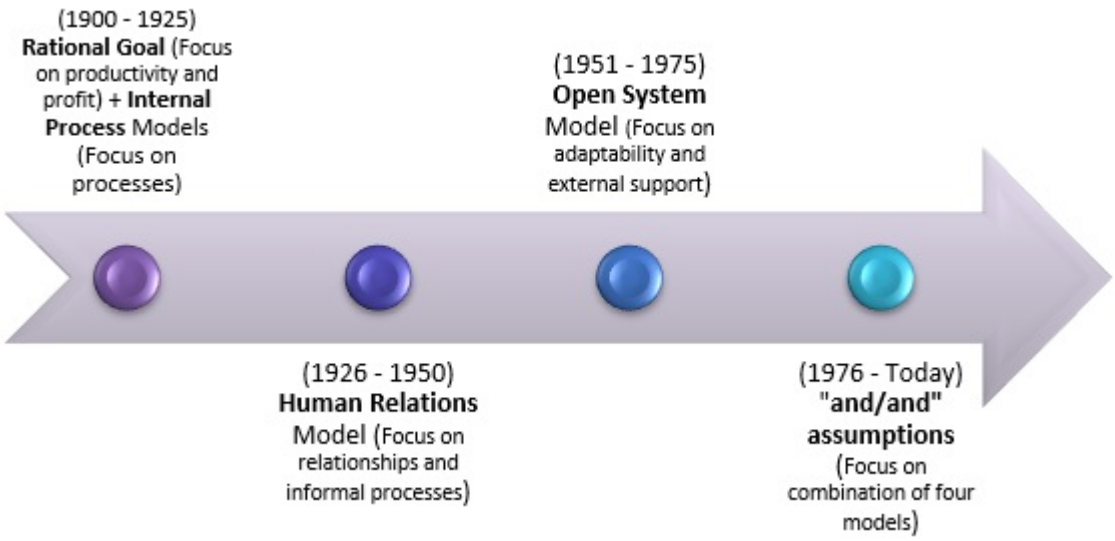
According to Abeysekera, within construction, culture is considered to be about the characteristics of the industry, approaches to construction, competencies of those working in the industry and the strategies, goals and values of the organisations in which they work (Ankrah et al., 2009a). The issue of culture has gained importance because of internationalization of construction markets and the fragmented nature of the industry (Oney-Yazıcı et al., 2007)

The discussion in Section 2.5, expands on the concept of a dominant culture in each industry driven by the reigning elite of that period. Figure 2.6 identifies clients as the current elite through their increased influence in the CI. Their values and behaviours therefore become important in determining the direction of the culture shift. Types of changes in the CI, the drivers of practices and values, the need for parallel change and the link to the client elite are discussed in the following sections.

2.8.1 Measuring Culture

Organisational culture is defined as the personality of an organisation that expresses its social ideals, values, beliefs, attitudes, dominant leadership style, language, symbols, procedures and routines (ACRCCI, 2001; Cheung et al., 2012; Harinarain, 2013; Riley and Clare-Brown, 2001). It is believed to be a distinguishing feature of successful organisations (Cameron, 2008).

Different models have been developed for the types of organisational culture. One popular model is the Competing Values Framework (CVF) developed by Quinn and Rohrbaugh in 1981 (*ibid*). The CVF is built on four important management models that have been developed since the start of the 20th century as explained by (Quinn Association, 2019).

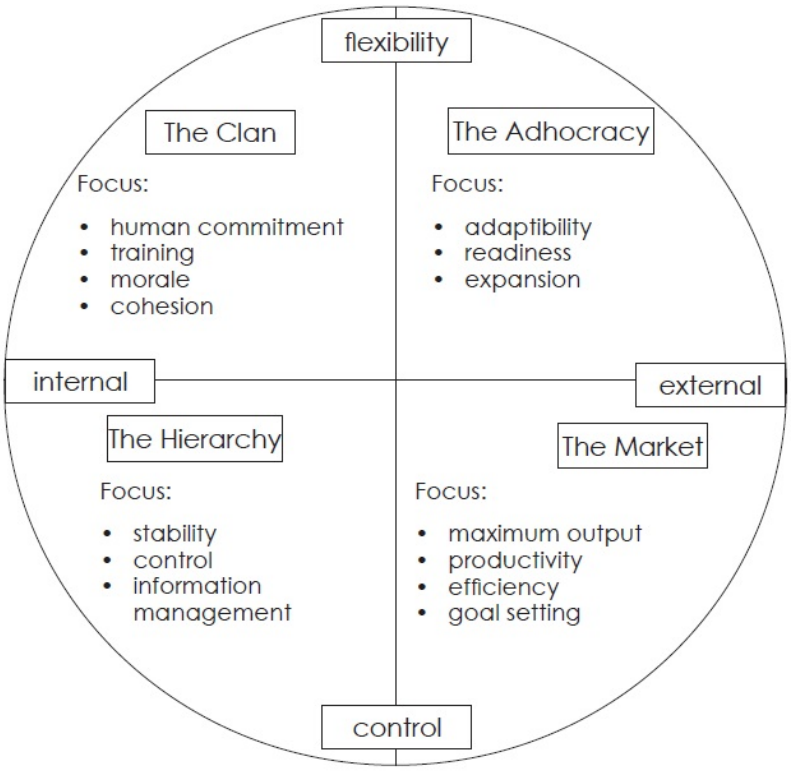


Based on (Quinn Association, 2019)

Figure 2.7 - Models of Management

These models as adapted in *(Harinarain, 2013)* show the four quadrants that the models fall under. These quadrants are on two dimensions:

1. Internal focus and integration vs. External focus and differentiation
2. Stability and control vs. Flexibility and discretion



Based on (Harinarain, 2013)

Figure 2.8 - Competing Values Framework

The culture types as adapted from (Bremer, 2010) are shown in Table 2.12

Table 2.12 - The Four Cultures

	Attributes			
Type of Culture	**Description**	**Leader Type**	**Value Drivers**	**Theory of Effectiveness**
Clan	Sociable with emphasis on teamwork and participation	Facilitator, Mentor, Team Builder	Commitment, Communication, Development	Human Resource development and involvement
Adhocracy	Creative with emphasis in individual ingenuity and freedom	Innovator, Entrepreneur, Visionary	Innovative outputs, Change, Agility	Innovativeness, Vision and New Resources
Market	Results based with emphasis on reaching goals and winning	Hard Driver, Rival, Producer	Market share, Goal Achievement, Profitability	Aggressively competing and customer focus
Hierarchy	Structured with emphasis on procedures and efficiency	Coordinator, Monitor, Organizer	Efficiency, Timeliness, Consistency, Uniformity	Control and efficiency with capable processes

Adapted from (Bremer, 2010)

While it is possible for organisations to have a mix of cultures it should be noted that care would need to be taken when mixing types as e.g. Market culture assumptions will not produce results in an Adhocracy culture (Handy, 1991).

2.8.2 Drivers of Practice and Culture

It is important to note than an organisation's norms and values play a critical role in the strategy of the firm meaning a match is needed between culture and strategy (Hartmann, 2006). While culture is manifested in practices (Cheung et al., 2012), practices too can influence culture (Ankrah et al., 2009a). This is emphasised by the fact that success in an organisation is a result of the successful translation of values and beliefs into policies and practices (Cheung et al., 2012).

Culture dictates the way an organisation responds to environmental stimuli (Yong and Pheng, 2008). While it is influenced by working practices (Höök and Stehn, 2008) it is also a reflection of practices and basic values (Yong and Pheng, 2008).

As shown by Figure 2.9, the practices influence the working culture, which in turn determines the practices in the organisation in a cyclic process. As a culture becomes entrenched, the organisation uses practices that are consistent with the existing culture (Yong and Pheng, 2008). Problems occur when after practices change, the culture is so ingrained it fails to adequately respond to the change (Babic and Rebolj, 2016; Brinkman et al., 2015). The end result is an ineffective change.



Figure 2.9 - The synergy between Culture and Practices

Geertz defines one characterisation of culture as the mapping of the formal and informal practices such as unwritten rules, procedure, management style and collaborative practices (Van Marrewijk et al., 2014). According to Widler though, practice theory conceptualises practices as directly anchored in organizational culture. While some practices can be taken for granted, others create and anchor new constitutive rules (*ibid*). This is in line with the synergy between culture and practices as noted in Figure 2.9.

2.8.3 The need for both Practice and Culture change

Trying to solve all problems using new tools and techniques is unlikely to address the underlying culture issues. It has been established that when practices change, the underlying behaviour behind those practices also needs to change; in essence there needs to be a corresponding culture change (Cheung et al., 2012). It is not that a particular cultural orientation is inherently wrong, it may simply not be conducive for overall implementation of collaborative practices (Yong and Pheng, 2008). Strategies for facilitating more rapid improvements can also be developed by consciously attempting to simultaneously shape the cultural profile (Riley and Clare-Brown, 2001). The practiced organisational culture may need to be changed so that attitudes and expectations within the organisation are in line with new philosophies (*ibid*).

Culture modification takes time so it may be prudent to implement practices in line with emergent culture (Yong and Pheng, 2008) so as not to rush the process and allow enough time for the necessary changes in both behaviour and culture to occur (Baiden et al., 2006). This makes it necessary to understand organisational culture, how to measure it and determine where the organisational culture should be.

An important concept when defining culture is that of strategy. Strategy can be defined as the practice of determining the best way to get from the current state to some ideal state (Rick, 2013). Organisational strategy and organisational culture are found to be symbiotic with a cause-and-effect relationship such that as they change, they inform each other (Undercurrent, 2012). A sound organisational culture can be translated into an effective organisational strategy as shown below (Rick, 2013). From Figure 2.10, it can be assumed that the effectiveness of an organisation's culture is shown in the end results of its projects.



Based on (Rick, 2013)

Figure 2.10 - Strategy vs. Culture

Based on the varied definitions of culture, the procurement culture for the purposes of this study is defined as:

The values, practices and behaviours of an organisation in terms of its procurement.

Cox and Ireland (2002) as quoted by Kwawu and Hughes suggested that the industry structure and culture prevent the prevalence of collaborative practices (Kwawu and Hughes, 2005). Black et al believed that to change any organisation strategically and successfully one must first attempt to change the individual beliefs, attitudes and values (culture) within the organisation before the organisation as a whole can benefit (ACRCCI, 2001). Challender et al also suggest that the quality of collaboration can be reinforced or weakened depending on the behaviours, approaches and attitudes of both organisations and individuals (Challender et al., 2013). This suggests that for practices to change effectively there is a need for change in culture (*ibid*) especially since strategy and culture are symbiotic (Undercurrent, 2012).

Bresnan and Marshall while acknowledging the shared presumption that for collaboration to succeed there needs to be a development of an appropriate culture of relations believe it becomes unrealistic because there might not be a shared unity of interest among contracting

parties meaning other conditions besides culture change may come into play (Bresnen and Marshall, 1998).

A study by Ankrah et al found no significant difference in the cultures of project organisations where different methods of procurement were employed giving credence to the suggestion that real cultural change is not fully embraced (Ankrah et al., 2009b). The Australian Cooperative Research Centre for Construction Innovation report also found this to be true in cases where organisations tried to change culture and only learnt basics of new culture without fundamentally shedding the old one (ACRCCI, 2001). All participants in change need to be able to fully appreciate and internalise the change.

Unfortunately, this is antithesis to the construction industry which is known to be slow in adapting to change (Mason, 2007) and more interested in doing things the "old way" (ACRCCI, 2001; Cicmil and Marshall, 2005). This means that change in the industry is a lengthy process that is difficult to accomplish even in an organisational setting (ACRCCI, 2001; Bresnen and Marshall, 1998). This as previously cited is due to the industry being synonymous with reliance on the known and controllable, with scepticism and suspicion of new initiatives (Challender et al., 2013). The typical industry personalities adapted from Michel are depicted in Table 2.13 below (ACRCCI, 2001).

Table 2.13 - Construction Industry Personalities

Construction Industry	
Culture Type	Personality
Undertakers	Simply leave everything alone – 'uninspired' mourners of the past
Caretakers	Just flow with the tide and only take care of things that support their immediate environment – 'if it ain't broke don't fix it'
Risk takers (Innovators)	The only ones who promote new technologies, new communication tools and who take on new challenges head on. Contradictory to the caretakers of the industry, risk takers will 'fix even it even if it ain't broke'.

Adapted from Michel (ACRCCI, 2001)

It can be concluded that CIs that have failed to adopt change tend to fall into the categories of undertakers and caretakers. There is a sense of complacency, with little effort taken into changing the status quo.

2.9 Studies on Culture

Multiple studies have been conducted into collaboration and culture. The studies fall under a number of broad streams

2.9.1 Profiling the culture of organisations

A number of studies have been conducted on how to profile or measure the culture of organisations. Some examples of these studies are provided in Table 2.14.

Table 2.14 - Studies profiling organisational culture

Study By	Study On	Findings
(Ankrah et al., 2007)	The cultural profile of construction project organisations	There are five principal cultural dimensions – workforce, performance, team, client and project orientation High team orientation with better integration, cooperation and coordination is a prerequisite for project success
(Chatman and Jehn, 1994)	Industry characteristics and organisational culture	Industry membership accounts for variance in culture patterns Competitive advantage of organisational culture may be constrained by environment
(Harinarain, 2013)	The organisational culture of the SA construction industry	Market culture predominant, then clan, hierarchy and finally adhocracy
(Zhang and Liu, 2006)	Organizational cultural profiles of construction enterprises in China	The ability of construction enterprises to successfully organise themselves internally and respond to environment externally is related to organizational culture
(Gajendran et al., 2012)	Conceptual approach to studying organizational culture in construction projects	Synthesised a robust theoretical platform for understanding culture of projects and organisations. When investigating cultural environments, adopting the non-functional paradigm facilitates the better understanding of individuals' behaviour within group settings thus allowing project participant behaviour to be contextualised within temporary organization providing a richer explanation of project performance/outcomes

2.9.2 The role of culture in collaboration

It has been recognised that culture plays a role in enabling collaboration. Several studies have been conducted on this concept. These are provided in Table 2.15.

Table 2.15 – Studies on Culture in Collaboration

Study By	Study On	Findings
(Höök and Stehn, 2008)	The need for cultural change to implement lean principles in industrialised housing production	There is a need for a people-oriented approach – which includes both top down and bottom up approaches Cultural change needs top down (management) approach and bottom up approach (tools/methods which can motivate employees)
(Cheng and Liu, 2007)	Organizational culture relationship to Total Quality Management	Organizations need to understand their cultural profiles to integrate TQM Ideal profile for TQM is one supporting friendly working environment, with leaders advising to ensure smooth operation, high commitment and morale
(Hartmann, 2006)	The role of organizational culture in motivating innovative behaviour in construction firms	Values and norms play a critical role in executing innovation strategy of firm
(Thomas et al., 2002)	The role of project culture in quality outcomes	Clan – correlates with improved quality outcomes Market which is more common in construction – weaker quality outcomes

2.9.3 Need for change of culture

Some studies investigated the need for a change in culture. These are shown in Table 2.16

Table 2.16 - Studies on the need for Change

Study By	Study On	Findings
(Van Marrewijk et al., 2014)	Changing collaborative practices through cultural interventions	Practices are linked to culture Power entangled in the emergence of new collaborative practices – participants agreed on new collaborative practices in shared reflection on their actions when power relations were largely either absent or positive and related to empowering
(Watermeyer, 2012a)	Changing construction procurement culture to improve project outcomes	Changes in approach and practice are needed to improve project outcomes. There is a need to understand contracting arrangements, modernise procurement and delivery management systems. A Culture change is necessary to embrace all possible changes as systems, tools and techniques available for use

The various studies all confirm that change is necessary on more than a process level, the culture needs to be considered too to ensure that the envisioned change becomes part of the

values of the organisation. This means that in construction clients need to get involved in the implementation of change in the industry

2.10 The Client Connection

In light of the need for culture change and the changing plane concerning the elite in construction (as detailed in 2.3.5), clients are best posited to push for change. It must be noted that government tends to be the most influential client due to the large number of public projects it engages in. Outside of government are “private” clients usually based in the private sector.

2.10.1 Clients as agents of Change

Latham’s report back in 1994 stressed the need for change with clients being in the best position to implement it (Latham, 1994). The client’s pivotal position is shown by the fact that motivation for quality improvement in construction has come from two sources; client dissatisfaction and government action (Thomas et al., 2002). This implies that the client has always potentially been a driving force of change.

Clients are essential because the manner in which they procure affects the degree of integration and cooperation among project participants (*ibid*). Where industry professionals are depicted as being at the helm of procurement separation, clients have been hailed as bridging the divide between various stakeholders by advocating cordial and long term relationships (Brinkman et al., 2015; Ling et al., 2015; Memon et al., 2015). Their emphasis on teamwork and cooperation has also brought the design and construction back together.

Client motivated change has occurred in two ways. In most scenarios, government as a client has imposed change on the industry such that there are particular credentials necessary in order to qualify for public projects (Babic and Rebolj, 2016). In other scenarios, clients in the private sector take it on themselves to insist on a particular manner of behaviour and procurement and impose it for their projects (Memon et al., 2015; Osipova, 2015; Van Marrewijk et al., 2014). These are referred to as the top-down approach and the bottom up approach respectively.

2.10.2 Public Sector for change (The Top-Down approach)

Change in construction has traditionally focused on a top-down tool approach (Höök and Stehn, 2008) which is reflective of government intervention.

As noted in Table 2.8, various national studies have been commissioned to determine how to improve the state of the construction industry. These reports suggested the implementation of procurement practices that are more collaborative with an emphasis on team integration, long term relationships and a move away from lowest price tendering in order to improve the industry's success statistics (Bowles and Morgan, 2016; Van Marrewijk et al., 2014).

It can be assumed that the practice/tool driven approach has imposed change on the industry such that stakeholders take on particular practices in order to win public contracts but ultimately values and attitudes remain the same. Given a choice it is likely some stakeholders would work the way they have always worked and given the opportunity they revert back to what they know best (Babic and Rebolj, 2016; Van Marrewijk et al., 2014). It cannot be emphasised enough how a corresponding change in culture is necessary for practices to change effectively (Challender et al., 2013) especially since strategy and culture are symbiotic (Undercurrent, 2012).

2.10.3 Private Clients for Change (The Bottom-Up approach)

When private, expert clients impose their collaborative culture on the industry they can influence all stakeholders to work in a different way. This can produce a ripple effect especially when multiple projects are worked on by the same stakeholders.

To enable this shift to collaborative behaviour, a conducive culture has to be in place (Cheung et al., 2011). Collaboration needs to be considered an important part of each project with emphasis placed on team culture and fostering right attitudes (Bresnen and Marshall, 2000). The stronger the collaborative climate the better any cooperative procedures will be performed (Eriksson and Westerberg, 2011b). An examination of most organisational values is likely to have a collaborative tone. Relying on industry specialists has eroded these values to an extent as they have had to adapt to the construction industry environment in order to allow them to get work done in the industry. Reverting back to original values and culture fosters the collaborative climate necessary for change.

Culture is said to gain from the process of friction with other cultures and by class conflicts (Billington et al., 1991, p. 11). As expert clients find their cultures at odds with the culture displayed by the industry they are clamouring for change and distancing themselves from the rampant traditional practices in industry. Clients while changing practices also have the added advantage of addressing individual behaviours, attitudes and values which are critical for the success of change (ACRCCI, 2001; Challender et al., 2013).

Envisioned change needs to pervade the entire organisation with senior management leading (Bresnen and Marshall, 2000). Where change focuses simply on individual projects, problems come up when project culture clashes with the wider organisational values and norms thus diffusion of appropriate norms and values is required organisation wide (*ibid*).

When change has been accomplished culture needs to be progressive, adaptive and enduring so it can be a foundation for efficiency (Cheung et al., 2011). A strong culture is able to adapt to any changes in the environment. With progress, changes are inevitable and as the construction climate evolves, the culture needs to be able to change accordingly so that organisations and the industry can run at maximum efficiency. Effective collaboration is then realised through implemented changes that are enduring and continually improved on (*ibid*).

2.11 Change models

Change tends to occur in one of two ways as noted by Burnes:

- Enforced, when conditions cannot sustain working in the same manner
- Planned, where there is recognition of changing conditions and ways are implemented for adjusting to change (Burnes, 2004)

2.11.1 Change models

There is a perception that the hype around change is caused by consultants (Sorge and van Witteloostuijn, 2004) making it important to understand change, how to implementing it and the consequences of change as it can prove ineffective and counter-productive when wrongly implemented (*ibid*).

2.11.1.1 Evolution of change models

Lewin played an integral part in shaping the understanding of change (Burnes, 2004). In discussing change and its associated cultural change he said the following, "To be stable a cultural change has to penetrate all aspects of a nation's life. The change must in short be a change in the atmosphere, not merely a change of a single item. Change in culture requires change of leadership forms in every walk of life". He also touched on the fact that the status quo is maintained by certain conditions or forces; as such, individual behaviour is a function of the group environment and field. Any changes in behaviour stem from changes in the forces within the field. In his assessment, group life is never without change, the difference is in the type and size of change.

Additionally, according to Burnes, Lewin viewed behavioural change as a slow process but acknowledged that there are circumstances where change can be rapid and radical. These circumstances can involve the breaking down of established routines and behaviours such that the status quo is no longer viable; new patterns can thus emerge rapidly establishing a new equilibrium. He noted that group dynamics also constrain individual behaviour as there is pressure to conform. In his estimation, change focus was to be on the group norms, roles and interactions.

Taking into consideration the fact that change to higher group performance tends to be short lived, Lewin developed the 3-step model of change:

Step 1 Unfreezing – equilibrium needs to be destabilized as a means of discarding the old and adopting the new

Step 2 Moving – taking into account all influences, identify and evaluate all available options

Step 3 Refreezing – stabilize the group at new status quo to prevent regression as without reinforcement, change can be short lived

Over time, new perspectives came about that viewed Lewin's planned approach as slow. The Culture-Excellence approach equates organizational success with the possession of a strong, appropriate organizational culture (Burnes, 2004). Peters and Waterman argued that organizations were losing competitive edge because they were bureaucratic, inflexible and slow to change. There was a need to reconfigure by encouraging innovation, experimentation

and entrepreneurship. They perceived change as preferably emerging from bottom-up action of everyday actions as opposed to being driven from the top.

Pfeffer on the other hand considered change as likely influenced by power struggles than by consensus building or rational decision making (Burnes, 2004). “Processualists” reject prescriptive, recipe driven approaches and are suspicious of single causes or simple explanations of events. They instead focus on the inter-relatedness of individuals, groups, organizations and society. To them the process of change is a complex cocktail of rational decision processes, individual perceptions, political struggles and coalition building.

Newer perspectives still, look at change as being continuous, arguing that in order to survive, organizations must develop the ability to self-transform (Burnes, 2004). Table 2.17 shows the various change models progressively from Lewin’s model.

Table 2.17 - Change Models

Action Research Model/Theory Collier 1945, Lewin 1946, French 1969, Schein 1980	**Lewin's Model 1945 & Schein's Model 1980 (Adaptation of Lewin's Model) *1958 Lippit. Expanded Lewin**	**Kotter's Model 1996**	**Shield's Model 1999**	**Mento/ Jones/ Dirmdofer's Model 2002**	**Jick's Model 2003**
Identify Problem(s)	Lewin - Step 1 Unfreezing	Establish a sense of urgency	Define the desired result and change plans	The idea and its concept	Analyse the organizational need for change
Consult with Behavioural Science (OD) Expert	Schein–Stage 1 Need for Change: People must be dissatisfied with the present	Form a powerful guiding coalition	Create capability and capability to change	Define the change initiative	Create a shared vision and common direction
Gather Data and Begin Preliminary Diagnosis	Lewin – Step 2 Moving/ Changing	Create a vision	Design innovative solutions	Evaluate the climate for change	Separate from the past
Provide Feedback to Client	Schein-Step 2 Cognitive Restructuring	Communicate the vision	Select and deploy solutions	Develop a change plan	Create a sense of urgency
OD expert and client members diagnose problems	Lewin-Step 3 Refreezing change to make permanent	Empower others to act on the vision	Reinforce and sustain business benefits	Find and cultivate a sponsor	Support a strong leader role
OD expert and client jointly plan action	Schein-Step 3 Refreezing involves self and others	Plan for and create short term wins		Prepare target audience, the recipient of change	Line up political sponsorship
Take action	Schein – To be permanent, change becomes a part of self, relations with others and system in which people exist	Consolidate improvements producing more change		Create the cultural fit - making the change last	Craft and implementation plan
Gather data after action	*Lippit, Watson, Westley EXPAND Lewin's Model	Institutionalize new approaches		Develop and choose a change team leader	Develop enabling structures
Measure and Evaluate results	*After Step 1, add, Establish a change relationship			Create small wins for motivation	Communicate, involve and be honest
Feedback Results	*After Refreezing, add, Achieve a terminal relationship			Constantly and strategically communicate the change	Reinforce and institutionalize change
Re-diagnose	*Lippit, et al Five Phase Change Model 1958			Measure progress of change effort	
New action if necessary				Integrate Lessons learnt	

Table 2.18 - Characteristics of types of Change

	Evolutionary	**Teleological**	**Life Cycle**	**Political**	**Social Cognition**	**Cultural**
Why change occurs	External environment	Leaders; Internal Environment	Leaders guiding individual's natural growth	Dialectic tension of values, norms or patterns	Cognitive dissonance; appropriateness	Response to alterations in the human environment
Process of change	Adaption; slow; gradual; non-intentional	Rational; linear; purposeful	Natural progression; result of training and motivation; altering habits and identity	First order followed by occasional second order; negotiation and power	Learning; altering paradigms or lens; interconnected and complex	Long-term; slow; symbolic process; nonlinear; unpredictable
Outcomes of change	New structures and processes; first order	New structures and organizing principles	New organizational identity	New organizational ideology	New frame of mind	New culture
Key metaphor	Self-producing organism	Change master	Teacher	Social movement	Brain	Social movement
Examples	Resource dependency; strategic choice; population ecology	Organizational development, strategic planning; reengineering; TQM	Developmental models; organizational decline; social psychology of change	Empowerment; bargaining; political change; Marxist theory	Single and double looped learning; paradigm-shifting; sensemaking	Interpretive strategy; paradigm-shifting; processual change
Criticisms	Lack of human emphasis; deterministic quality	Overly rational and linear; inability to explain; second order change; plasticity of people	Little empirical proof, deterministic character	Deterministic; lack of environmental concerns; little guidance for leaders	Deemphasizes environment; overemphasizes ease of change; ignores values and emotions	Impractical to guide leaders; focus on universalistic culture; mostly untested
Benefits	Environmental emphasis; systems approach	Importance of change agents; management techniques and strategies	Change related to phases, temporal aspect, focus on people through-out organization	Change not always progressive; irrationality; role of power	Emphasizes socially constructed nature, emphasis on individuals; habits and attitudes as barriers	Context; Irrationality; values and beliefs; complexity; multiple levels of change

Adapted from (Kezar, 2001)

In further explaining change models, Kezar delves into how Nordvall described the general existence of eight change models within three categories (Kezar, 2001):

1. Teleological models which include problem solving, action research and organizational development
2. Dialectical models which include political models and social interaction
3. Evolutionary models which include systems theory and adaptive models

Models are broadly based in these three as there are too many individual models to separately classify.

2.11.1.2 Characteristics of types of change models

Table 2.18 provides a broad overview of characteristics of various models (Kezar, 2001).

2.11.1.3 Theories of change

Rhydderch (2004) notes that there are four theories applied to organisational change: namely systems theory, organizational development theory, complexity theory and social worlds theory. Six dimensions reveal differences and similarities between them (Rhydderch, 2004).

Table 2.19 - Theories of Change

	Systems	Organisational Development	Complexity	Social Worlds
	Goals	People	Evolution	Conflict
Metaphor of organization	General practices are inertial, and change is infrequent, discontinuous and intentional		General practices are emergent and self-organising, and change is constant, evolving and cumulative	
Analytical framework	Change takes place at the level of a single organization		Change takes place where the organization interacts with another organization or with its environment	
Trigger for change	Clear goals, measurement and feedback loops	Overlap between individual and organizational goals	Desire to try multiple approaches and let direction arise gradually over time	Difference of opinion
Change process	Change as goal achievement	Change as "Lewinian" process	Change is Confucian, already underway, without end	Change as conflict followed by synthesis into new order
Role of leader	To establish a measurement and feedback process	To encourage participation	To interpret emerging change with team	To take a strategic view of multiple agendas

Resistance to change	Due to data poverty and lack of clear goals	When individual and organisational goals differ	As one stage in the sense making process	As a natural part of a conflict process

Adapted from (Rhydderch, 2004)

It is important to determine the theory driving a particular organisation's change so as to understand what the change means and encompasses.

2.11.1.4 Preparing for change

Organization readiness for change refers to the level of commitment to change and the efficacy to implement the change (Weiner, 2009)

Drawing on Lewin's 3-step change process, Weiner goes further and suggests the following strategies to create readiness for change:

- Highlighting of discrepancy between current and desired performance
- Fomenting dissatisfaction with status quo
- Creating appealing vision of future state of affairs
- Fostering confidence that this future can be achieved

Circumstances that generate a shared sense of readiness include – consistent leadership messages and actions, information sharing through social interaction and shared experiences

The following are also important to note:

- Change commitment is largely dependent on change valence; the positive or negative value people assign to it based on its attractiveness to them
- Readiness for change does not guarantee success of implementation; poor design and efficacy can have detrimental effects. (Weiner, 2009)

2.11.1.5 Change conditions

Various opinions have been cited on what needs to be in place for change to happen

Table 2.20 - Change conditions

Change	(CCS, 2018)	(Marsee, 2002)	(Akgun et al., 2007)
Increase urgency - inspire people to move and objectives real	✓	✓	
Build guiding team – need the right people in place	✓		
Get the vision right – establish what you want to achieve	✓	✓	
Communicate for buy in – involve as many people as possible	✓		
Empower action – remove obstacles, give support to agents	✓	✓	
Create short term wins – set progressive, easily attainable aims	✓	✓	
Don't let up – encourage determination and persistence	✓		
Make change stick – reinforce value of change, weave it into culture	✓		
Align leadership style with organizational culture – adapt change to culture		✓	
Do not overuse change agents – they can burn out		✓	
Maintain focus when the project drifts – monitor key indicators that led to initiation of change		✓	
Unlearn established beliefs and methods as means of being receptive to the new			✓

Table 2.20 provides the most generic needs for change to occur.

Additional to understanding the conditions for change, Kotter posits these errors as contributing to failure (CCS, 2018):

- Allowing too much complacency
- Failing to engage a core coalition of support
- Underestimating the need for a clear vision of the end result
- Under-communicating the vision
- Permitting obstacles to block the new vision
- Failing to create short-term wins
- Declaring victory too soon
- Neglecting to anchor the changes in the organisation

As can be concluded, change requires structure and an understanding of the organisation's human resources.

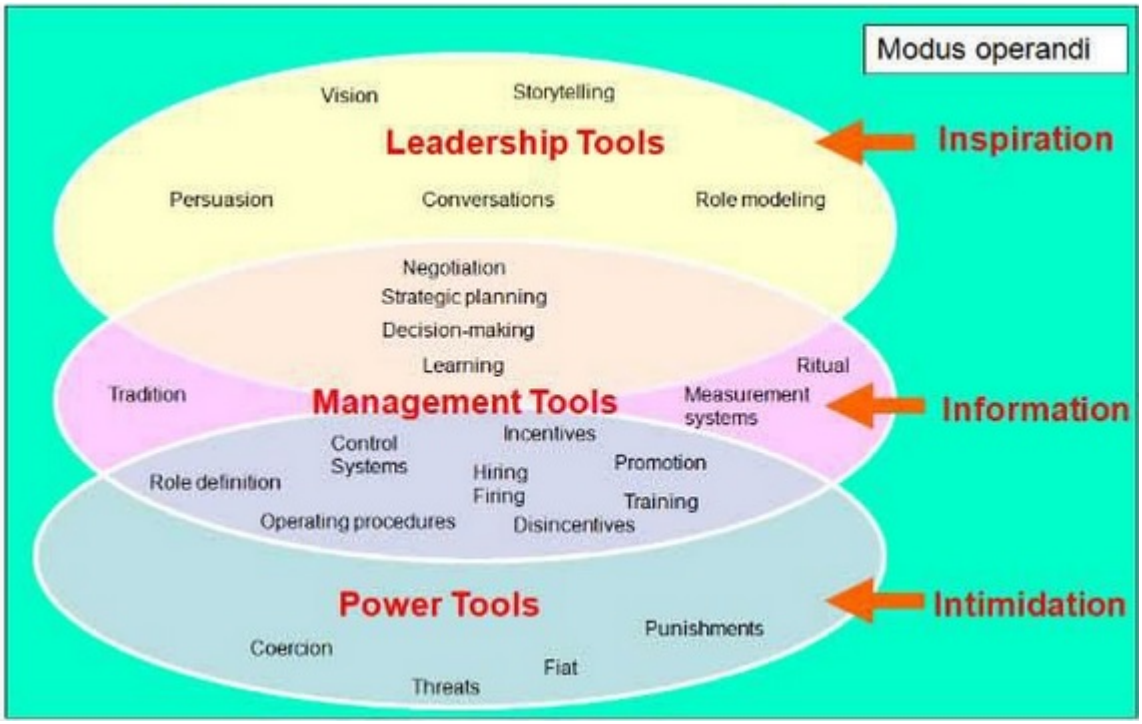
2.11.1.6 Changing culture

Katzenbach explains how culture change is a challenge due to the fact that cultural inclinations tend to be entrenched (Katzenbach et al., 2012). Drawing on positive aspects of the existing culture and using them to advantage can offset some negative aspects as change is implemented. He posits that it is better to work with culture and within it than to fight it. His suggested ways of utilising culture include:

1. Match strategy and culture – culture trumps strategy every time. Organizations make the mistake of having laundry list of desirable traits with a vague notion of the strategy to employ
2. Focus on a few critical shifts in behaviour – choose your battles. Select a few key behaviours in which change can be widely recognised and emulated; result tends to be stakeholders developing additional ways to reinforce them
3. Honour the strengths of your existing culture – demonstrate the relevance of the original values and acknowledge them. Leverage stakeholders who are already aligned with strategy and desired culture
4. Integrate formal and informal interventions – in promoting new behaviour ensure there are formal processes such as rules and incentives integrated with informal processes which are more emotional. Utilise key influencers
5. Measure and monitor cultural evolution – should be done at each stage paying attention to business performance, critical behaviour, milestones and underlying beliefs, feelings and mind-sets

Often cultural change is left as a last resort making it an excuse and diversion rather than an accelerator and energizer (*ibid*)

According to Denning, another reason why changing organizational culture is a challenge is because culture consists of interlocking set of goals, roles, processes, values, communications practices, attitudes and assumption (Denning, 2011). The most fruitful success strategy begins with leadership tools, cements change with management tools and uses power tools as last resort. Figure 2.11 details the available tools:



Based on (Denning, 2011)

Figure 2.11 - Tools for change

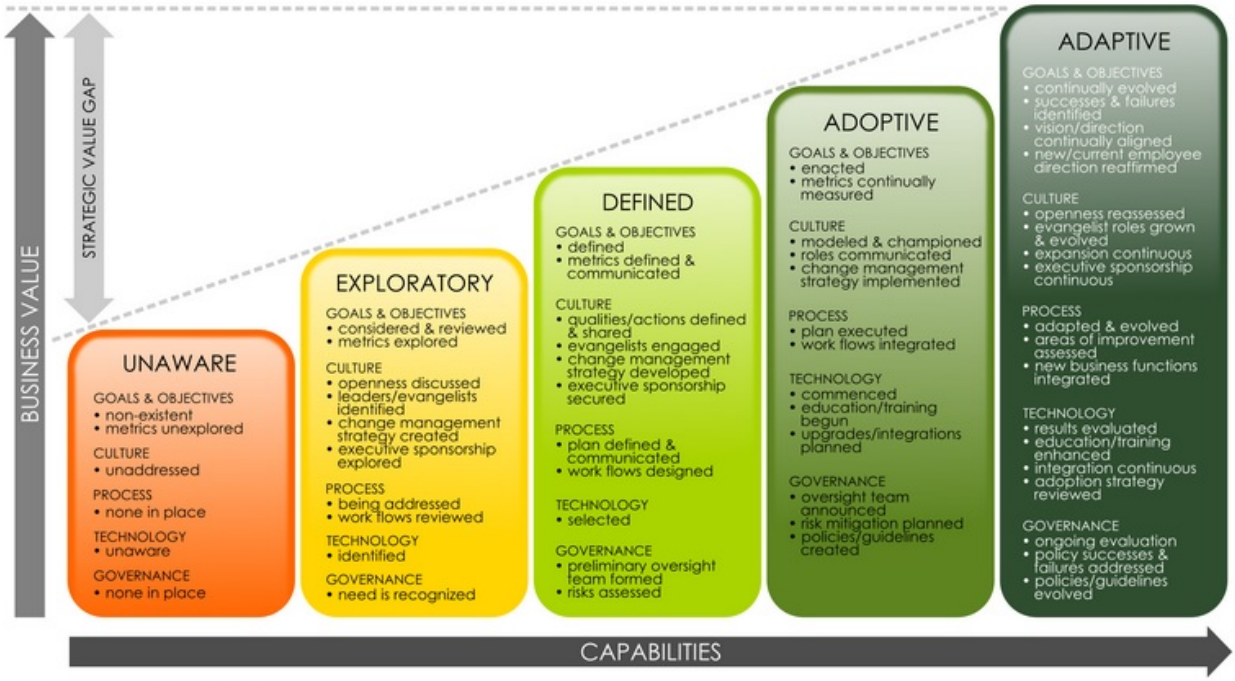
As with any change, there are mistakes to avoid when changing culture so as to prevent change failure. These mistakes include (*ibid*):

- overuse of power tools of coercion and underuse of leadership tools
- beginning with vision but failing to put management tools in place to cement behavioural changes
- beginning with power tools even before a clear vision of the future

While change circumstances may be different, these tend to be generic cautionaries.

2.11.2 Changes in the Construction Industry

In conceptualising emergent collaborative change, Morgan provides the model in Figure 2.12 (Morgan, 2013).



Based on *(Morgan, 2013)*

Figure 2.12 - Conceptualization of Change

Briefly according to Morgan,

1. The Unaware Organization has no knowledge or understanding of collaboration. While opportunity is great for change, management is likely to be strongest as value of change is not clearly understood.
2. The Exploratory Organization is investigating the issue of collaboration trying to understand what it can do for the organization. Resistance would come from It and management in some cases and change only occurs when there is solid understanding of what collaboration can accomplish for the organization.
3. The Defined Organization has a strategy and direction that needs to be communicated and shared before they can start adopting collaboration.
4. The Adoptive Organization is one that is in the process of implementing change. Resistance in this organization tends to be from employees as they try to embrace a new way of working. Morale improves as employees better understand their roles.
5. The Adaptive Organization is one going through a continuous cycle of improvement and evolution as it learns and adapts to change. Regression is easy at this stage if there

is a breakdown in communication with employees. The organization is able to determine what works, what doesn't and adjust accordingly.

It is of concern that organisations can still find themselves in the lower end of the continuum unaware of changes taking place around them and of options available for change. The industry needs to move forward from traditional practices that prevent them from attaining best value for money to best practices that ensure mutual benefit for stakeholders and allow them to utilise tools and processes.

2.12 South Africa's Construction Industry

The South African construction industry faces many of the challenges that were rife in the UK. These include limited skills capacity, constant late information and changes, creation of islands of information (Thwala, 2012; Bowen et al, 2012), master/servant relationships (Watermeyer, 2012b) and dependence on lowest price tendering (Hindle, 2012). This tends to result in lower productivity, reworking, slow/poor service delivery, fragmentation (Bowen et al., 2012; Thwala, 2012), adversarial relationships and low profit margins for contractors (Doree, 2004; Rust and Koen, 2011; Watermeyer, 2012a).

The need for change is emphasised by the sheer number and at times complexity of planned infrastructure projects. For example, the Presidential Infrastructure Coordinating Committee (PICC) has mandated over 150 infrastructure interventions nationwide. The industry's track record has been less than stellar as shown by projects such as Eskom's Medupi Power Station (Tech Central, 2014), Transnet's multi-product pipeline (Donnelly, 2012) and even the 2010 world cup stadia(McKinley, 2010). The resonating chord in these projects was late delivery and massive time overruns. With growing concern over affordability and government spending the industry has to take steps that ensure its future development and improvement (CIDB, 2005).

In its white paper of 1997 the Department of Public Works recognised a need for participative management and creation of less adversarial relations in the industry as a means to improve the industry in accordance with international experience (Department of Public Works, 1997).

It also conceded that changes would be difficult to make as long as divisions persist between design and delivery, there is a need for integration (*ibid*).

The Construction Industry Development Board (CIDB) in turn recognised that various measures are desirable for developing the industry. These include clearly stated and enacted corporate values, engagement in long term relationships, recognition of the interests of stakeholders, promotion of collaborative partnerships with communities, working to build capacity, partnering approach within procurement with win-win attitudes and provision for design by other parties in project (CIDB, 2003).

As in the UK case, the procurement strategy was found to be a great influence on the state of the industry with the predominant use of traditional procurement touted as the cause of various challenges. South African experts such as PS1 and PD1 have stressed the need for a cultural change in the construction industry (Hodgson, 2011; Watermeyer, 2012a). As long as focus is on change in techniques or methods, reverting back to traditional procurement could possibly be inevitable. The industry is structured such that moves towards collaboration maybe unsuccessful (Kwawu and Hughes, 2005) because of disparity between client organisational culture and the industry culture. For example, while people and organisational culture may be directed towards trustworthiness, firms may be forced to be opportunistic for sheer survival in the industry

When a balance is reached between a client's culture and the industry's culture change ceases to be about scratching the surface and more about practicing an organisation's values through strategic procurement.

The state of the Construction Industry has played a role in the current state of HEIs in South Africa. As clients, HEIs are in a unique position to petition for change. Change has been accomplished in some institutions and a determination of both what change and how change was implemented would provide a wealth of knowledge to the existing Body of Knowledge

2.13 Summary of Chapter 2

This chapter focused on construction procurement. Various theoretical models were presented as a means of typifying relationships within the construction industry. The evolution of the construction industry was investigated before the focus shifted to the state of the global construction industry.

Studies on collaboration, changing to collaborative procurement, change models and culture were reviewed and these were all linked to the client role when implementing change. These concepts were then applied to the South African Construction Industry as a means of determining the state of the SACI.

The key findings can be summarised as follows:

- Infrastructure procurement is different from that of goods and the same processes cannot be used indiscriminately both
- Traditional procurement has challenges when exclusively used in all projects
- Collaboration is a viable alternative to traditional procurement though it has its own shortcomings
- Infrastructure procurement focus needs to be on value for money and not lowest price
- The landscape of influence in the construction industry is slowly evolving
- Clients play a pivotal role in implementing change in the construction industry
- Meaningful change is associated with a cultural change occurring simultaneously with change in practices

Consequently, there is an urgent need for change with Clients in the most pivotal position to ensure it happens. Changing to more collaborative is about more than using certain practices, it encapsulates better relationships, attitudes and values. The following chapter will review the state of Higher Education Institutions in South Africa in terms of their infrastructure and construction procurement.

It is important to note that Chapter 2 zones in on Stewardship theory, Stakeholder theory and the Elite model. These two underpin the basis of the research. Collaboration represented in Stewardship and Stakeholder theory is touted as best practice and as a state to aspire to.

Clients through the Elite model are confirmed as those best able to drive change from traditional to a more collaborative procurement culture.

Chapter 2 played an important part in building the foundations for three of the objectives of the study. It provides background on the attributes of what could constitute a collaborative procurement culture so these can be identified during the study. The chapter pointed to clients as best suited to implementing change, the main premise for this study i.e. clients are being investigated as those who were best able to implement changes in procurement. Finally, literature provided guidelines on what tends to be in place before change can take place. All this information is especially critical in providing direction especially in terms of themes and patterns for data analysis.

3 Higher Education Institutions in South Africa

3.1 Introduction

Higher Education in South Africa has evolved since the days of apartheid with access to education improving across the divide. All of this is at stake though if HEIs fail to be sustainable. This is a real threat due to protests, limited state funding and reduction in fees collected from students. The aim of this chapter is to provide a background of higher education in South Africa and interventions by Treasury and the Department of Higher Education in terms of infrastructure development. It helps contextualise the need for change in HEIs.

3.2 Background on the Education system in South Africa

3.2.1 Apartheid

Apartheid means “apart” in Dutch and its South African variant Afrikaans (Kalantzis and Cope, 2012). This term is used to describe the racial divide system enacted in South Africa in 1948 separating the country into four groups; Whites, Indians, Coloureds and Blacks (*ibid*) in descending order of superiority (Carrim, 2006; Thobejane, 2013). In 1953, Dr Vewoerd, then Minister of Native Affairs, opened the door to the Bantu Education Act with his now infamous statement in parliament:

> *There is no space for him [the "Native"] in the European Community above certain forms of labor. For this reason, it is of no avail for him to receive training which has its aim in the absorption of the European Community, where he cannot be absorbed. Until now he has been subjected to a school system which drew him away from his community and misled him by showing him the greener pastures of European Society where he is not allowed to graze.*
>
> (Kalantzis and Cope, 2012) *as quoted in Kallaway,92*

The passing of the Act in essence meant that apartheid had found its way right into schools with 75% of the population (*ibid*) being ‘dumbed down’ as a means of maintaining the status quo (Thobejane, 2013). The implemented segregation disadvantaged all non-whites with the Black population as the most devastated. Kalantzis and Cope’s adaptation aptly describe the situation in the following way; “The white government made it clear that Bantu Education

was designed to teach African learners to be "hewers of wood and drawers of water" for a white-run economy and society, regardless of an individual's abilities and aspirations" (Kalantzis and Cope, 2012; Thobejane, 2013). It was not long after that HEIs were targeted with the segregation of Universities in 1959 (Kalantzis and Cope, 2012).

It is also of note that by this time, the apartheid government had divided the country into "five separate entities"; the Republic of South Africa (vast majority of land holdings), Republic of Transkei (part of old Cape Province), Republic of Bophuthatswana (part of old Transvaal Province), Republic of Venda (also from part of old Transvaal Province) and Republic of Ciskei (another part of old Cape Province) (Carrim, 2006). The latter four were known as the "TBVC countries" (*ibid*). The government considered them as legally independent countries though they were never recognised as such internationally (*ibid*)

Summarising Carrim; the government put into place systems that designated specific institutions for specific races. Where especially Blacks wanted to attend a university not designated to them, the university had to apply for permission. The Historically Advantaged Afrikaans medium universities hardly ever used the permission system while the Historically Advantaged English ones tended to utilise them. The latter universities considered themselves above the apartheid system and could find no justification or reason to enable the system; they were institutions that tried to circumvent the policies (Carrim, 2006).

HAIs were able to amass donations; the Afrikaans ones from government, and the English ones from overseas. These gave them an advantage over their Historically Disadvantaged counterparts who were funded on a discriminatory basis (Carrim, 2006; Thobejane, 2013) that treated them to the very bare minimums of infrastructure and equipment (Carrim, 2006). In this system, there was also discrimination in terms of qualifications received (*ibid*). While HAIs graduated degrees, HDIs awarded diplomas said to have an equivalent value to the degrees (*ibid*).

The education system from basic education to higher education was skewed against the Black child and this was a sore subject to the Black population who felt everyone should be afforded a chance to prove themselves and be educated regardless of race or background as long as they deserved it (Kalantzis and Cope, 2012; Overcoming Apartheid, 2019; Thobejane, 2013).

Table 3.1 below highlights the segregation of the different universities (Carrim, 2006):

Table 3.1 - Segregation of different Universities

Type	Universities	Key characteristics up to 1994	Historically dis/advantaged
Historically white Afrikaans-medium universities	University of the Orange Free State Potchefstroom University University of Pretoria Rand Afrikaans University University of Port Elizabeth	Authoritarian institutions which supported the apartheid government Good management and administrative systems in place Intellectual agenda affected by instrumentalist commitments and by the severing of contacts with international academics during the academic boycott in the 1980's	Historically Advantaged
Historically white English universities	University of Cape Town University of Natal Rhodes University University of the Witwatersrand	Did not support the apartheid government Collegial institutions at top levels of senate and heads of academic departments but authoritarian at lower levels Good management and administrative systems in place Intellectual agendas set as commitments to knowledge as a good in itself and strong international disciplinary teaching and research links	Historically Advantaged
Historically white technikons	Cape Technikon Free State Technikon Natal Technikon Port Elizabeth Technikon Pretoria Technikon Vaal Triangle Technikon Technikon Witwatersrand	Authoritarian institutions which supported the apartheid government Intellectual agendas determined by instrumentalist commitments to vocational training	Historically Advantaged
Historically black universities in the RSA	Medunsa University University of the North Vista University University of Zululand University of Durban-Westville University of the Western Cape	Top management originally supportive of apartheid government Originally authoritarian institutions which became sites of anti-apartheid struggle at the beginning of the 1980's Intellectual agenda determined by instrumentalist notion of knowledge and function being that of training useful black graduates	Historically Disadvantaged
Historically black universities in the TBVC countries	University of Transkei North West University University of Venda University of Fort Hare	Perceived in 1980 as extensions of civil service of independent republics Authoritarian institutions which became sites of anti-apartheid struggle at the beginning of the 1990's Intellectual agenda determined by instrumentalist notion of knowledge and function being that of training useful graduates for independent republics	Historically Disadvantaged

Historically black technikons in the RSA	ML Sultan Technikon Peninsula Technikon Mangosuthu Technikon Technikon Northern Transvaal	Top management originally supportive of apartheid government Authoritarian institutions which became sites of anti-apartheid struggle in the early 1990's Intellectual agenda determined by instrumentalist commitment to vocational training	Historically Disadvantaged
Historically black technikons in the TBVC	Border Technikon Eastern Cape Technikon North West Technikon	Perceived as extensions of civil service of independent republics Small institutions with primary focus on vocational training	Historically Disadvantaged
Distance Education universities and technikons	University of South Africa (UNISA) Technikon South Africa (TSA)	Authoritarian institutions which supported the apartheid government UNISA: instrumentalist intellectual agenda with little outward or international focus on teaching and research TSA: primary focus on vocational education	Historically Advantaged

Adapted from (Carrim, 2006)

3.2.2 The Freedom Charter

Before the segregation of races in terms of education, there was already recognition of the unfairness of implemented educational systems among other things (Overcoming Apartheid, 2019). This led to mass action and people coming together to find ways of addressing the ills of society. The Freedom Charter was born at the Congress of the People at Kliptown, Johannesburg in 1955 (The Congress of the People, 1955). This document represented the hopes of the majority. They envisioned a South Africa governed through the will of the majority, belonging to all, with equally shared rights and opportunities. One of the specific notes was that on education (*ibid*).

Education shall be free, compulsory, universal and equal for all children.

Higher education and Technical training shall be opened to all by means of state allowances and scholarships awarded on the basis of merit (ibid)

Those who fought against apartheid recognised the power of education to help rebuild the country and restore the dignity of the majority who had been mistreated and treated like “as perpetual children in need of parental supervision by whites, which greatly limited the student's vision of "her place" in the broader South African society as noted by Hartshorne” (Overcoming Apartheid, 2019). Their fight was one for equality in both opportunities and resources.

3.2.3 Redresses of the past

In seeking to implement the vision of the Freedom Charter, the newly elected government quickly went to work setting up systems to try and redress the inequalities of the past. The Higher Education Act was instituted in 1997 (South African Government, 1997), with amendments made over the years as needed. It served several purposes including (*ibid*):

- Restructuring and transforming of programmes and institutions to better meet the Republic’s needs
- Redressing past discrimination to ensure ‘representivity’ and equal access
- Providing optimal opportunities for learning and knowledge creation
- Promoting values underlying a society based on human dignity, equality and freedom

- Pursuing of excellence, promoting the full realisation of every student and employee's potential, tolerance of ideas and appreciation of diversity

Working in tandem with the Act was the Department of Education which was established in 1993. The Department incorporated both basic and higher education. The department's focus was on opening access to education, ensuring education was available to all based on merit (DHET, 2012; Minister of Education, 2001). From 2007, the Department lobbied National Treasury for funds to set up a capital projects programme. The department recognised the dire straits HEIs found themselves in with the aging and insufficient infrastructure.

To ensure these policies and institutions accomplished their goals, government set up NSFAS which was implemented as a means of ensuring all deserving students could have access to quality higher education regardless of status, race and gender (Department of Higher Education and Training, 2016; Ministerial Committee, 2013; National Planning Commission, 2011). Using set parameters such as household income, students could get education through a bursary or through a loan (Ministerial Committee, 2013). While this has helped thousands of students, it has also recently become the impetus for violent protests in campuses across the country. For some, parameters set for benefitting from NSFAS meant that students from middle class families were struggling to pay fees charged by Universities (DHET, 2012; Universities South Africa, 2016b, 2014), while for others the scheme was not living up to its purported use; moneys are paid late, students end up with no money for food etc.

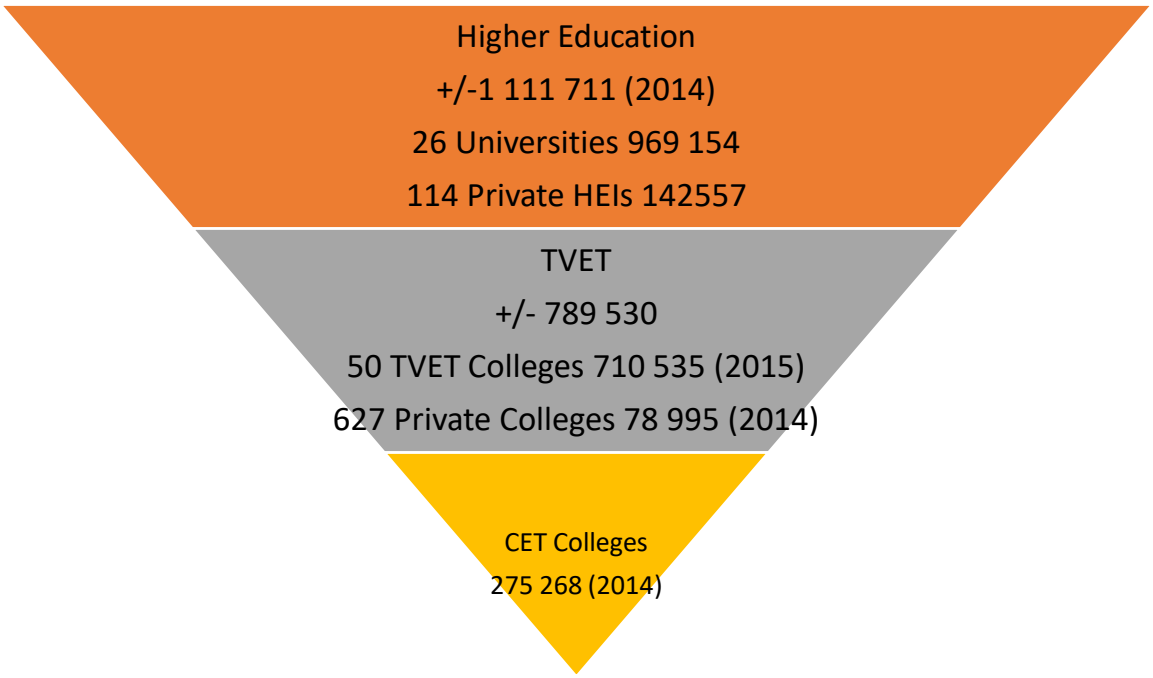
In spite of this, the South African Government has put considerable effort into redressing the past and as far as it is able, it is still championing the education cause (Ministerial Committee, 2013).

3.2.4 The shift to DHET

DoE was split in 2009 into the Department of Basic Education and the Department of Higher Education and Training as a means of ensuring enough attention was paid to the particular needs of both ranks of Education (Ministerial Committee, 2013). Since 2009, DHET has handled all issues dealing with higher education including funding for education purposes and infrastructure (*ibid*).

3.2.5 The Current Higher Education Landscape

Considerable progress has been made in ensuring accessibility of education. There are 26 public universities on South Africa besides the fifty Technical and Vocational Education and Training (TVET) colleges, nine Community Education and Training (CET) colleges and registered private colleges and higher education institutions (Presidential Commission, 2016). The distribution of students is shown in Figure 3.1 below (*ibid*)



Adapted from (Presidential Commission, 2016)

Figure 3.1 - Student Enrolment distribution

From 2010 to 2014, university enrolments increased from 837 779 to 969 154 (*ibid*). There was student population transformation during this period, with 72% African,16% White, 6% Coloured and 5% Indian enrolled - compared to 62% African, 25% White, 6% Coloured and 7% Indian in 2003 (*ibid*). Three new universities, Sol Plaatje University, University of Mpumalanga and Sefako Makgatho Health Sciences University were established to cater for the increased enrolments (*ibid*).

Several Post-School Education and Training (PSET) System targets were also put into place (*ibid*). These included a 2030 goal of an increase in participation rate by 70% (R950 000 to R1.62 million)

and the expansion of infrastructure especially student accommodation which has been a serious cause of concern in recent years (*ibid*).

The DHET recognises that the possibility of accomplishing targets is slim without a substantial injection of funding and the development of capacity in the system. Current funding has failed to keep up with growth, putting system quality and sustainability under threat (*ibid*). Ironically, solutions to these issues include better funding for institutions and slower growth of institutions (*ibid*).

3.3 The Fees Must Fall Movement (#FMF)

3.3.1 Initial protests

The #FMF movement was launched by students as a protest to fee increases at what were already viewed as expensive universities (Presidential Commission, 2016). These students did not qualify for NSFAS funding yet were in a class that was still unable to afford the "exorbitant" fees (*ibid*). Protests broke out in October 2015 in the University of the Witwatersrand and descended into chaos (*ibid*) when police had to be called in to restore order.

Other Universities also got on board and a Higher Education crisis ensued. Issues that had long been brushed aside bubbled into a tense situation (Universities South Africa, 2017). Students insisted that universities and government listen to their grievances; they could not afford fees, they had no sufficient accommodation and increase of fees would just exacerbate an already dire situation. Government in response, eventually tabled a no fee increase moratorium on HEIs (Presidential Commission, 2016).

3.3.2 Escalation

Fast forward to 2016 and protests flared up again. More issues were brought to the fore. These included; demands to free education for all, the scrapping of student debt, and the provision of decent and affordable accommodation (Universities South Africa, 2017). Protests quickly descended into chaos again with violence which destroyed property estimated at R500 million between October 2015 and June 2016 (Presidential Commission, 2016). Universities that were battling to stay afloat while providing quality education found themselves under severe financial

stress and with their sustainability threatened (*ibid*). June 2016 was not the end of the protest action; these have continued into 2019 with students airing the same grievances that don't seem to be solved over time. In 2017, then President Jacob Zuma announced a free education clause which no one (including government and HEIs) had prepared for. Fact finding committees established on funding of higher education had cautioned against a free education strategy as the fiscus was not in a position to handle the cost (Ministerial Committee, 2013). Protests broke out anew when students went to register at the start of the year and discovered that free education wasn't what they had envisioned, government still needed to make a sustainable plan for better student funding.

3.4 The right to education

At the heart of the protest is the concept of free education which itself is hinged on the right to education. Section 29 (1) of the Constitution, reads:

- *Education shall be free, compulsory, and universal for all children*
- *Higher education and technical training shall be open to all by means of allowances and scholarships, awarded on the basis of merit*

The sticky point has been that of interpreting the constitutional *right "to further education, which the state through reasonable measures, must make progressively available and accessible"*.

The Education Department, and government generally interpret this to mean that "basic education, including adult basic education, is a fundamental right and must be provided to all who need it; while further education, which can be interpreted as consisting of HE (university education) and TVET, is a secondary right that must be made available and accessible to those who merit it (meet the academic requirements)" (Presidential Commission, 2016). Table 3.2 below shows further interpretations (*ibid*):

Table 3.2 - Interpretation of Section 27 of Constitution

Term	Meaning
Make further education available	The system must grow to develop sufficient spaces for study
Make it accessible	It should be affordable with no room for individuals to be denied access based on financial need

Access	Not simply about financial access, includes epistemological access to effective study

Adapted from (Presidential Commission, 2016)

Government is the first to attest that it has worked hard to meet these needs through (*ibid*):

- Increasing space in universities, establishing 3 new universities
- Providing funding to support poor students at universities
- Significant investment in funding foundation phases in universities to enable improved success rates in universities

Each year of protests represents students with limited options who believe their government has failed them. In their view higher education is their right and should be made accessible without students having to pay back monies they can ill afford especially in the current economy (Universities South Africa, 2017).

Government finds its hands tied because as much as it would like to provide access to higher education to all students, it can only do so much under the current constraints of the economy (Presidential Commission, 2016). Government believes there needs to be concerted effort with the private sector and universities themselves finding means of saving money to allow more students access to education (*ibid*).

3.5 Challenges HEIs face

3.5.1 Increasing numbers

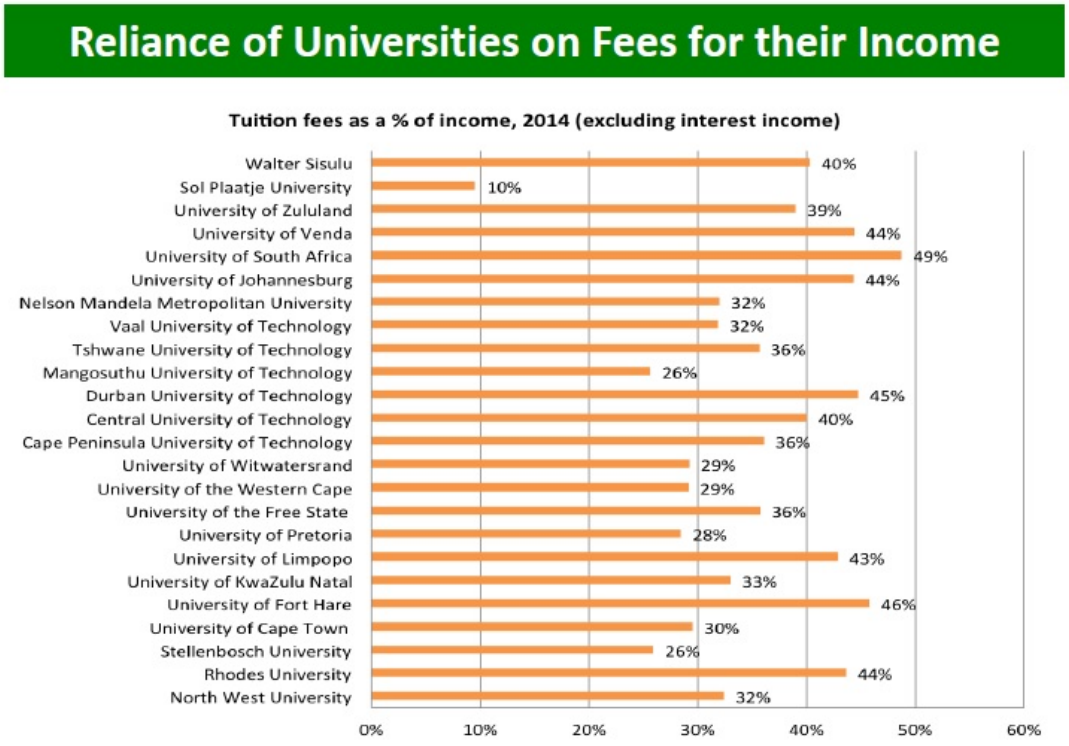
As noted earlier, one of the National Development Plan goals is to increase enrolment at universities by at least 70 percent by 2030 such that enrolments increase to about 1.62 million from 950 000 in 2010 (National Planning Commission, 2011; Presidential Commission, 2016). There is also an effort to increase the number of students eligible to study towards maths and science-based degrees to 450 000 by 2030 (National Planning Commission, 2011).

While HEIs understand the need for growth, they are ill equipped to deal with expansion that comes without corresponding growth in subsidies especially from government (Universities South Africa, 2014). This is in line with the report from the committee reviewing the funding of universities which

recommended that growth in the education system be aligned with institutional capacity as well as available infrastructure and student accommodation (Ministerial Committee, 2013)

Regardless of what should be in place, enrolments are still on the increase and this has occasioned the underfunding of higher education, pressuring institutions to raise funds through fees and third-stream income (Presidential Commission, 2016). This in turn has resulted in the very issue that students are protesting against; university fees becoming increasingly unaffordable to the working and lower middle classes.

Figure 3.2 highlights the extent to which HEIs rely on student fees as an income generating source of revenue (Presidential Commission, 2016). These percentages show that HEIs can ill afford to offer free education, let alone while providing quality education.



Based on (Presidential Commission, 2016)

Figure 3.2 - Reliance on Student Fees

It is also of note that spending at universities has increased, with personnel costs at 53% of total expenditure in 2014 (*ibid*). It is unfortunate that although staffing expenditure has increased, staff-

student ratios have worsened; universities find it difficult to keep up with the growing enrolments (*ibid*). It has been suggested that to ensure affordable fees and the sustainability of HEIs, block grant funding from DHET must increase to at least 50 (*ibid*).

The 0% fees increase and demand for insourcing of workers exacerbated sustainability concerns especially for universities that are already cash strapped (*ibid*). It is likely that each year here on student debt will increase – universities report anecdotally that in the wake of the #FMF campaign it is harder to recover fee payments from students (even wealthy students). 3 Universities had to request approval for overdrafts as they are experiencing shortfalls (*ibid*).

In light of these difficulties, Government has urged universities to become more efficient in utilising the funding in the system including finding mechanisms to improve collaboration and sharing resources across the system, improve internal efficiencies in their operations, improve student success and ensure less wastage in the system (*ibid*)

3.5.2 Old and insufficient infrastructure

The World Bank in its Financing Higher Education in Africa report observed that the decline in public expenditure was having an adverse impact on the quality and relevance of education programmes in higher education sectors (Ministerial Committee, 2013). Enrolling an ever-increasing student body in the absence of funds to actually support the increased numbers has led to deteriorating conditions in universities (*ibid*). Universities find it difficult to maintain appropriate levels of infrastructure to accommodate all students which eventually leads to buildings falling into disrepair (*ibid*).

From 1997/98 - 2007/08 DoE had no earmarked grants for new buildings (Ministerial Committee, 2013). This resulted in infrastructure that was deteriorating and becoming hugely inadequate for the rapid expansion of enrolments (*ibid*). From 2006 the government invested more than 6.8 billion in upgrading and expanding infrastructure across the existing 23 universities (*ibid*). From 2012/13 - 2014/15 a further 6 billion was allocated for infrastructure expansion (*ibid*). Regardless of these efforts, capacity still remains inadequate to accommodate students who are qualifying for university (*ibid*)

These funds provided through infrastructure and output efficiencies funding are for increasing the capacity of the university system in order to keep up with the growth in enrolment of students (*ibid*). It is also meant to equip universities, so they may meet national goals and priorities (*ibid*).

Globally, institutions are expected to be accountable for the manner in which they use public money; HEIs are no exception (Ministerial Committee, 2013). It is important that infrastructure and capital allocations always remain earmarked grants to ensure that these funds are not used for any other purpose e.g. teaching or operational purposes (*ibid*).

Since limited funding is available, HEIs are also expected to contribute from their own resources to projects that have been approved by the Minister (Ministerial Committee, 2013). These resources include income from student fees, institutional investments and endowments, donor funding and any external loans (*ibid*).

A major concern has been how to help HDIs catch up with their peers in terms of education, infrastructure and equipment. This was addressed in 2012/13 - 2013/14 when DHET committed to addressing infrastructure backlogs at HDIs (Ministerial Committee, 2011).

The committee recommended that HDIs should continue to be prioritised in infrastructure development grants till both the infrastructure and equipment back logs have been eradicated and the universities have the necessary infrastructure to provide the same quality education as developed universities. The institutional factor grant for HDIs was implemented as a way of providing additional funding for infrastructure.

Any discussion of backlogs would be incomplete with mention of the fact that currently the system has ±R25 billion in deferred maintenance currently. The Ministerial Committee on University Funding recommended that all universities should build reserves for the planned future replacement of equipment and renewal of infrastructure (Ministerial Committee, 2013). These reserves they believe will help with sustainability of the institutions. The numbers are of great concern and rather ironic as already five universities incurred operating deficits in 2014, with 7 incurring deficits on their Council controlled funds. Of these 7, for 4 it was for a second year running, while for one it was for a third year running (Presidential Commission, 2016). With weaker economic outlooks these are worrying statistics which could possibly turn into trends.

On another note, the fee-freeze resulted in a likely unintended effect of putting institutional loans at risk as the freeze by extension applied to students' residences which traditionally do not receive any state subsidy; they are run on a model which needs them to be self-sustaining (Universities South Africa, 2016a). Many institutions recently built residences using loan funding where repayments were projected on future residence fee increases (*ibid*). This is a major concern as shortfalls will be experienced when having to pay off loans.

Universities have to be circumspect in how they handle their funds. Government has cautioned institutions on wasteful processes. Everyone has to do their part in sustaining HEIs and their infrastructure

3.6 Government Funding

Government funding is addressed in terms of spending on public infrastructure and the insufficiency of funds available for such projects.

3.6.1 Public Infrastructure Spending

Between 1998/99 and 2016/17, the public sector spent more than R2.7 trillion on infrastructure (National Treasury South Africa, 2018). The amount spent increased from R48 billion in 1998/99 to R249.9 billion in 2016/17, resulting in an average annual increase of 5.2 per cent after discounting inflation (*ibid*). Their public sector definition of infrastructure is given below:

> *Here, "infrastructure" is defined broadly, including spending on new assets, replacements, maintenance and repairs, upgrades and additions, and rehabilitation, renovation and refurbishment of assets. Capital and interest payments are also included in the definition. In contrast, "capital spending" typically excludes maintenance and finance charges.*

Social services infrastructure accounts for 20 per cent of total public-sector infrastructure spending (*ibid*). Of this, education and health account for 6 per cent and 4 per cent respectively. Figure 3.3 provides a breakdown of projects from 2014/15

R billion	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	MTEF
	Outcomes			Estimates				Total
Energy	67.8	65.9	67.0	62.0	74.1	81.1	63.6	**218.8**
Water and sanitation	29.5	31.5	30.8	35.6	36.9	38.5	42.8	**118.2**
Transport and logistics	92.4	81.3	70.9	84.9	86.9	93.7	107.6	**288.2**
Other economic services	13.0	13.2	14.3	6.7	4.6	3.2	3.0	**10.8**
Health	8.7	10.3	10.4	11.1	10.4	10.8	11.3	**32.6**
Education	15.4	18.0	17.8	18.7	15.5	15.6	15.8	**46.8**
Human settlements[1]	17.1	18.3	18.3	20.0	18.2	18.8	20.1	**57.1**
Other social services	9.3	11.9	10.3	11.1	10.0	10.0	10.6	**30.6**
Administration services[2]	9.0	10.9	10.1	10.0	9.5	10.5	10.9	**31.0**
Total	**262.2**	**261.2**	**249.9**	**260.1**	**266.0**	**282.3**	**285.8**	**834.1**
National departments	13.5	14.5	15.8	15.8	15.3	15.5	15.8	**46.6**
Provincial departments	56.4	60.6	62.6	62.6	53.5	54.9	56.9	**165.3**
Local government	53.2	54.7	54.4	63.6	59.7	60.4	63.7	**183.8**
Public entities[3]	19.2	17.8	17.1	15.6	16.2	17.4	18.1	**51.7**
Public-private partnerships	4.0	4.3	4.8	5.0	5.9	6.1	6.4	**18.5**
State-owned companies[3]	115.8	109.3	95.2	97.5	115.4	128.0	124.8	**368.2**
Total	**262.2**	**261.2**	**249.9**	**260.1**	**266.0**	**282.3**	**285.8**	**834.1**

Based on (National Treasury South Africa, 2018)

Figure 3.3 - Infrastructure Spending

In this report released in 2018, The *education infrastructure grant* allocated R31.7 billion, of which R1.5 billion was earmarked for the maintenance of school infrastructure. The grants were co-funded for programmes that include maintenance of existing infrastructure and the building of new infrastructure.

The report further explains how an amount of R3.1 billion was allocated to the DHET to continue construction at the University of Mpumalanga and the Sol Plaatje University. New facilities include lecture rooms, laboratories, sport and recreation amenities, and student accommodation. These two institutions, which opened their doors in 2014, were expected to jointly increase their intake to 5 181 students in 2018. All other public universities received R8.5 billion in total for the construction and refurbishment of student accommodation, lecture rooms and laboratories, and for maintenance.

The commission on funding explained how there has been a need for increase in funding fuelled by higher expenditure due to increases in staff, utilities, rates, taxes, electricity etc (Presidential Commission, 2016). It also highlighted how while the block grant allocation to universities increased by 139.7% between 2004/5 and 2015/16 in nominal terms, the effect of inflation (CPI) translated

this into a 29.8% increase in real terms. The substantial growth of students in universities also resulted in a net decrease in the per capita Full Time Equivalent (FTE) student allocation of -3.4% during these eleven years. Utilising Higher Education inflation (CP1 + 2%), the 139.7% nominal increase actually translated into 5.6% in real terms and a net decrease in per capita FTE student allocation of -21.4% during this period.

Given the economic forecast for government as a whole and the constraints on the current budget allocations, all government departments had to reprioritise and find efficiencies in the system as additional funding in the following Medium-Term Expenditure Framework (MTEF) cycles was very limited (DHET, 2016b). Universities were required to put in place efficiency measures to ensure that available funding was effectively utilised. Suggested measures included (*ibid*):

- reducing overheads relative to the core functions of universities;
- collaboration amongst universities in order to save on spending;
- improving debt collection; and
- putting in place processes to generate additional third-stream income funding (including sourcing additional donor funding).

3.6.2 Insufficiency of available funds

With the economic downturn, the South African Government is facing a fund crisis. This has pushed National Treasury, the Department of Public Works, the Presidential Infrastructure Coordinating Commission and the Department of Planning, Monitoring and Evaluation to implement reforms to improve spending efficiency through better planning, financing, procurement and implementation of infrastructure projects (National Treasury South Africa, 2018).

The initiatives have included the following:

- *Improving planning, financing and delivery of quality projects:* The Budget Facility for Infrastructure's objective is improving rigour of assessments done for full life-cycle costs to prevent costing surprises
- *Improving asset management:* Government working on institutionalising the Infrastructure Delivery Management System (IDMS) through utilisation of the Standard for

Infrastructure Procurement Delivery Management (SIPDM), which the National Treasury published in 2016. The Standard provides governance structures and processes for achieving value for money in procurement and ensuring knowledge sharing

- *Standardising procurement requirements:* Treasury is raising awareness of the and building capacity across government. The SIPDM initiative has been extended to the private sector. A review of the SIPDM will also be done to further enhance efficiencies in the system.

It is hope that a focus on procuring better will help promote efficiency while reducing waste of public funds.

3.7 Capital Projects in HEIs

The major projects undertaken in the last five years are shown in Figure 3.4 (National Treasury South Africa, 2018)

Education				
University of Mpumalanga	Department of Higher Education and Training	7.5	Construct university with two campuses in Mbombela (main) and Siyabuswa by 2025	Bulk water and sewer infrastructure undertaken in 2017. 4 new buildings started construction in 2017 and will be completed during 2018. 3 new facilities will start in 2018
Sol Plaatje University	Department of Higher Education and Training	5.4	Construct university in Kimberley by 2025	3 new buildings completed for the 2018 academic year. Another 4 new buildings will be completed for the 2019 academic year
Technical and vocational education and training college campuses	Department of Higher Education and Training	2.5	Construct 12 new technical vocational education and training colleges, refurbish old ones by 2020	Thabazimbi campus is completed and operational. Bids for 13 sites were evaluated and 11 have been awarded, with site establishment planned to commence mid-March
Tertiary institutions infrastructure	Department of Higher Education and Training	35.2	Construct new buildings and procure equipment, refurbish and upgrade facilities	Work in progress. Feasibility studies for 5 universities are being undertaken as part of the Student Housing Infrastructure Programme for 200 000 new beds

Based on (National Treasury South Africa, 2018)

Figure 3.4 - Capital Projects in HEIs

These projects are in tandem with the NDP whose goals included an increase in available institutions (completion of new universities), expanding the infrastructure of existing institutions and allowing all universities to use of distance education to reach more learners (National Planning Commission, 2011).

DHET provides this summation of the current problems observed in infrastructure development at HEIs (DHET, 2017a):

- DHET not obtaining optimum value for money with infrastructure investments
- Less than optimal prioritization of infrastructure investments
- Inconsistent standards in service of infrastructure development, at times making replication unaffordable in all universities
- Inconsistency in quality and functionality
- Under-utilization of infrastructure assets
- Lack of long-term planning for infrastructure needs at some institutions
- Poor spatial planning in some institutions caused by ad hoc decision making
- Inadequate maintenance of some infrastructure assets with no consideration of lifecycle costs when procuring infrastructure
- DHET not always receiving useful information on condition of infrastructure
- DHET not receiving sufficient information on benefits of its infrastructure programme
- DHET not providing adequate monitoring and oversight of institution expenditure on infrastructure
- Inefficient and sometimes ineffective delivery and procurement of infrastructure projects
- Receiving insufficient funds from the fiscus to accomplish all that needs to be done

The DHET also provides this summary of the common problems HEIs experience in procuring or rehabilitating infrastructure (DHET, 2017b):

- Numerous tenders to issue and evaluate
- To many separate contracts and professionals to manage
- Poor quality, delayed completion and cost overruns
- Under-expenditure of infrastructure budgets by some
- Rework due to poor specifications
- Project delays due to delayed information from designers and poor performance from contractors
- Scope creep leading to budget and time overruns

- Lack of continuity of work leading to little skills development and transfer
- Decline in competence of contractors and consultants
- Disruptions to core university business because of construction

Examination of these lists shows an underlying procurement problem; contracting right, preventing overruns, managing relationships, skills transfer and project design to name a few. The right procurement methods and standards would make a huge difference in mitigating some of the mentioned issues. DHET needs more efficient systems to ensure more efficient spending of DHET funds. It is therefore of great importance for HEIs to have a conducive environment within which they can transform as needed and utilise different ways of working that can enable the required efficiency.

3.8 Client Industry relationships

3.8.1 Types of FM Departments

A definition for Facilities Management that is often cited is that provided by Barret and Baldry:

> *An integrated approach to operating, maintaining, improving and adapting the building and infrastructure of an organization in order to create an environment that strongly supports the primary objectives of that organization* (Atkin and Brooks, 2009).

In HEIs it plays an important role in the organising, maintenance and construction of buildings. These functions can be under a single umbrella body or as different entities. For instance, checking the official websites of these HEIs reveals the following:

The University of Pretoria has four main divisions - Planning and Administration, Project Management, Maintenance and Operations and Campus Services.

The University of the Free State has a single FM Department with two divisions under it, namely the Physical Resource division and the Facilities Management Unit. The former deals with soft and hard skills, including cleaning, hard surface maintenance to insurance and space allocation. The latter deals with development and construction while utilising inhouse consultants.

Wits also has four divisions, the two main ones being PIMD and CPD; with the former dealing with operations and maintenance while the latter deals with capital projects. The other two divisions are the Services Department and Campus Control.

Outside of FM, these departments are part of a bigger organisational structure. Generally, FM's positioning in an organisation falls within Jensen's synthesis that is summarised below (Ogbeifun, 2011).

Passive non-strategic FM with only an administrative relationship, where FM provides support but is not involved in the strategic planning process

Reactive strategic FM with one-way relationship, where FM reacts but does not influence the corporation's strategic initiatives.

Proactive strategic FM with a two-way relationship, where the strategic planning takes place in parallel and interdependent at corporate level and in FM with mutual exchange of information

Integrated strategic FM with a fully integrated relationship, where a dynamic, ongoing dialogue takes place between the corporate strategic planning and strategic FM (Jensen, 2008: 493).

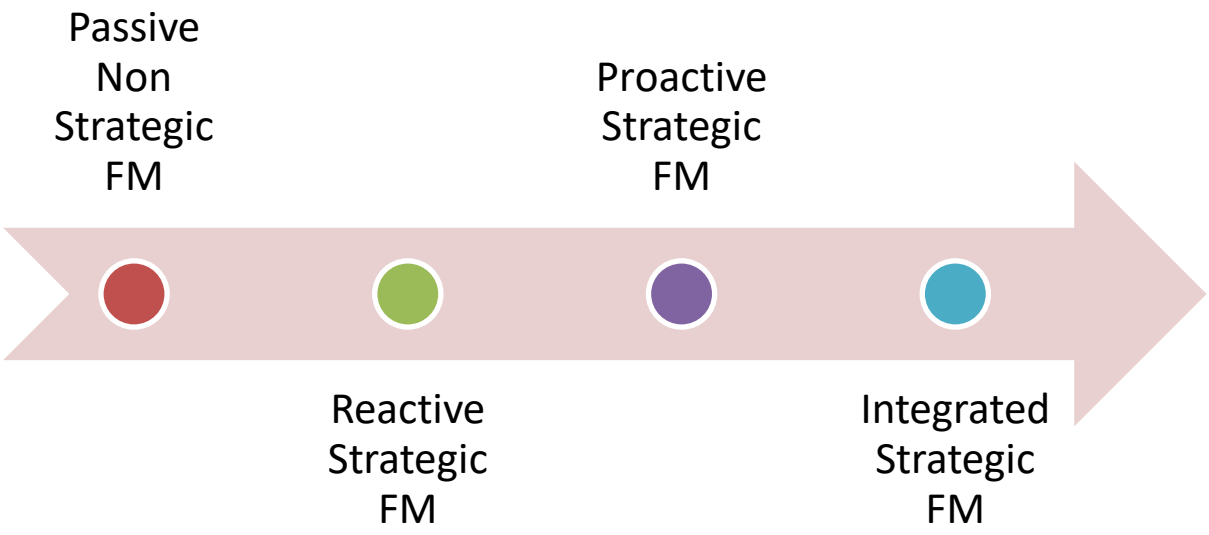


Figure 3.5 - FM Strategic Continuum

While it is most ideal for the FM Departments to fall within the Proactive Strategic and the Integrated Strategic position this is not the case in all organisations (*ibid*). Some tend to find themselves as a supporting structure, they are told what needs to be done and that is the extent of their influence (*ibid*). For others, though they can show initiative, they are not in a position to actually influence the organisation's strategy (*ibid*). This is unfortunate as it seems to create unnecessary silos in an organisation by shutting out those who actually have practical experience in what the organisation wants to achieve.

Some HEIs are playing catch-up, trying to put in place structures that ensure they are putting the right people in the right teams or committees. Developing infrastructure needs the input of all stakeholders and should not be treated as the procurement of goods through the FM Department.

3.8.2 Values of HEIs

It is expected that HEIs are centres of learning who through research and practice determine, utilise and disseminate best practice. While not all universities focus on the same activities or share exactly the same values, it is expected that their core values are relatively similar globally.

Of interest is the Magna Charta Universitatum (MCU). Its website states that it "contains principles of academic freedom and institutional autonomy as a guideline for good governance and self-understanding of universities in the future". The document further states that values are "crucial to helping universities understand and identify themselves and communicate that identify and mission to stakeholders". This document which has been signed by 889 universities in 88 countries commits the signatories (usually Rectors, Presidents or Vice Chancellors of Universities) to comply with the principles of the MCU. Several HEIs in South Africa are signatories of this document.

The principles of the MCU (also termed living values) which institutions are expected to develop over time include the following (Living Values Observatory, 2018):

- Integrity and fairness
- Equity
- Creativity, innovativeness and excellence
- Social responsibility and community service

- Diversity, pluralism and inclusiveness
- Health, wellbeing and a caring community

An examination of these values requires a few definitions. These definitions are from the Oxford Dictionary:

Table 3.3 - Definitions of Values

Term	Definition
Integrity	The quality of being honest and having strong moral principles
Equity	The quality of being fair and impartial
Creativity	The use of imagination or original ideas to create something
Innovative	Featuring new methods; advanced and original
Social Responsibility	Relating to society or its organisation + Being accountable for something = accountability to society
Excellence	The quality of being outstanding or extremely good

Based on *(Oxford University Press, 2019b)*

It is expected that most universities would encapsulate such values. A couple of South African HEI examples are provided below: (This information was obtained from the official website of each institution)

Table 3.4 - Values of HEIs

University	Values
UNISA	In the same way that necessity is the mother of invention, change is the driver of progress Embraces change in all its facets
Rhodes	To promote excellence and innovation To promote interdisciplinary and inter-institutional collaboration To strive for excellence and promote quality assurance in all activities Social responsibility
TUT	Social accountability Duty of care Promotion of mutually beneficial academic, social and economic partnerships
Wits	Believe in achieving that which seems impossible Social responsibility and responsiveness Accountability Innovation through creating new knowledge and providing human capital Promoting a dynamic relationship between state, industry and academic institutions – Triple Helix Model

Adapted from Universities (UNISA, Rhodes, TUT, Wits)

The provided examples reflect how seriously HEIs take their missions/visions. Meeting their visions reflects the strength if their values. Most HEIs value social responsibility, they believe they have a

duty to provide for social needs as they are able. They also reflect a spirit of collaboration in the manner they interact with other stakeholders; they value relationships that are mutually beneficial. HEIs also consider themselves as centres creating knowledge that can be shared. Innovative and the possibility of enabling change are highly valued.

The Triple Helix Model identified by Wits is of special note as it speaks directly to relationships that HEIs have with government and the various industries. This will be discussed further in 2.8.3

3.8.3 Construction modelled after SACI

It is expected that while various departments in an organisation may have their own specific values, these are a subset of the existing overall values of the organisation. As described in 2.8.2, HEIs value engagement, social responsibility, innovation and change. It is thus expected that departments within the HEI structures would also value the same as they work towards meeting the HEI's objectives.

Considering that the FMDs considered in this chapter are from HEIs, several assumptions can be made as shown in the figure below. Ultimately it is to be expected that these HEIs would be able to utilise best practice because of the environment they are in

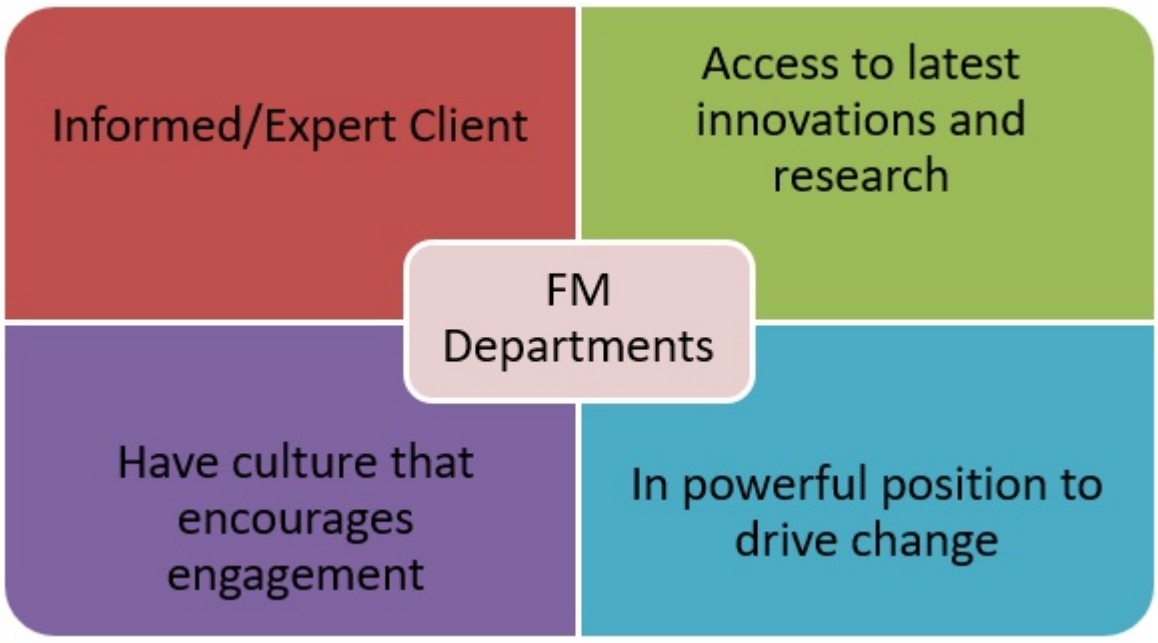


Figure 3.6 - Expectations of FM Departments

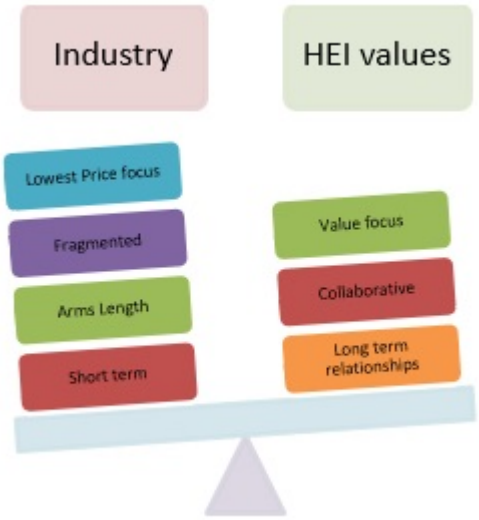
Informed/Expert Client – considering the number of experts available through the various Schools in the Engineering Faculty, it is expected that the HEI as the universal client would utilise the expertise of those who actually train the graduates who will join the industry

Access to latest innovations and research – HEIs are centres for learning and producing new knowledge. Change has been happening in the construction industry over the last thirty years. It is expected that HEIs are disseminating all this new knowledge. It would therefore make sense for FMDs to be in touch with the various Schools, learning what is new and how to implement it. Through working together, Schools could actually produce more research that is more practical than theoretical

Have a culture that encourages engagement – as seen from the values provided as examples, HEIs claim to be open to engagement. This means a move from employer/employee engagements to that of a partnership where there is engagement from both sides and recognition of mutual benefits.

In a powerful position to drive change – this assumption builds on the previous three. With expert clients, access to innovation and a different perception of the terms of engagement, FMDs would be in a powerful position to enact change. Considering the infrastructure backlog that HEIs have, if every HEI chose to work a different way, it would make strides in influencing the way that industry works

This need for clients to actually have a say in how projects are run is a means of breaking from the current mould of the industry. As stressed before by various government departments (e.g. DHET, National Treasury), overruns are norm, relationships are adversarial and fractured, there are high incidents of contractor claims and at times quality of projects is poor. Clients need to be proactive in their contribution especially considering how these issues in the industry are antithesis to their values.



Adapted from (Table 3.4)

Figure 3.7 - Industry vs. HEI values

In light of these differences, it would be prudent for HEIs to work with the CI to enable a mutually beneficial relationship. The two are in a crucial position to assist each other in developing best practice methods. A third party that would prove beneficial in this relationship is government, firstly because it tends to be the biggest client in a state and also because it is in a position to speed up change through regulations. The relationship between these three entities has been referred to as the Triple Helix.

The Triple Helix Research Group from Stanford University defines the Triple Helix thesis as follows:

> *The potential for innovation and economic development in a Knowledge Society lies in a more prominent role for the university and in the interfusion of elements from university, industry and government to generate new institutional and social formats for the production, transfer and application of knowledge.*

The group further states that this concept of university-industry-government relationships was initiated by Etzkowitz (1993) and Etzkowitz and Leydesdorff (1995), based on the influence of previous work by (1982) and Sábato and Mackenzi (1982). It defines the shift from a dominant industry-government dyad in an Industrial Society to a triadic relationship between university-industry-government in the Knowledge Society

This concept has two perspectives

1. *The (neo) institutional perspective* examines the expanding role of universities as innovators through "commercialisation of academic research and involvement in socio-economic issues". Of considers are themes such as stakeholders, drivers, barriers, benefits and impact etc
2. *The (neo) evolutionary perspective* inspired by theories of social systems of communication (Luhmann, 1975, 1984) and mathematical theory of communication looks at university, industry and government as co-evolving subsets of social systems interacting in a dynamic manner through e.g. technology

The (neo) institutional perspective which is relevant to this study has three main configurations

Statist configuration – governments has lead role driving both academia and industry while limiting their capacity for initiation and innovative transformation.

Laissez-faire configuration – limited state intervention with industry as driving force while universities and states act as support structures i.e. the former supplies skilled human capital while the latter acts as a regulator

Balanced configuration – universities act in partnership with industry and government, even taking lead in joint initiatives. Touted as providing the best environment for innovation

Examination of the situation with HEIs in South Africa shows a Laissez-faire configuration. The Construction Industry generally drives the procurement process with HEIs delegated to being inactive clients. This is a sad state of affairs especially since as noted before, universities are the cradles of knowledge from which best practice is expected to emanate as it works together with government and the industry. Shifting to a balanced configuration would have huge benefits as previously stated. It is expected that infrastructure development would see positive growth if everyone worked better together, focusing on improved relations, best value and being open to innovation.

3.9 Updated Treasury Framework

3.9.1 Background

Government has taken notice of the dismal state of procurement in especially public infrastructure projects (The various problems have been alluded to in Section 2.7). one major step in rectifying the issues was the separation of infrastructure procurement from that of general goods and services. The underlying notion behind the separation was that as supply chain management systems function effectively and efficiently, there would be value for money and good service delivery.

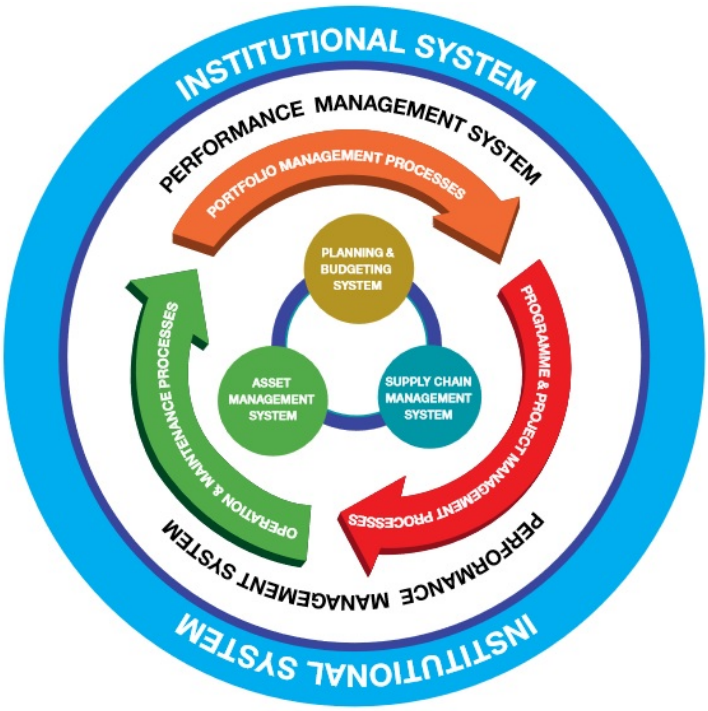
This was essential as in 2011, the National Planning Commission published a diagnostic of the problems faced in meeting Constitutional objectives and the conclusion was that things could not continue as usual. It was clear that there was need for an infrastructure delivery system focused on prioritising, planning, allocating and measuring. This resulted in the development of the Standard for Infrastructure Procurement and Delivery Management (SIPDM) to be implemented by 1 July 2016 and a model Supply Chain Management (SCM) policy as a standard for municipal SCM policies (National Treasury, 2016).

The IDMS has three core systems; a planning and budgeting system, a supply management system and an asset management system as detailed in the model in Figure 3.8.

3.9.2 Highlights of the Standard

This review focuses on specific sections of the published Standard. Of note are the following:

- Controls within the project
- Separation based on type pf procurement
- Value for money
- What should make up a procurement strategy
- Framework for the development of a procurement strategy
- Risk
- Types of approved contracts



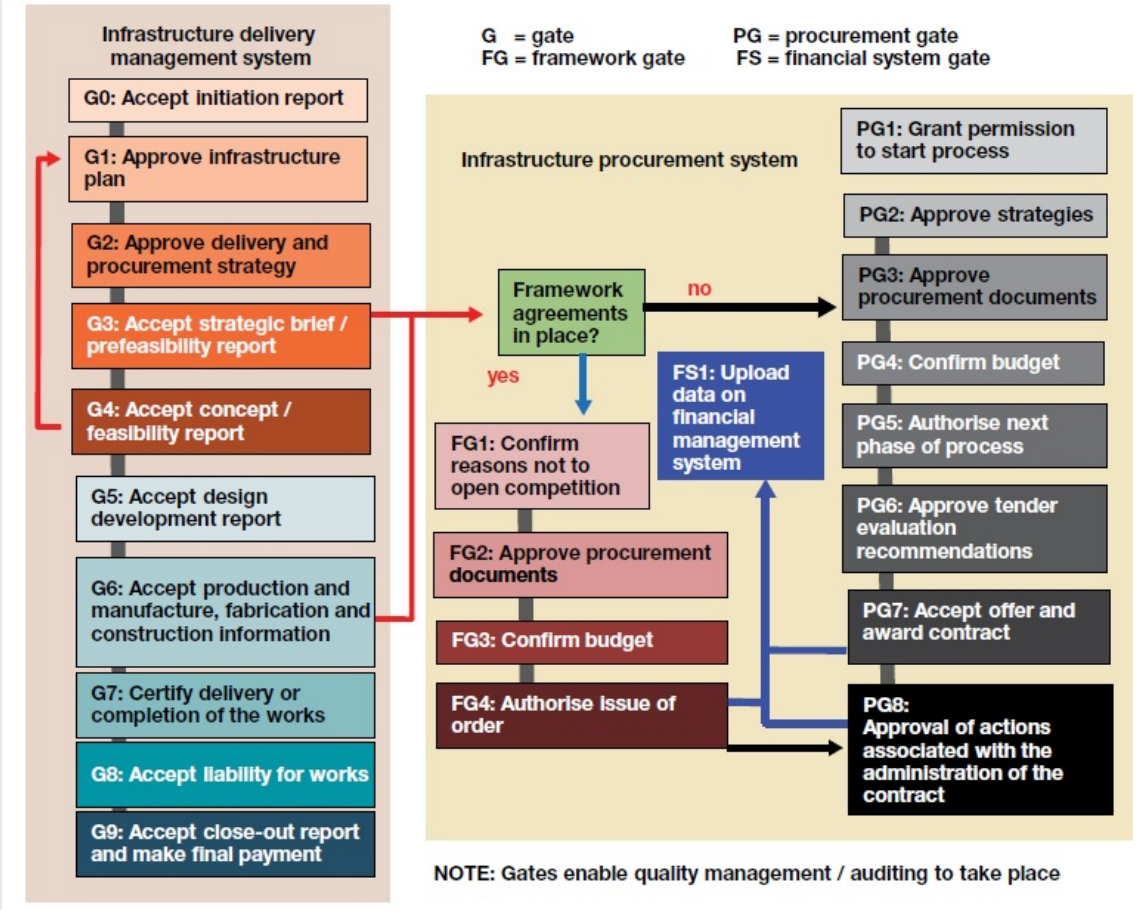
Based on (National Treasury, 2016)

Figure 3.8 - The IDMS

3.9.2.1 Controls in the project

The controls (gates) are checkpoints at which decisions need to be made, confirmation is made that requirements have been complied with and information is provided to enable any needed corrective action. These gates enable proactive managing of risks and facilitate auditing. It should be noted that feasibility plays a major role before any design or delivery is considered. Figure 3.9 below provides a conceptualisation of this control framework (National Treasury, 2016).

In procurement these gates would act as confirmation that everyone is on the same level, understanding what needs to be done, how it needs to be done and why it should be done. Any projects failing to meet set criteria would be stopped before wastages of funds occur.

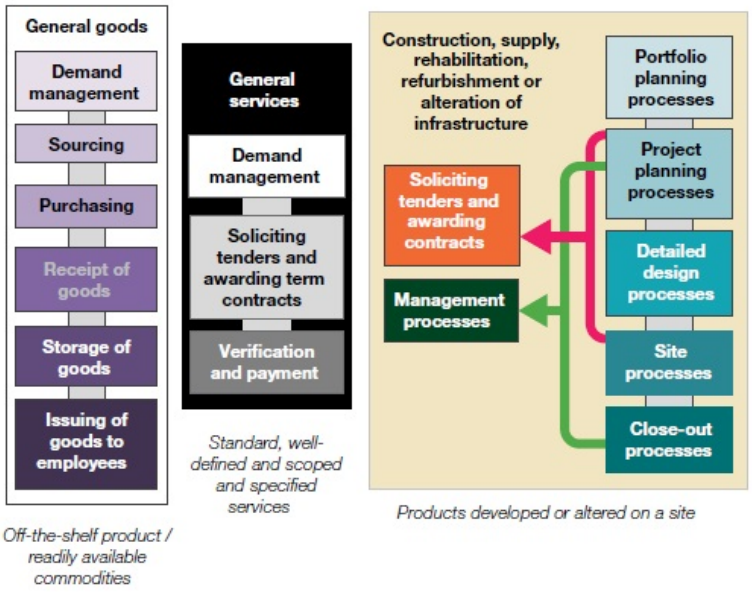


Based on (National Treasury, 2016)

Figure 3.9 – Control Framework

3.9.2.2 Separation based on type of procurement

As can be seen in the Figure 3.10 (National Treasury, 2016), procurement is now to be conducted based on the type of product as opposed to a single procurement route for all. This is especially helpful for infrastructure procurement as it focuses on context and not merely procurement. It takes into account the fact that infrastructure does not involve direct acquisition and that changes can happen to the contract price.



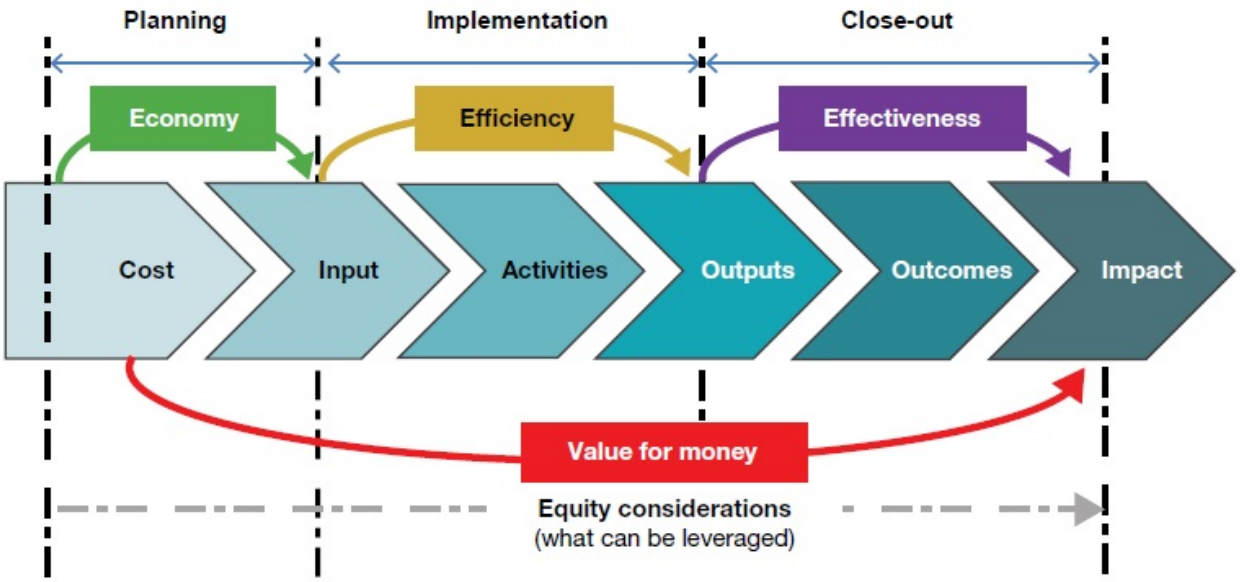
Based on (National Treasury, 2016)

Figure 3.10 – Separation of Procurement

In short, it considers infrastructure procurement as a separate entity for general procurement. It then models the procurement system in a manner that takes into account the needs of infrastructure procurement

3.9.2.3 Value for money

Value for money occurs when what is achieved equals or exceeds what was expected. This makes it critical that parameters such as time, cost, risk be formulated by the end of the planning stage. Collaboration is best suited for enabling better accuracy for these parameters as more stakeholders available to provide helpful information. A model depicting this concept of value for money is provided in Figure 3.11 (*ibid*):



Cost	Sum of money required to fund the intervention.
Input	Inputs cover all the materially significant financial, human and material resources used for a development intervention.
Activities	Activities are used to deliver outputs.
Outputs	Outputs relate to products, capital assets and services which result from a development intervention. Outputs are limited to the specific, direct deliverable of the intervention.
Outcomes	Outcomes are the likely or realised short-term/medium-term effects of the outputs of any intervention. Outcomes are used to identify (a) what will change, (b) who will benefit and (c) how it will contribute to poverty reduction and/or the Millennium Development Goals.
Impact	Longer-term effects are produced, directly or indirectly, by a development intervention. Impact refers to higher level identified achievements that the intervention will contribute towards.

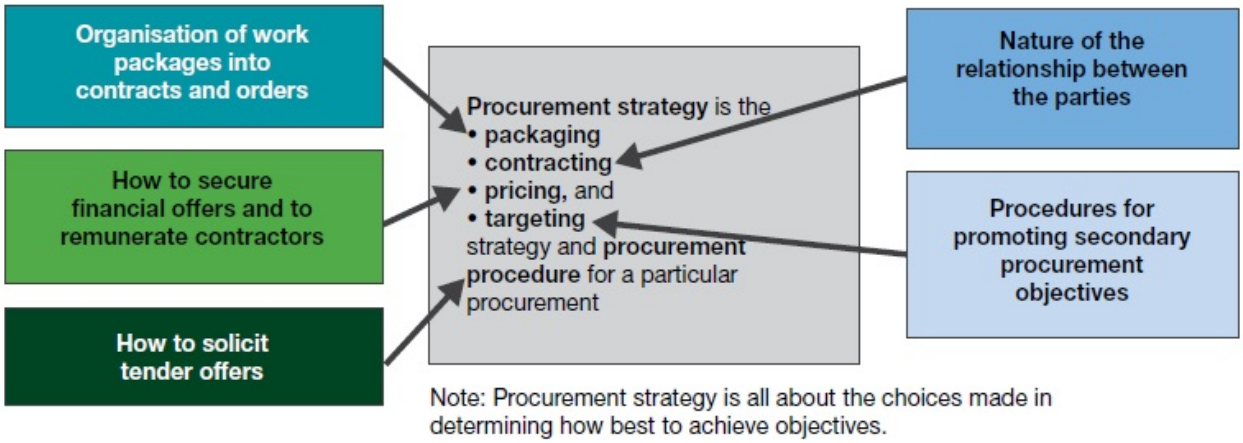
Based on (National Treasury, 2016)

Figure 3.11 – Conceptual Framework for Value for Money

A move from use of lowest price reduces the risk of hefty management or maintenance bills occurring in the project lifecycle; in essence, there is consideration of the future as opposed to paying less now.

3.9.2.4 Components of a procurement strategy

The procurement strategy components tend to be generic. It is assumed that all components are linked with each component having a specific effect on another. For example, a focus on collaborative relationships could signal a shift from traditional contracting. Depending on the number of projects to be done, grouping of projects or packaging of a particular project can be done in various ways. It is important to make sure the various components are a good fit to prevent procurement issues down the line.



Based on (National Treasury, 2016)

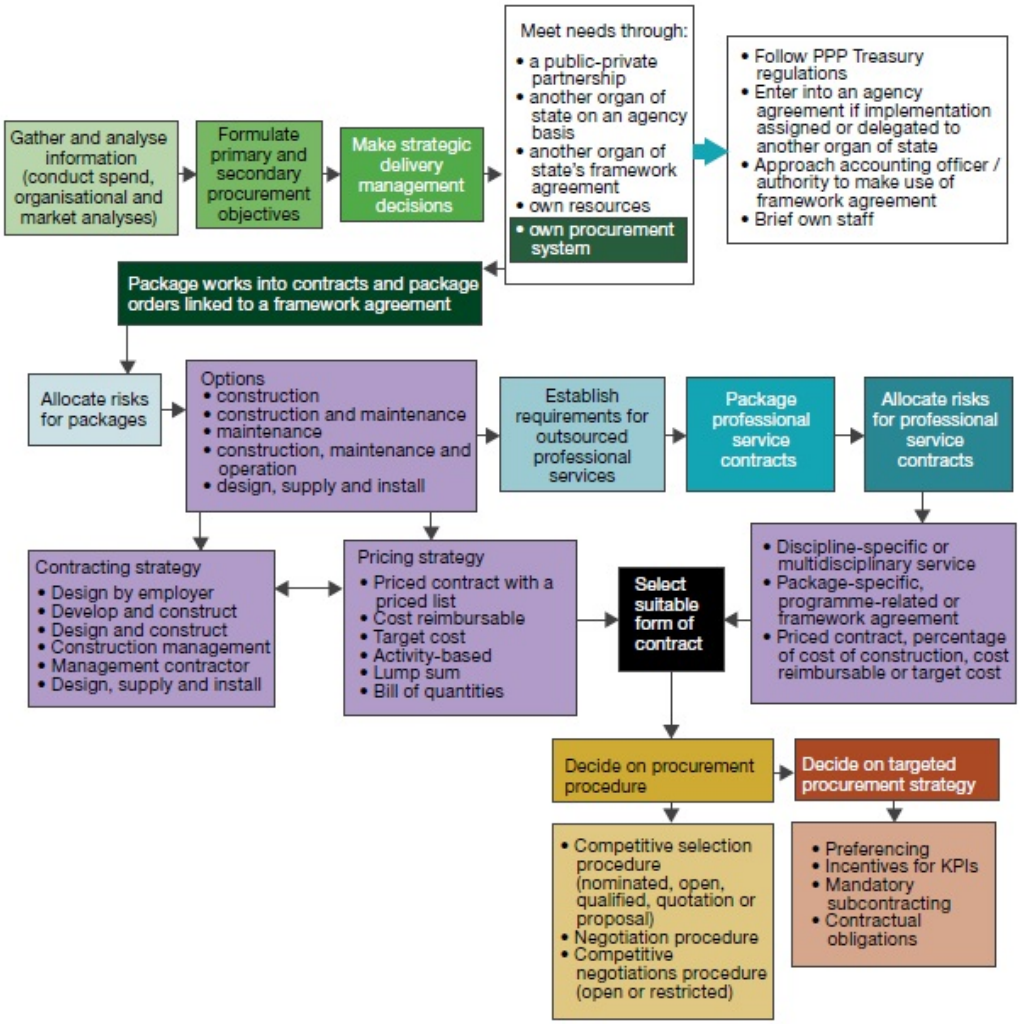
Figure 3.12 – Components of a Procurement Strategy

3.9.2.5 Framework for developing a procurement strategy

This section of the IDMS addresses the issue of ensuring the right fit of components.

Firstly, choices for the procurement strategy are informed by the project objectives (National Treasury, 2016). For example, if client looking to minimise the number of contractual relationships entered into, they can rationalise use of a portfolio of. This is especially useful when capacity is strained as budgets can be reduced by this minimisation.

The framework can also be used as a means of improving secondary procurement outcomes as shown in Figure 3.13

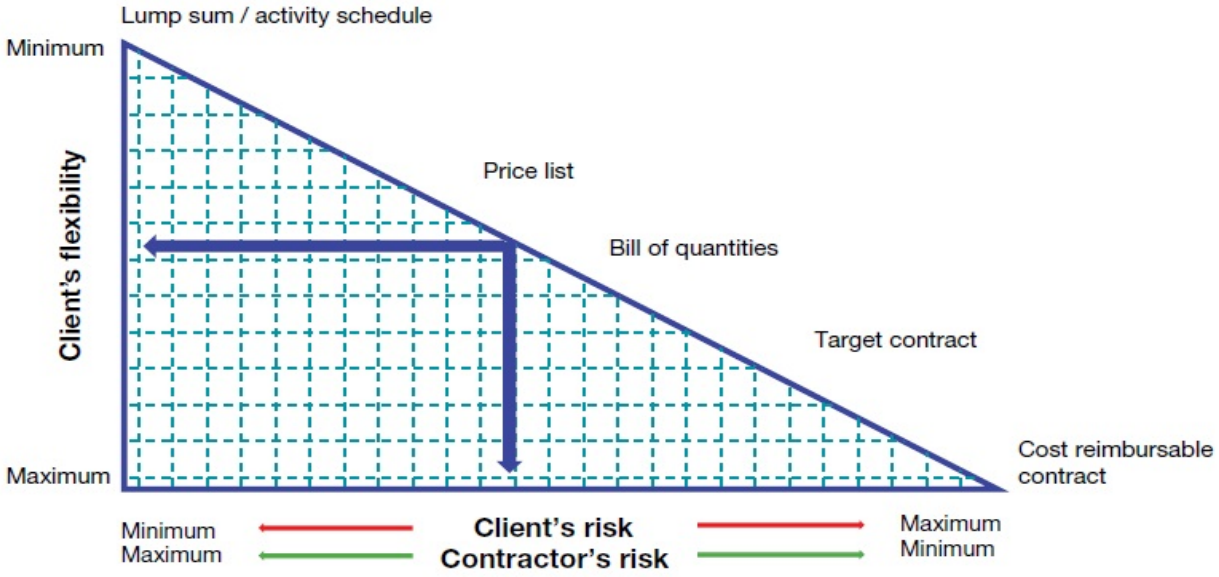


Based on (National Treasury, 2016)

Figure 3.13 – Framework for developing Procurement Strategy

3.9.2.6 Risk/Flexibility and Price

Risk is a necessary component of every infrastructure project. There is a need to identify risks, assess their likelihood and decide on best course of action. Best practice involves assigning risk to the party best able to manage it or proactively managing the risk. Figure 3.14 shows how the contractor is at risk when using lump sum or activity schedules, the client is at risk when using cost-plus basis for paying the contractor and how risk is shared when all the other pricing strategies are used (*ibid*). Allocating risk to the best suited party would be helpful in ensuring reciprocal relationships as especially contractors can feel they are being dealt with fairly.



Based on (National Treasury, 2016)

Figure 3.14 – Risk Feasibility and Price

3.9.2.7 Contracts

In terms of contracts, the standard still maintains the use of contracts based on project needs. Both collaborative and traditional contracts are approved; clients need to make an informed choice and not rely on only the traditional contracts they know

Contract type and SANS 10845-2 definition	National Treasury approved standard forms of contract
Engineering and construction contract: contract for the provision of a combination of goods and services arranged for the development, extension, refurbishment, rehabilitation or demolition of a fixed asset, including building and engineering infrastructure	FIDIC Short Form of Contract FIDIC Conditions of Contract for Construction for Building and Engineering Works designed by the Employer FIDIC Conditions of Contract for Plant and Design-build for Electrical and Mechanical Plant, and for Building and Engineering Works, designed by the Contractor FIDIC Conditions of Contract for EPC Turnkey Projects FIDIC Conditions of Contract for Design, Build and Operate Projects
	JBCC Principal Building Agreement JBCC Minor Works Agreement
	NEC3 Engineering and Construction Contract NEC3 Engineering and Construction Short Contract
	SAICE General Conditions of Contract for Construction Works

Based on (National Treasury, 2016)

Figure 3.15 – Approved Contracts

As seen from the sections shared above, National Treasury is making an effort to improve the CI landscape by encouraging public entities to work differently as needed to ensure value for money and better procurement conditions within the CI. The buck is then passed onto other departments to enforce these changes in their environments.

3.10 DHET Framework

3.10.1 Background

Despite all the headway in developing and expanding HEI infrastructure, challenges still remain. These include ongoing infrastructure shortages, management of infrastructure, insufficient attention to maintenance and operation of existing infrastructure, inconsistency in quality and standard of service in terms of developed infrastructure and under-utilisation of infrastructure (DHET, 2017a).

To ensure consolidation of gains made thus far and further building of capacity, DHET prepared draft guidelines as a base for the capacity building process. The guidelines were informed by global best practice and local best practice in terms of National Treasury's IDMS. It is hoped they can improve infrastructure procurement and delivery management of projects conducted by HEIs. DHET also committed to providing support mechanisms to enable HEIs to build capacity to meet the set norms and standards.

3.10.2 Moving forward

Since the use of the SIPDM is mandated for all public projects, the DHET has been in discussion with universities to develop a Macro Infrastructure Framework (MIF) which will serve as a generic procurement strategy for universities; the framework is built from the SIPDM.

The DHET is currently in a prime position to engineer change in HEIs as it provides infrastructure funding for public universities. This position could be used to influence the manner in which universities procure.

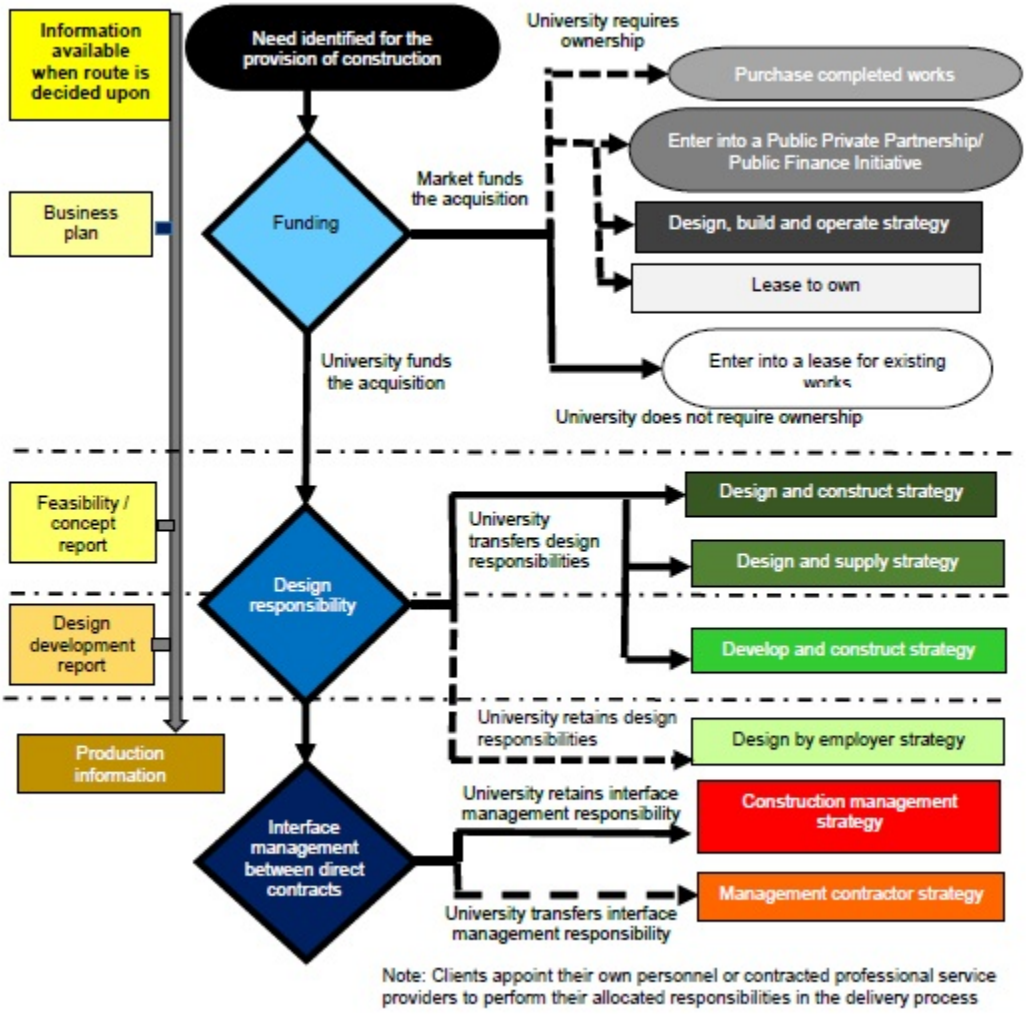
A new framework has been necessitated by a variety of problems that are faced by universities engaged in capital projects. Another listing of them is found below (DHET, 2017b, p. 1):

- Too many tenders for issue and evaluation
- Too many separate contracts and professionals to manage
- Poor quality, delays and cost overruns
- Under-expenditure of budgets
- Rework needed because of poor specifications
- Delays due to information delays and poor contractor performance
- Scope creep resulting in cost increase and time overruns
- Constant contractor claims
- Lack in work continuity for local emerging suppliers
- Declining competence of contractors and consultants
- Disruption of core business of university from construction

The main provisions of the proposed framework as relevant to this research are detailed below:

3.10.2.1 Available procurement routes for construction work

Universities as clients are mandated to abide by certain conditions for the success of the project. These include providing resources necessary for project delivery, providing leadership and direction, complying with legislation, overseeing scope and leading engagements with stakeholders (DHET, 2017b, p. 2). It is thus of utmost importance to select a procurement strategy that will ensure the success of the project. Figure 3.16 details the available routes of procurement



Based on (DHET, 2017b)

Figure 3.16 – Procurement routes for construction works

3.10.2.2 Proposed procurement strategies

The DHET has indicated possible procurement strategies for different types of infrastructure projects. Strategies are detailed from type of packaging to types of contracts to procurement arrangements. It must be noted that NEC3 is emerging as a preferred contract showing a shift towards more collaborative contracting relationships (DHET, 2017a).

Category	Component of strategy	Strategy
Specialist sports facilities e.g. Astra turfs	Packaging strategy	Non-framework
	Contracting strategy	Design and construct
	Pricing strategy	Price list
	Standard contract	NEC3 Engineering and Construction Short Contract
	Procurement arrangements	Restricted competitive negotiations procedure
	Targeting strategy	Preferences for B-BBEE
	Number and coverage of contracts	One contractor
One of a kind projects or projects with little repetition • Buildings (general) • Buildings (science, engineering and health) • Centralise HVAC systems • Internal bulk services (water, sewer and stormwater) • Medium voltage networks • Sports facilities	Packaging strategy	Non-framework
	Contracting strategy	Design by employer
	Pricing strategy	Bill of quantities / price list
	Standard contract	NEC3 Engineering and Construction Contract. NEC3 Engineering and Construction Short Contract, JBCC Principal Building Agreement, JBCC Minor Works Agreement or SAICE's GCC
	Procurement arrangements	Open tender
	Targeting strategy	Preferences for B-BBEE
	Number and coverage of contracts	As per projected demand

Based on (DHET, 2017b)

Figure 3.17 – Proposed procurement strategies

3.10.2.3 Proposed procurement for professional services

In terms of professional services there is a lean towards framework agreements and the use of NEC contracts. This does away with the problem of too many contracts and professionals to manage. This also helps with skills transfer and is a goal of more expensive projects

Component of strategy	Strategy
Packaging strategy	3 year framework agreement for a single profession / discipline or profession specific service
Contracting strategy	Single discipline / profession professional service contract
Pricing strategy	Time based or lump sum based on fee percentage (see Annexure D) or estimates of time, as appropriate
Standard contract	NEC3 Professional Service Contract – Option G: Term service
Procurement arrangements	Open tender
Targeting strategy	Preferences for B-BBEE Skills development goals where value of Task Order exceeds R2,0m
Number and coverage of contracts	A number of framework agreements will be entered into in respect of each service area to enable projected demand to be met.

Based on (DHET, 2017b)

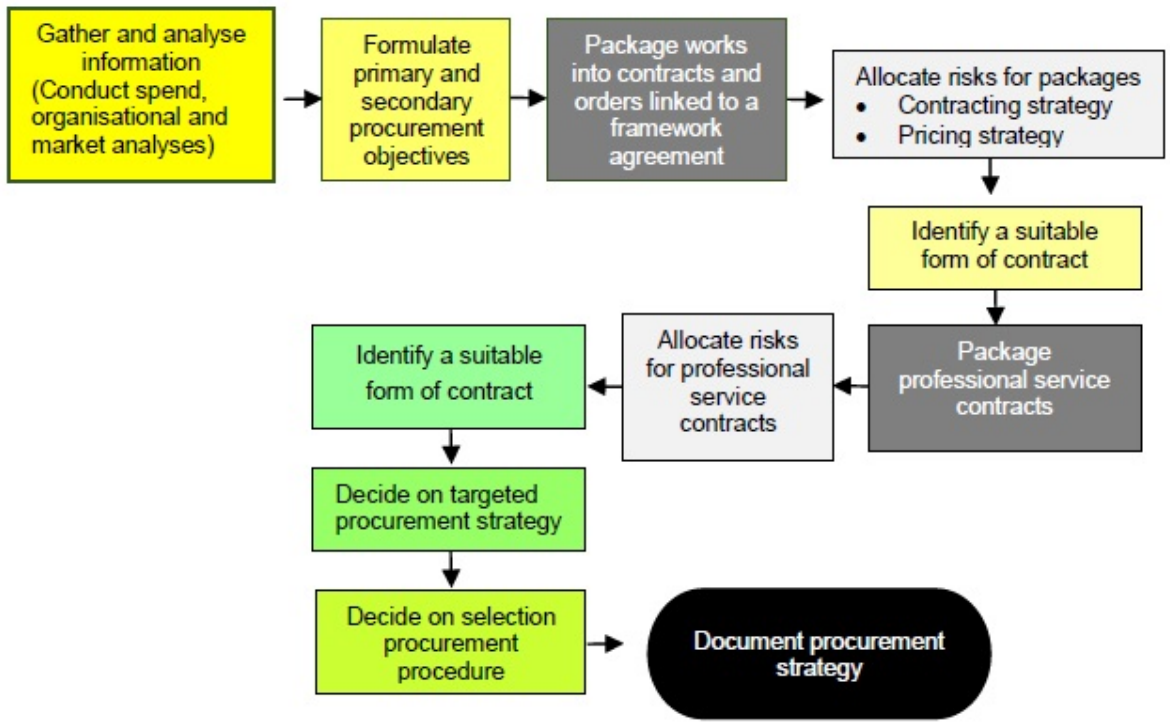
Figure 3.18 – Proposed procurement for professional services

3.10.2.4 Developing a procurement strategy

The framework as outlined in Figure 3.19 enables systematic development and documentation of choices to be made and aligned with project objectives. The application of the framework allows the following (DHET, 2017b, p. A1):

- Rationalisation of project delivery using a programme or portfolio
- Minimisation of contractual relationships entered into
- Addressing of capacity constraints
- Improving of secondary procurement outcomes

As noted in Figure 3.19, the focus is on long term relationships that have the ability to work to the advantage of all stakeholders



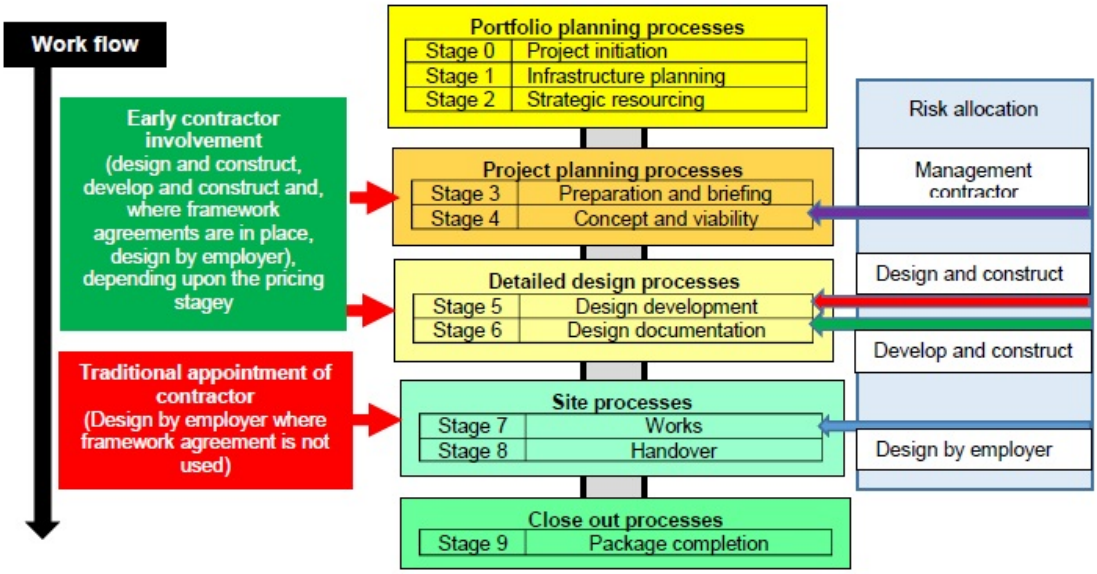
Based on (DHET, 2017b)

Figure 3.19 – Developing procurement strategy

3.10.2.5 *Early Contractor Involvement*

The DHET recognises the importance of the use of contractors early on in the design stages of the project. This contributes to (*ibid*):

- Collaboration
- Minimisation of waste
- Integration of design and construction
- Value for money
- Utilisation of market capacity



Based on (DHET, 2017b)

Figure 3.20 – Early Contractor Involvement

Early contractor involvement can also be utilised when using Design by Employer contracts as shown in Figure 3.20 above.

3.10.2.6 *Various contracts*

In selecting contracts, the criteria in Figure 3.21 can be used as means of ensuring the right decision. The NEC is shown as an excellent choice for transparency, flexibility and collaboration (*ibid*).

Criteria		FIDIC	SAICE GCC	JBCC 2000	NEC3
1	Correlation / fit with respect to Society of Construction and Law's Delay and Disruption Protocol (2002)	Moderate	Poor	Poor	Excellent
2	Potential for collaborative working	Moderate	Poor	Poor	Excellent
3	Target contract option for application in framework agreements, collaborative working and early contractor involvement	No	No	No	Yes
4	May be used for both engineering infrastructure and building projects	Yes	Yes	No	Yes
5	The main contractor may be required to assume responsibility for the design or the works or the finalisation of the design	Yes (yellow and silver)	Yes	No	Yes
6	The main contractor may be required to operate as a management contractor	Yes (silver)	No	No	Yes
7	Cost based pricing strategies, including target cost contracts	No	No	No	Yes
8	Back to back subcontracts	Yes	No	Yes	Yes
9	Short forms of contract suitable for use where risks are low and there is no requirement for sophisticated management techniques	Yes	None	Same management requirements as for principal contract but no subcontracts	Yes
10	An open book approach to the cost of change	No	No	No	Yes
11	Pricing structures that align payments to results and reflect a more balanced sharing of performance risk	No	No	No	Yes

Based on (DHET, 2017b)

Figure 3.21 – Different contracts

3.10.2.7 The DHET Framework

As observed, this framework would help in providing an environment that is conducive to more collaborative working within Higher Education capital projects. Special attention is being paid to use of the NEC, Framework agreement and more relational contracting. This is relevant to this study as it looks into the processes involved in actually making this desired move to more collaborative working.

3.11 Summary of Chapter 3

This chapter examined the context in which HEIs in South Africa operate. The discussion started with a note on the condition of education during the apartheid era, moving to the various ways in which government has tried to redress the ills of the past, finally ending with current initiatives from both National Treasury and the DHET.

Several concerns were highlighted

- Inequality in access to education
- Aging infrastructure
- Damage to infrastructure
- Insufficient grants from Government
- Increase in enrolment without sufficient increase in provided funds
- Wastage especially of public funds needs to be reduced and potentially eliminated
- HEIs needs to find ways of saving and being sustainable while providing good quality education

This chapter built on the notion that it is possible to implement savings by procuring right when it comes to infrastructure development. Constructing at value-based cost, utilising other contracting methods and focusing on long term relationships are some of the suggestions from National Treasury and the DHET. The question becomes how to actually accomplish this change in procurement strategies. The following chapter details the research design to investigate how this has been done

Chapter 3 detailed directives from Treasury concerning procurement. These are the backdrops of client implemented change in the sector and assist with the fourth objective of the study that looks into the processes involved in change, it can be understood that changes will emanate from the processes set out in the directives. This chapter also helped provide a clear perspective on the stakeholders to be considered as per objective five of the study.

4 Research Design

While there are multiple definitions for research, their underlying theme is that of inquiring into, or investigating something in a systematic manner (Merriam and Tisdell, 2015). Research tends to be either basic or applied; with *basic research* being motivated by an interest in extending the knowledge base while *applied research* is conducted as a means of improving the quality of practice in a discipline (*ibid*).

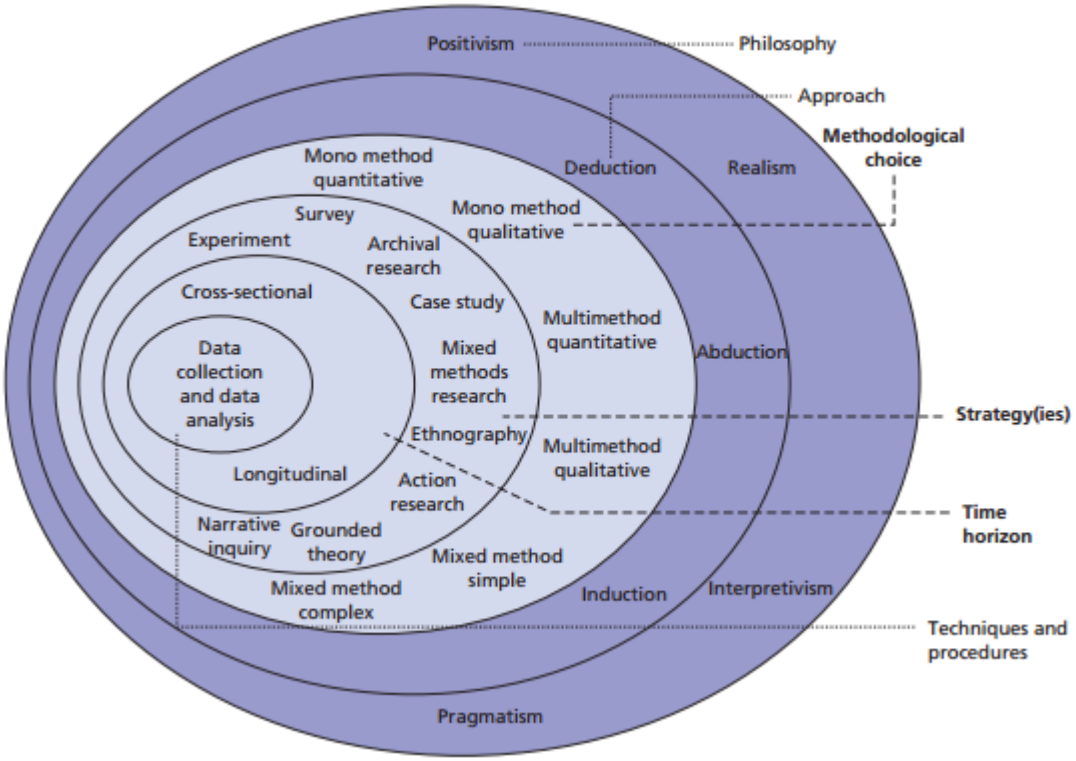
Creswell defines research design as the plan and procedure for research that spans from broad assumptions to detailed methods on both data collection and analysis (Creswell, 2013). This plan is informed by 3 components:

1. The worldwide view assumptions of the researcher
2. The procedures of inquiry also called strategies
3. The specific data collection and analysis and interpretation methods

This chapter delves into these 3 components under *Research Philosophy and Approach*, *Methodology* and *Research Methods*. It considers the *Population and Sampling* used for the study, explains the *Development of the Research Instruments*, then concludes the section with a discussion on the *Data Collection Protocol* that was followed. The chapter then turns to the *Ethical Risks and Mitigation Strategy* employed in the study, expounds on the tests conducted to ensure the *Validity and Reliability* of the data collected finally concludes with the *Data Analysis* strategy employed for the study.

Saunders' conceptualisation of research was the primary source for the research design as its focus is on business management which forms the underlying theme of this research. Yin was also utilised for his invaluable insights on case study research.

In Saunders' conceptualisation, research is depicted as an onion from which layers have to be peeled off to finally reach data analysis. This conceptualisation is shown in Figure 4.1 below, and the onion structure will be followed throughout this chapter (Saunders et al., 2015).



Based on (Saunders et al., 2015)

Figure 4.1 - The Research Onion

4.1 Research Philosophy and Approach

The research philosophy relates to the development of knowledge and the nature of this knowledge (Saunders et al., 2015). Research makes assumptions which influence the understanding of the research, the methods used and the interpretation of results (*ibid*). The main influence on philosophy is what is perceived as acceptable knowledge and the process of developing this (*ibid*).

The research philosophy consists of three dimensions, namely ontology, epistemology and axiology. These are interlinked and determine the manner in which research is approached

Figure 4.2 below provides a brief overview of these dimensions (Saunders et al., 2015).

Assumption type	Questions	Continua with two sets of extremes		
		Objectivism	⇔	**Subjectivism**
Ontology	• What is the nature of reality?	Real	⇔	Nominal/decided by convention
	• What is the world like?	External	⇔	Socially constructed
	• For example:	One true reality (universalism)	⇔	Multiple realities (relativism)
	– What are organisations like?	Granular (things)	⇔	Flowing (processes)
	– What is it like being in organisations?	Order	⇔	Chaos
	– What is it like being a manager or being managed?			
Epistemology	• How can we know what we know?	Adopt assumptions of the natural scientist	⇔	Adopt the assumptions of the arts and humanities
	• What is considered acceptable knowledge?	Facts	⇔	Opinions
	• What constitutes good-quality data?	Numbers	⇔	Narratives
	• What kinds of contribution to knowledge can be made?	Observable phenomena	⇔	Attributed meanings
		Law-like generalisations	⇔	Individuals and contexts, specifics
Axiology	• What is the role of values in research? How should we treat our own values when we do research?	Value-free	⇔	Value-bound
		Detachment	⇔	Integral and reflexive
	• How should we deal with the values of research participants?			

Based on (Saunders et al., 2015)

Figure 4.2 - Research Philosophy

4.1.1 Ontology

While Objectivism asserts that social entities exist in an external reality independent of social actors, Subjectivism on the other hand asserts that social phenomena are created from perceptions and consequent actions of actors (Saunders et al., 2015). In this study that would constitute a view that all collaboration is the same and conducted in the same manner with all stakeholders vs. viewing collaboration as a multifaceted concept defined by an organisation dependent on its relationship with a stakeholder.

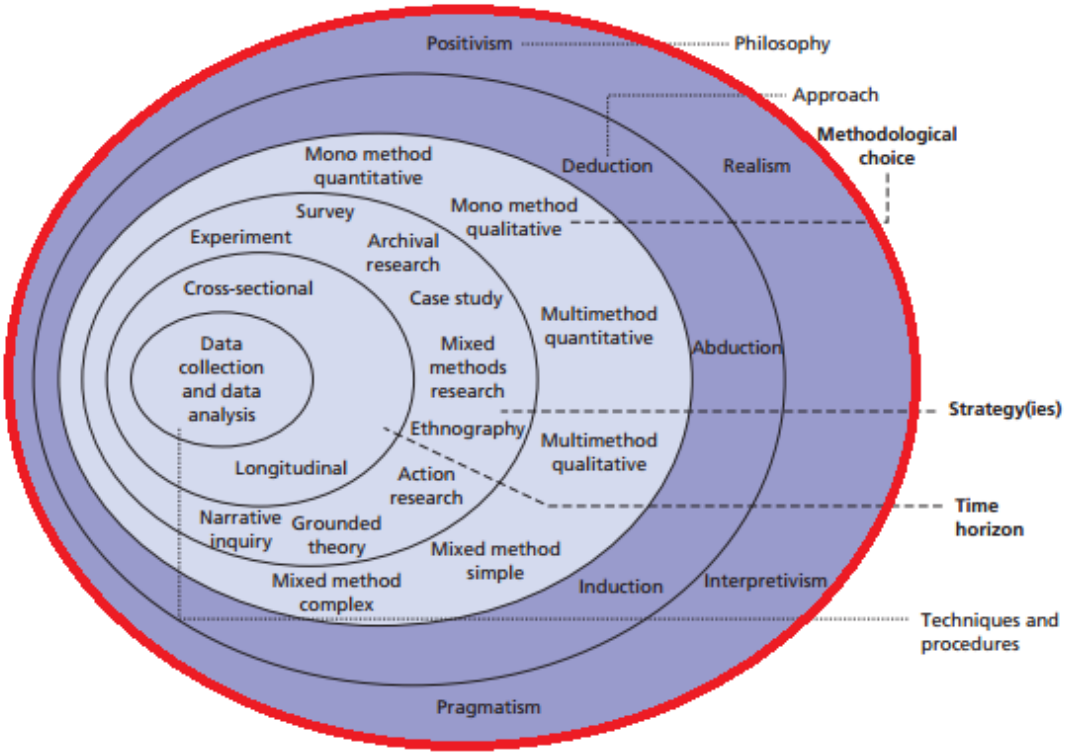
Since one does not strictly have to take one or the other view, this study utilised both lenses (ibid) taking on both an objectivist and subjectivist view. While collaboration can be defined in a specific way i.e., through its attributes or characteristics, its application or results can be viewed subjectively. In essence, while change likely took place in a particular manner, it is possible to perceive that change in different ways. The research asserts the following:

- The existence of processes in change
- The existence of multiple realities
- The existence of order in the process of change

It is of interest to note especially in light of this study that Saunders compares the objectivist-subjectivist debate to the different ways in which research into organisational culture have developed over the past 35 years (Saunders et al., 2015). Objectivists view culture as something an organisation has as opposed to subjectivists who view culture as something an organisation is (ibid). This study takes the subjectivist view as it is assumed that culture defines an organisation

4.1.2 Epistemology

Epistemology looks at what constitutes acceptable knowledge in a study (Saunders et al., 2015). Research can consider only facts (objectivism), or it can also consider perceptions, feelings, impressions (subjectivism). This continuum is represented by the outer ring of the onion shown in Figure 4.3 below (*ibid*).



Based on (Saunders et al., 2015)

Figure 4.3 - Philosophy adapted from The Research Onion

These two types of research are referred to as *Positivism* on the objectivism end of the continuum and *Interpretivism* on the subjectivism end (*ibid*).

4.1.2.1 Positivism

On closer analysis, positivism's underlying assumptions include the belief that the social world can be studied as the natural world, that method of study can be value free and that causal explanations can be provided (Mertens, 2009; Ryan, 2006). It further claims that scientific knowledge is valid, certain and accurate (*ibid*) and that the foundation of knowledge is to be found in observable phenomena understood through formal logic embodied in scientific laws (Lobato, 2008).

There have been criticisms about positivism. It has been challenged on its traditional notion of absolute truth of knowledge (Creswell, 2008), its assertion that what could be studied was limited to what could be observed (Mertens, 2009) and the recognition that it is not possible to be positive about claims of knowledge when studying the behaviour and actions of humans (Creswell, 2008; Mertens, 2009). The subjective manner of perceptions meant this study could not be purely positivist.

4.1.2.2 Realism (Post Positivism)

Realism then enters the continuum as another philosophical position related to scientific enquiry; it assumes a scientific approach to the development of knowledge in terms of both data collection and the understanding of collected data. Realism proposes that what is sensed is reality; objects have an existence independent of the human mind.

Realism exists in two forms; Direct Realism and Critical Realism (Saunders et al., 2015). Direct realism claims that what is experienced through the senses is an accurate portrayal of the world while Critical Realism argues that what is sensed is more of sensations which are representations of reality as opposed to direct reality (*ibid)*. Their stance is substantiated by how often the senses can deceive. Direct realists counter this by citing a lack of complete information; deception occurs because the senses have insufficient information.

The main differences between these two realisms are cited below (*ibid)*:

- Direct realism says the world is experienced only through the thing itself and the sensations it invokes, Critical realism deems this as insufficient and adds a second level which involves the mental processing that occurs after the sensation meets the senses (in essence - *this is reality vs. this is how reality is perceived*)
- Direct realism considers the world as unchanging; it exists on a single level whereas; Critical realism recognises that multilevel study is importance as it provides the potential for change depending on the level studied

Critical realism hereafter referred to as Post positivism thus emerged as a means of countering the criticisms of positivism. Its philosophy is deterministic in that causes probably determine effects or outcomes, reductionist, in that ideas are reduced into discrete sets such as variables for testing and it involves observation and measurement of objective reality (Creswell, 2008). While not discarding the notion of objectivity, post positivism sees objectivity as a regulatory ideal (Lobato, 2008). It also holds no claims to absolute truth (Cooper, 1997; Lobato, 2008; Ryan, 2006) and value free inquiry but believes that progress is made when researchers exercise care in theorising, are critical of theoretical assertions and empirical justifications (Lobato, 2008) and take ethical aspects of research into consideration (Ryan, 2006). Post positivism also does not assume universally generalizable results; it strives for context dependent generalization (Cooper, 1997). The focus in thus on enhancing objectivity and developing accurate explanations of the social world.

Careful consideration rendered this study as Post positivist. Participants perceived reality in various ways with no single set reality. The result of this was a collective perception of reality i.e. while participants had different perceptions of reality, they could reach a consensus on what reality was providing an “accurate” portrayal of how change occurred.

There has been a rejection of the notion of total confirmation of a theory because only a small part of the world is observed and it can never be known if the theory holds in every observable instance (Lobato, 2008; Popper, 1990). This is referred to as the problem of induction. To counter this, Popper proposed the notion of falsification where a researcher looks for instances that are inconsistent with the proposed theory and if these are not found it is concluded that for the present

the theory is corroborated i.e. not confirmed because a subsequent test can falsify the theory (Popper, 1990).

Creswell complementing this emphasises that theories developed before the observations need to be supported or refuted with revisions made before additional testing to ensure that the theory fits (Creswell, 2008). Thus, post positivism unlike positivism does not simply accept results as absolute; it tests to ensure probable validity of the results (Aliyu et al., 2014).

As noted in Section 1.11, the study made the following assumptions:

- The same types of changes are necessary regardless of the type of collaborative practice adopted
- The type of culture in an organisation determines whether collaborative practices can be adopted
- Procurement culture can be determined through an examination of an organisation's culture

These assumptions meant that a level of caution had to be applied i.e. the results of change were observed; they could not be disputed but the process of getting to those results had to be tested. While micro details from participants could be given some latitude because of varying perceptions, the macros had to match to ensure the validity of the results.

4.1.2.3 Interpretivism

The social world is complex. Researchers critical of positivism argue that complexities cannot be reduced to law like generalisations (Saunders et al., 2015). Studying objects and actual humans in the same manner is not ideal or feasible. Humans in their daily roles are defined according to the researcher's set of meanings. As interactions occur with subjects, the researcher's meanings and actions are adjusted accordingly. A researcher has to adopt an empathetic stance, understanding research subjects from their point of view.

This study employed a level of interpretivism. The collected data provided the perceptions of participants from which conclusions could be drawn. The various discussions engaged in through interviews also enabled the adjusting of assumptions and understanding of the change phenomena

being studied. The Epistemology is thus defined through the adopted philosophy stance as will be shown in Table 4.1.

With the ontology and epistemology defined, the final dimension of philosophy is that of axiology.

4.1.3 AXIOLOGY

The *Axiology* dimension looks at what the researcher values in the study (Saunders et al., 2015). Values play an important part in determining the credibility of the research (*ibid*). The philosophical choice and data collection techniques reflect the researcher's values (*ibid*).

Values are important to both the researcher and research stakeholders as they encourage awareness of the value judgements used in drawing conclusions from the data (*ibid*). These judgements can result in drawing conclusions that are different from researchers with different values. In this study, the researcher noted that there would be bias based on the observed "success" of the projects WCPD embarked on. The researcher acknowledged there would likely be a varnished perception on the change that occurred, but regardless valued understanding how change occurred. Document analysis proved useful as a means of validating what participants said. This meant, they could be as positive as they liked with the understanding that follow ups were possible when their narrations were compared with other data sources.

In summary, the research followed a post positivism approach (critical realism). While there is only one route that was followed for change, it is not only the facts that were under consideration, feelings and perceptions were also required from participants. The responses could be viewed as multi-levelled as they were from different types of respondents who were at different levels within projects.

The philosophical differences are reflected in Table 4.1 below with a summary provided on what the study entailed

Table 4.1 - Positivism vs. Post positivism Adapted

Issue	Positivism	Post Positivism	This Study
Ontology	Naive realism - "real" reality but apprehendable	Critical realism - "real" reality but only imperfectly and	Post positivist, perceptions on the reality of what the change process consisted of

Issue	Positivism	Post Positivism	This Study
		probabilistically apprehendable	
Epistemology	Dualist/objectivist: Findings true	Modified dualist/objectivist; Critical tradition/community; findings probably true	Both objectivist and subject – context matters Collective narrative detailing change
Methodology	Experimental/ manipulative; Verification of hypotheses; Chiefly quantitative methods	Modified experimental/ manipulative; Critical multiplism; Falsification of hypotheses; May include qualitative methods	Qualitative methods Varying perceptions of the change process
Axiology	Propositional knowing about the world is an end in itself, is intrinsically valuable	Propositional knowing about the world is an end in itself, is intrinsically valuable	Understanding the change process is most valuable to this study

Adapted from (Saunders et al., 2015)

4.1.4 Research Paradigms

The research philosophy can also be defined using paradigms.

> A paradigm is defined as "a way of examining social phenomena from which particular understandings of these phenomena can be gained and explanations attempted" (Saunders et al., 2015).

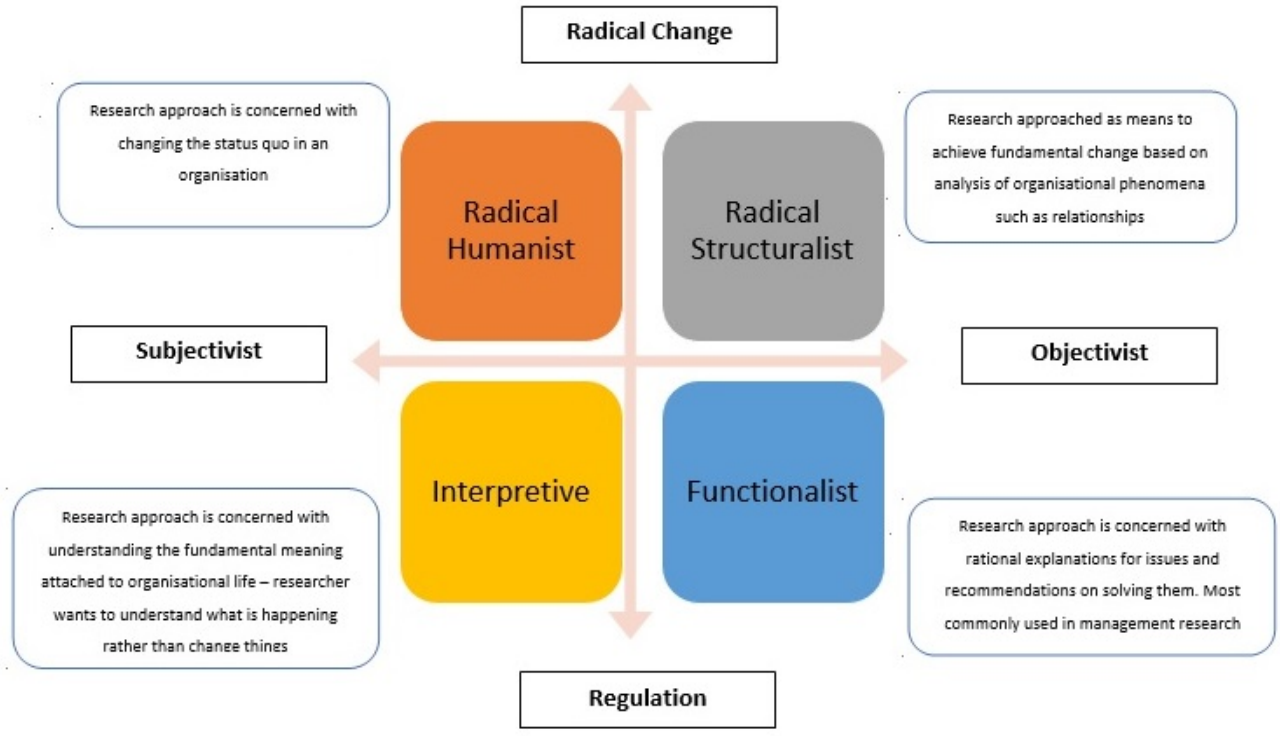
Burrell and Morgan define management and business research in four categories which can be represented as a matrix (*ibid*). They developed these categories as a means of representing the major belief systems in social science based on ontology and nature of society views (*ibid*).

Subjectivism and *Objectivism* make up the first dimension and their definitions do not change from those discussed in Section 4.1. Within the second dimension, *Radical change* relates to judgements about how organisational affairs should be conducted and suggestions on how these affairs may be conducted to make fundamental changes to the normal state of things – it is a critical perspective of organisational life with the intention of overturning current affairs (Saunders et al., 2015). *Regulation* on the other hand seeks to explain how organisational affairs are regulated and offers suggestions for improvement within operating framework. It is less judgemental and critical with the intention of working within the existing state of affairs (*ibid*).

The purpose of these four paradigms is to

- Help researchers define their assumptions about their nature of science and society views
- Provide a way for researchers approaches to their work to be better understood
- Help researchers create a roadmap for their research so they understand the possibilities of their research

It is helpful to know exactly what the research intends to accomplish. When considering the categories as defined in Figure 4.1, the research follows the interpretive category as there was a need to understand what happened. In essence it fell between the subjectivist and regulation paradigms



Adapted from (Saunders et al., 2015)

Figure 4.4 - The four paradigms

4.1.5 Research Approach

The extent to which research is clear about theory has an important impact on the research design (Saunders et al., 2015). Based on the reasoning adopted, the most common approaches are

deductive, inductive and abductive. These approaches form the second part of the onion layers. It is important to understand the research approach as it provides a clear picture of the reasoning from which the research starts.

Deductive reasoning occurs when logical conclusions are reached based on a set of premises; the conclusion is true when all premises are true. On the other hand, *Inductive reasoning* occurs in cases where a gap exists between the conclusions and premises observed; the conclusion is judged as supported by observations made. The third approach, *Abductive reasoning* starts with observing a surprising fact which becomes the conclusion and not the premise (Saunders et al., 2015). From this conclusion premises are derived that are judged as sufficient for explaining the conclusion. These approaches are summarised in Table 4.2 below and will be studied in detail individually.

Table 4.2 - Deduction vs. Induction vs. Abduction

	Deduction	**Induction**	**Abduction**
Logic	When premises true, the conclusion must also be true	Known premises used to generate untested conclusions	Known premises used to generate testable conclusions
Generalisability	From general to specific	From specific to general	From interactions between the specific and general
Use of data	To evaluate propositions or hypothesis	To explore phenomenon, identify themes and patterns then create conceptual framework	To explore phenomenon, identify themes and patterns then create conceptual framework and test through subsequent data collection
Theory	Theory Falsification or Verification	Theory Generation and Building	Theory Generation or Modification

Adapted from (Saunders et al., 2015)

4.1.5.1 Deduction

Deduction involves developing theory that is then subjected to rigorous testing through a series of propositions(Saunders et al., 2015). It has several characteristics (*ibid*):

- It seeks to explain causal relationships
- Develops theories that are tested using hypothesis
- While it commonly uses quantitative data, it can use qualitative too
- Uses highly structured methodology to enable replication and thus ensure reliability

- Concepts need to be operationalised, so they are measurable (accomplished using reductionism)
- Results should be generalisable (possible through careful sample selection and a sufficiently sized sample)

While the research was not purely deductive in nature, it did have deductive characteristics. Initial theories were formed and expected to lead to relevant data that needed to be collected (Yin, 2010, p. 94). The study included concepts that were operationalised such as collaboration and culture. It also had results that could be generalised i.e. while change happened one way, that process cannot be generalised; the results instead helped create a generic model for change that could be generalised.

4.1.5.2 Induction

Induction is an alternative approach to developing theory. Unlike deduction, it does not seek to prove or disprove a theory, it embarks on research in order to develop theory or a conceptual framework about the studied phenomena.

Induction came about as social sciences emerged in the twentieth century. Researchers were wary of deduction because of the following reasons:

- It enabled cause and effect links to be made with no understanding of the way humans interpreted their social world
- Its tendency was the construction of a rigid methodology that failed to take into account alternative explanations of observed phenomena
- Where alternative explanations were suggested, these were limited by the highly structured research design

Induction has specific characteristics that differentiate it from deduction:

- It focuses on the context where phenomena are observed as opposed to generalisation
- Smaller sample sizes are used in comparison to deduction
- Commonly uses qualitative data

- Tends to use a variety of data collection methods to enable different views of observed phenomena

The inductive characteristics of the study included a focus on context, in this instance a critical case that could possibly be used to create a generic model for change. Various collection methods were also used, in this case semi structured interviews and archival data in the form of documents.

4.1.5.3 Abduction

Abduction on the other hand works as a combination of both deduction and induction (Saunders et al., 2015). Instead of moving from theory to data or data to theory, it moves back and forth between the two. As noted by Saunders et al, this approach tends to be common in business and management research.

A comparison on the typical process of abductive reasoning (*ibid*) is provided in comparison to the reasoning of this study in Table 4.3 below:

Table 4.3 - Abductive reasoning of the study

Abduction	**This Study**
Observation of a surprising fact	Successful projects through collaborative procurement
Working out of a plausible theory	Successful adoption of collaborative procurement possible through a corresponding culture change
Required sufficiently rich and detailed data to explore phenomena	In depth interviews with experts and relevant stakeholders involved in change
Resultant themes integrated into conceptual framework	Creation of a generic model of change
Framework tested against existing data and new data revised as needed	Validating of the created model

Adapted from (Saunders et al., 2015)

While it may be assumed that qualitative data implies the use of an interpretivist approach, in this study the observations are taken as 'true' requiring no further in-depth interpretation as to meaning of what is being said. Both qualitative and quantitative data can be used in post positivist research and what the study is focusing on is a single reality not multiple realities on what constituted change i.e. change happened and it could have only possibly happened in a particular way.

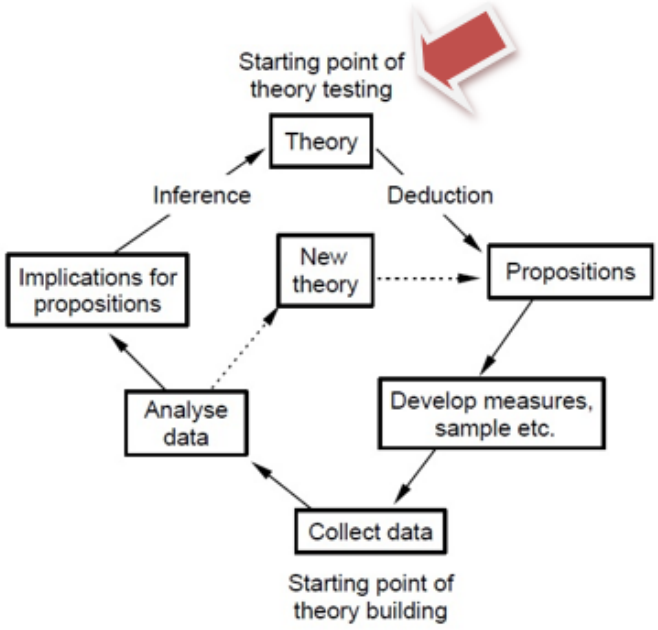
This study had the following propositions which inform the theory (Section 1.8):

a) *Certain pre-existing conditions are necessary for the implementation of collaboration*

b) *There is a clear generic process for changing to successful collaborative procurement*

c) *A culture change is necessary for collaboration to be successfully adopted*

The study thus started with theory testing as shown by the arrow in Figure 4.5 below (New York University, 2016).



Based on (New York University, 2016)

Figure 4.5 - The logic of the research process

Unlike positivism where results after data analysis are accepted as absolute truth, post positivism allowed the revision and testing of theory. In this case, the process of change was detailed, then a model for change was developed after which it was validated by industry experts

It is interesting to note that the philosophical approach was common in studies on collaboration and culture (Table 4.4).

Table 4.4 - Philosophies of various studies

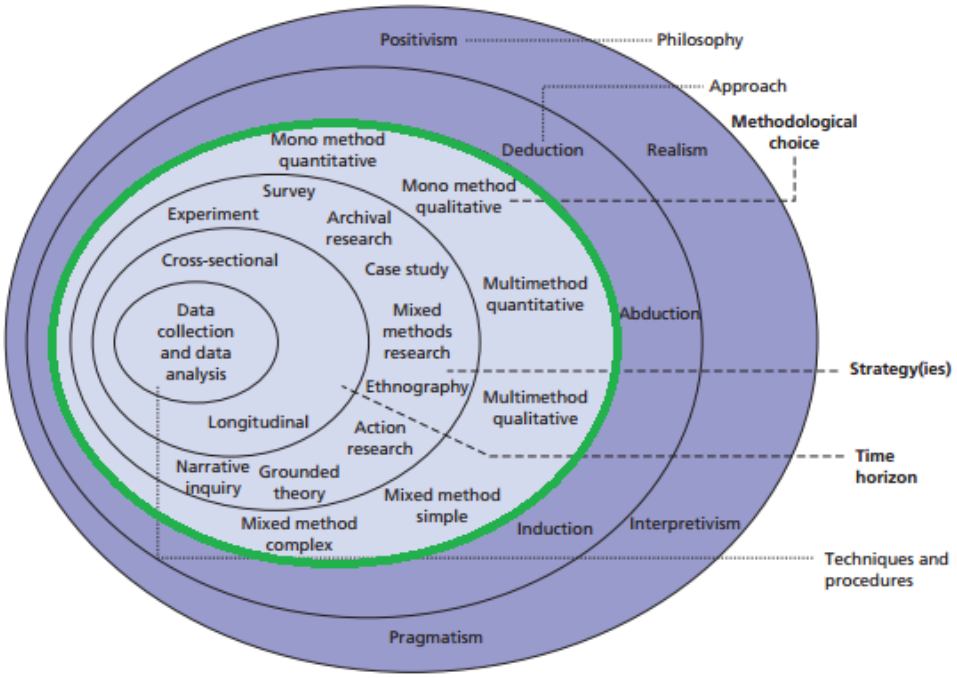
Authors	Study on	Philosophy		
(Ankrah et al., 2009b)	Factors that influence the culture of a project	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Ankrah et al., 2007)		***Ontology***	***Epistemology***	***Approach***

Authors	Study on	Philosophy		
	The cultural profile of construction project organisations	Objective	Positivism	Deductive
(Greenwood and Wu, 2012)	Association between collaborative working and construction project performance	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Chatman and Jehn, 1994)	Industry characteristics and organisational culture	***Ontology***	***Epistemology***	***Approach***
		Objective	Positivism	Deductive
(Bresnen and Marshall, 1998)	Partnering strategies and organisational culture	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Woodland and Hutton, 2012b)	Entry points and strategies into collaboration	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Van Marrewijk et al., 2014)	How collaborative practices can be changed through cultural interventions	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Thomson et al., 2009)	Conceptualising and Measuring collaboration (provides way to measure collaboration)	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Shelbourn et al., 2007)	Planning and implementation of effective collaboration in construction projects	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Mason, 2007)	The views and experiences of specialist contractors (checking if specialists are unwilling and/or unable to participate in partnering arrangements)	***Ontology***	***Epistemology***	***Approach***
		Objective	Post positivism	Abductive
(Chen, 2010)	The role of antecedents and processes in producing well-functioning interorganizational collaborations for social service delivery	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Lozano, 2007)	Collaboration as a pathway for sustainability	***Ontology***	***Epistemology***	***Approach***
		Objective	Positivism	Deductive
(Crowe and Fortune, 2012)	Classifying contractual behaviour in higher education construction projects	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretivism	Inductive
(Challender et al., 2013)	The effects of economic downturn on collaborative working especially in practice and trust in relationships	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Harinarain, 2013)	The organisational culture of the SA construction industry	***Ontology***	***Epistemology***	***Approach***
		Objective	Positivism	Deductive
(Woodland and Hutton, 2012a)	Evaluation of organizational collaborations	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Kumaraswamy et al., 2005b)	Reconstructing cultures for relational contracting	***Ontology***	***Epistemology***	***Approach***
		Objective	Post Positivism	Deductive

Authors	Study on	Philosophy		
(Emuze, 2011)	How to improve project delivery in SA construction	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Ning and Ling, 2013)	Drivers and barriers to relational transactions	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Höök and Stehn, 2008)	The need for cultural change to implement lean principles in industrialised housing production	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Cheng and Liu, 2007)	Org culture relationship to TQM	***Ontology***	***Epistemology***	***Approach***
		Objective	Post Positivism	Deductive
(Zhang and Liu, 2006)	Org cultural profiles of construction enterprises in China	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Bresnen and Marshall, 2000)	Building partnerships	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Hartmann, 2006)	Role of org culture in motivating innovative behaviour in construction firms	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Alam et al., 2014)	Shifting from a contractual to a collaborative public management strategy	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Amirkhanyan, 2009)	Measuring collaborative performance	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Ng et al., 2002)	Problematic issues associated with project partnering from a contractors' perspective	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Nikas et al., 2007)	The antecedents and drivers affecting the adoption of collaboration technologies in the construction industry	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Tookey et al., 2001)	Procurement routes in construction	***Ontology***	***Epistemology***	***Approach***
		Subjective	Interpretive	Inductive
(Walker, 2002)	Successful project alliancing	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive
(Gottlieb and Storgaard, 2006)	Flexible strategic partnerships	***Ontology***	***Epistemology***	***Approach***
		Subjective	Post positivism	Abductive

Where studies were not explicit about their philosophy, this was determined through the methodology characteristics provided in the paper as explained in Section 4.2.

4.2 Methodology



Based on (Saunders et al., 2015)

Figure 4.6 - Methodologies

In simplistic terms, methodologies tend to be quantitative or qualitative. The choice of methodology is an integral part of the research design and is based on the philosophical assumptions of the research. A brief overview on quantitative and qualitative research is provided in Table 4.5 (Saunders et al., 2015).

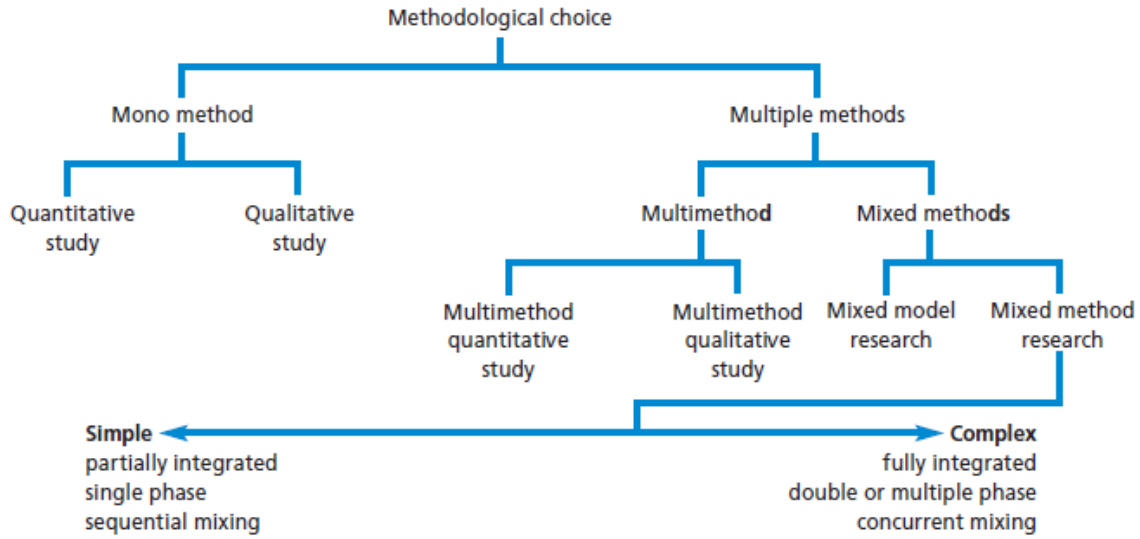
Table 4.5 - Quantitative vs Qualitative

	Quantitative Research Design	Qualitative Research Design	This Study
Research Philosophy	Tends to be Positivist Can be used in Realism and Pragmatism	Tends to be Interpretivist Can be used in Realism and Pragmatism	Post positivist
Research Approach	Tends to be Deductive May also incorporate Induction	Tends to be Inductive Some strategies start with deductive approach Abduction also commonly used	Abductive
Characteristics	Examines relationships between variables Incorporates controls to ensure data validity	Studies participant's meanings and relationships between them	Studied perceptions, feelings, relationships Non standardized data collection

	Quantitative Research Design	Qualitative Research Design	This Study
	Uses probability sampling to ensure generalisability Researcher seen as independent to respondents	Non-standardized data collection Likely to use non-probability sampling Success built on access, rapport and sensitivity to participants	Snowballing
Research Strategies	Associated with Experimental and Survey Research	Action Research, Case Study Research, Ethnography, Grounded Theory and Narrative Research	Case Study, Narrative research

4.2.1 Methodological Choice

It is also possible to use Multiple methods research design where both quantitative and qualitative research design are incorporated.



Based on (Saunders et al., 2015)

Figure 4.7 - The Methodological Choice

The Multiple methods option is being increasingly utilised in business and management research as it overcomes the weaknesses of using only one method and provides wider range for data collection, analysis and interpretation (Saunders et al., 2015). There are various ways of conducting it as shown in Figure 4.7 above.

Multimethod allows more than one data collection technique but the techniques are limited within quantitative or qualitative design – there is no mixing of quantitative and qualitative research (Saunders et al., 2015). Mixed method on the other hand allows the use of both quantitative and qualitative design ranging from simple to complex (Saunders et al., 2012, p. 166).

This study utilised a multiple method, mixed method design. This was in the form of semi structured interviews and document analysis. These two methods were necessary as a means of corroborating the collected data.

4.2.2 Research Strategies

The various combinations of the above-mentioned characteristics lead to the use of a variety of research strategies as shown in Table 4.6

Table 4.6 - Research Strategies

Strategy	Characteristics
Concurrent Triangulation Design	Both quantitative and qualitative methods are used within a single phase of data collection and analysis with results then interpreted together for richer and comprehensive response to research question
Concurrent Embedded Design	One methodology is embedded in another during a single data collection phase e.g. quantitative questions in a qualitative data collection method
Concurrent Embedded Design (Single Phase)	Quantitative and qualitative methods used concurrently (collected separately) with one method used to support the other
Sequential Embedded Design (Double Phase)	Quantitative and qualitative methods used for data collection and analysis one after the after with one used in supporting role
Sequential Explanatory Design	Quantitative method followed by Qualitative method
Sequential Exploratory Design	Qualitative method followed by Quantitative method
Sequential Multi-Phase Design	Multiple phases of data collection and analysis e.g. quantitative to qualitative then another quantitative phase

Adapted from (Saunders et al., 2015)

The study followed a sequential then concurrent design. First were semi structured interviews with FM Heads from public HEIs, followed by semi structured interviews with various stakeholders involved in change done concurrently with document analysis. The study in essence was of a Sequential Multi Phase design.

A number of reasons can be cited for the use of mixed methods design. Saunders et al summarise them in Table 4.7 (Saunders et al., 2015).

Table 4.7 - The use of Mixed Method Research

Reason	Explanation	This Study
Initiation	Initial qualitative or quantitative use may be for defining the nature and scope of sequential research. Can be used as means of providing contextual background	Proving of WCPD as a critical case (See Chapter 5)
Facilitation	During research, one method can lead to discovery of new insights which inform and follow up through use of another method	
Complementarity	May allow meanings and finding to clarified, confirmed or linked	
Interpretation	One method may help explain relationship between variables emerging from another method	
Generalisability	Can establish importance of the study or its generalisability	Establishment of Wits as critical case
Diversity	Allows greater diversity of views informing and reflected in the study	
Problem solving	Alternative method may assist when initial method has inexplicable results or insufficient data	
Focus	Different methods may be used to focus on different attributes in a study	
Triangulation	Used as means to determine corroboration of findings from different methods	Corroboration of information from semi structured interviews with that from document analysis
Confidence	Findings may be affected by method used so greater confidence created through use of another method	

Adapted from (Saunders et al., 2015)

When various methods have been identified for a study, the type of research question is then used to determine the types of study that will be conducted. The study can be exploratory, descriptive or explanatory with answers that are descriptive, descriptive and explanatory or explanatory. These studies are summarised below in Table 4.8 (Saunders et al., 2015). The type of study then informs the research strategies used as addressed in Section 4.3.

Table 4.8 - Types of studies

Study	Question Type	Way conducted	Characteristics
Exploratory	Open questions as means to discover what is happening	Searching literature Interviewing experts In-depth interviews Focus groups	Flexible and adaptable to change Can start with broad focus but narrows with progress

Study	Question Type	Way conducted	Characteristics
Descriptive	Questions asked to determine an accurate profile of events, people or situations	Clear picture of phenomenon required before data collection	An extension or precursor to exploratory research OR A piece of explanatory research (descripto-explanatory studies)
Explanatory	Questions used to establish causal relationships between variables	Study the situation or phenomenon Can utilise statistical research	

Adapted from (Saunders et al., 2015)

This study took on both an Exploratory and Descriptive strategy. It was Descriptive as an accurate profile of events needed to be compiled. Industry experts Hodgson and Watermeyer had deemed the process of change as being that of cultural change. This needed to be confirmed by a collective narrative of change process events. The study was also Exploratory as it focused on determining what happened. This was possible through in-depth interviews with industry experts and relevant stakeholders. The Descriptive strategy was an extension of the Exploratory strategy.

4.3 Research Strategies for Data Collection

There are various strategies available for data collection. These depend on the philosophy, approach and methods used for the study. The study was Post Positivist, more deductive than inductive and utilised mixed methods. Strategies falling outside these demarcations are briefly summarised in Table 4.9 below.

Table 4.9 - Data Collection methods

Data collection Method	Details
Experiment	Tends to study changes in variables – purely inductive This study was abductive and not focused on determining relationships
Survey	Used for deductive research answering what, who, where etc questions For this study, Semi-structured interviews were deemed more in-depth and thus suitable for the type of data required
Ethnography	Typically used to study group behaviour Unnecessary as this study was looking at historical phenomena
Action Research	Iterative process designed to develop solutions to real life situations This study was determining the change process without seeking to change anything
Grounded Theory	Used to create/generate theoretical explanations of social interactions This study was working from theory
Narrative Inquiry	About collecting complete stories

	While there were slight elements of this in the research, the researcher guided the conversation as participants told their narratives of the process of change

Adapted from (Saunders et al., 2015)

4.3.1 Archival Research

This strategy utilises administrative records and documents as a principal source of data. This data does not have to be historical as the name suggests; it is typically secondary data analysis. The data can be utilised as part of the reality being studied.

The research can be exploratory, descriptive or explanatory as it allows questions on what happened in the past and changes that have occurred (*ibid*). It must be noted though that the answers to the questions are constrained by the nature of the analysed documents. Even where records exist, the following may hamper the research (*ibid*)

- The records may not contain the data necessary to meet research objectives
- Data may be missing
- Access may be refused for some data
- Data may be censored because of confidentiality issues

As a rule of thumb, it is best to determine what data exists and design the research around how best to utilise this data.

This study relied on documented evidence to confirm the participant narratives. Archives were especially important in assisting with various timelines and dates. WCPD provided open access to available information conditional of confidentiality as necessary. The Archival Research was in the form of various internal and external reports from WCPD. These documents included reports to the DHET, Internal Review Documents and Close Out documents for projects.

While it was known that it was likely there would be documentation that could contribute to the study, it was not clear what documents would be helpful. It must be noted that the WCPD team was open about sharing any information that would aid in conducting the research even encouraging other participants to share whatever pertained to their work with the relevant WCPD projects.

Identification of the relevant documentation came during discussions with various participants. The WCPD team especially would mention various reports or documents to do with what was being discussed and offer to email these through (something done immediately). Such reports and documents included reports to the DHET, reviews conducted, and the construction policy documents. Other documents such as the DHET Micro Infrastructure Framework used in Chapter 3 were received serendipitously from participants on the relevant committees. It is important to note that these documents were received immediately after being offered leaving no time for them to be edited to suit a particular narrative

4.3.2 Case Studies

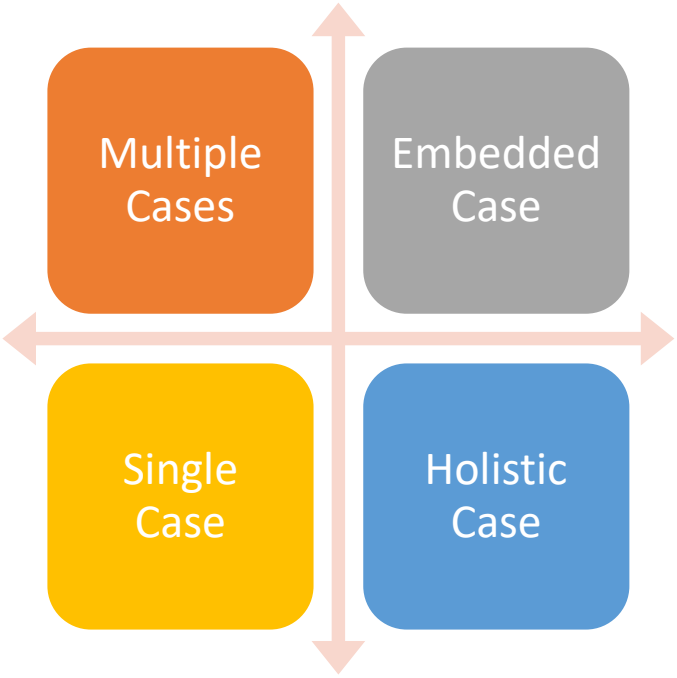
Creswell et al identify Robert K. Yin, Sharan Merriam, and Robert E. Stake are the most influential authors dealing with procedures for conducting Case study research (Rashid et al., 2019). According to Yazan, these three are also noted as the "three foundational methodologists" making or breaking case study design decisions (*ibid*).

In this discussion on Case Studies, it must be noted that Yin will be used as the primary source. Not only does he have high citations for his work, he is also the most recently published of these three authors (Merriam 1988, Stake 1995) with his most recent publication "Case Study Research and Applications" in 2018. He is widely recognised as an authority in Case study research.

Case studies are most relevant when a researcher intends to gain a rich understanding of the context of the research and processes utilised (Saunders et al., 2015). It is different from experimental research in that contextual variables are not highly controlled and different from surveys in that understanding of the context is not limited by the number of variables for which data can be collected (*ibid*).

A case study is used to answer questions involving 'why', 'what', and 'how'. It is thus a good fit for explanatory and exploratory research. It can use quantitative, qualitative or even both research methods for data collection and analysis. Triangulation tends to be a must in case studies as a means of confirming what the data is saying (*ibid*).

Yin identifies four distinct case study strategies based on two dimensions as shown in Figure 4.8 (*ibid*).



Adapted from *(Yin, 2015)*

Figure 4.8 - Case Study Strategies

4.3.2.1 Single Case

Used where there is a critical, extreme or unique case (Saunders et al., 2015). It can be used because it is a typical case or because it allows observation of previously unconsidered phenomena. Where used, the case needs to be defined (*ibid*).

4.3.2.2 Multiple Cases

Used where more than one case exists and focus is on whether replication of results is possible. Literal replication refers to contexts where cases have been carefully chosen based on the assumption that similar results are expected, and this actually occurs (Yin, 2015). Theoretical replication refers to contexts where cases are chosen based on the assumption that there will be a difference based on a deliberately different contextual factor (*ibid*).

It has been proposed that a case study strategy can actually incorporate both literal and theoretical replication. When all cases function as predicted, this works in strong favour of the theoretical propositions (*ibid*)..

4.3.2.3 Holistic vs Embedded

This dimension refers to the unit of analysis. If the research is focused on a single entity as a whole, say an organization then the research is holistic (Saunders et al., 2015). If instead the research focuses on subunits within the entity e.g. in an organization this could be departments, then the research is embedded as it involves more than a single unit if analysis.

A single case study may also have an embedded design meaning there is more than one unit of analysis and these "subunits" form part of the study (Yin, 2015). The use of either a single holistic design or a single embedded design has its challenges. These are detailed in Table 4.10 below:

Table 4.10 - Holistic vs. Embedded Design Adapted

Single Holistic Design	**Single Embedded Design**
Study may end up conducted on an abstract level	Study may end up focusing on the subunits and fail to return to larger unit of analysis
The nature of the study may shift, and a different orientation emerge without the researcher being aware	Can end up with original phenomenon as context as opposed to target of the study

Adapted from *(Yin, 2015)*

In general case studies while intensive and demanding, are useful for the following (Yin, 2015):

- Exploring existing theories
- Challenging existing theory
- Providing a source of new research questions

The type of case study to use is dependent on the research being conducted.

An embedded Case study was carried out with WCPD as the main unit and the two New Universities as embedded cases. WCPD managed Phase 1 procurement for the latter when they were being constructed. Semi-structured interviews were carried out in the Case study

It is also important to understand the manner in which other researchers have approached data collection within similar studies. Several studies have looked into collaboration, culture and change.

Examples are provided in Table 4.11 below showing the typical data collection strategies in collaboration and culture studies

Table 4.11 – Data Collection in Collaboration and Culture Studies

Authors	Study on	Data Collection
(Ankrah et al., 2009b)	Factors that influence the culture of a project	Qualitative study using semi-structured interviews Quantitative study using a survey
(Ankrah et al., 2007)	The cultural profile of construction project organisations	Quantitative study using a questionnaire survey
(Greenwood and Wu, 2012)	Association between collaborative working and construction project performance	Multiple case study using interviews
(Chatman and Jehn, 1994)	Industry characteristics and organisational culture	Quantitative study using the Organizational Culture Profile (OCP)
(Bresnen and Marshall, 1998)	Partnering strategies and organisational culture	Case studies with semi-structured interviews
(Woodland and Hutton, 2012b)	Entry points and strategies into organizational collaboration	Quantitative and qualitative study using the Levels of Organizational Integration Rubric
(Van Marrewijk et al., 2014)	How collaborative practices can be changed through cultural interventions	Ethnography
(Thomson et al., 2009)	Conceptualising and Measuring collaboration (provides way to measure collaboration)	Mail questionnaire sent to directors of orgs participating in large national service program
(Shelbourn et al., 2007)	Planning and implementation of effective collaboration in construction projects	Semi structured interviews, workshops, questionnaire and literation review
(Mason, 2007)	The views and experiences of specialist contractors (checking if specialists are unwilling and/or unable to participate in partnering arrangements)	Questionnaire and semi structured interviews
(Kwawu and Hughes, 2005)	The impact of relational contracting on the construction industry (Empirical study was to be done)	Case study using semi structured interviews
(Watermeyer, 2013)	Value for money in the delivery of public infrastructure (industry expert)	Industry Expert
(Chen, 2010)	The role of antecedents and processes in producing well-functioning interorganizational collaborations for social service delivery	Survey Used revised Thomson dimensions

Authors	Study on	Data Collection
(Lozano, 2007)	Collaboration as a pathway for sustainability	Literature – Game Theory
(Van Marrewijk et al., 2014)	Changing collaborative practices through cultural interventions	Longitudinal ethnographic study or public private collaboration in Dutch construction industry
(Crowe and Fortune, 2012)	Classifying contractual behaviour in higher education construction projects	Inductive – case study Interviews
(Challender et al., 2013)	The effects of economic downturn on collaborative working especially in practice and trust in relationships	Qualitative – semi structured in-depth interviews
(Harinarain, 2013)	The organisational culture of the SA construction industry	Competing Values Framework & OCAI – email questionnaire
(Woodland and Hutton, 2012a)	Evaluation of organizational collaborations	Qualitative and Quantitative
(Watermeyer, 2012a) Industry expert	Changing construction procurement culture to improve project outcomes	Industry expert
(Kumaraswamy et al., 2005b)	Reconstructing cultures for relational contracting	Questionnaire Survey
(Emuze, 2011)	How to improve project delivery in SA construction	Mixed mode quantitative survey
(Ning and Ling, 2013)	Drivers and barriers to relational transactions	Questionnaire survey of 104 public projects
(Höök and Stehn, 2008)	The need for cultural change to implement lean principles in industrialised housing production	Questionnaire and case study
(Cheng and Liu, 2007)	Org culture relationship to TQM	Questionnaire
(Zhang and Liu, 2006)	Org cultural profiles of construction enterprises in China	Case study – 5 firms
(Bresnen and Marshall, 2000)	Building partnerships	Case studies
(Hartmann, 2006)	Role of org culture in motivating innovative behaviour in construction firms	In depth case study
(Alam et al., 2014)	Shifting from a contractual to a collaborative public management strategy	Semi structured interviews Secondary data such as government documents & reports + reports from private consultants
(Amirkhanyan, 2009)	Measuring collaborative performance	Semi structured interviews with contract managers and contractors
(Gajendran et al., 2012)	Conceptual approach to studying org culture in construction projects	Literature Review
(Thomas et al., 2002)	The role of project culture in quality outcomes	CVF

Authors	Study on	Data Collection
(Ng et al., 2002)	Problematic issues associated with project partnering from a contractors' perspective	Structured interviews with contractors
(Nikas et al., 2007)	The antecedents and drivers affecting the adoption of collaboration technologies in the construction industry	Semi structured interviews and survey
(Raisbeck et al., 2010a)	Comparative analysis of IPD and alliance contracting	Literature
(Tookey et al., 2001)	Procurement routes in construction	Case study – Elite interviewing
(Walker, 2002)	Successful project alliancing	Longitudinal study of successful building construction projects using project alliancing Survey, semi structured interviews, direct observations
(Gottlieb and Storgaard, 2006)	Flexible strategic partnerships	Qualitative and quantitative research Social survey, interviews of 237 Dutch construction companies
(Cameron, 2008)	A process for changing organizational culture	Lit Review and study of org using CVF and OCAI

As can be observed, different methods have been used for the various studies conducted on collaboration and culture. It is especially of note that "Elite interviews" were carried out. The researcher was fortunate enough to be able to consult with well-known industry experts and stakeholders who were part of the Case study. These elite were targeted for their knowledge and involvement in the functioning of WCPD

The one outlier in the studies was that of the ethnographic study done on the Dutch Construction Industry. It must be noted that the study was longitudinal, measuring the evolution of the industry after reforms pushed through by the Construction Industry collusion scandal. For this study it was necessary to look at changes and their effects over a period of time while the other studies were more cross-sectional. The Cross-sectional studies were a mix of both Inductive and Abductive approaches. This study worked from theory and was both deductive and inductive making it fall in line with other studies on collaboration and culture

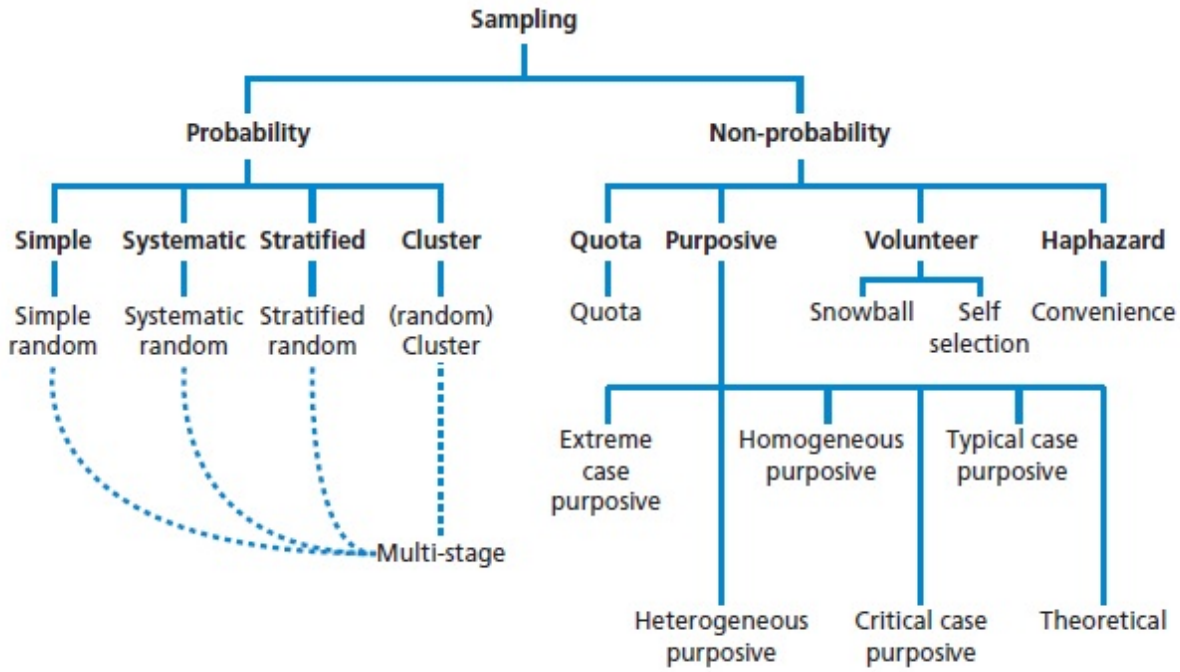
4.4 Population and Sampling

Sampling is a means of representing a select number from the population. It is necessary for several reasons (Saunders et al., 2015):

- Impractical to survey entire population
- Too expensive to survey entire population
- Too time consuming to survey entire population

The researcher needs to ensure they get an adequate and appropriate sample to represent the population.

There are two types of sampling techniques. They are depicted in Figure 4.9 below (Saunders et al., 2015)



Based on (Saunders et al., 2015)

Figure 4.9 - Sampling Techniques

When *Probability Sampling* (also known as Representative Sampling) is used, the probability of each case being selected is known and tends to be equal for all cases (Saunders et al., 2015). It is primarily used in surveys where inferences need to be made about the population (*ibid*).

With *Non-Probability Sampling* on the other hand, probabilities of selection are not known and questions requiring statistical inference will not be answered (*ibid*). It is possible though to still generalise results (*ibid*). Sampling used is shown in Table 4.12

Table 4.12 - Sampling used in study

Stage	Sampling used
Stage 1 – Comparison of WCPD to other HEIs	Originally it was intended that the entire population of public HEIs would be part of the survey. Permission failed to be obtained from all HEIs and it was difficult getting all heads of FMDs to participate, so purposive sampling was utilised with a focus on self-selection sampling. The researcher advertised the need for participants and those who were willing participated in the survey and/or interviews
Stage 2 – WCPD investigation	Purposive sampling was again utilised but at this stage, it was critical case purposive. WCPD has been procuring differently from other HEIs and it was necessary to determine what they accomplished specifically. Within this type of sampling, snowballing was also utilised. Participant PD1 facilitated introductions to those who were involved in the WCPD changes.

The type of study dictated the possible sampling to be done as only a limited number of stakeholders were involved in the change that took place at WCPD

4.5 The Case of Wits Campus Planning and Development

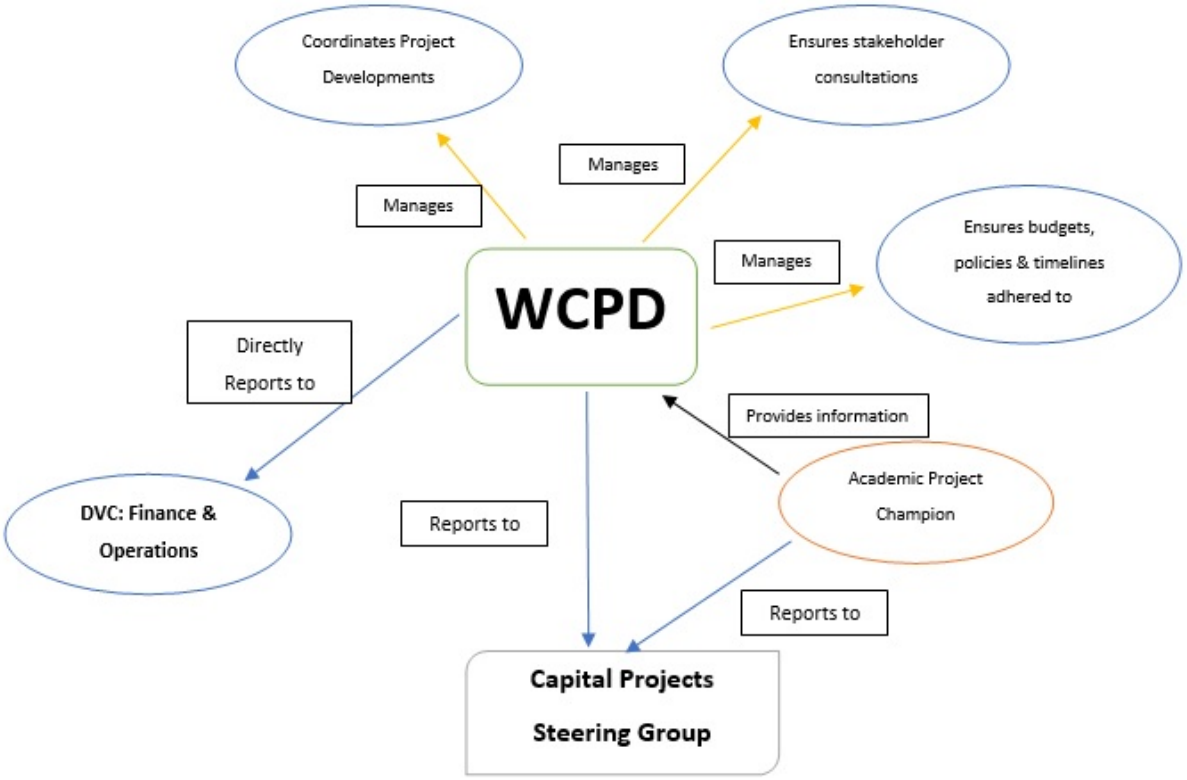
WCPD is the arm of the University of Witwatersrand that deals with capital projects on its campuses. It has evolved since its inception to create permanent capacity for capital projects which for example between 2008 – 2013 were worth R1.5 billion.

Its responsibilities include property development, improved campus access and integration plus urban and rural outreach. The department thus has two main functions

1. The management of campus planning to support the University's long-term goals

2. The management of infrastructure design and implementation to meet the needs of staff and users (WCPD, 2014a)

The structure is shown in Figure 4.10 below *(WCPD, 2014b)*



Adapted from (WCPD, 2014b)

Figure 4.10 - The WCPD Structure Adapted

WCPD is very specific about the values it espouses. In its commitment to delivering value to Wits and its stakeholders, it values the following that are relevant to this research:

- Leadership that applies vision, experience and effort in pursuing best value
- A collaborative approach to project delivery and risk management
- The promotion of new ideas in the search for best practice throughout all the project lifecycle stages
- Building trust and utilising the expertise of relevant stakeholders (WCPD, 2014b)

In the pursuit of best practice, WCPD has employed the use of Framework Agreements. This has provided sustainable jobs, skills development and an improvement in health and safety practices across sites (WCPD, 2014c).

The pursuit for best practice has further led them to innovative and collaborative working as discussed in various papers by Hodgson (Hodgson, 2011). The focus on lowest tender price has been rejected and focus has shifted to best value. WCPD believes best value possible when project team stakeholders work in an integrated system that recognises and rewards performance. They also believe that cultivation of long term relationships results in participants willing to invest in innovation, people and efficiency (WCPD, 2014d).

Another measure implemented for best practice is the use of the NEC contract Option C which is based on target cost and works on a gain share, pain share principle. This promotes performance and efficiency of project teams (*ibid*). This was especially relevant as one of the problems DHET recognised was that of inefficient and sometimes ineffective delivery and procurement of infrastructure projects. As such, the use of a contract with higher chances of project success would definitely be worth investigating.

The pursuit of best value has placed WCPD way ahead of its counterparts at other public HEIs. Their success while implementing new strategies of procurement is worth studying as a means of enabling other HEIs to have a baseline for change especially since they are still stuck on lowest price tendering. The WCPD becomes especially important in light of the new procurement framework from Treasury and the proposed DHET framework (explored in Chapter 3).

Yin though notes that there tends to be criticism of using a single case study. The following sections delve into the issue and aim to justify the use of this single case in this research.

4.5.1 The use of Case Studies in research

An amalgamation of Benbasat and Yin defines case study research as follows:

A case study is an empirical inquiry that examines a phenomenon in its natural setting through the use of multiple methods of data collection from one or a few entities. The boundaries of the

phenomenon are not clear from the start of the research and no experimental control or manipulation is exercised (Benbasat et al., 1987; Yin, 2008)

According to Yin, case studies are the preferred methods when:

- How or why questions need to be answered (type of questions)
- The researcher has no control over any events (extent of control)
- The focus is on a contemporary phenomenon within a real-life context (contemporary or historic focus) (Yin, 2008)

An illustration is provided in Table 4.13 below comparing different research methods using the above-mentioned criteria

Table 4.13 - Comparison of Research Methods Adapted

METHOD	Form of Research Question	Requires Control of Behavioural Events?	Focuses on Contemporary Events
Experiment	how, why?	yes	yes
Survey	who, what, where, how many, how much?	no	yes
Archival Analysis	who, what, where, how many, how much?	no	yes/no
History	how, why?	no	no
Case Study	how, why?	no	yes

Adapted from (Yin, 2008)

This research employed a case study with an exploratory bent. It is useful to note that exploratory studies tend to be versatile as they can utilise any of the methods identified above. This research employs both how and what questions. WCPD managed to successfully change to more collaborative procurement; there was therefore a need to determine this process of change and use it as a means of creating a generic model for change.

This study also looked at contemporary events with no control over behaviours. Change has occurred but unlike histories where there is no access to anyone for verification, this study involved participants who were part of the change at WCPD and could relate their experiences. Case studies are also unique for their ability to utilise different forms of evidence, in this case Interviews and Archival Research

4.5.2 Concerns on Case Study use

Case study research has its detractors. Great concern is expressed over what is viewed as a lack of rigour in research where researchers are sloppy or become biased in the direction of results or conclusions. This is attributed to limitations in available texts on specific methodological procedures.

Another concern is that of limitations in generalising case studies. There are queries over how a single case study can be generalised and the answer provided is that they are "generalizable to theoretical propositions and not to populations or universes" (Yin, 2008). The goal is therefore to "expand and generalize theories (analytic generalization)" (*ibid*).

A third concern is the amount of time case studies take and the purported massive, unreadable documents that are produced (*ibid*). While this could have been true for the way case studies were done in the past, with new ideas on how to conduct case studies, their future is different. The use of ethnography or participant observation tends to increase the timeframe of studies but with the developments in technology, different types of studies can be conducted which reduce time required for research.

The characteristics and applications of case study research are in Table 4.10 below (Yin, 2015)

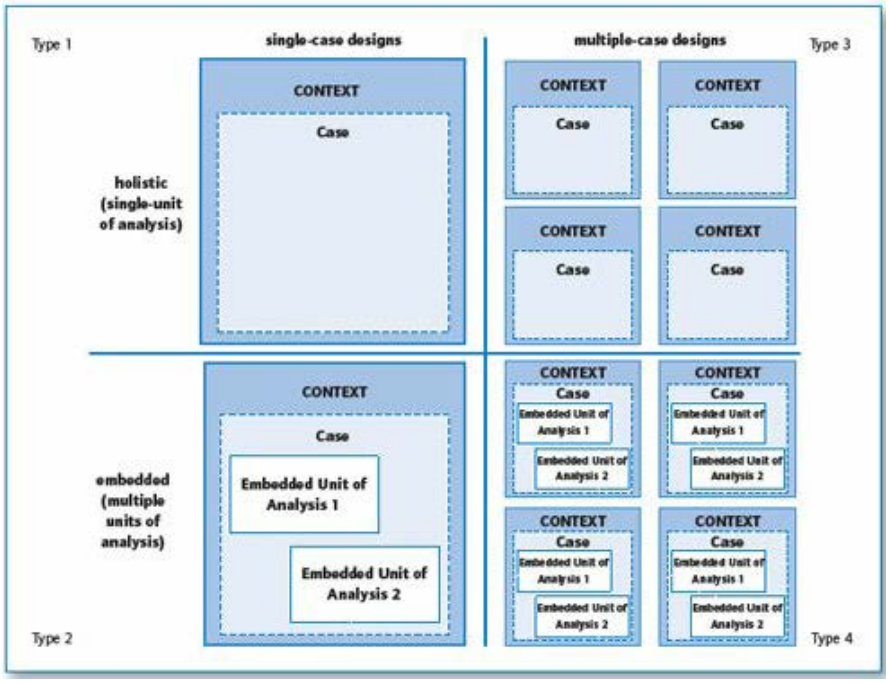
Table 4.14 - Characteristics and Application of Case Studies Adapted

Characteristics	**Application**
o **Single** case or multiple case studies o **Can** include quantitative evidence o **Tend** to be qualitative o **Can** mix both quantitative and qualitative evidence o **Relies** on multiple sources of evidence that triangulate o **Benefits** from development of theoretical propositions to guide research o **Does** not always include direct and detailed observations	✓ **Explaining** causal links in real life interventions ✓ **Description** of an intervention and context in which it occurs ✓ **Descriptively** illustrate particular topics in an evaluation ✓ **Enlighten** situations in which intervention has no clear single outcome

Adapted from (Yin, 2015)

4.5.3 The use of a single Case Study

As discussed in Section 4.3.8 there are four types of case studies. These are illustrated in the Figure 4.11 below:



Based on *(Saunders et al., 2015)*

Figure 4.11 - Types of Case Studies

Unfortunately there tend to be concerns over the robustness of using a Single Case Study; Yin provides five rationales in defence of their use (Yin, 2008):

4.5.3.1 The case study represents a critical case

This study is most relevant when testing a well formulated theory. Propositions and conditions to be met are established. Meeting all conditions can either confirm, challenge or extend the original theory.

This study is based on the premise of a need for cultural change in order to enable successful change to collaborative procurement. Since WCPD was successful, its case can be used to test and validate the premise.

4.5.3.2 The case study represents an extreme or unique case

Typically used in clinical psychology where a condition can be rare, and any single case is worth documenting and analysing

WCPD was the only HEI utilising collaborative procurement in terms of NEC, ECI and framework agreements. Validating its status as unique was possible through the first stage of the research where Wits was compared to other HEIs.

4.5.3.3 The case study as a representative or typical case

With this type of study, the objective is to illustrate the conditions of a typical or commonplace situation. Lessons derived from the case are deemed informative about everyday experiences

Development of a generic model would be useful in guiding other HEIs in implementing change and being aware of the issues they can potentially face. The generic model thus becomes a typical change process guide

4.5.3.4 The case study as a revelatory case

Typically used when a researcher has a chance to observe and analyse a previously inaccessible phenomenon

WCPD was the first to exclusively use NEC, ECI and framework agreements in building projects. Its experience provides invaluable information on how to actually successfully implement new ways of procuring

4.5.3.5 The case study as a longitudinal case

This type of study is used when a single case is studied at two or more points in time. Typically used to determine changes over time

WCPD was studied in terms of projects before the change till after the 1st phase of the NUs. That period marked both the change and replication processes highlighting the evolution of change

4.5.3.6 The shortcomings of a Single Case Study

The major shortcoming of using single case study research is the possibility of the case not being what it was originally envisioned as. Careful investigation is therefore a necessity to minimise misrepresentation (*ibid*).

The WCPD case proved to be exactly what it was envisioned as confirmed by the unique case test in phase 1 of data collection and subsequent data collected from participants and documentation. WCPD successfully changed from traditional to collaborative procurement and its track record and commendation from DHET validate its claims of uniqueness

4.6 Development of the Research Instruments

4.6.1 Time Horizon

Of major importance before the development of the research instruments is a determination of the time horizon to be used in the study. The time horizon is either cross sectional or longitudinal. In simplistic terms, Saunders defines the two as follows; a cross-sectional timeline is a snapshot time horizon while a longitudinal timeline is a diary or series of snapshots (Saunders et al., 2015).

This research used the Cross-sectional time horizon as it sought to determine the process of change WCPD went through as it evolved to a more collaborative procurement strategy. The research instruments had to be developed with this time horizon in mind.

4.6.2 Research Instrument Development

Data was collected in two phases. The first phase looked at the Heads of Facilities Management Departments (FMDs) in HEIs. The second considered WCPD and its project team stakeholders.

FMD heads were required to provide a brief overview of how their departments function. This was a means of determining that WCPD is different. Questions were based on the OCAI instrument and Thomson's collaboration variables

WCPD has completed a number of capital projects since 2009. These include the Science stadium, New John Moffat, FNB and multiple residences such as Wits Junction. They have built a solid work structure system and changed the manner in which they approach procurement. This research

looked into determining what changes took place and how they took place. As such, this information determined what questions were asked.

There were five groups from whom information was required; 1) University Management 2) Program Coordinators, 3) Project Managers, 4) Consultants and 5) Contractors as shown in Table 4.15.

Table 4.15 - Research Questions

Group	Questions to Answer
University Management	What determines client's ability to change?
Program Coordinators	What are critical characteristics of change in projects? How can clients initiate change? What are processes involved in change? What is resulting influence on major stakeholders when change has occurred?
Project Managers	What are critical characteristics of change in projects? What are processes involved in change? What is resulting influence on major stakeholders when change has occurred?
Consultants	What are processes involved in change? What is resulting influence on major stakeholders when change has occurred?
Contractors	What are processes involved in change? What is resulting influence on major stakeholders when change has occurred?

The distribution of these questions determined what questions were asked to each group. The specific questions are attached in Appendix 1.

4.7 Data Collection Protocol

In order to assure reliability of the data, a data collection protocol was followed for all interviews. The protocol was slightly different for the two stages as detailed below.

4.7.1 Stage 1 - Heads of FMDs

FMDs tend to belong to the Higher Education Facilities Management Association (HEFMA). HEFMA has a yearly conference that the researcher was able to attend in 2016 in order to meet with heads of FMDs. Once heads had been met and email addresses/phone numbers received, the protocol followed was as shown in Figure 4.12:

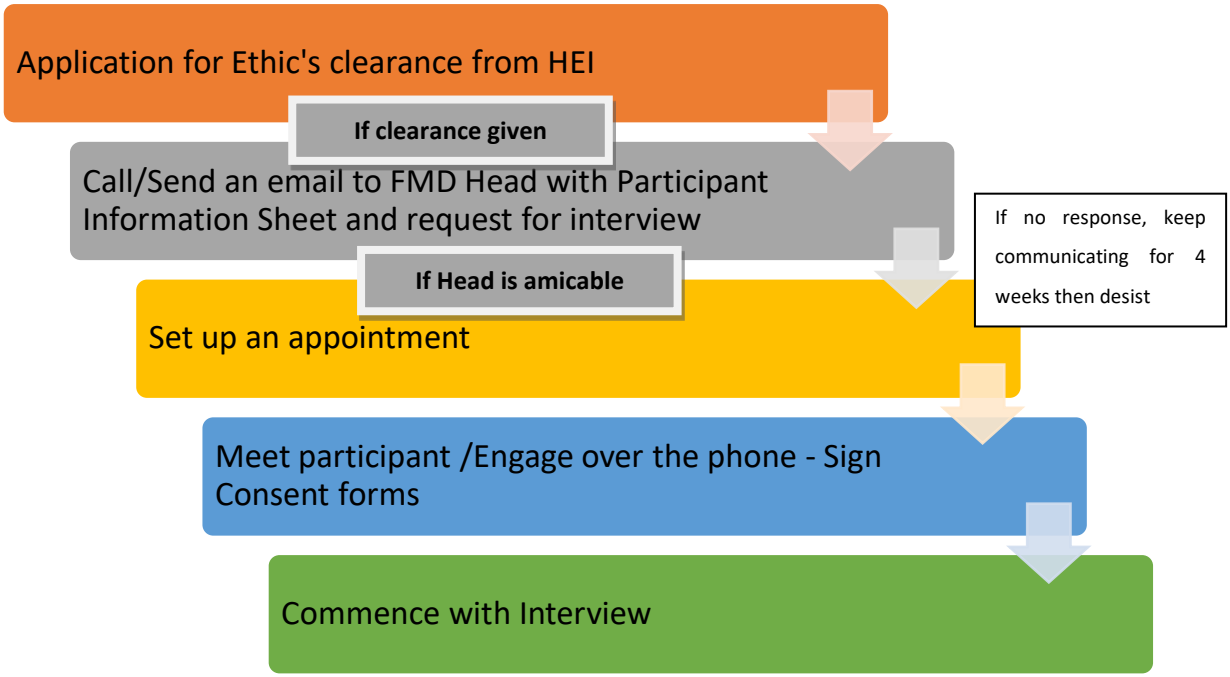


Figure 4.12 - Stage 1 Research Protocol

Difficulties were experienced with getting heads of FMDs to cooperate, hence the use of the obtained interviews as a representative sample of all public universities. This is further explained in Chapter 5

4.7.2 Stage 2 - WCPD and its Project Team Stakeholders

Participant PD1 as the coordinator of the WCPD program was the point of contact. The participant provided information on possible participants and sent through introduction letters. The WCPD provided a letter informing potential participants that they were allowed to reveal information about the projects they were involved in. When responses were obtained, the protocol for all interviews was as follows in Figure 4.13:

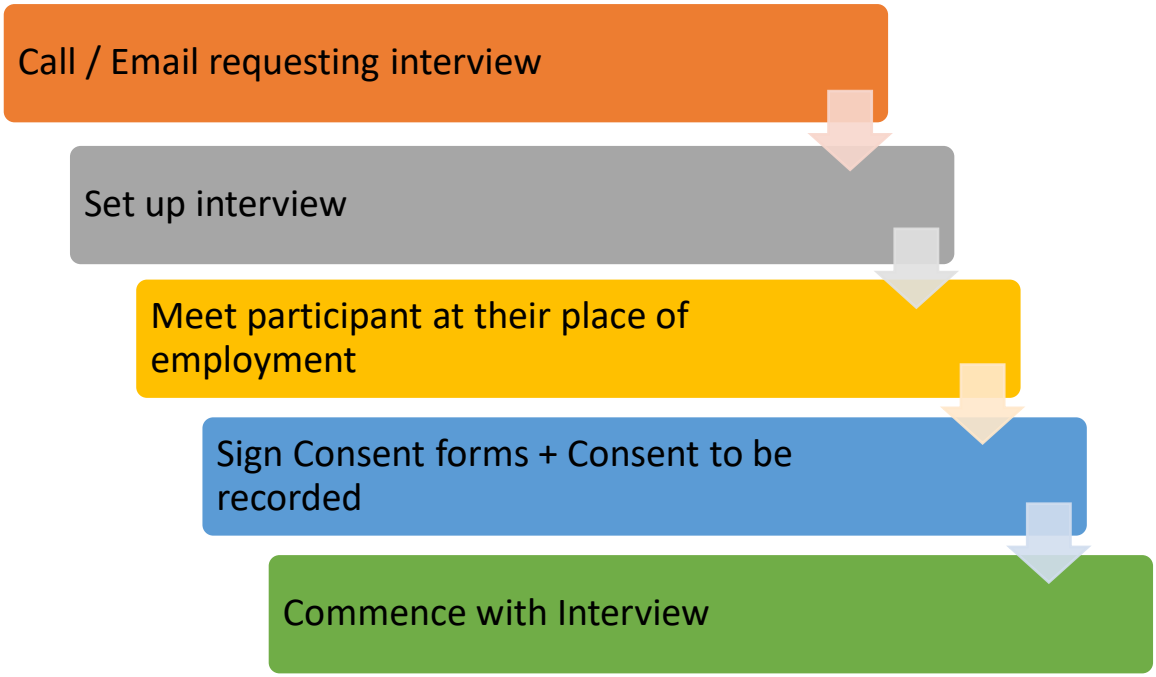


Figure 4.13 - Stage 2 Research Protocol

Introductions from Participant PD1 were very helpful in getting stakeholders to open up and discuss their experiences on WCPD Projects.

4.8 Ethical Risks and Mitigation Strategy

Before any of the research could commence, the researcher and supervisor met with the Wits Legal Department to discuss ramifications of the study. It was agreed that the research would first go through the legal department before being published publicly. This would ensure that there were no negative ramifications for the institution. This meeting was in no way meant to push the research towards a particular narrative but was rather a means of protecting the institution's reputation. It was suggested that if there was any negativity, the research would be made public after a number of years.

Other ethical issues are addressed in Table 4.16 below:

Table 4.16 - Ethical Issues in Research

Collection	Ethical Issue		Solution
Survey	Permission	HEI	Ethics Clearance was obtained from Universities
		Individual	Participants were sent a Participant Information Sheet (PIS) to make an informed decision about participating
	Informed Consent		After studying the PIS, participants had a choice on whether to continue. They also had choice on whether to be recorded where telephonic interviews had to be conducted. Participants were also allowed to stop at any point
	Confidentiality		There is no identification of either the institution or the participant in this report and no provided information was attributed to specific participants without their express consent
	Anonymity		Coding was done for both the institution and participants to ensure they could not be identified.
Interviews	Informed Consent		Participants were sent the PIS and had a choice on whether to continue with interview. They also had choice on whether to be recorded when interviews were conducted. Participants were also allowed to stop at any point
	Confidentiality		There is no identification of either the institution or the participant in this report and no provided information was attributed to specific participants without their express consent
	Anonymity		Though those who have worked with WCPD are on record, coding was done for both the organisation and participants to ensure they could not be specifically identified.
Documents	Permission		The University of Witwatersrand gave permission for the study and WCPD as an organ of the Institution also gave permission
	Confidentiality		No confidential information was noted without express permission

The researcher acted respectfully at all times and did not try to influence or intimidate participants in any manner.

4.9 Validity and Reliability

4.9.1 Reliability

Reliability is a measure of whether the data collection techniques and analytical procedures used would produce similar findings if replicated on a different occasion or by a different researcher (Saunders et al., 2015).

There are various threats to reliability (*ibid*):

Participant Error – any factor affecting normal manner in which participant performs

Participant Bias - any factor which can induce a false response

Researcher Error – any factor altering researcher's interpretation

Researcher Bias – any factor inducing bias in manner in which researcher records responses

One critical threat to reliability was that of participant bias. Change at WCPD was implemented from 2009 meaning a +/- 10-year gap between the time the events happened and actually having to discuss the process of change. In the worst-case memories can be faulty, with participants forgetting important information. Another threat is that of post rationalisation where participants form a collective narrative of the change because it suits the envisioned ideology of change.

Triangulation became an important tool as information provided could be checked against various documents such as reports and reviews. Documentation assisted in verifying dates and sequences. It also proved helpful in prompting the remembrance of previously forgotten details. The case of post rationalisation is further discussed in Chapter 7

4.9.2 Validity

To further ensure the quality of research, test on validity need to be conducted. Validity is a measure of how accurate one's research is. A researcher needs to be conscientious of the following (Saunders et al., 2015):

Construct Validity – the extent to which the research actually measures what it is supposed to measure

Internal Validity – deals with causal relationships and is established when it can be shown that two variables are related causally. Researcher always needs to be careful not to establish relationships that do not exist

External Validity – concerns how generalisable results are

Since the research focused on a Case Study, it was prudent to consider Yin's validity tactics. The tactics and the phase of research in which they should be applied are illustrated in Table 4.17 below.

Table 4.17 - Validity Tactics

Tests	Case Study Tactic	Phase of Research
Construct Validity	Use multiple sources of evidence Establish chain of evidence Have key informants review draft case study report	Data collection Data collection Data collection
Internal Validity	Do pattern matching Do explanation building Address rival explanations Use logic models	Data analysis Data analysis Data analysis Data analysis
External Validity	Use theory in single-case studies Use replication logic in multiple-case studies	Research design Research design
Reliability	Use case study protocol Develop case study database	Data collection Data collection

Adapted from (Yin, 2015)

Table 4.18 below shows how validity, reliability and generalisations were dealt with in this research

Table 4.18 - Validity, Reliability and Generalisability

	Method
Validity	Triangulation of quantitative and qualitative methods Respondent validation through verification of data Iterative Questioning Peer review of research at conferences or workshops (Heugens et al., 2002)
Reliability	Use of Mixed Methods research Use of audio and video recording Careful documentation of data collection and analysis procedures Use of an interview protocol (Heugens et al., 2002)
Generalisability	Lessons learnt can be utilised by other public universities and clients at large interested in making changes to their procurement

The utmost care was taken to ensure that validity, reliability and generalisation criteria were met.

4.10 The use of Anecdotal Evidence

As noted, the research was subjective, participants were encouraged to share their recollections and perceptions concerning change. The research thus utilised anecdotal evidence in its data collection. The following section discusses anecdotal research and its use in the study as a means of showcasing how the process went beyond mere storytelling and was beneficial to building the context behind the change.

4.10.1 Anecdotes

For the purposes of this research, an anecdote is defined as a short narrative of an interesting incident (Banney, 2017) which helps shape historical events into stories which can be perceived as formalized facts (Laden, 2004).

Banney identifies three types of anecdotes (Banney, 2017):

1. Archival anecdotes – a memory with specific relevance to a project
2. Real Time anecdotes – emerge from/about a project situation
3. Speculative anecdotes – extrapolated from a tangible position

These types are used to justify why anecdotal evidence is considered as similar to circumstantial evidence as it is a personal view that tends to be subjective (*ibid*). It then becomes necessary to gather various evidence which corroborates each other as a means of establishing conviction (*ibid*). Laden agrees with this stating that anecdotes subscribe to the protocol objectivity, relying on details and multiplicity of facts making up "reality" (Laden, 2004).

Greenblatt defined anecdotes as a principal product of a culture's representational technology, snatches of reality that are shaped making them viable for telling and retelling (*ibid*).

4.10.2 Controversy on the utilisation of Anecdotal Evidence

While anecdotal research is an important means of providing context, its use has been shunned making it a source of controversy (Moore and Stilgoe, 2009). Tensions exist between scientific, generalizable knowledge and more localized understanding rooted in individual experience (*ibid*). Since anecdotal evidence is individual it lends itself to being subjective. Scientific knowledge focuses on the known with subjective knowledge diminished (*ibid*).

Enkin and Jadad emphasise how anecdotal information should not be considered a replacement for formal research evidence but should rather be used to complement it (Enkin and Jadad, 1998). They also found it important to note that the use of anecdotes to convey ideas and influence behaviour is well established but its use in making casual inferences is controversial. This stance was demonstrated by extensive experimental research which found that when both formal

research evidence and anecdotal information are available and pointing in the same direction, they have a more forceful impact than the consideration of either alone.

Greenblatt also shows how the testimony of a witness is no less subjective than it is objective; the subjective view helps in determining credibility of various participants in research (Laden, 2004).

Hoeken points out how it is expected that statistical evidence should be more convincing than anecdotal evidence (Hoeken, 2001). Various experiments though have concluded that anecdotal evidence is more persuasive than statistical evidence. These reviews led O'Keefe to note that there is a distinction between what constitutes a strong argument from a normative point of view and a descriptive point of view (*ibid*). Weighing in on the discussion, Baesler and Burgoon claimed that a secondary factor made a difference; that of vividness of the evidence (*ibid*). Nisbett and Ross dubbed this the vividness effect. Based on this, anecdotal evidence would be more convincing than statistical evidence as it is simply easier to imagine (*ibid*).

4.10.3 The use of Anecdotal Evidence

The noting of these distinctions then prompts the need for clarity on when anecdotal evidence is best utilised. One interesting example is that of Michael Banney. His PhD constituted a "series of anecdotes that were interesting, testable and concretising" (Banney, 2017). In providing feedback on his work, six panellists provided various comments (*ibid*):

"Do not end up with only entertaining stories

Make connections between things

Use anecdotes that unearth issues beyond oneself

Use anecdotes as a decision-making armature beyond the normalcy of decision making

Use anecdotes about specificities that point to something else

Use the anecdotal approach as a means to operate beyond the personal and inflect upon peers and result in a cultural continuum"

Banney's experience shows that while not common, it is possible to use anecdotal evidence in research especially outside the medical field. As noted by the panellists, it is about looking beyond interesting stories to extrapolating underlying issues and making the needed connections.

In discussing organisational culture, Jemielniak, Przegalinska and Stasik propose that instead of being refuted as unimportant, organisational anecdotes, jokes and short fictional stories should be a core object in organisational culture analysis (Jemielniak et al., 2018). This they concluded was because they provide more insight into culture than the establishment of mere facts.

The researchers propose further that "what happened" is incidental while prevailing anecdotes carry truer meanings. Kostera found that they resemble myths in that they can be true from human experience point of view and untrue from the view of empirical history (*ibid*). Gabriel noted how to deepen the understanding of organizational actors' perception of reality there is a need to break with the "pretence of factuality" (*ibid*). various studies have also acknowledged the usefulness of fiction on organizational life and this has pushed a shift of focus from facts to fiction. The collection of anecdotes thus assists in providing access to the informal culture of an organization and can contribute to a better understanding of the relationship between formal and informal organizational culture. Anecdotes that are common among actors are especially relevant and provide the means for further discoveries (*ibid*).

Jemielniak et al also found that anecdotal evidence is "especially valid in studies of power relations, inequality, professional identity, organizational change and organizational innovations". They are a means of understanding organizational reality.

4.10.4 The use of Anecdotal Evidence in this Research

Anecdotal evidence played an important role in understanding the changes that the WCPD went through. Participants were open about their experiences, sharing various stories to complement the facts from the research. The stories shared reflected the ups and downs of change, challenges that could be laughed about in the present, thoughts on how some issues could have been solved differently; all these experiences would not be very clear from mere facts.

The researcher appreciated that this anecdotal evidence was to be used in a complementary manner with the "facts" or empirical evidence. The panels were especially useful in providing anecdotal evidence as panellists would pick up from each other, explaining issues or pointing out other connected issues. As noted by Banney, there was a need to go beyond just the stories. The anecdotes revealed the informal reactions and culture of all actors involved and provided a vivid story of the change that occurred.

4.11 Data Analysis Strategy

After data is collected, it needs to be analysed in order to get results that have a bearing on the research questions and objectives. Analysis was done over two stages.

4.11.1 Stage 1 Data Analysis

Thomson et al (2007) in their study measuring collaboration determined there are 5 key dimensions of collaboration and they used these five as the unobserved factors to measure collaboration. These dimensions are 1) Joint decision making, 2) Joint operation, 3) Autonomy, 4) Mutuality and 5) Norms/ Building trust (*ibid*). These dimensions have also been identified by other authors such as Bazzoli et al (1997), Thomson (2001), Agranoff and McGuire (2003) and Selden et al (2006) (Amirkhanyan, 2009). The first two address decision making and management responsibility while the last three reflect how committed partners are to sharing resources, fostering trust and altering policies and procedures (Chen, 2010).

By adapting several collaboration measurement instruments, they developed a 56 question (or indicator) questionnaire to gather qualitative and quantitative data on the nature of collaboration, collaboration outcomes, key dimensions of collaboration and basic demographic graphic. They then used a Structural Equation model to determine the relationship between the latent (unobserved) variables and their underlying observed variables. Using a chi-square test, root mean square error of approximation and goodness of fit index they were able to determine the fit of the developed model.

The qualitative data collected in Stage 1 was limited such that SQM, Chi-square, Root Mean Square Error of Approximation and Goodness of Fit could not be utilised. The variables intended for the

survey were instead embedded into the interview questions for FMD heads. The interviews were then able to provide an overview of perceptions concerning collaboration in HEI FMDs. Thematic analysis was used, and these variables were utilised for identifying themes and patterns in the data. On completion of the analysis, the type of procurement culture that each HEI exhibited was shown.

4.11.2 Stage 2 Data Analysis

In this stage, collected data was from both Semi-structured Interviews and Archival Research. All data from interviews was transcribed word for word in order to get an accurate reading of what was said, and copies of relevant documents and reports were made available to the researcher.

Generally qualitative data is analysed through conceptualisation unlike the diagrams and statistics used in quantitative data analysis (Saunders et al., 2015). A standardised manner of analysis of qualitative data does not exist; depending on whether the research is deductive or inductive, analysis may be structured or less structured. The continuum in Figure 4.14 illustrates this concept.



Based on (Saunders et al., 2015)

Figure 4.14 - Dimensions of Qualitative Analysis

This research was abductive in nature meaning the theoretical propositions could be used as a means of devising a framework to direct data analysis. This had the advantage of linking research to the available body of knowledge. This framework was derived through identifying the main variables, components, themes and issues in the research.

4.11.3 Analysing Qualitative data

The semi structured interviews and the documents received were analysed using content analysis as detailed in this section.

According to Saunders et al, a generic manner of qualitative analysis involves the following (Saunders et al., 2015):

1. Identification of categories or codes
2. Attaching data from different sources to the appropriate category or code as means of integrating data
3. Developing analytical categories further for relationship identification
4. Developing testable propositions
5. Drawing and verifying conclusions

Examples of this process are provided in Appendix 2

4.11.3.1 Coding data

At this stage, codes or categories are determined from the data that has been collected. Three ways of deriving the codes include:

- Using terms that emerge during analysis
- Utilising actual terms used by participants in study
- Deriving terms from existing body of knowledge

In this study, there were specific terms derived from the existing body of knowledge. Some terms were also common because multiple participants talked about them. These two methods enabled the deriving of codes.

4.11.3.2 Integrating data

Integration involves attaching data to the categories or codes. This can be done using CAQDAS or manually. The aim and objectives of the research needs to guide this process to ensure that data is reduced into more manageable and compact form (Saunders et al., 2015). This process is in essence, reorganisation of the data

For this study, Microsoft Excel was utilised to match data to the corresponding themes or codes. The spreadsheet was in matrix form, with x-axis representing participants and y-axis representing the codes

4.11.3.3 Identifying relationships

At this stage the researcher is looking for key themes, patterns or relationships in the rearranged data. Revision of categories can occur with integration or further division of categories as analysis is refined

At this stage, the researcher had to investigate possible relationships e.g. by profession. Integration occurred as e.g. various codes were observed to fall within a similar theme or pattern. This process was iterative as after thematic analysis some codes would be found to fit better under a particular theme, or some themes were found to be duplicates. Eventually the data was reduced to the best possible categorisation.

4.11.3.4 Developing propositions and Drawing conclusions

Relationships or patterns found during analysis need to be tested to make definite conclusions. Testing includes seeking alternative explanations or examples not fitting the specific pattern being tested. Validity is thus verified by conclusions being able to withstand alternative conclusions and negative cases (Saunders et al., 2015)

In this study this phase involved determining especially sequencing of events, the most important tasks or processes and important individuals. This phase helped in tying the story of change together.

4.11.3.5 Pattern, Theme and Content Analysis

Thematic analysis requires a core competency of pattern recognition in seemingly random information (Patton, 2002). Content analysis tends to refer to analysis of text (can be e.g. interview transcripts and documents) as opposed to observation-based notes. With its use data is reduced and sense is made of qualitative data to determine core categories and meanings. These core meanings are referred to as patterns or themes.

Where inductive analysis is used, patterns, themes and categories are discovered in the data while with deductive analysis data is analysed according to an existing framework. Qualitative analysis tends to be inductive in its early stages especially when patterns or codes are being figured out. Once these have been established, the final stage of confirmation may be deductive

in testing and affirming validity – this is referred to as Grounded Theorising. Analytical induction on the other hand begins with deduced propositions or hypotheses and is a means of verifying these. The researcher may examine data based on theory (deductive phase) then when this is exhausted look for emerging ideas and patterns (inductive phase).

The crux of Content Analysis is simplifying and making sense out of the complexity of the reality captured in transcripts and notes (Patton, 2002). Keeping this in mind, the researcher noted that the Content Analysis process would be iterative, the five generic steps would have to be repeated based on the original propositions and also emerging themes from the data.

4.11.3.5.1 Testing completeness

It was also important to ensure that the categories were tested for completeness. Patton suggests the following for testing (Patton, 2002):

- Categories should be both internally and externally plausible i.e. individual categories should be consistent, and the set of categories should seem to comprise a whole
- Set should be reasonably inclusive of existing data
- The set should be reproducible by a competent person
- The set should be credible to those who provided the information

4.11.3.5.2 Checking significance

In checking that the categories were significant; the following issues were addressed as suggested by Patton:

- The solidity and consistency of the evidence in support of findings
- The extent to which findings increase understanding of phenomenon being studies
- The extent to which findings are consistent with body of knowledge
- The usefulness of the findings to the intended purpose (in this case creating a framework for change) (Patton, 2002)

4.11.3.6 Analysis using Computer Aided Qualitative Data Analysis Software (CAQDAS)

While analysis can be purely manual, various CAQDAS exist that are purported to make the process simpler. The use of CAQDAS is advantageous in that it can aid continuity and also increase transparency and methodological rigour (Saunders et al., 2015). Different CAQDAS exist and selection tends to be based on ready access. Examples include ATLAS.ti, QSR N6 and NVivo.

The research did not utilise any CAQDAS but rigorous manual analysis was conducted as detailed by Saunders et al and explained above. This was because the use of CAQDAS was observed to be a duplication of what the researcher was accomplishing on Excel. The target CAQDAS was NviVo as it is highly popular and was more easily accessible. Its shortcoming was the fact that the researcher would have had to do all the coding anyway before uploading the data onto NviVo. The researcher was also better able to work with the matrix as the various codes and categories could be printed and examined in detail through manual groupings. Pictures of this manual process are available in Appendix 2

4.12 Summary of Chapter 4

A summary is provided below of the Research Design for this study.

A *Subjective, Post Positivist Philosophy* was utilised for this study with an *Abductive* approach. The abductive approach was both Deductive and Inductive but with a stronger focus on Deduction.

The research was Mixed Method, utilising two strategies; an embedded Case Study and Archival Research. Data collection methods included semi structured which were both sequential and concurrent i.e. Semi structured interviews to confirm that WCPD was a unique, critical case and then semi structured interview with WCPD project stakeholders. Document analysis was conducted at the same time with the latter interviews.

It was necessary to utilise purposive, snowballing sampling as only specific individuals had participated in bringing about change. The snowballing was especially useful when needing to interview external stakeholders.

The data was analysed using thematic analysis with both the interviews and documentation triangulated as a means of confirming and verifying pertinent details. A model for change was built based on this data. Validation was done with the relevant industry experts which corrected the model for change at Wits and enabled the development of a generic, strategic model for change for HEIs intending to change to a more collaborative procurement culture. The models are discussed in Chapter 7.

The research design framework is again provided to show a summary of how the study was carried out.

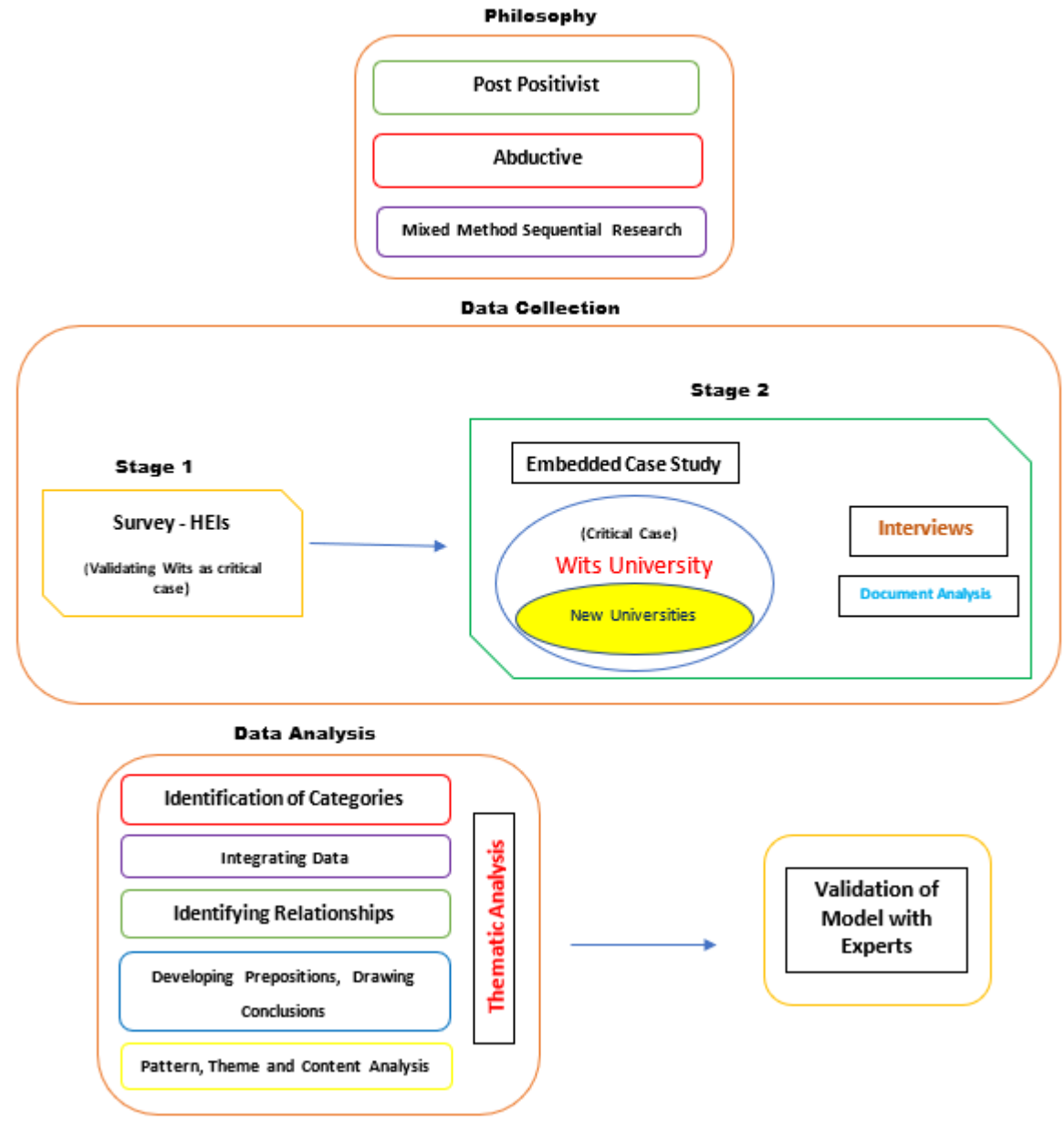


Figure 4.15 - Methodology Framework

5 Validating the Critical Case (Phase One Data)

5.1 Introduction

This chapter is based on interviews conducted with Senior Management of Facilities Management Departments in four public universities (U1, U2, U3 and U4). Two interviews were conducted in person while the last two were through telephonic interviews. The latter was because of geographical proximity to the researcher. Permission was granted for the use of a tape recorder for all participants.

It must be noted that participants were not interviewed in their personal capacity but rather as representatives of their institutions.

The purpose of these interviews was to determine the manner in which HEIs in South Africa procure for their capital projects. While permission was granted to conduct interviews by eighteen universities, only four FM Departments responded to requests for participating in the research giving a response rate of about twenty-two percent (22%).

5.2 Profiles of Higher Education Institutions

In-spite of the response rate, the participants were representative of each of the types of institutions available in South Africa. Participant profiles are shown in Table 5.1

Table 5.1 - FM Departments Participants

Type of Participant	Type of Institution	Participant Code
Head of Department	Comprehensive (offers both theoretical and vocational oriented degrees and diplomas)	U1
Head of Department	Comprehensive (offers both theoretical and vocational oriented degrees and diplomas)	U2
Senior Manager	University of Technology (offers vocational oriented degrees and diplomas)	U3
Senior Manager	Traditional (offers theoretically oriented degrees)	U4

U1 is a comprehensive university with three campuses in one region and other centres in at least 6 provinces. It has a large staff contingent in its FM department with roles from fleet management to space allocation and Capital Projects. This University does not offer student accommodation.

U2 is also a comprehensive university which came into being through a merger with other smaller institutions. While it has four campuses it is only based in one Province. The University offers student accommodation

U3 is a Technikon with six campuses and also based in one Province. It also offers student accommodation

U4 is a traditional University with 6 campuses also based in one Province. It offers student accommodation close to its many campuses.

5.3 Procurement in Higher Education Institutions

Two documents mentioned in Chapter 2 are of great significance in this section. These are the National Treasury Standard for Infrastructure Procurement and Delivery Management (SIPDM) from National Treasury and the University Macro-Infrastructure Framework (MIF). The SIPDM provides insights into creating and implementing infrastructure procurement while the MIF seeks to provide a guideline to Universities concerning procurement. These two documents act as a road map of where public institutions need to be and what they should be doing. It is therefore appropriate to use them as a means of determining where various institutions lie in terms of procuring better. This section looks at the procurement practices of the various universities that have been described above.

The CIDB (SANS 294, 2004) in defining procurement activities states that activities commence once the need for procurement is identified and end when the transaction is completed. The principal processes involved include the following:

1. Establishing of what is to be procured
2. Deciding on procurement strategies to be utilised (contract, pricing and procurement procedure)
3. Solicitation of tender offers
4. Evaluation of received tender offers

5. Awarding of the contract
6. Administering of contracts and ensuring compliance with requirements

These six activities are detailed under the headings provided in the following sections.

5.3.1 Establishing what is to be procured

DHET funding means universities need to have a spatial plan in place that prioritises the greatest needs on campuses. University Councils are involved in decision making with various faculties or departments for example making a case for why their projects require first priority. By the time the FM Department comes into decision making, the projects have been identified and they are overseeing the projects. In the case of Wits, the Programme Manager was a part of meetings to share input, ensure understanding of what needs to be done and to provide feedback on projects.

The MIF advocates for the relevant people to be involved in meetings that pertain to capital projects. Someone from the FM department is in a position to give insight into projects, provide progress reviews and detail problems or risks faced. Different faculties and departments are also encouraged to develop plans that also incorporate the needs of others (departments, faculties etc) on campuses. This highlights the need to better relations between the FM Departments and Senior Management, their role should not be merely that of an implementer but also that of a contributing member of the team.

5.3.2 Deciding on procurement strategies

The procurement strategy is to some extent dependent on the types of consultants that an organisation has in-house. In the case of Wits because they were moving to a more collaborative contract the NEC, they have consultants that are in house and these are the project managers. Other universities such as U1 have mechanical engineers and cost consultants in house, while U2 has principal-agent engineers, cost consultants and designers. While U3 only has project managers in-house U4 actually has all consultants available in house. U4 only calls in externals to assist when they have big or specialised projects. In terms of external consultants, U1 brings in cost consultants and project managers while U2 brings in engineers, U3 brings in all other consultants who are not project managers while Wits brings in mostly consultants and designers.

It was noted that for most of the universities the contract that could be used for projects was set by university policy and in these universities, that involves great use of the JBCC. In addition to this U1 utilised FIDIC while U3 and U4 also utilised GCC.

Two universities U1 and U2 confirmed that they utilise lump sum costing with U1 also utilising BOQ. U2 and U4 also shared how they have actually been involved in PPPs in some of their capital projects. Wits stood out as a university utilising the NEC and target cost contracts.

The MIF emphasises the need for project-by-project assessments of the required procurement strategy. Current strategies tend to be geared towards the use of traditional contracts such as JBCC and GCC. The availability of various strategies implies the use of different ones for different types of projects. The MIF also advocates the development of internal capacity to enable transition to use of other strategies. As noted, most of the universities worked a particular way and because of the personnel they had in the department were able to only approach projects in a particular way.

Wits deliberately decided to utilise the NEC contract. This contract works optimally with Project Managers and thus determined the capacity needed by the department. While they did start off with outsourced PMs, these were later insourced as it was found that outsourcing this role risked a lack of continuation.

Another idea advocated by the MIF is that of PPPs. As noted, several universities were a part of these arrangements. PPPs assist with the raising of funds needed for the infrastructure backlog in universities and it is hoped that more of these will spring up and be utilised.

5.3.3 Solicitation, evaluation of tender offers and awarding of contracts

All Universities confirmed that they use open competitive tender processes. U1 detailed that they utilise a two-stage tender while Wits utilizes a three-stage tender

While most tender evaluations were based on price the Universities also had extra criteria that the utilised. U1 evaluated based on the financial offer and the quality of work produced, U2 also evaluated based on quality and BEE, U3 evaluated based on a point system which also utilised for example BEE, while U4 also evaluated based on BEE and similar work previously done. While Wits did utilise a point system, it also looked at value for money as the most stringent criteria.

The MIF in addressing evaluation of tenders stresses the need for consideration of full lifecycle costs. They encourage universities to look beyond initial costs as they can be misleading. An example is provided of an option with a high initial cost, but low ongoing costs as opposed to one with low initial costs but high ongoing costs. The danger they stressed was that of lowest price procurement vs. that of value for money procurement; lowest price cannot be the most important factor when evaluating tenders.

For projects under specific values (values based on procurement policy), databases were utilised for tenders. All the universities have a vendor list from which quotations are obtained and then dependent on evaluation criteria, a single vendor is selected for a job.

For the costlier projects, by the time the team came into the project, they were cognizant of the roles they were to play within the project. U1, U2 and U3 though terming it differently were all very clear on the fact that a contractor came to build. U1 and U2 stressed that by the time the contractor came into the project everything had been signed off. and they would need to be change orders if contract is brought any changes. U1 did state that contractors were allowed to voice concerns they have, and these would be dealt with through change orders where possible. U2 on the other hand stressed that for contractors it's a matter of sticking to their side of the deal. U3 was very concise "contractors come in to build". U4 had a more congenial attitude to contractors stating that they are allowed a voice and if they have concerns about something serious then the project could go back to the drawing board. Wits on the other hand through framework agreements brought in the contractor during the design stage to do value engineering where possible and brought in contractors as consultants who were equal partners with consultants

The MIF in listing the common problems faced by universities mentions work having to be redone because of poor specifications, project delays because of information delay from designers, scope creep and constant claims from contractors. These problems speak to the point at which especially contractors are brought into projects. The earlier a contractor is brought in, the better they understand the problem, the more input they can provide and the less likely that specifications and delays are problems. This has been experienced in projects by WCPD and while not always possible to do because of time factors, it is helpful when implemented.

5.3.4 Administering of contracts and ensuring compliance with requirements

This section delves into how the project team relates and the processes in place for the team to work well together for the duration of the project.

5.3.4.1 Relationships

The four universities (U1, U2, U3 and U4 were clear on the fact that there were no long-term relationships in capital projects. U1 specified that there was no alliancing done while U3 specified that no framework agreements were ever utilised. U2 did specify that working together long-term was dependent on the type of tender you were selected for, while U4 considered that long term relationships were possibly likely in their maintenance department. WCPD through their policies advocate for long-term, cordial relationships involving both compromise and negotiation.

The type of relationship a contractor has with the project team tends to determine the behaviour of that contractor. Cordiality can lead to less of an "us vs. them" attitude and ensure that the team works together to solve problems and ensure the project progresses well. Literature agrees that the client is supposed to be the driver behind good relationships (Ng and Skitmore, 2002).

5.3.4.2 Risk

The Universities (U1, U2, U3 and U4) had a similar policy in terms of risk. Risks are determined, and risk registers drawn up before tenders are sent out such that by the time the contract commences, everyone knows their allocated risk and has the responsibility to deal with it accordingly. In addition to this, in U2, risk was also assessed monthly. U3 was very clear on the fact that risk such as over runs were the responsibility of the contractor. U4 shared how there was strict use of tender clauses with overruns especially dealt with through penalty clauses. At Wits all parties contribute in the assessment of risk as they believe that working together means less risk. To deal with risks that may arise during the project, the Early Warning System (EWS) from the NEC is utilised.

Literature advocates for risk being placed on whoever is best able to handle it in the project team (Bowles and Morgan, 2016; Memon et al., 2015; Nukic and Huemann, 2016; Osipova, 2015). Traditional methods such as those used by the four universities tend to load most responsibilities

on the contractor regardless of his ability to handle them. This creates an environment where to carry the risk, the contractor comes up with strategies to ensure they make money from the project.

It is also true that not all risk can be identified by a single party right at the start of the project; this can put the client at risk (Snippert et al., 2015). Considering that contractors are the best buildability experts, it is expected that they would be best suited to help draw up the risk registers.

WCPD reported that working with contractors and the EWS helped them address risks quickly with everyone working to avert any possible disasters or distractions.

5.3.4.3 Conflict

All participants agreed that litigation was never a good thing, and they took time to avoid situations that could bring it about. For U1, they identified that conflict happened when the client wanted more than the contractor could give. The solution to conflict was having frequent meeting so everyone was working from the same understanding. U2 on the other hand utilised its project managers to manage the team and limit any litigation. U3 also utilised project managers in terms of resolving conflict with the escalation and contract clauses used when necessary. U4 indicated that it always preferred arbitration to litigation. Wits was proud to announce that it has not had any big disputes in the last 10 years, they follow a process of remediation, arbitration then litigation if all else fails.

A high percentage of conflict cases in construction end up in litigation. This occurs as everyone if trying to get a one up on the next project team member. Cordial, equal relationships play a big role in reducing conflicts. When contractors work in an environment where they are treated well and as equals, they are able to voice problems and focus on resolving them without litigation

5.3.4.4 Collaboration

U1 and U2 related how they would need to be a policy revision in order to implement collaborative working in their projects especially in terms of framework agreements, incentives and early contractor involvement. At both universities policy does not allow for this. While U2 did utilise contractors for value engineering on some projects, there was a distinct lack of trust of the contractor as contractors were not allowed to know how much was budgeted for the project. U3

did not provide incentives they did state that they have informal early contractor involvement if there's specific work or specialised work that needs to be done; this is the only time contractors can be called in to assist early. For U4, ECI took place only if a contractor was available as the principal agent. They also practiced an informal type of ECI if specific help was sought for a project. While they did not have FAs, they do have preferred consultants to work with. Wits championed collaborative processes through their use of ECI, Framework agreements and incentives as appropriate in their projects. It was also found that unlike the other universities, Wits actually has a construction procurement policy that is separate from goods and services procurement

Various advantages are cited from the use of ECI, Framework Agreements and Incentives. These processes promote collaboration, improve trust, commitment and even productivity of the project team (Ankrah, 2009a). In essence they create a more cordial working environment with the team working towards the same goals and looking to ensure everyone benefits. As shown by the comments of the various universities, their current type of procurement is not about mutual benefit or consideration and at times, contractors are treated as the greedy enemy.

5.3.4.5 Challenges faced

For two of the University's namely U1, U3 and U4, the biggest issue was that of red tape especially when any changes needed to be implemented. U1 also found that policies at the university took too long and there was a need to actually shift from goods procurement to construction procurement. The major challenge also noted was the fact that cost is only realised at the end of the project and this tends to result in shortfalls. U2 seems to have had bad experiences with contractors as they noted how you constantly have to watch the contractors to make sure they do not cheat you or create scope creep. They emphasized how they constantly struggle to stick to the budget. U4 also noted the need to change current systems or policies that are in place. They cited how are times when costs get too high projects can be canned. While it is true that Wits worked differently, it did not mean that it did not face challenges. The use of the NEC contract brings with it a huge administrative load which is something it's uses have to incorporate into their budget and their time. Wits also noted how working under pressure because of things like University opening

times can prevent optimal contribution from contractors as there is limited time to implement their suggestions.

5.3.4.6 Implementing change

Participants were then asked whether they could consider change or could actually be in a position to implement change. The common response was how current policies and structures do not allow such changes. Both U1 and U2 showed interest in implementing ECI citing the advantage of early and cordial relationships with contractors. U1 did mention that moving to the NEC could be challenging because of the amount of administrative work involved as they do not have capacity to deal with it. U4 on the other hand mentioned that incentives would be something interesting for them to consider. Since Wits is already involved in collaborative working for them potential change involved the possibility of introducing more integration between the capital projects and maintenance divisions especially when it came to handover of projects as collaboration seemed to be lacking at this phase

The MIF details the fact that the procurement department cannot apply a one size fits all policy when it comes to infrastructure procurement. The need for a separate policy is what spurred the need for the MIF. Current policies are so rigid they only allow a particular type of procurement to take place. Flexibility is needed and as noted by the various tables in the MIF, different scenarios require different procurement strategies. Consistently procuring in only one-way limits what can be done to improve projects and performance.

Table 5.2 provides a summary of the characteristics of each university. As can be seen, some characteristics are generic to the current construction environment

Table 5.2 - Collaboration level of Participants

Characteristic		U1	U2	U3	U4	Wits
Functioning of FM Department		Separate divisions for projects and maintenance	Has central office with 5 directors – projects, maintenance, property management, site services	Has a central office dealing with infrastructure and maintenance	Has main capital projects department that deals with projects greater than R1 million	Has a department for maintenance and a separate one for capital projects
Consultants	**Inhouse**	Mechanical Engineers, Cost Consultants	Principal Agent, Engineers, Cost Consultants, Designers	Project Manager	All consultants available inhouse	Project Managers
	External	Cost Consultants, Project Managers	Engineers	All other consultants	With big projects can have externals called in to assist e.g. PMs	Cost Consultants, Designers
Procurement	**Contract**	JBCC, FIDIC BOQ, Lump Sum	JBCC, lump sum Have had PPPs	JBCC, GCC	JBCC, GCC Have had PPPs	NEC Target Cost, BOQ
	Tender	2 Stage Tender Evaluated on financial offer and quality	Public tender Evaluation mostly based on price, quality, BEE	Open competitive tender process with points system based on e.g. BEE, cost	Open competitive Depending on project, evaluated based on e.g. BEE and similar work done	3 stage-tender
	Contractor	By time they join in everything has been signed off and further changes need change order Contractor there to build Allowed to voice concerns	While contractors allowed to come in with suggestions, by the time they are involved everything is done and its matter of sticking to their side of the deal	Contractors come in to build	Allowed a voice, can go back to drawing board if concerns serious	In Framework Agreement, they are brought in during design stage, functioning as equal partner with all consultants. Used in value engineering
	Partners	Have consultants known for good work who are on database	Have vendor list. Updated every 3 years With consultants tend to have same ones	Have vendor list on database for projects under R500K	Have vendor list. Projects with value above vendor list threshold are put on open tender	Have Framework Agreements which mean an agreement for 3 years
Relationships		No alliancing, no long-term relationships	Long term dependent on being selected for tender	No long-term relationships, no FAs	No long-term relationships in capital	Long term, cordial relationships with

Characteristic	U1	U2	U3	U4	Wits
	Trust and respect are a 2-way street	Contractors never know total budget as they tend to aim for that	Possible to work with same partner if they win tender	projects. Possible likely in maintenance	compromise and negotiation
Risk	Risk register developed before tender sent out	Risk determined upfront then assessed monthly Each party responsible for their own risk	Everyone has allocated risk in contract which is their responsibility Overruns etc are responsibility of contractor	Tender document clear on risks and consequences. Strict use of tender clauses Overruns dealt with through penalty clauses	Early Warning System from NEC utilised. All parties contribute in assessment of risk. Working together means less risk
Conflict	Contained through regular meetings Conflict when client wants more than contractor can give Can result in litigation	Project Managers manage the team in quest to limit litigation	Project Manager in charge of resolving conflict, with escalation, contract clauses are used	Arbitration preferred to litigation	Have a remediation, arbitration, litigation process No big disputes in last 10 years
Collaboration	No incentives, ECI or FAs Would need policy revision to implement	The university policy does not allow collaborative working especially in terms of FAs and ECI Have PMO so projects managed inhouse Contractors help with value engineering	No incentives Have informal ECI if there is a specific thing that needs specialised work then contractor called in to assist	ECI if contractor is available as Principal agent, can have informal ECI if specific help is sought for project No FAs, just preferred consultants	ECI, FAs and incentives Have construction procurement policy
Challenges	Too much red tape, processes take too long and need shift from goods procurement to construction procurement Cost realised at end of project and can result in shortfall	Have to work closely with contractors to prevent them cheating and getting scope creep. Try very hard to stick to budget.	Red tape for any changes that would be envisioned	Need changes in systems Red tape depending on type of changes that need to be made. If cost too high projects can be canned	Though necessary, NEC has huge administrative load University problems mean teams working under pressure which at times prevents contractors from contributing as well as they can

Characteristic	U1	U2	U3	U4	Wits
Possible Changes	ECI not a bad idea but current structure does not allow Move to NEC challenging as would involve more administrative work for which they have no capacity	ECI seems a viable option as you get better relationship with contractor; but current policies do not allow	Changes not really viable at the moment	Incentives would be something interesting to consider	Need more integration between capital projects and maintenance especially when it comes to handing projects over

Keeping these characteristics in mind, it is simple to go back to the table of collaborative practices from Chapter 3 to determine how collaborative the universities are.

** Those with an asterisk denote a partial/informal implementation of the practice

Table 5.3 - Collaboration level of Participants

Collaborative Practice	**University**				
	U1	**U2**	**U3**	**U4**	**Wits**
Long term relationships		*	*		✓
Joint problem solving	*	*		✓	✓
Shared goals					✓
Sharing of rewards					✓
Leveraging technology					
Increased coordination					
Information sharing					✓
Trust					✓
Informal dispute resolution	*			*	✓
Close relationships	*				✓
Innovation					
Learning					✓
Strategic relationships				*	✓
Using preferred contractors					
Use of KPIs					
Value based procurement					✓
Flexibility					✓
Use of NEC					✓
Use of Framework Agreements					✓
Joint communication					
Early involvement of Contractors					✓
Equitable allocation of risk					✓
Joint evaluation and monitoring					
Interdependence of parties					
Structured documentation					✓
Less competitive tendering					✓
Sharing resources					

From the conducted interviews, it is clear that WCPD works in a more collaborative manner than its counterparts. While participants like U2 would like to shift to more collaborative working, they have to wait for policy to catch up with current procurement trends

5.4 Government

The last two years have seen a push for better efficiency and efficacy in infrastructure projects. This has been part been influenced by the current state of the CI and the diminishing funds available from government. Wits has a reputation for bringing projects in on time and budget; all their yearly audits come back clean. They have also managed through value engineering to drastically reduce the cost of some projects; this is quite a feat in a public industry that accepts its faults as norm. they brought them under the notice of the DHET.

As described by one Wits Council member, funds were allocated for the development of two universities. These two institutions had no structures in place let alone a FMD and DHET was not allowed to personally handle any funds from Treasury. Wits was then approached to oversee the first R50 million that went into both projects as plans were being drawn up and implemented. Eventually, Wits took over the management of the first phase of the project while the two institutions were building their own capacity. The DHET was won over by the policies and systems that Wits had in place. They believed in the possibility of duplicating the process and put their trust in the ability of the WCPD team to manage the projects within time and budget. There were news articles written about their appointment (Swart, 2013).

Worth noting, was the fact that the department was so impressed with the work done by the core WCPD project team that they recommended that the team be kept as a national resource to assist in shifting the public sector to more collaborative working.

To further cement the fact that Wits was able to accomplish something that was new and unique to HEIs is the fact that the SIPDM was developed based on the procurement policies developed for Wits University. The panel from Wits explained how a test run of the standard was done on the New Universities and their success confirmed that the Wits case could be successfully duplicated

5.5 Summary of Chapter 5

Yin states that a critical case study is most relevant when testing well formulated theory where propositions and conditions are well established (Yin 2008). The focus of this chapter was the validation of Wits as a critical case study. It was posited that Wits was more collaborative than other public universities and in general worked differently from other HEIs in terms of procurement. Using extrapolation from the interviews conducted with various universities, it was shown that Wits works in a manner that is different from other universities and has a more collaborative bent than they do (see Table 5.3).

The conclusions drawn from this chapter are as follows:

- Wits procures in a largely collaborative manner
- Wits procures differently than other universities
- Wits can be used to model how change can take place when procuring for infrastructure
- Wits can be utilised as a single case study as it succeeded in shifting to collaborative procuring and is the only known public university in South Africa to have accomplished this
- Testing of possible duplication of the Wits process was successful as shown by the case of the New Universities

6 Data Analysis and Discussion (Phase Two Data)

6.1 Introduction

This chapter focuses on the data collected, analysis of the said data and a presentation of the results. The research followed a concurrent design with both Semi-Structured Interviews and Archival Research. The data from these two methods was triangulated to build a narrative of what happened to cause change and how it was implemented. It should be noted that in some sections the narrative shifts between the interviews and documents.

6.1.1 Structure of the Chapter

The chapter expands on the embedded cases for the study, details how both collection and analysis were done after which it delves into an analysis of the results which are then discussed.

A sequential structure is adopted as a means of providing background to the study itself while detailing why change had to happen, how it was implemented, the challenges faced, the advantages of change and finally the duplication of this change.

6.1.2 Previous Work

Research tends to follow a strategy where data collected is reported and analysed in a single chapter with a subsequent discussion of the results in another chapter. A plethora of examples exists that highlights this approach.

This research though follows a strategy where collected data is reported, analysed and discussed in one chapter. This type of structure has been followed in doctoral research within construction. Two examples are provided below:

David S. Root (2000, University of Bath) - The influence of professional and occupational cultures on project relationships mediated through standard forms and conditions of contract

Amaka Chinweude Ogwueleka (2015, University of Pretoria) – Evaluation of incentive mechanisms on performance based contracting systems in South Africa and Nigeria

This approach was adopted in this research for the following reasons:

- It made it easier to triangulate the data from the two collection methods
- There were multiple, interlinked themes which needed to be focused on. Bringing everything together in one chapter ensured a less messy structure to the research report and reduced the likelihood of repetition of ideas through the use of two separate chapters.

6.2 Collection and Analysis

This section focuses on how the data was collected and the subsequent analysis of this data. It does not cover these topics in detail as they are already detailed in Chapter 4; it serves as a recap of the data collection process and its analysis

6.2.1 Participants

The research was in case study form and utilised stratified sampling. Participants involved those who had worked on WCPD projects and subsequent projects in the new institutions. Participants fell under the categories shown in Table 6.1 below

Table 6.1 - Research Participants

Type of Participant	Participant Code
Member of Wits Council	MWC1
Member of Wits Council	MWC2
Programme Director	PD1
Programme Director	PD2
Programme Director	PD3
Procurement Specialist	PS1
Spatial Planner	SP1
Project Manager	PM1
Project Manager	PM2
Architect	A1
Cost Controller	CC1
Cost Controller	CC2
Contractor	CX1
Contractor	CX2
Panel	P1

All participants with the exception of PD3 worked on WCPD projects before they worked on the New Universities projects. Interviews were conducted with all participants with the exception of MWC2 who was communicated with via email.

Other essential individuals who were also influential in the change process but not part of the interviews conducted are provided with their codes below. Efforts were made to set up interviews, but they did it materialise. Interviews with other participants revealed their impact and input to change. These participants are shown in Table 6.2 below

Table 6.2- Influential Participants

Role	Code
DVC in Wits Council	MCW3
Financial Systems Specialist	FS1

The documents shown in Table 6.3 were used in the study

Table 6.3 - Documents Used

Document	Description	Code
Campus Development and Planning Triennial Review Self-Evaluation Report (Section A: Report)	This document was a "progress report" on various projects that had been completed, ongoing projects, financials and future outlooks	Document A
Five-year Integrated Infrastructure Plan – An outline Summary (2013 – 2017 version 5)	This document detailed plans for projects over the 5-year period	Document B
Notes on CDP Tender Process and the proposed integration with certain processes in Central Procurement	This document looked into the integration of WCPD's new procurement strategy with existing procurement strategies	Document C
Construction procurement policy, processes, procedures, methods and delegations (2013)	Detailed descriptions of the procurement system utilised at WCPD	Document D
Procedure for Capital Programme Projects Initiation Take-On Forms, Contracts, Variations, Purchase Orders, Works Orders and Supplier Invoices	This document detailed procedures to follow for various functions	Document E
NEC Training Programme	Description on purpose of training and expected outcomes	Document F
Report of the Triennial Review of Campus Development and Planning CDP (by Quality Improvement Unit)	A detailed review of WCPD by QUI	Document G
CDP comments on the 2013 Triennial Review Report	WCPD's response to the QUI Review	Document H
New Universities 2015 – 16 Annual Report Narrative (no annexures) v4	A report on WCPD programme management of the New Universities in the first cycle of infrastructure development before handover to inhouse management	Document J
Narrative report to the Department of Higher Education and Training 2012	A "progress report" to the DHET on progression of the capital program	Document K

6.2.2 Method of Analysis

The researcher took measures to ensure that data was as accurate as possible in the collection stage. This involved confirming details with a range of participants during interviews. To ensure thorough analysis, literature was reviewed for noted themes, a range of participants were interviewed and the information they provided which was complemented by document analysis. The researcher commenced the research with specific ideas on the results expected especially on the prerequisites of change and the form of change. While literature findings were confirmed, various other themes specific to the context also emerged and these were considered and analysed.

As advised by Yin, the research utilised constant comparisons, was alert to negative instances, considered rival explanations and made a point of probing matters deeply to avoid bias (Yin, 2015).

The analysis stage consisted of a five phased cycle as shown in Table 6.4. Analysis was initiated using themes based on collaborative characteristics from literature. Further analysis revealed themes pertinent to this particular study. This involved a further disassembling and reassembling process as a means of including all necessary data. Interpretations were made based on comparisons with current literature on culture, collaboration and change. These interpretations are provided after each theme is discussed with conclusions reserved for Chapter 8.

Table 6.4 - The five phases of Analysis

Phase	
Compiling	Informal analysis while data is collected results in notes. This phase takes those notes and formally arranges them in some useful order. When compilation complete, it can be referred to as the database
Disassembling	This phase looks at breaking down the data into smaller pieces or fragments which can be assigned labels or codes. This process can be repeated several times using trial and error as means of refining the labels or codes
Reassembling and Arraying	Fragments are reorganized through potentially new combinations of disassembled items. The rearrangements are facilitated through graphs, arrays or other tabular forms
Interpreting	The reassembled data is used to create a new narrative. Initial interpretations may lead to recompiling the database in a different way. This is defined as the stage where data is interpreted

Concluding	This is the phase were conclusions are drawn from the entire study. These should be in line with the interpretation in phase 4 and the data built from the other phases

Various broad themes were identified in the data and these are detailed in Table 6.5 below:

Table 6.5 - Themes from Research

Theme	**Detail**
Background	This theme focused on the period pre-dating the implementation of change, those who pushed for change and how it was envisioned
Changes	This theme looked at the changes that were necessary at WCPD and why they were necessary
Implementation of Change	This theme delved into how change was actually implemented, who was involved, the challenges faced, the accomplishments and the results of the changes made
Sharing and Replicating change	This theme looked into how change did not just end with WCPD but expanded to government and the New Universities. It considered how change was replicated and the challenges faced
The Future	This theme looked at what is expected to happen now that the Capital Projects have slowed down and what further changes are needed at the WCPD

These themes are better understood when viewed through a timeline of change at WCPD. This timeline is provided as a means of providing a summary of why and when change occurred, who was involved, various reactions and the results of the change.

6.3 The Timeline of Change

Please see separate attachment – Timeline.pdf for A3 size

6.4 Background

The University of the Witwatersrand has a rich and colourful history digitally detailed under History and Heritage on the University's website.

https://www.wits.ac.za/about-wits/history-and-heritage/

From the establishment of the Kimberly based South African School of mining in 1896, the institution evolved and grew till it was granted University status on March 1st, 1922. By this time, it was based in Johannesburg and building began in Milner Park on land donated by the Johannesburg Municipality.

In 1923, the University moved into newly completed teaching buildings at Milner Park. There were six faculties, thirty-seven (37) departments, seventy-three (73) academic staff and just over a thousand (1 000) students. By 1945, enrolment had increased to three thousand and one hundred (3 100) students and accommodation problems arose which were solved till 1972 through the use of wood and galvanised iron hutments located centrally on campus. Expansion continued and by 1988, the University awarded its 73 411th qualification. By now additional property had to be purchased and the University expanded into the areas of Hillbrow, Parktown and Braamfontein. Today these campuses cover about one hundred and one (101) hectares.

Since then, other changes have also occurred, with a reduction in faculties to five (5), thirty-three (33) schools and about three thousand six hundred and ten (3 610) courses offered. Student enrolment for 2018 sat at thirty-seven thousand, three hundred and seventy-four (37 374) students. There are seventeen residences, eleven libraries, the Wits Theatre, two art galleries, a concert hall and seven museums.

Document A and Document B revealed how between 2000 and 2012, the Wits student population grew from 18000 to 30000. This rate of growth placed significant pressure on available space, resulting in both overcrowding and, in many cases, inappropriate space allocation. A rolling infrastructure programme was utilised to enable the University to meet the needs of its rapidly expanding student community.

This history is reflected in several government reports that have highlighted the inadequacies of available infrastructure (Ministerial Committee, 2011; Presidential Commission, 2016). Student populations are expanding at a rate that is higher than what the infrastructure can accommodate.

Section 6.4 delves into the background of this expansion programme.

6.4.1 PIMD

Participants (Wits Council member, programme directors, project managers and the spatial planner) shared the state of infrastructure procurement before WCPD came into play as the University's capital project arm. A narrative is provided below of their accounts on the need for the WCPD arm.

The Property and Infrastructure Management Division (PIMD) was in charge of all Infrastructure Development, Operations and Management for the University. Its first major project since the 1980's was the FNB Building in 2007.

Several participants then shared how faculties always looked at only their own needs when they received funding; there was a lot of self-interest. Projects were also undertaken on an ad-hoc basis. As a spatial planner, participant SP1 noted that there was no framework for future work to take place, no prioritization and no plan for access management.

Literature details the need for structured engagement among stakeholders. Stakeholder Theory stresses the need for inclusive stakeholder engagement in decision making to enhance both performance and commitment (Sinclair, 2011). It is expected that self-interest attitudes are detrimental to success. Unfortunately this attitude was reflective of norm where construction is regarded as a hostile environment with stakeholders who prioritise their own interests (Babic and Rebolj, 2016; Holley and Ben Farrow, 2012; Memon et al., 2015; Osipova, 2015; Van Marrewijk et al., 2014)

Participant MWC1 related how in 2006 he and Professor MWC3 who were Deputy Vice Chancellors at the time, came up with an idea of developing a 50-year spatial plan for the University. They took a group of architects and planners and told them to draw up what the

University would look like in 50 years. There was recognition that Wits was running out of situational capacity. There was a two-fold need; a spatial plan for raising funds for infrastructure and clients to look outside their own specific capacity and determine the broader implications of impact or benefit to the rest of the campus.

A virtual 50-year spatial plan was created as it was clear Wits was running out of situational capacity

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6.4.2 DHET

Participant MWC1 then related how around this time then Minister of Higher Education Dr Pandor managed to source R2bn from treasury for University infrastructure. Document A noted how there was a lack of capital funding for HEIs until about April 2007 when the envisioned funds from the minister of Higher Education came into fruition. The money was to be used only for infrastructure development in Science, Engineering and Technology. Universities were asked for their plans on how they would use these funds and according to Document A funding was only granted on condition that universities were able to prove the alignment of their submitted projects with DHETs strategic objectives.

Coincidentally, the University already had these plans in place (from the 2006 spatial plan project) and were able to quickly request funds. The initial request was for R270 million with a pledge to raise and extra R50 million. They only received R220 million (a tenth of the available funds) and this was the start of the massive Wits infrastructure program. They continued receiving funds and eventually spent a total of R1.4bn including that from external projects.

The virtual spatial plan came in handy as Wits already had a plan and could quickly request funding from DHET

6.4.3 The FNB Building

The first project embarked on was that of the FNB Building in 2007. PD2 who was then the PIMD director reflected on how PIMD did the refurbishment of FNB. The project utilised JBCC and had a Principal Agent. The project was notorious for its lack of cost control and time management (Hodgson, 2011).



FNB Building

adapted from Hodgson 2011

Figure 6.1 - The FNB Building

Involved participants all noted how the project was 30% over budget and 10% of that was only known when the final account was presented to the client. PD2 related how the cost information came too late making it difficult to manage both the cost and risk. PS1 explained how this was very problematic because when universities receive grants there is only X-amount they can spend; they do not have an operational budget especially for unexpected extras.

The panel identified the type of contract and the culture in the project as the primary causes for the problems. PD1 and PDS1 through their work with the CIDB had spent time examining problems with procurement in the industry and advocating for change. This enabled them to quickly pick up the issues with the JBCC and relationships in the project. The team was counting bricks after the fact and no one kept an eye on the end result of the project. The

outcome of that project emphasised the need for a different approach and the ability to look forward instead of backwards in projects.

FNB had both time and cost overruns with 10% of the cost overrun discovered months after the end of the project when the client received the final account

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While not true for all projects, JBCC contracts can be considered susceptible to overruns because of the fragmented nature of relationships, lack of joint problem solving and the adversarial attitudes of team members (Eriksson and Westerberg, 2011b). Collaboration is touted as a more proactive way to work, with higher possible control over the various aspects of the project (Chen, 2010).

6.4.4 Change Champions

The funds from the DHET meant a sizeable capital programme for which Wits was not equipped. Careful consideration of the ramifications of undertaking the programme while unprepared made Wits Council conscientious of the need for drastic change in their approach to infrastructure development to ensure a successful programme. The final account from the FNB project justified this need for change and the Council was open to strategies to ensure better project results. This openness was made possible by the professionals who were part of the Council such as board members of giant construction companies in South Africa who understood the pitfalls of a lack of strong management of the programme.

MWC3 suggested that PIMD be split to enable a separate department dealing exclusively with infrastructure development.

PIMD split to enable a department dedicated to infrastructure development. Ended up with two separate departments – PIMD & WCPD

The funding from the DHET had brought to the fore the lack of systems, skills and resources to deal with a capital projects programme – the PIMD was overwhelmed with dealing with all capital works plus its daily operations and maintenance.

Document A identified the formal establishment of Wits Campus Development and Planning (WCPD) as being on the 1st of July 2009. Its establishment involved business process separation from the property and infrastructure management division. University management acknowledged the strain that was being placed on PIMD due to the fact that they were performing operations and management, maintenance and minor works. A decision was then taken to formally separate ongoing maintenance operations from Capital Planning and Development works.

Document A and Document B further explained how PIMD was then split into two - PIMD and WCPD as a means of streamlining the different functions. PIMD was tasked with ensuring cost effective and efficient maintenance and upkeep of existing infrastructure which would ensure business continuity and the support of the diverse and extensive requirements of the campus community and its visitors.

WCPD on the other hand dealt with infrastructure development. With PD2 as its director, its role was that of custodian of the spatial development framework which established strategic spatial development principles and supported flexible growth into the future. One of its core business values was that of integrated construction project design and implementation to meet the needs of faculties and users. Its role was to coordinate project development ensuring consultation between the design team and relevant University clients throughout the project delivery cycle.

MWC2 who at the time was the CEO of Murray and Roberts, Chairman of the CIDB Board and a member of Wits Council asked the crucial question "Who will run the programme?".

As MWC2 relates it, his concerns stemmed from a consciousness of how disastrous capital works programs could turn out. He then proposed that Murray and Roberts sponsor the appointment of an experienced project coordinator to ensure higher chances of success.

Murray and Roberts would get no financial benefit from the project but would make its expertise and systems available to the project coordinator. This was done through the organisation's corporate social investment programme.

MWC2 realised the need for an individual who was "an integrator, not a typical hard-nosed project manager, who had empathy for and knowledge of the complex regulatory and relationship environment in and around the public sector".

MWC2 proposed PD1 whom he had gotten to know well when he was the CIDB CEO. At this time PD1 was Special Advisor to the Minister of Public Works and MWC2 had to personally approach the minister to release PD1 from the role. Her one condition was that he not be "captured" into the private sector.

PD1 then revealed how he was offered the position at Wits three days a week for a period of five years from 2008 – 2012 with Murray and Roberts paying his salary. After this he was again seconded to help the New Universities with their Capital Projects

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As part of Murray and Roberts' corporate social investment programme, MWC2 seconded PD1 to Wits for 5 years while paying his salary and allowing him full access to M&R resources

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The pertinent issue of running the programme was solved, what was needed were governance systems. MWC1 and MWC3 championed the newly formed department. When changes needed to be made, they were at the fore as they had bought into the vision on how Wits could progress in spatial expansions and consolidation. They helped sell the changes to the Wits Council.

MWC1 and MWC3 championed the new department

Hammer points out operational innovation is a reliable pathway for growth as it creates new ways of work and not a better way of working (Hammer, 2004). He also notes that this sort of

change tends to be one which management is not concerned with as it does not drum up publicity. This tends to be what contributes to the need for change champions.

Kotter adds to this sentiment, stating how performance change works best when individuals or a group have a frank discussions on the unpleasant facts of the organisation's current status and show the seriousness of the status quo (Kotter, 2007). It is then expected that the discussion which starts with one or two people grows into a leadership coalition able to lead change. The change at Wits followed this particular route with discussions on shortcomings and individuals pushing the change agenda. This resulted in a strong management team supporting change.

6.4.5 Spearheading Change

Change had been championed with University management; the need was for someone to lead that change. The sponsored project coordinator, PD1 took his role as programme director very seriously. As CIDB CEO he had helped craft policy for the construction industry and had a deep understanding of the industry and its challenges. PD1 described himself as "the one who had to crack the whip". Other participants cited him as one who motivated and shaped change.

Drove the programme through a non-conformist attitude (Procurement Specialist)

Crucial to the success of projects - a strong, extremely competent leader with outstanding management skills (A1)

Had skills, experience, commitment and a keen understanding of governance - a gift worth his weight in gold (PD2)

Was a tipping point, without him the programme is unlikely to have gone in the direction it did (Panel)

Learnt a lot from him (PM)

A strategist and wide thinker (PM)

For successful change there needs to be a precise vision and strategy detailing the results to be produced, who should perform what activities and where, and the sequence in which activities are to be performed (Hammer, 2004; Kotter, 2007). Hammer also emphasises the need for reinventing work processes with the greatest strategic impact (*ibid*). Pryor cautions that there is need for management to use a model that will help the organisation survive and flourish (Pryor et al., 2008). In what could be considered a summary of these activities, Ford et al exposited the following definition for a change agent; one responsible for identifying the need for change, creating a vision, specifying a desired outcome and then making it happen (Ford et al., 2008). By this definition, PD1 was the change agent. His strategy is detailed below.

PD1's strategy involved putting together a team of like-minded individuals who believed in change. His first asset was PS1 a procurement specialist he had worked with while at CIDB. PS1 is a well-known reformer in public procurement in South Africa. He developed the standard for Uniformity that became the ISO 10845 and campaigned for the separation of supply chains for infrastructure from general goods and services - the Infrastructure Procurement Delivery Management Standard that has been legislated by Treasury.

PD1 and PS1 had previously discussed how to do things better and improve the Construction Industry and now was the time to get faster delivery and reduced costs in projects – better productivity and outcomes. They wanted to test theory in practice.

Other members of the team included SP1 who was involved in spatial planning and FS1 who assisted with financial systems. These four individuals have been recognised as the core team at the fore of change.

The core change team consisted of

PD1 (Programme Director)

PS1 (Procurement Specialist)

SP1 (Spatial Planner)

FS1 (Financial Systems)

It can be concluded that an implementation team is necessary for successful change. There is a need for those who understand what is wrong, what needs to change, what needs to stay and how to implement any necessary change. PD1 managed to put together a specialist team able to formulate and implement the change strategy.

6.4.6 Background to Change

Two things needed to be in place before the programme could move forward

6.4.6.1 Framework

Participant SP1 detailed how a framework was needed in order to know how to spend money if funds were received. Wits was able to receive substantial funds from DHET because they already had a plan, other institutions struggled with having to immediately draw up plans on use of funds.

6.4.6.2 Governance

Erdogan et al explain how the implementation of collaborative change tends to be hindered by a focus on the technical while ignoring or underestimating human and organisational factors (Erdogan et al., 2014). Identified failure causes included poor capture of user requirements, lack of strategic approaches, lack of proper planning/project management, user resistance to change, lack of user involvement and technical characteristics (*ibid*).

The panel explained how Wits had to set up the Capital Projects Steering Group (CPSG) represented by DVCs and Deans. Their job was to determine needs, scope projects and oversee both risk and management. They were Wits Council's reporting mechanism. PD1 emphasised how CPSG functioned as the board for WCPD to whom they had to report every 2-3 months – WCPD was not a law to itself; there were checks and balances in place. MWC3 was the Chairman with MWC1 as Deputy Chair. CPSG prioritised the BIG 5 projects for the University and had to figure out how to fund them.

MWC1 explained how he was in charge of governance while MWC3 was in charge of relationships with project teams and the contract arrangements. Both had their roles, clearing blockages and championing change to the Council.

To get programme off the ground needed the following:

Framework of what work needed to be done

Governance systems to ensure everything went smoothly

6.5 Changes

This theme looks at the reasons why change needed to occur then delves into the different changes that took place.

Pryor defines organizational change as the movement of an organization from its existing state to a desired future state in order to increase organizational efficiency and effectiveness (Pryor et al., 2008). Current types of change are different in that they are simultaneous, speedy, complex with immediate communication and impact. They can also be convergent vs. radical or revolutionary vs. evolutionary. The relevant type of change in this case was radical, meaning it involved a tearing loose from an existing orientation with transformation of the organisation. Transformation occurs through developing and deploying a new vision, mission, goals, values, strategies and structures. It encourages risk taking and non-traditional ideas while getting rid of obstacles, and changing systems and structures that undermine the vision (Kotter, 2007).

6.5.1 Reasons for Change

Vennström and Eriksson identified the following problems as the impetus for most change; relationships known for conflicts and disputes, poor collaboration, lack of customer focus and end user involvement (Vennström and Eriksson, 2010). Other identified problems include fragmentation of the industry, delivering value to clients and the need for lean working

(McGrath-Champ and Rosewarne, 2009). In essence, change is caused by the need for fundamental changes in how business is conducted in order to cope with a new or more challenging business environment (Kotter, 2007).

In the Wits instance a myriad of reasons existed for the need for change. While participants had various reasons they cited, the general theme was that things could not continue as they were, they needed to work better and cheaper. The reasons for change were either to do with the general function of the University or projects themselves

6.5.1.1 General function of the University

Document A provided one of the major reasons for change. Wits realised that the number one strategic risk the university was facing was that of lack of long-term planning in relation to campus development. A spatial survey revealed:

- A history of ad-hoc decision-making which eventually led to a lack of structural and spatial clarity
- A lack of shared vision about the university
- Historical ad-hoc land assembly
- And planned informal responses to problems over time

A spatial framework needed to be created for a more systematic manner of implementing projects. The university spatial development framework was approved in June 2009

6.5.1.2 Project Function

PD2 suggested reasons including the rapid infrastructure expansion programme, the need to move from ad hoc management to a creative approach and strategy and the fact that they were dealing with huge amounts of money that needed defined systems and approaches.

The panel agreed with PD2's assessment while adding a few more reasons. The major reason was costs, there was no extra money for overruns as everything was reliant on fundraising – the FNB scenario in terms of costs and time could not be repeated. There was need for greater budget control with "a move away from pay as you go or pay forward to design for budget and deliver for budget"

They also touched on the issue of strategy. Wits was buying and not procuring; they were missing the management part that comes with procurement. Emphasis was made for the need for strategic decisions and the building of strategic relationships.

They also noted that the projects they were involved in were complex with up to thirty contracts running simultaneously and both simultaneous and sequential processes taking place. They needed to be strategic in their management approach.

Universities work with tight schedules and to work around this they needed early starts, greater price certainty and less risk. Getting contractors in early would help with these as they could influence the finalisation of the design. In essence they needed a forward-looking contract with better time and risk management.

In line with this, they also needed a Body of Knowledge for the institution – knowledge needed to be retained and carried forward. PS1 expounded on the fact that the short-term relationships they had been working with were not viable, they needed repeat relationships as different projects could be moved to with the same time. Wits needed to do away with the constant learning curve and maintain some stability

PD1 explained how JBCC was a flawed method of contracting, producing short term hit and run relationships which did not develop relationships with contractors. While long term relationships change contractor attitudes, short term relationships have contractors just looking to make their money. Table 6.6 provides a summary of the shortcomings identified with the procurement strategy in use

Table 6.6 - Shortcomings of Procurement Strategy

What they had	**What they needed**
Short term relationships	Long term strategic relationships
Overruns	Strict budget and time control
Constant learning curves	Body of Knowledge
Ad hoc management	Creative and defined strategy
Buying	Procurement
Risk and Cost uncertainty	Risk & Cost certainty
JBCC – counting bricks backwards	Forward thinking contract

A quick check of the HEI and South African Construction Industry problems highlighted in Section 1.1.2.5 reveals that Wits exhibited many of the very symptoms arising from

procurement problems. Of additional note is the fact that a number of these problems are global issues mentioned in studies such as the Latham report. Numerous countries such as UK, Singapore, New Zealand and Hong Kong have made decided efforts to revamp their industries to do away with these problems. The problems are reflected in Table 6.7 below

Table 6.7 - Problems in the Global Construction Industry

Problem	Global	SACI	HEIs	WITS
Low productivity	✓	✓	✓	✓
Scope creep	✓	✓	✓	✓
Adversarial relationships	✓	✓	✓	✓
Master/Servant relationships	✓	✓		✓
Limited skills capacity	✓			
Poor quality, delays, overruns	✓			
Scope creep	✓			✓
Constant claims	✓	✓	✓	✓
Lack of continuity, no development, empowerment or growth	✓	✓	✓	✓
Declining competence of contractors and consultants	✓	✓	✓	✓
Reworking			✓	
Constant late information and changes	✓			
Dependence on lowest price tendering	✓	✓	✓	✓
Late Payment	✓	✓		
Too many tenders for issue and evaluation			✓	✓
Fragmentation	✓	✓	✓	✓

With consideration of these problems and the ideal that Wits was working towards, a clear bend towards moving forward with best practice to ensure best value for money is observed. Examples are provided of measures put into place by various countries to deal with their construction procurement are tabled below in Table 6.8 for easy reference with the ideals set out by Wits.

Table 6.8 - Various Construction Industry Reports

Report	Recommendations
Latham	Less adversarial contracts Partnering Greater standardization of contracts Best practice clients Mutual cooperation of the supply chain Fair risk allocation Better conflict management Teamwork with incentives Openness, trust and stakeholder engagement Client driven change

Report	Recommendations
Egan	Integrated project process Decent and safe working conditions Improved management and supervisory skills Long term relationships Public sector to be best practice clients
Tang	Integration in industry Teamwork Seek continuous best performance Strategic relationships Sharing of learning/knowledge Achieving value in procurement
Construction21	Raise professionalism Set skills level for construction workforce Improve industry practices and techniques Integration of construction activities Championing the industry
Valuing the role of construction (VRC) (2016 update by PWC)	Increase in standardized contracts Integrating design and build during procurement Recruiting workers from other industries who have transferable skills e.g. PMs Clients to play role in better performance

As noted in Table 6.9 below, Wits' change goals were in line with global pursuits for best practice procurement in construction.

Table 6.9 - WCPD change goals

Wits Changes	Global pursuits
Long term strategic relationships	Latham, Egan, Tang, Construction21,
Strict budget and time control	Costruction21,
Body of Knowledge	Tang, Costruction21,
Creative and defined strategy	Construction21, VRC
Procurement	Construction21, Tang
Risk & Cost certainty	VRC, Latham
Forward thinking contract	VRC

The changes WCPD intended to implement had been identified or pursued at some global level.

6.5.2 Client Involvement

It has been noted that there tends to be limited client involvement in change and innovation exacerbated by the fact that client functions such as project management have also been outsourced to external organisations (Vennström and Eriksson, 2010).

There are also three types of barriers to exerting of client influence (*ibid*):

1. Attitudinal barriers involving adversarial attitudes, lack of ethics and morality, focus on projects instead of processes and a short-term focus
2. Industrial barriers involving traditional organization of construction process, conservative industry culture, industry structure and traditional production processes
3. Institutional barriers involving standard contracts, laws and traditional procurement procedures

Clients wishing to be change agents need to be aware of the implications of having internal vs. external project management. The choice affects both the client's influence on stakeholders and the implementation of change and innovation; it tends to be more advantageous to have internal project management and rely less on the external (Vennström and Eriksson, 2010)

The panel explained how they had to shift from a position where the client let others take over the management of the projects (principal agent). The client was involved in active delivery management with someone taking on the role of delivery manager – in this case PD1 was the designated trouble-shooter. The client took on an active leadership role that included providing workshops for entire team (all contractors and consultants) so they could understand the change in the manner projects were procured.

Clients needed to be driving projects and not sitting back and letting someone do it for them

Active Delivery Management

As shown in Table 6.8 above, clients play a major role in change. The five industry reports previously dealt with all placed the client at the fore of change. In taking back the client role, Wits was implementing a change that has been touted for two decades. Again, they demonstrated a move towards best practice and an acknowledgement of the crucial role a client plays in bringing change into construction procurement

6.5.3 Inhouse Consultants

According to the panel, the splitting of PIMD largely determined the direction change would happen; project management was brought back inhouse. Having a dedicated capital projects department meant it was possible to move away from principal agents and have dedicated project managers instead. This was a novel approach as Wits had never worked with massive project management. As noted by Vennström and Eriksson, this switch enabled Wits to have more control over change and have a greater influence on the direction of projects.

Document A and Document B noted how delivery of Capital Projects required specific built environment project management expertise and the service of project managers was utilised for this purpose based on the NEC term contracts

PD1 explained how in line with this need, WCPD initially utilised outsourced project managers from consultancies but with time these were appointed inhouse and directly employed by Wits as that was deemed a better strategy. It was not smooth sailing but eventually the transition was made.

No more Principal Agents, moved to Project Managers

As discussed in *Section 2.3.1*, clients may face challenges with the use of Principal Agents due to conflicts of interest. Project Management has emerged as crucial especially in complex projects that require dedicated management and the ability to manoeuvre among stakeholders. Management of contracts such as the NEC is enhanced through the use of Project Managers. The Association for Project Management defines NEC contracts as a combination of project management, contracting and procurement in one best practice process (APM, 2016a). The NEC has also been used to successfully deliver some of the highest profile projects in the world, including the London 2012 Olympics and Crossrail.

6.5.4 Procurement

Partnering is recognised as assisting in eliminating problems associated with competitive tendering (Bayramoglu, 2001). Instead of focusing on lowest price, it encourages contractor selection based on qualitative criteria and partnering experience with cost assessed through

long-term implications rather than initial cost (*ibid*). While focusing on partnership-oriented procurement, Wits changed the type of contracts used, the term of relationships and the project lifecycle phases in which important stakeholders became a part of the project.

6.5.4.1 NEC

The panel went into details concerning how the change to NEC came about. There was a need for more proactive management of projects – JBCC was not providing this as it is reactive. WCPD wanted a forward-thinking contract where the team is always trying to solve problems ahead of time instead of feeling effects after an event has occurred.

It was recognised "that there were new types of contracts available providing different options and different possibilities to deliver better. NEC was chosen because Wits was entering into a dedicated PM approach. NEC is PM intensive, needing someone to manage it properly all the time. As one in the panel put it, with JBCC, "the contract is not managed, architects do not manage it, they muddle through it".

The need for strict budget control was a big factor against JBCC. MWC1 praised how the NEC allowed the flexibility to work with the fixed bottom line of the University's finances. Wits was able to negotiate prices with the contractors even after the contractor had tendered, something which is not possible with JBCC.

Project Managers noted how JBCC lacks the transparency of the NEC as the client does not know especially the cost breakdown. It is also very dangerous because if you don't have a sharp PM, you can end up overspending.

NEC also provides an unparalleled level of control such that change can be priced, agreed on and its implications determined all before the event occurs. It is also rare to be able to add odd extras to a project when using NEC because of the level of control in comparison to JBCC. Another control highlight was that with NEC auditing is on actual proven cost as opposed to walking around site making measurements and this made it much easier to get clean audits.

Those who started at Wits with the NEC used Option C which the activity schedule utilising Target Costs. This was different from the JBCC which utilises Bill of Quantities. A PM explained how all the information is prepared and issued to the contractor who measures prices and provides tendered fee as well as mark-up fee. The tendered fee becomes the baseline price.

Where savings are made these are recorded unlike the JBCC where the client will never know about that difference

The contractor who worked with Wits on both the JBCC and NEC made an important note that NEC allows you to change specification to something more affordable, whereas with JBCC, a higher price than what the client is offering could get you kicked off a project.

This “rigidness” of JBCC was also noted by CC1 in a slightly different vein. With NEC the process is shared, both contractor and client are involved in making decisions, with JBCC all issues are contained in the contract, there is no negotiation.

Another concern is that of time management and PD1 suggested that JBCC has weak programming especially as there is no sharing of the same program; the client is simply told whether or not contractor on schedule. This tends to result in a lot of delays with accounts submitted 40 days after event meaning there is no control as its all after the fact. NEC also have strict timelines; if the project manager does not respond in 14 days the issue is deemed accepted contractually. JBCC does not have these strict timelines in place, you have to keep following up until you get a response.

Relationships are another difference between NEC and JBCC. JBCC is a traditional prepaid approach notorious for its master slave approach and with no mechanisms to carry lessons forward. Its process is cumbersome not allowing fast track construction which is a disadvantage in an environment which very strict and limited timelines.

NEC provided a chance to move from hit and run relationships to moving site to site to site which is not possible with JBCC. It also recognises the expertise of the contractor and the detail they can go into which refines especially the final designs. There is no them and us as the client is conscious of how the future is interlinked with that of the contractor. This opens the way for incentivising contractors so as to make savings on projects that do not compromise final quality of project.

In relation to relationships, in JBCC the consultant prepares the bills and the contractor just prices it meaning the client take responsibility in terms of quantities, whereas in NEC especially the activity schedule, the contractor carries the risk for quantities and it’s a shared responsibility as the client’s cost controller also has to check.

Other problems related to risk revealed by PM2 were those of incorrect measurements, late remeasurement, fighting with contractors on late claims and cost claims when using JBCC. NEC on the other hand avoids this as the majority of documentation is done pre-construction with cost certainty of about 90%. It also allows flexibility not available with JBCC especially in disputes about rates. Contractors also emphasised how in disputes in JBCC their contract is used as a weapon to pull each other down. The NEC mitigates legal interactions through the use the Early Warning System (EWS) to prevent fights later. Even if something does not turn out to be an issue, everything is resolved there and then not 9-10 months down the line where legal costs will be high.

A final difference noted by PD3 was how the JBCC is a legalese filled contract basically requiring an attorney to run it properly. It is easy to get confused about what's going on. NEC on the other hand is reasonably self-explanatory. It is easier to read, understand and manage.

Switching to the NEC thus met the following needs:

Permanent Project Management arrangement

Proactive contract

Strict budget control

Strict time control

Flexibility

Long term relationships

Full utilisation of contractor capabilities

Cost certainty

Risk certainty

Ease of use

Limited disputes

6.5.4.1.1 Advantages

Participants concurred that the NEC has many advantages.

For the panel the greatest advantage was the NEC's proactive attitude which looked at how to solve things as opposed to apportioning blame. They felt that with NEC you are always moving forwards not backwards.

Architects appreciated the greater discipline it brings to the project. They believed there was more collaboration and less chances of contractors coming up with bogus overruns; this is due to the transparency required.

PD3 felt that it's a simple contract that can be understood with minimal training and is fair in its use of similar terms for both consultant and contractor agreements. In his view it also addressed problems in a more intimate manner.

Both A1 and CC1 emphasised that the manner in which risk is dealt with is a great advantage. The contract is upfront about risk with any variations or changes discussed and quantified immediately to prevent surprises; it teaches the team to think ahead of the project. Because risk is shared, CC1 felt contractors do not get undue risk and clients understand the limitations in risk. The JBCC on the other hand offers counter work at the end of the project as remeasurements are done.

One of the contractors cited the inclusion of contractors in this contract as enabling the most cost-effective design for the client, helping with the reduction of costs. In addition to this CC1 noted that being able to manage and track costs helped with knowing exactly where the project stood enabling planning ahead. CC2 also commented on how relationships are more harmonious with no hierarchies and more talking to each other

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Advantages of NEC:

Proactive contract

Brings greater discipline to project

Cost control

Upfront risk assessments

More cost-effective design

Better relationships among the project team members

Participant perceptions were in line with acknowledged benefits of NEC use. The contract focused on bringing stakeholders together collaboratively in a spirit of mutual trust and cooperation (Riddeck et al., 2013).

The specific observed benefits are reflected in Table 6.10 below:

Table 6.10 - The benefits of using the NEC

Benefit	Detail
Great flexibility and adaptability (Attia, 2012; Riddeck et al., 2013)	It has a number of options which can be utilised as needed. It benefits from having a sophisticated client
Provides clarity, simplicity and flexibility of use (APM, 2016b; Attia, 2012; Riddeck et al., 2013)	A very clearly written contract with the ability to be easily and accurately translated into other languages
Proactive project management (APM, 2016b; Attia, 2012; Riddeck et al., 2013)	There is no monitoring projects from afar, a more hands on approach needed. This leads to greater site administration
Adjudication (Attia, 2012)	While sentiments are varied on this benefit, the contract does not immediately jump to arbitration to settle disputes, adjudication is considered first
Relational contract (Riddeck et al., 2013)	The contract works best with openness and trust between parties. It requires a change in traditional mindset
Risk approach (Riddeck et al., 2013)	Employers pay for risks as and when they occur as opposed to paying a premium to pass the risk onto the contractor from the start. Risks are managed as opposed to an allocated responsibility
Incentive options (Riddeck et al., 2013)	In the spirit of collaborating, the Target Cost option rewards results such as savings and early finishes
Time and cost reassurance (APM, 2016b)	When using especially the Target Cost option, there is greater project cost and time control, preventing overruns

Early Warnings (Riddeck et al., 2013)	Potential risks are determined early on as a means of providing warnings and quickly dealing with the risks before they occur
Forward looking (Riddeck et al., 2013)	Unlike traditional contracts which use a retrospective approach, NEC is forward looking with a quotation style approach. It protects against contractor inefficiencies and excesses
Decision making (Riddeck et al., 2013)	While traditional contracts tend to place administrative obligation on the contractor and employer, the NEC places them on the employer, contractor, project manager and supervisor – a more collaborative effort

6.5.4.1.2 Challenges

The different professions had different views on what was challenging with NEC.

PD3 noted that if the penalty and damage clauses are not clearly written the client can struggle if they use a bad contractor. His other complaint was on the paperwork, there is up to 10 times more according to him.

CX1 agreed on the paperwork issue. According to him it is time consuming to do the monthly audits. JBCC feels like an easier contract because you agree on rate and do review at end of the project, NEC has more pressure and scrutiny

A1 commented on how you cannot not simply fast track things using NEC, there is a lot of administration involved and not enough time to complete everything before construction starts. NEC seems to work best with projects that are not constantly changing so by that virtue they don't lend themselves to architecture projects

CC2 also had issues with the amount of administration involved. Assessing the contractor's target cost is very time consuming and there is too much extra administrative work. Bill of Quantities is nice and short. According to him, with Target Cost contracts, the risk lies with the contractor and that is disturbing, it is preferable for risk to lie with the cost consultant. He also noted that while it is great to have contractors help with finalising design, there is very little time available for their contribution because of the tight schedules involved. He did concede though that when enough time is allowed on design, the paperwork is reduced.

The panel's comment on challenges was that it takes a lot of effort to do things differently, but they cannot think of any project where they wish they had used an "easier" route. The challenges faced are summarised in Table 6.11 below

Table 6.11 - Challenges from the use of the NEC

PD3	Contractor	A1	CC2	Panel
Penalties and Clauses should be clearly defined	*Monthly audits are time consuming*	Cannot fast track start process, need enough time on design	Assessing TC very time consuming	It was a lot of effort but zero regrets
Up to 10 times more paperwork than JBCC	More pressure and scrutiny with NEC compared to JBCC	A lot of administration	Risk lies with contractor, preferable with cost consultant	
		Perception that it does not lend itself to architecture projects	Tight schedules reduce time spent in design	
			Too much extra administrative work	
Top Disadvantages	Too much extra administrative work Too much paperwork			

The challenges participants faced with the use of the NEC vary from the most common of those observed in literature. An APM user review cautioned the consideration of NEC as a "panacea" as it can be affected by external factors (APM, 2016b). A major problem is that of the Z clauses which if poorly drafted can alter the profile of a contract, resulting in confusion or disputes that can in turn create an adversarial environment

The issue of paperwork is a given when it comes to the NEC. While participants viewed it as a negative, it is meant to be a means of ensuring that everyone knows and understands what their roles and responsibilities are. It can be assumed that this issue with paperwork is based on previous use of contracts that demanded less documentation and adjusting to the new amounts has been difficult.

6.5.4.2 Framework Agreements

Framework agreements were utilised with the NEC. Conditions of the FAs included fixed rates and escalation rates for the duration of the contract. PD3 explained how they were utilised as a way of making the client's life easier – no more going into three-month procurement process regularly thus saving time.

Contractors appreciated the securing of work for longer terms based on their performance. PMs appreciated this as it meant they could move with the same team from project to project which boosted team dynamics and made the PMs life easier.

In addition, CC1 noted that short timeframes meant having direct access to consultants who were already on board and understood the process reduced time wastage. This also enabled a team that did not need to keep restarting and learning the process. The FA basically assured that there was continuity and benefit from experience gained in previous projects

6.5.4.2.1 Advantages

The major advantage specifically noted by most participants was the reduction in number of times procurement process is done. In this case every three years as opposed to every single project.

Other observed advantages included those in literature shared procurement expertise and resources, shared risk and contract management, lower administration in terms of time and cost, flexibility and security of supply (OGC, 2010). The consensus was on how better relationships could be forged, making working together on subsequent projects easier.

Benefits of framework agreements have been noted as including value for money, improved project/quality outcomes, time savings as no need to re-advertise, flexibility in terms of budget and the reduction of relationships to be managed (OGC, 2010; Watermeyer, 2011). Contractors also benefit in terms of repeat work and improvement in health and safety performance and quality (Watermeyer, 2011). The Office of Government Commerce in its archives notes these additional benefits of framework agreements; shred procurement expertise and resources and shared risk and contract management (OGC, 2010).

6.5.4.2.2 Challenges

The challenges concerning Framework Agreements all had to do with perceptions.

A1 found that with tendering only done every three years maybe not enough people get to benefit from getting work. The PM expressed how there is always a perception that something fishy is going on, so all actions need to be done while cognisant of this. CC1 also noted that there can be a perception of corruption if only particular contractors are used. It

was suggested though that the fact that a public tender process is conducted should put such perceptions to rest

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Framework Agreements:

Less frequent tendering

Less time wasted

Sense of job security

Downside of corruption perceptions

The issue of closing out other entrants for duration of a framework agreement is acknowledged in literature, new entrants are in essence banned during this period (OGC, 2010). Other common disadvantages though expand beyond perceptions to include the following: customers are reliant on how the contract has been established and managed, sharing responsibility for a contract can cause issues around supplier management and if work volume is uncertain, this can result in a risk premium from suppliers.

6.5.4.3 ECI

Participants generally expressed similar thoughts on ECI. With the Framework Agreements in place, contractors were involved at the start of the project working with consultants on the design up to costing stage. In this process, the contractor could provide value engineering where projects were not fitting into the available budget. Wits was firm on not exceeding available funds and thus contractors could question the designs as they came, with discussions on what worked or what did not work as a means of ensuring cost effective designs.

6.5.4.3.1 Advantages

There was a general consensus on the advantages of engaging contractors early. This helped the team get together sooner and understand the project together – everyone would be on the same page.

As contractors share their expertise, this helps the project run better and there is a transfer of ideas without having to reinvent or reexplain everything; this helps with better efficiency. Elevating the position of the contractor also gives them confidence to work better with the team as they know they will be heard.

Some participants were impressed with how contractors are with buildability and efficiency. Their contribution helps with solving problems before construction commences. They were also able to provide methodologies appropriate for the needs of a specific area

The panel did not mince words when it came to the role of contractors. “Contractors are helpful with value engineering and savings where architects are clueless”.

An example was given on what happened with the Wits Art Museum (WAM)project

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The WAM Competition won by Fiona Garson and Nina Cohen. The projected cost was R69mil and going up each year. WCPD got the contractor involved and managed to strip it to R39mil. Raised R29mil and while trying to get extra funds there was a sewerage leak in one of the basements and the artwork was at risk. This was taken to Wits Council and they managed to get the outstanding R10mil

The contractors were able to do what the QS could not – improve it and make it simpler without quality suffering. They were also able to solve problems and provide cost certainty for the client.

Another posited advantage of ECI was that it guarantees that the contractors know the job well by the time they start construction, maybe even better than the architects

The results reflected the advantages posited in literature; project control in terms of robust information with transparency and fewer changes, time savings through use of parallel processes, innovation through input from contractors (Lenferink et al., 2012), better understanding of skills and resources requirements for informed strategic decision making (Greve, 2014).

6.5.4.3.2 Challenges

While ECI has a great many advantages, it also has what participants viewed as shortcomings

PD3 explained how the positive impact of ECI is only felt if there is enough time for their involvement. The lack of sufficient time can negatively impact the project as the client may end up with something that cannot be constructed. CC2 agreed with this view, suggesting that the full impact has been felt because projects have been running on too tight a schedule. A1 described it as things getting messy as contractors never come into the process cleanly.

CC1 had views on the use of the Target Cost contract. One suggested that Target Cost is a premium contract meaning the client needs to pay extra for ECI and it has become more expensive over the years, with traditional contracts working out cheaper. While another suggested that contractors need to be smart and not concentrate on maximising their gain - they realise rewards only once they have been through the process

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ECI:

Helps with efficiency in projects

Helps with buildability

No time wasted with additional explanations or reinventing the wheel

Only effective when sufficient time provided for contractors to contribute

Comes at an alleged premium which client not always willing to pay for

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Early contractor involvement is acknowledged as best practice as it involves bringing in one of the most important stakeholders into the project early (See Section 2.3.4). It is also acknowledged that time is an important factor in ensuring the best result from their involvement. Early Stakeholder Involvement theory advocates the usefulness of involving stakeholders as early as possible. The concept of involving especially the contractor from the start tends to be a foreign concept especially to those who are used to a specific hierarchy in

the project team that places contractors on the bottom rung. Electing to engage contractors early was a move that was bound to have positive ramifications for the projects especially in an industry that relegates contractors to only building thus preventing use of their full potential.

6.5.4.4 Strategies

Several strategies were put into play all at once. These were deliberately used and fall under the headings provided below

6.5.4.4.1 Procurement

MWC1 explained how where before the procurement was completely outsourced, they moved to a more internalised process. As noted, this included a move from principal agents to project managers. Procurement policies and processes were put into place which also focused on BEE and construction competency. PM2 expanded on this detailing how contractor selection was based on quality of work, fee component, structuring of management, execution of projects and competitive edge. The use of NEC and FAs also resulted in a system of tendering every three years effectively putting into play a system of portfolio procurement as opposed to project procurement.

As noted from global construction industry problems, fixing procurement is the key to more successful projects. A move to more collaborative working was a major step to improving the infrastructure development process.

Typical fragmented business systems are characterised by low ownership and alliancing integration of various stakeholders with narrow, specific association built on minimal cooperation (Whitley, 2000). Most systems though unlike those in construction are flexible in consolidation and use of resources with an emphasis on commitment to partners or workers (*ibid*). Wits had to adjust to cooperative working and the strategies it put in place assisted with this.

6.5.4.4.2 Definition of value

The panel delved into how value was a great consideration in the changes. Firstly, clients and the delivery team were focused on different objectives with delivery teams often focused on monetary gain. This emphasised the need for change in how the value of money was

perceived. There was a move from focus on least cost for quality to optimal use of resources to achieve the intended outcome. Team is satisfied with all choices made in projects to arrive at this required outcome

The issue of value is one that is also addressed in various global industry reports as shown in Table 6.8. This shift from lowest price focus was also instrumental in creating a mind shift from buying to procuring.

6.5.4.4.3 Relationships

Various changes in the relationships were also noted. Most important was developing relationships with contractors by doing away with the master-slave model; everyone had a voice. CC1 noted how negotiation between client and contractors was prioritized especially where changes needed to occur. They expressed how Wits is an exceptional client as they actually understand collaboration and the entailed shared risk. Many clients want to run NEC as though it is JBCC. An example was given on how Wits understands the necessity of documenting information upfront while other clients tend to be resistant to giving consultants enough time to work properly upfront.

The panel reiterated how an active effort was made for the client to manage delivery in a move from an exclusive consultant driven process.

Finally, an example was provided on the change in relationship between construction workers and students on campus. Workers were quickly disabused of the notion that whistling at girls on campus was acceptable. MWC1 noted it and insisted on a quick stop to it. The dignity of women on campus was a priority to the team.

Relationships play a major part in successful collaboration. There is a move from self-interest to that of mutual interest. This attitude change then helps change the manner in which stakeholders work together as focus is now on the greater good. An indicator of collaboration levels is the type of relationships within the project. The shift to “equality” within the team is indicative of a real/practical change in relationship – there are times when stakeholders can spout collaborative rhetoric without the corresponding practical action

6.5.4.5 New Ventures

MWC1 explained how Wits was able to try new ventures. They entered a gearing agreement with a bank which was considered risky for a University. Wits Junction, the student accommodation which was built through this venture is operated in such a way that it has to make a profit to pay off the loan.

Strategies:

Procurement and Financial systems – better governance systems

Value systems – shift from lowest cost to optimum use of resources

Relationships - Long term, cordial relationships and respect for all stakeholders

Taking on new ventures with a different type of risk – in this case gearing

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The successes of the new way of working helped WCPD take calculated risks; they were working with tight budget control and could be more certain about their costs. This confidence resonates with Latham's statement; *"The client who wishes to accept little or no risk should take different routes for procuring advice from the client who places importance on detailed, hands-on control." Collaboration involves taking a chance on openness, trust and working for mutual benefit. It is safe to assume that collaboration played a huge role in the risk taken in new ventures as it provides flexibility and openness to doing things differently* (Alam et al., 2014).

6.5.5 Documentation

All participants were vocal about the amount of paperwork required when using NEC. One described it as up to ten times more than that of JBCC. While CX1 felt all the documentation was unnecessary, other participants felt it was cumbersome but worthwhile as it ensured the efficiency of the project.

Though necessary, there is too much paperwork involved

Greater control means clear cut roles, responsibilities and risk allocation. These are possible through the copious amounts of documentation drawn up for projects and rather than be viewed as limiting, should be viewed as guaranteeing a smoother project

6.5.6 Budget Control

All participants commented on how PD1 was strict with the budget. There were no compromises, if you missed something or needed to add something you had to find a saving in order to accommodate it. This principle was also applied in the New Universities.

Budget control was not negotiable

Cost savings and delivery of projects within budget is a critical factor in project success (Eadie et al., 2012) especially since some studies have shown that while relational contracting has achieved success in terms of quality and client satisfaction, it has also failed in terms of budget and schedule performance (Ling, 2014). Wits had to work extra hard to ensure that their projects came in within budget.

Target costing (TC) was the NEC option selected. It has been touted as an effective, strategic management technique for achieving cost predictability (Zimina et al., 2012). Wits utilised target costing with a pain/gain share mechanism as a means of equitably distributing risk and responsibility (*ibid*). Everybody working in a mutually beneficial manner enabled the control of the project budgets.

The NEC Target Cost contract is the obvious choice for budget control. Universities do not have the luxury of extra funds to meet overruns, they need to ensure best value for money in all projects

6.5.7 Health and Safety

The panel discussed how Health and Safety had never truly been a priority; “you would find workers on site without shoes or hard hats”. PD1 organised workshops on Health and Safety

for everyone. He also appointed agents with leeway to stop work on site if standards were not met. This enabled an accomplishment of no serious injuries in a decade on site

Document A and Document D explained how WCPD embarked on health and safety initiatives. Working with associates and contractors they engaged in a rigorous program to transform the culture of construction. Regular training was provided, and all projects were supported by health and safety plans and monitoring procedures. As part of its health and safety requirements the university could not appoint a contractor who was unable to demonstrate the ability to manage health and safety risks in accordance with the Occupational Health and Safety Act

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Focus on H&S issues with measures put into place to ensure compliance

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This focus on Health and Safety is a natural result of long-term relationships. Mutual benefit plays a part in ensuring that the utmost care is provided in work conditions. Construction is known as an industry with high risk reflected in fixed cost contracts (Bayramoglu, 2001). Traditional contracts tend to result in overburdening of contractors with risk. As everyone collaborates, it is easier to share risks which in turn makes it easier for stakeholders to monitor and request improvements in Health and Safety. The contractor's anticipation of future work also motivates the meeting of client stipulations. Clients as seen in the Wits case, can initiate talks on health and safety and insist on changes where contractors are lax.

It is interesting to note that in 2009 when Wits embarked on its H&S initiative, a CIDB report commissioned from CREATE had been released highlighting the status of the industry and providing recommendations for better construction H&S (Haupt et al., 2009). The report found poor H&S performance due to lack of management commitment, inadequate supervision, inadequate or lack of H&S training, lack of worker involvement, personal risk appreciation and work pressures. Recommendations included enhancing impact of Construction Regulations, establishing minimum competence standards and accreditation client appointed H&S agents in terms of the Construction Regulations, ensuring tertiary education addresses construction H&S and facilitating a developmental approach to support small and emerging contractors.

In line with improving the industry, the 2003 Construction Regulations were repealed with the publishing of new regulations in February 2014. Noteworthy requirements included:

- More stringent obligations on a wider range of parties including the client, contractor, principal contractor and designer
- Designer obligations such as designs that are cognisant of the safety of workers
- The use of competent agents with requisite knowledge, training and experience
- The appointment of a construction manager to manage all work and ensure H&S compliance
- Client responsibilities such as baseline risk assessments and ensuring compliance from especially the contractor and construction manager in terms of H&S (DoL, 2014)

Five years before these regulations, Wits as a client (using its agent) was already taking an active interest in H&S, enforcing compliance to stringent H&S controls and providing training to all employees on site.

6.5.8 Disputes and Risk

Disputes and risk tend to be synonymous with construction.

6.5.8.1 Disputes

PD3 noted there will always be disputes which can devolve into harsh fights, but they always manage to resolve issues in a fair manner so that everyone is happy. CX2 even mentioned how they have never entered into a dispute on any of their jobs. CC1 noted how disputes tend to be over disallowed costs for example when quality is not up to snuff, and consultants request a redo of work which contractors then want the client to pay for when they have to carry that cost. CC2 agreed that everyone wants disputes resolved as quickly as possible and noted the difference between NEC and JBCC when dealing with disputes:

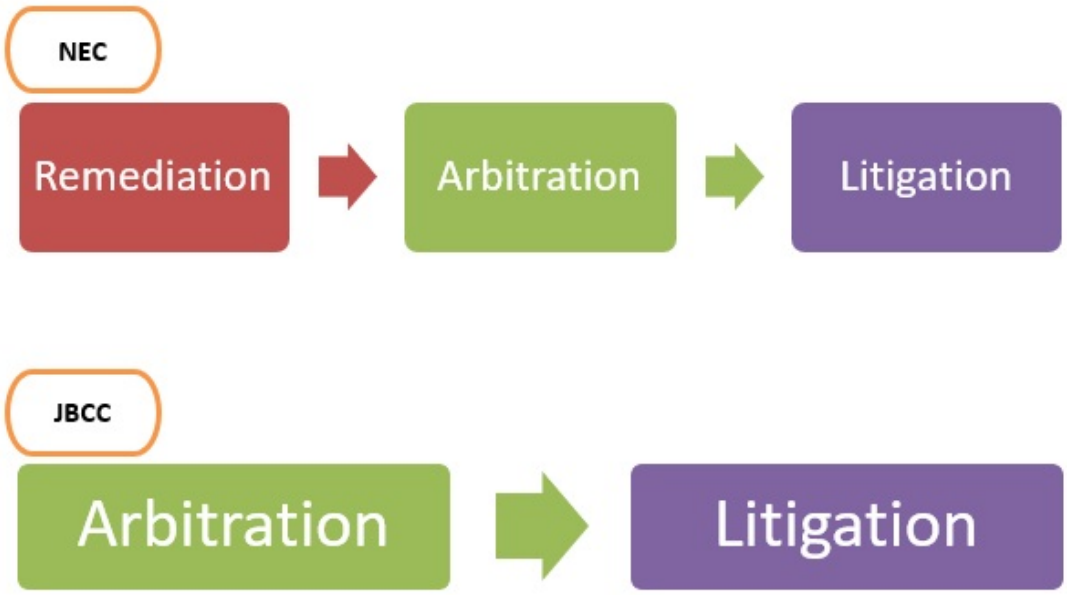

Figure 6.2 - Dispute Resolution NEC vs JBCC

While starting at adjudication is lauded by some, others have advised caution when it come to this aspect of the NEC. Hawkswell Kilvington Legal addressed how it could be unwise to agree to a dispute resolution provision limiting your discretion to deal with disputes in a manner you deem more appropriate (HK Legal, 2012). This on the other hand could be viewed as an advantage since it gives parties the time to cool off and reflect before pursuing the legal route

6.5.8.2 Risk

SP1 explained how using the NEC offers an opportunity to address challenges or problems early on so one can quickly deal with all red flags. With other contracts, warning can happen retrospectively in a sense and by then it's too late. The EWS warns or events before they happen so you can prevent, change or provide a recommendation.

CX2 agreed that the early warnings make a world of difference. Their proper usage mitigates a lot of the disputes. If an early warning is given and concerned party does not address it, then they need to take the consequences of that action. In JBCC the early warnings do not work in the same convenient manner.

One bonus was that participants concurred on was that NEC gives a more accurate assessment of risk, so all parties concerned are aware of risks and can deal with them before they occur.

Type of relationships make a difference in risk management

Early Warning System in NEC helps with risk reduction

NEC provides a more accurate assessment of risk which can be dealt with before they occur

Factors causing high risks include climatic conditions, procurement problems, subcontractor delays, technological inefficiencies, lack of experience and overwhelmed construction firms (Bayramoglu, 2001). Partnering plays a major role in reducing these risks through the coordinated efforts of stakeholders to deal with risk and the application of risk equity (*ibid*). Early contractor involvement can also play a part in better risk management especially where entire project team is actively involved in risk management through-out the project (*ibid*).

The early warning system is a somewhat misunderstood but touted advantage of the NEC (Kudi, 2017). It would prove an excellent asset to HEIs as it can help project team keep up to date on risks and also reduces delays since response to threat has to happen within a specified period. As long as everyone has access to the system, there can be no unfair blame placed at any stakeholder's feet.

6.5.9 Management Oversight

In terms of management oversight, Document A revealed the existence of formal committees whose purpose was to provide a wide range of input to spatial planning, strategic direction and project development. These oversight and consultative working groups include:

- Campus Planning and Development group
- Space allocation committee
- Infrastructure for teaching working group
- Energy and sustainability working group
- Capital projects steering group

- Capital Projects finance working group

The capital project steering group integrates the aspirations of the various stakeholders. This group is comprised of the Vice Chancellor, various DVCs, Deans of faculties, DVC: Special Projects and the DVC: Development and Fundraising Office. The CDP reports to this structure together with academic project champions. The CPSG approves and monitors project budgets, design briefs, implementation timelines and project fundraising progress

PD2 and PS1 concurred that that the University does not intentionally put up barriers, it tends to be open to what gets the job done. The one thing the Vice Chancellor was concerned about was the budget, the University could not afford any overspending; this was a huge factor behind the strict budget control.

PD1 and PM1 delved into the problems experienced with the Procurement Department. They were not impressed with having a separate procurement policy and had an issue with long term relationships with consultants as the process looked too quick and seemed to give an unfair advantage to consultants. The appointment of a dedicated construction procurement person and Treasury legislation made the process easier.

PS1 and PM2 also explained how there was a lot of opposition and scrutiny from the Legal Department especially over the contracts. These eased especially with the excellent audits received and application of supporting processes.

MWC1 provided a brief description on how the University management was kept abreast of project developments. Wits Council was kept in the loop by frequent meetings with updates on how projects were going. Instead of pages of reports, they were given a concise single page reports on progress. Members appreciated these reports as it was easier to see at a glance what was happening with the projects.

Management Misgivings

Problems faced over separate procurement policy

Scrutiny from Legal over contracts

Opponents to change are expected as many do not appreciate being moved out of their comfort zone. Change champions and agents need to determine the best way for reaching the naysayers. A push is the final resort when all else has failed to move detractors. Different organisations approach this issue differently, the crux is to always remember that change requires soft skills especially since people need to be dealt with.

Vennström and Eriksson in explaining the industry note how management tends to be technical. Though it depends on human labour, its management attitude gives preference to top down technocratic systems while ignoring its human capital (Vennström and Eriksson, 2010). Institutions are also in place governing human interactions through formal standard contracts which hinder flexibility and change. Clients in the public sector are noted for the rigid protocols in place that prevent procurement based on trust and long-term relationships (*ibid*).

6.5.10 Prerequisites for Change

Participants shared what they perceived as the prerequisites to change taking place. Everyone agreed that management buy in was the greatest factor. It is necessary for the University's executive to understand the principles of FCs and NEC. They have to understand and accept the contractor coming into projects as a partner not a "servant". The panel also expressed it as getting buy in from the VC's office to act as a special function that can take special risk. This was necessary to prevent fighting later. PD1 added that management also needs to accept that mistakes can happen and has to show trust in the team. His additional prerequisites were having a large enough capital projects programme and a team that can actually shape the change.

Prerequisites:

Buy in from management

Team to shape the change

The noted prerequisites for change in the WCPD's case fall into generic change prerequisites. Bresnen et al identify championing by senior management and accepted industry best practice as critical factors for change (Bresnen et al., 2005). Kotter notes the need for a frank discussion on current status of the organisation, aggressive cooperation of many individuals and a powerful guiding coalition for the change process (Kotter, 2007).

As established from the Wits experience, without buy-in from leadership and a team to guide the change, change is likely to be unsuccessful. WCPD were in a fortuitous position to actually have change suggested at leadership level with known industry experts to drive the change

6.6 Implementation of Change

The previous section provided data on what changes took place and the general feelings and reactions to the change. This section looks at how these changes were actually implemented as a means of determining the processes involved in change and the type of decisions that need to be made.

It should be noted that change occurred all at once. As one PM described it, a jump in and swim philosophy was used. PD2 noted that it took about 12-18 months for change to take and this was because most in the team were new to what was being done and there was thankfully no legacy baggage to deal with.

While currently change tends to be viewed as more dynamic and constant, previous norm suggested that change should take an incremental curve with small wins designed to encourage those who are a part of the change (Burnes, 2004). WCPD went against this norm and yet managed to successfully implement change.

6.6.1 Client Role

PD1 was emphatic about how the client should lead in industry, yet this is not well understood or implemented. The client has a specific role to play in bringing everyone together and contracting all players. PD2 agreed, stating that the client cannot sit back expecting to get an asset, he has to roll up his sleeves and work within a project. According to PS1, any change

starts with the client. There is a need to rebuild intelligent clients who go beyond writing strategy and actually drive it. Clients are not driving processes in the public sector anymore.

The panel agreed that clients need to change. Most professionals do not appreciate the importance of procurement and contractual relationships. They want to do the easiest and most comfortable thing which they are used to. Clients need knowledge and preparedness otherwise change will not happen. CX2 expressed how in changing clients have to buy into this new process. The problem is traditional clients do not understand or appreciate it is because there is a trust element involved which some clients cannot accept.

Participants then discussed this important client leadership role. Clients need to have a vision that they can be supported to accomplish. The procurement strategy is the glue holding everybody together, but the client has to provide leadership for the vision to come to fruition.

Included in this leadership is the client's role in shaping the project team especially contractors. FAs play a great role in this as they provide continuity and a long-term relationship in which the team can be moulded. PD3 added how the type of management also affects the manner in which a team adjusts to change. Management needs to be open to communication and working easily with people as opposed to driven as in standing there with a whip. SP1 commented on how the relationship with the contractor i.e. coming into the project as an equal partner is dependent on who is handling oversight, the culture of the client and their expectations.

CC2 concluded that Wits was a very approachable client with whom you could discuss issues openly with no need for fear. While people can work and discuss, sort things out etc, there is a need for certain type of person with a certain personality to be the client. PD1 was that person, he got things done, held the system together and provided excellent leadership and management.

The recurrent theme in these discussions was that clients need to take an active leadership role and drive change. This is accomplished through being knowledgeable on what is available and making an effort to guide the team to the standard you need them at.

Clients need more active involvement

Strong leader needed to push through client's agenda

The Client is the best Driver of change

Management affects how team adjusts to change

Change tends to be successful when championed by the client. The client also has a critical role in pushing and sustaining the change. Lack of interest on their part communicates limited importance of the change. Loosemore and Richard note how the relationship between clients and the project team affects the speed of construction (Loosemore and Richard, 2015). Clients need to realise that people deliver results and not procurement systems; it's the quality of team relationships vs. the specific circumstance of a project. Clients with clear goals reflected in the brief and team selection have better chance if goal congruence (*ibid*). Clients were also encouraged to actively participate and be supportive through-out the project lifecycle (*ibid*).

Manley and Le Chen recognised the client's significant role as the final say on the type of procurement used in a project and the champions of innovation (Manley and Le Chen, 2016). They noted how while in traditional projects clients had seven key roles; project initiation, project design, project control, tendering and award, information coordination, facilities management and standardization, with collaboration there are additional roles of mediation to ensure commitments and requirements determined in democratic manner, involvement with wider supply chain and facilitating of team work (*ibid*). Manley and Le Chen also found that while stakeholders can argue on the best type of client, they agree that the greatest impact of clients on the project is through their procurement choices.

In terms of the construction industry, since Latham's report, calls have been made for a client driven change. The client role is recognised as critical as they can hold the most influence in a project. In taking change upon themselves as the client, WCPD ensured that they were in line with best practice and also in a position to monitor and push change as needed. Other stakeholders take their cues from leadership

6.6.2 Attitudes

PD2 acknowledged how change is usually unwelcome and it takes both time and effort to appreciate a new way of working. There is need for a project management team that is dedicated and supportive of the changes.

PS1 scathingly revealed that Built Environment Professionals are narrow minded and resistant to change. Contributing to this is the fact they have been taught JBCC even at university and they think anything else is outside their comfort zone. PD2 backed this view and added that some clients are as difficult as some BEE and academic professionals. This he attributed to a lack of trust

One PM argued that all team players need to move away from the them and us attitude. This was supported by PD1 and SP1 who believe that professionals have to change their attitude to contractors and the client with a mental shift necessary for all parties to work closer together and appreciate change

PD3 noted that the contractor needs a big mind shift to be assertive and architects have a big shock when they find they have to step off their pedestal and work closely with the contractor. He argued that ego tends to play a big part in this. Architects have had to be taken aside and reminded of the collaborative spirit of the project. The PM also needs to show by example that the consultant is not always right and preserve equality in the team.

CC1 revealed how at times clients need more of a mindset shift as they use NEC while still running on a JBCC mentality. They fail to understand the implications and time limitations that come with NEC use.

PD1 expressed how contractors are quicker to adjust to changes than professionals. This the panel justified by an example of how the contractor that refurbished FNB using JBCC quickly adapted well to NEC and FCs on their next project – there was a smooth transition.

Adjustment to change was not limited only to the project team as MWC1 explained how Wits Council too needed an attitude that understood that things could go wrong as this was a new system that was being tried out.

With all the change expectations, members of the panel revealed that there were casualties to change. There was a time when 1 or 2 project managers had to be removed as they were either inexperienced or couldn't fit in. This was not exclusive to PMs, one contractor had problems with the way of working and could not match their organisational culture with what Wits wanted to achieve – the contractor never got it. Though the contractor did huge projects that were successful they never bought into the culture and eventually decided it was more profitable not to continue relationship. This was perceived to be due to the requirement that all parties had to be open about their finances; transparency apparently prevented them making more profit.

PD3 noted that change is a process; one cannot wake up one morning and have had a personality change. It is necessary to be consistent with values and remind everyone about the mind shift. SP1 agreed, emphasising the fact that change takes time.

Implementation of change:

Client ensures they are knowledgeable about change is expectations of change

Client living up to collaborative spirit

Project management team dedicated and supportive of change

Client keeps a close eye on relationships among project team and reinforces collaborative attitude

Letting go of those who cannot adjust to change

Understanding that it takes time for change to be cemented

Attia noted how a complete mindset shift is needed when using collaborative contracts such as the NEC (Attia, 2012). Changes to more collaborative working fail when the underlying

attitudes remain the same as when traditional procurement is used. It is not enough to say work will be collaborative, actions need to show the change too

6.6.3 Roles and Functions of Project Team

Change failures tend to be due to lack of attention to human aspects (Erdogan et al., 2014). Success factors include proper planning/project management, alignment between people and organizational processes, experience in use of technology and early involvement of users. In this case, alignment of the various stakeholders with their specific functions enabled the project team to function smoothly.

6.6.3.1 Programme Director - PD1

PD1 defined his role as that of a symphony conductor, “a makhulu baas” (loosely translated the boss man). He represented the client. According to PS1 his role also included finding out what was causing problems and unblock it, so the team could function successfully.

Characteristics noted by PD3 included being a people person and leading by example; being collaborative so your team can follow suit. It was emphasised that a programme director cannot be a person who is rigid and cannot compromise.

6.6.3.2 WCPD Director - PD2

PD2 explained how the PIMD is the custodian for University infrastructure while WCPD develops assets for the asset manager and hands it over for them to manage. His role as Director of WCPD was to make sure projects align with the University's spatial development framework

6.6.3.3 Procurement Specialist - PS1

PS1’s role was to set up procurement systems, get them up and running then hand them over to the client

6.6.3.4 Spatial Planner - SP1

SP1’s role was that of oversight in strategic planning

6.6.3.5 Project Manager

The PM role involves looking after the interests of the client. They write up and negotiate contracts for the clients, negotiate their fees and ensure the project stays within budget. They are also involved in planning, briefing, scoping and managing projects.

6.6.3.6 Cost Consultant

The role of the cost consultant is to negotiate target prices especially if the contract is on a framework tender. The consultant needs to check rates to ensure the original tendered rate is used or the market related rate instead.

Responsibilities - managing costs, establishing budgets

Informs budget - traditional tender process then, contractor prices then comparison which involves questions, negotiations etc till target cost arrived at. No remeasurements, instead an evaluation is done monthly which issues financial reports, audit contractor payments, formalised final account with thinner documentation than with traditional project

The Cost consultant also has to keep up to date with the contract

6.6.3.7 Architect

Architects believe they have the role of coordinating all other consultants especially since an integrated services drawing has to be produced; their role goes beyond design. This makes them question the need for a PM

6.6.3.8 Contractor

Contractors help with design and value engineering; they construct and also work with the client's cost consultant to make sure the budget is not exceeded.

Contractors had an interesting view on the consultants stating that originally, they were very confused because traditionally they want to instruct, and contractors must deliver. With this new process they instruct, and contractors can query. As architects are seldom principal agents anymore, they do not seem to have much conflict with project managers, conflict tends to be between the contractor, project manager and client. PMs want to instruct and when contractors disagree the collaboration card needs to be pulled.

Programme Director – symphony conductor who clears all blockages in the project

WCPD Director – custodian of University infrastructure

Procurement Specialist – setting up procurement systems and handing them over to project team

Spatial Planner – oversight in strategic planning

Project Manager – protects the interests of the client

Cost Consultant – negotiation, budgeting costs

Architect – design, coordinating with other consultants

Contractor – input in design, value engineering, building

One benefit of the NEC is how it clearly defines the roles and responsibilities of each stakeholder (Broome, 2012). Lack of clarity on this front can lead to duplication of roles and in worst case scenario the blame game when one stakeholder or the other has failed to do what was assumed to be their responsibility. Collaborative working enabled the project team to support each other in their various roles.

6.6.4 Training

Everyone went through workshops driven by PS1. This training covered Framework Agreements, the NEC and what the team could expect to get out of this process. PS1 also looked at how collaboration was to be done and the expectations of the contract. PD3 expressed that he attended the training as a means of understanding what the contractor could use against him contractually. A1 explained that experience was also a great teacher as they better understood NEC when they were on the job.

The panel explains it this way - workshops were provided so the entire professional team would understand its workings and get everyone on the same page. The day long workshops were not to teach NEC but rather its culture, what are its features, what are you embracing; basically, the need to understand we are all partners in the process

Document F provided an example on the course outcomes of the training that is provided to contractors and Consultants. These outcomes include:

- An understanding of the NEC principles and how they link together
- Exposure to concepts in the NEC3 Professional Services Contract, NEC3 Engineering and Construction Contract and the NEC3 Engineering and Construction Short Contract
- An appreciation of the scope of the family of contracts, what is agreed to by the various parties and what options are available
- What is expected of designers when the NEC3 contract is applied

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Training provided to educate project team on the NEC, Framework Agreements and what to expect

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Implementing change without the relevant support structures dooms the change from the start. WCPD realised they were entering largely uncharted waters and they took it on themselves to provide relevant stakeholders with the necessary skills to accommodate the change.

While it can be assumed that most training is relevant for more technical changes such as the implementation of new technology, it is interesting to note that contractors tend to have insufficient resources for training, lack management capacity and have poor construction procurement systems (Thwala and Mofokeng, 2012). Keeping this in mind, Wits approached change with a blank slate for the project team, assuming everyone needed to be trained to adapt to the changes. For Wits, compulsory training was a means of ensuring that everyone was on the same page, understanding the issues and project the same (Erdogan et al., 2014).

6.6.5 Contracts

Wits had moved past making evolutionary change, radical change of their procurement system was accomplished through changing contracts. Relational contracts were more about relations than discrete transactions involving a wider social and economic context (Alam et al., 2014)

6.6.5.1 NEC

The selection of a project management administered programme automatically determined the choice of the NEC as the contract choice. NEC has six options and WCPD focused on the Activity Schedule / Target Cost option as the team wanted to strictly curb all costs. Experience in the use of NEC was not a prerequisite to tendering for the projects.

Document A states how CDP piloted the NEC3 for large-scale buildings and successfully invested in and established construction partnerships with both its contracting and professional service providers, adopting innovative sharing and target cost strategies.

The following examples are available in the Annex[2].

- Contract Documents example
- Framework agreement example
- NEC3 package order contract
- Standard for developing skills that result in nationally accredited outcomes through infrastructure contracts

PD1 explained how a wait and see approach was taken for any necessary future modifications. In future projects, Bills of Quantities were also utilised as cost consultants perceived contractors as having too many loopholes and they preferred keeping the risk more on their end.

The panel described the typical procedure followed as the client and contractor worked to agree on a Target Price:

[2] It should be noted that any identifiers for projects have been removed.

- Provide a complete specification of the project (drawings) to the contractor
- Measure the drawings
- Break it down into activities
- Decide on lump sum for each activity
- Negotiate based on the series of lump sums
- Agree on Target Price
- In signing off on the Target Price, the contractor took responsibility for meeting that target
- The contractor was then paid on cost plus based 'reimbursal'

PD3 explained how working with a cost-plus based system means less risk for both parties as the contractor knows he will be paid for all his legitimate costs and the client has surety on the price of the project.

MWC1 then explained how fixed clause contracts were used with pre-arranged agreements on shared losses and gains. This, all CC1 explained was utilised as a means of incentivising the contractor to build as cheap as possible with no shortcuts. Where the contractor comes in below the TC, he shares with the client in the gain made with the same conditions applicable with losses. Percentages of the sharing allocations were fixed at the start of the project based on expert advice and a specific formula was applied to ensure the contractors could not manipulate the TC. Pain share and gain share was limited to just the client and contractors. Consultants on the other hand were on a fixed rate which did not change according to whether there was pain or gain.

CC1 and PD3 also noted the need for a document controller for NEC projects. This, they explained is because the NEC is an administrative intensive contract to document and a dedicated resource is a necessity to keep everything manageable. A1 explained how typically up to 95% of the required documentation for the project is required upfront before construction commences. In regard to documentation, CC2 also emphasised the need for templates; the contractors were provided with samples of Bills of Quantities and utilised these when drawing up their own.

CX2 mentioned how with strict cost control, another necessity was that of total transparency between the client and contractor in terms of finances. Monthly audits were also conducted as a means of keeping track of the budget.

One implied strategy was that of using experienced architects as they were better able to adjust when changes needed to be made. This, contractors had picked up as an issue as consultants with limited practical experience were perceived as unable to quickly understand how to implement change.

PS1 defined one other condition in their contracts as that of developmental goals. These included local participation, subcontractor suppliers, empowerment, job creation and skills development. Contractors were penalised for not meeting the set goals.

Participants noted how these changes were not implemented without misapprehension. Consultants worried about the activity schedule as the contractor takes on the risk in preparing price while with the more utilised BOQ that risk is shared with the consultants; something they found more palatable. They believed TC was better done with contractors who have been through the NEC experience and understand how it works.

The panel noted though that in-spite of any teething problems that could occur, the ability to use the contractor early paid real dividends. It was possible to get smarter designs, improvements and the simplification of aspects of the project; something a cost consultant could not accomplish especially when costs need to be reduced through value engineering. For them the NEC provided a flexibility they had previously failed to achieve.

NEC:

Used Target Cost then BOQ later

Less risk with TC

Pain/Gain share clauses

Needed Document Controller

Strict budget control

Transparency on both sides in terms of budget

Had to meet set development goals

Essentially, the main idea behind Target Value Design is "to make a client's value (specific design criteria, cost, schedule and constructability) a driver of design thereby reducing waste and satisfying or even exceeding the client's expectations" (Zimina et al., 2012). As the project team understood what constituted value to the client, they were better able to calculate and set target costs. Everyone played a role in meeting value.

6.6.5.2 Framework Agreements

WCPD offered framework agreements only to contractors. A shift occurred with the NUs, where consultants were also given FAs. CC1 explained how consultants were selected depending on the size of the project. With larger projects, "Framework Consultants" were used whereas smaller ad hoc projects could be put out to tender. Quality was also a consideration for being a preferred consultant.

The ability to utilise the same team over and over was one of the major factors that influenced the decision to use FAs. With a rapid rollout programme, there was a need for readily available teams to work consistently ensuring continuity of work, better team dynamics and the building of long-term relationships within the team. All these contributed in making the PM's job easier.

PD3 explained that FAs were given for a 3-year period. Contenders had to go through the tender process explained in *Section 6.6.7.4* after which they did not need to tender for those 3 years. CC2 further explained that the contractor tendered to be on a roster or database as a preferred contractor. Each project the contractor was appointed to came with a separate contract that used fixed rates. PD3 and CC2 also emphasised that contractors did not simply have a job for the next 3-years, they had to work for it. Major conditions were those of consistent performance on the projects and the ability to adjust to collaborative working.

The panel confirmed that the assumption that FAs would provide a better team experience paid off with a contractor who aimed to please by improving Health and Safety records, improving quality, utilising better employment options and basically working harder to ensure

they get the next batch of work. The client in essence helped to shape a better contractor. There were cases where contractors even improved in their CIDB gradings.

PD2 noted how it took 2 years to feel the effects of the change. Lessons learnt from the first Framework agreement set the tone for the success of future projects.

WCPD had FAs strictly for contractors

FAs used for consistency, better team dynamics and long-term relationships

Each project had a separate contract

Client helped in shaping a better contractor

6.6.5.3 Early Contractor Involvement

The use of FAs meant there were readily available contractors before designs were finalised; the working relationship between contractors and consultants started early. ECI was implemented in the ways listed below:

- More teamwork and less us and them mentality (CX2)
- Contracts were brought in as an expert resource i.e. construction professions and not as simply builders (PD2)
- Contractors were exposed to the drawings/plans earlier (PD3)
- Contractors had a voice in meetings to provide input on design (Panel)
- Contractors were also given the opportunity to be frank when consultants not doing their job (Panel)
- Contractors provided value engineering (PM)
- Contractors given as much weight as consultants meaning a change in power dynamics
- Contractors given more authority due to their bigger responsibilities especially when using TC contract (CX2)

Participants agreed that having contractors in early was of great benefit to the project, the issue was the limited timeframes that limited what could be accomplished with the contractor especially in the design

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Great benefits to using contractor early. Problem is limited timeframes which prevent more comprehensive input from contractor

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In the Wits experience, the major advantage of ECI corresponded with that noted in literature – early start of projects. ECI was a means of expediting the process while providing invaluable project timeline and cost related input (Greve, 2014).

6.6.6 Relationships

The establishing of cordial, long term relationships came through concerted effort and had a learning curve as industry attitudes especially between contractors and consultants had long been set. There were times when the required behaviour had to be enforced. These are the changes that occurred with relationships:

- The client took an active interest in the project and guided the direction it went
- The contractor was brought in as an equal partner rather than an adversary (PD1 & SP1)
- The team had to listen to the contractor in his new status as a construction professional. This enabled less time changing things that did not work (PD3 & PM)
- The contractor was not treated as a servant anymore (Panel)
- No blame games were allowed from consultant to contractor (Panel), PD1 had to be stern on this point till they eventually understood
- Interventions in the form of risk reduction meetings when contractors and architects were not getting along (PD3)
- Issues were dealt with differently; in a “how can we solve this” manner. For example, when dealing with quality issues, instead of meeting just consultants on their own then the contractor separately, everyone came to same meeting and questions became “what can we do?” instead of throwing blame around

- Architects had to learn not to be “prima donnas”, they needed to be open to criticism and flexible with their design (PD3)

The panel provided examples on how change was not easy, the different relationships had a hard time accepting the new status of contractors.

6.6.6.1 Contractor vs. Architect:

Example of a contractor asking deep and detailed questions about the design and the architect getting hot and bothered. The architect was not happy as he had never worked with contractors in that way. The contractor had to stop and let the architect know he was not questioning his design ability but rather trying to understand the flexibility of the design so as to be able to accurately price

6.6.6.2 PMs enabling QS vs. Contractor

The worst experiences have been because of weak PMs who did not grasp the culture of what was being done e.g. a case where contractor had forgotten to carry a figure in the totals. The QS said fault was with contractor and they should pay but PD1 reminded everyone that this was collaborative effort and the QS should have also checked the totals. The costs were shared in this case

The panel observed that it is possible to make contractors absorb pain but in next corner he will try and trip you up to make up for the loss. With collaboration pain is shared because to err is human and everyone is in the project together

CC2 though had a harsh opinion on the relationships. In his book, the contractor was equal in the sense of having opinions or suggestions but at the end of the day everyone is there to make money, he is not part of the family.

PD1 emphasised the need to never change the entire team as this would mean starting from scratch again. Relationships and dynamics are maintained by preserving part of the team for each new venture.

Client more involved in the project

Contractor equal (though not family)

No blame games

Never change entire team all at once

Relationships are the cornerstone of collaborative change; the team dynamic matters. A mutually beneficial relationship requires practical, obligational relations. In practical terms, risk needs to be equitably shared, there should be open and effective communication, collective responsibility, joint coordination and monitoring, real pain/gain share, long term commitment, team working, trust and compromise (See table 5.3). Wits accomplished this through an active client who was constantly reinforcing change. The WCPD experience showed the difficulties various project team members have in adjusting to a change in power dynamics. Consultants especially had a difficult road to accepting contractors as equal partners.

6.6.7 Systems and Processes

6.6.7.1 Systems

PD1 explained how proper systems were lacking especially those relating to finance and procurement. For procurement there was a general procurement policy with no separate construction procurement policy. One PM confirmed this by describing how as a team they realised that they urgently needed structures in place. They needed to find the right way to do it in the cheapest and quickest way.

Document D provided examples of how the implementation of systems meant clearer guidelines on responsibilities. The systems were able to detail team members designated to undertake specific actions. Examples are provided in Table 6.12 below

Table 6.12 - Project Team Responsibilities

Action	**Team Member**
Develop a construction procurement strategy	Programme Manager
Approval of a construction procurement strategy	Director Campus Development and Planning
Appoint a documentation review team	Program Manager or Director Campus Development and Planning division

Action	Team Member
Submit a motivation for not conducting a competition amongst framework contractors	Project Manager
Motivate the reasons for pursuing the negotiation procedure of approaching a confined market	Programme Manager or Assigned Project Manager
Approve conditionally or Unconditionally a request from the Accounting Officer of an organ of state to make use of a framework agreement entered into at the university	Deputy Vice-Chancellor of Finance and Operations

In a similar vein, procurement activities associated with the contract had designated people who could perform them. Some examples are provided in Table 6.13 below.

Table 6.13 – Assignment of project activities

Activity	Team Member
Prepare broad scope of work for procurement	Assigned Project Manager
Estimate financial value of proposed procurement	Assigned Project Manager
Obtain permission to start with the procurement process	Programme Manager or Director Campus Development and Planning division
Establish contracting and pricing strategy	Assigned Project Manager
Establish targeting strategy	Assigned Project Manager
Establish procurement procedure	Assigned Project Manager
Prepare procurement documents	Assigned Project Manager
Compile Contract document	Project procurement administrator in consultation with assigned project manager
Obtain approval to waive penalties or low performance damages	Programme Manager or Director campus development and planning division

For smaller jobs WCPD automatically used Wits vendors who are on a database. These jobs were the type where there was no need to go out and tender. Systems needed to be put in place for the bigger jobs that were worth a lot more and did go out for tender.

6.6.7.2 Financial Systems

As a matter of priority, PD1 targeted the Finance department. He pushed for the finance department to pay on time and to actually move from a normal 30 days payment period to a 21-day system. The panel revealed how the logic behind this was that to receive value, one has to be good client and pay on time. When contractors are paid on time, they can also pay subcontractors on time promoting better efficiency. Document F expanded on this.

A clear financial policy served three purposes:

- To establish and develop controls and processes and ensure minimised risk. This also ensured that efficiency improved from project initiation to final payment and capitalisation of completed projects into fixed assets.
- To ensure procedures and internal controls in place to record all incoming invoices and authorise facilitation of payments
- To provide accurate data capturing within the Wits Financial Management System

Some examples of summarised processes and collective responsibilities are provided in Table 6.14 below.

Table 6.14 - Processes and Responsibilities

Task	Procedure	Collective Responsibility
	Procedures for Issuing Orders and Project Take On Forms (TOF)	
1	Project Manager completes and submits the Project Initiation Take on Form	Project Manager, CPP Administrator, CDP Finance Office
2	For outsourced service that is not contractual or within budget, TOF coded and routed back to CPP	CDP Finance Office, CPP Administrator
3	For external service providers, TOF coded and routed to CDP Office	CDP Finance Office, CDP Office Manager
4	Creating work order on Archibus	PIMD Fin Administrator, Call Centre Consultant
5	PM copies Work Request to CPP Administrator	Project Manager
6	CPP Administrator obtains copy of Work Request and updates Schedules	CPP Administrator
7	Creating Purchase Orders on Oracle	CDP Office Manager, Procurement Buyer, CDP Finance, CPP Admin
	Procedures for Progress Payments and Payment Authorisation Form (PAF)	
8	PM generates Payment Authorisation Form (PAF)	Project Manager
9	Attaching copy of PO to invoice and PAF for approval	CPP Administrator
10	PAF submitted to CDP Finance to review, code and receipt authorised invoice	CDP Finance Officer, CPP Admin, CDP Finance Assistant, Central Finance AP
11	PIMD Finance Admin receives PAF document batch and routes to Call centre to close Work Request	PIMD Financial Admin, Call Centre Consultant
12	PIMD Finance Admin Officer received invoices attached to PAF and captures on Accounts Payable	PIMD Finance Admin Officer
13	Verified AP batch submitted to Wits Central Finance where payment is effected	Central Finance AP

Other finance processes pertained to Budgetary items. These were to be avoided as far as possible with assumptions stated in the price in data and adjusted in terms of the contract should they prove incorrect. Only when unavoidable could estimates of likely costs be included in the contract

It was also emphasised that no provision was to be made for contingencies or price adjustment for inflation in the pricing data. The contract price would be changed in accordance with the provisions of the contract where:

- Quantities are different to that scheduled
- The scope of work is changed
- Events occur which are not the contract is risk
- Price inflation occurs

PD1 and PD2 explained how a project management system was set up which tracked projects and recorded expenditure. Another system was set up outside Wits Oracle system for authorising payments; this helped with the 21-day payment system. PD2 noted how the FA pushed the need for both financial and procurement changes.

CX1 commenting on this expressed how getting paid on time is less about NEC and more about the client's administration system budgets, cash flow and people. If the client has money for the project we should be paid on time. Being a good client matters to the contractor

MWC1 expressed how much attention the systems received. In what will be referred to as a commendation, Government confidently entrusted the New University DHET money to Wits because they seemed to know what they were doing. This was due to the fact that their reports were never late, no budget was overrun significantly and not one project had a questionable audit statement. They believed proper systems were in place to ensure efficiency in their projects

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System set up for tracking expenditure

21-day payments

Monthly audits/reports

6.6.7.3 Procurement Systems

To grasp the critical need for procurement systems one needs to understand procurement in HEIs. Background was provided by Document C.

Procurement is defined as the process which creates manages and fulfils contracts. It deals with activities surrounding contracts i.e. the development of a procurement strategy, procurement documents, the solicitation of tender offers, the evaluation of submissions, the award of a contract and the administration of the contract

Non-construction procurement deals with direct acquisitions which involve standard, well defined and scoped services, off the shelf items and readily available commodities. Construction contracts differ in that each contract is unique and there cannot be direct acquisition of infrastructure. Each contract has a supply chain which needs to be managed and programmed to ensure that the project is completed within budget, to the required quality and within the available time.

The National Development Plan proposes five (5) focus areas when designing a procurement system that is better able to deliver value for money while minimising the scope for corruption. One of these focus areas is that of differentiating between the different types of procurement in terms of the Public Finance Management Act. The regulations that have since come into effect, separate the supply chain for the delivery and maintenance of infrastructure from that for general goods and services

In August 2012, Campus Planning and Development documented its procurement processes, procedures, methods and delegations. The reviewed document contained in Document C covers

- Goods or services and engineering and construction works and disposals relating to the delivery and maintenance of fixed assets
- Goods or services necessary for a new facility as delivered to be occupied and used as a functional entity
- Goods or services associated with discharging of obligations in terms of an agency agreement with an organ of state

This document was based on the Western Cape Provincial Treasury Standard for a Construction Procurement System. All procurement documents were developed in accordance with the provisions of ISO 10845 - 2 and the CIDB standard for uniformity in construction procurement. Standardization has been implemented with all procurement documents including calls for expressions of interest based on the standard University approved templates which comply with the CIDB Standard.

The procurement system is specific on what can and cannot be done and the behaviour of stakeholders. For example, no contract manager responsible for managing and administering the contract can interact with designated persons to obtain the necessary approval to waive penalties or for compensation events etc.

Norms of practice are also detailed, for example price escalation is generally based on appropriate indices published by Statistics South Africa. The base date for indices is the month during which the closing date for tenders falls.

Insurance for long-term programmes of works involved in construction rehabilitation, alteration or extension of construction works shall preferably be principal or employer controlled. This helps ensure that risk is insured on a more systematic, scientific and cost-effective basis than is the case where insurances are effected on a piecemeal basis by contractors executing projects within a program.

In addition to standard norms and procedures, the procurement policy promoted Broad-Based Black Economic Empowerment. This was accomplished through work opportunities for targeted contractors and experiential work opportunities for professional registration. Targeted procurement procedures included:

- Granting of preferences using Standard preferencing schedules
- Accelerated rotations on electronic databases where appropriate
- Granting of up to 10% of the total number of evaluation points used to shortlist tenderers using Standard preferencing schedule
- Financial incentives for the attainment of KPIs

- Creating contractual obligations to engage target groups in the performance of the contract

Another issue addressed in the procurement policy is that of framework agreements. The process of putting in place a framework agreement is the same as that for any contract, the difference being that at the time of its award no price is attached to it as call offs will be made over a period as per the terms of the contract

According to the policy, Framework Agreements could be entered into for a term not exceeding 3 years by:

- Inviting tender offers using stringent eligibility and evaluation criteria
- Entering into a limited number of contracts based on the projected demand and location for such services

Frameworks that were entered into could not commit the university to any quantum of work beyond the first order or bind it to make use of such agreements to meet its needs. Additionally, the cumulative value of batch orders could not in any one year following the start of the contract exceed the value stipulated in the contract by more than 10% unless prior approval had been granted. Batch orders were also required to indicate who the contract manager was and ensure this manager was fully empowered to act on behalf of the university. Specifics were also provided on the activities associated with the issuing of a package/ batch/ task order within a framework agreement

Call offs from framework agreements could be made with and without requiring competition. Competition between framework contractors could take place where:

- There was no justifiable reason for issuing a batch to a particular framework contractor
- The terms in the framework agreement were insufficiently precise or complete to cover the particular requirement
- A better quality of service could be attained through a competitive process

On the other hand, justifiable reasons for issuing an order to a particular framework contractor included:

- The contractor providing the most economical transaction and having the capacity to deliver
- The required services not technically or economically being separated from another contract or order previously performed by a specific contractor
- The service or works being instructed being largely identical to work previously executed by that contractor
- The value of the order being less than the threshold for the quotation procedure
- The schedule for delivery necessitating that each framework contractor be issued with orders on a continuous basis
- The capacity to execute the order

The Procurement Policy also allowed for other institutions to utilise the University's Framework Agreements. For example, an organ of state could request to use one of the universities framework agreements. Such request would need to be accompanied by an outline of:

- The scope and anticipated quantum of work required
- Whether or not the services of only one contractor would be required and if so the motivation for acquiring the services
- The benefit to be derived from making use of the framework agreement

Approval for a framework agreement to be used by an organ of state could be granted if:

- The framework agreement was put in place following a competitive tender process
- Confirmation was obtained that the framework agreement was suitable for the intended use and fell within its scope
- The framework agreementor agreed in writing to accept the batch, package or task order from the organ of state
- The issuing of a batch, works or task order by that organ of State would not compromise the performance of the contractor in executing work for the University

The greatest advantage of the procurement system was the separation of construction for goods and services procurement. This was necessary because of the difference in types of

procurement as indicated earlier. Such a separation meant a shift from lowest price focus to value for money procurement

The use of collaborative contracts convinced the team of a need to provide proper procurement policies. PD2 explained how they realised the need for procurement systems to change and the need for a procurement officer with both experience and focus.

PS1 was brought in as the procurement expert. His role as he describes it was to sort out procurement. The panel explained how a separate procurement policy different from that for normal goods and services had to be developed for capital works. They needed a policy that was both comprehensive and appropriate for infrastructure development

PS1 wrote all the procurement documents; these were important as a means of putting strategy into practice that works. These documents included methods, processes and procedures. PMs add that they were also consulted to provide input on sections that needed tweaking. The procurement policy was revised a number of times.

The policy detailed what procedures to apply under which circumstances and who authorises what. It set out when you have to provide quotes and how many, value for quotations, when to go to public tender and when to invite tenders etc. It was basically a control framework for procurement.

PS1 explained that when a project had been decided on, his team would run through procurement, sort out documents, get the proper tender awarded then step back for the project team to work. Standardized procurement templates were also developed with most of the work done upfront.

The panel was quick to point out that they still worked within Wits' systems and used the tender committee. Procurement was not done separately from the procurement department but in consultation with it. The department was the administrator while PS1 was an advisor. When comparing university tenders to infrastructure tenders, more infrastructure tenders were pushed through because the policy enabled better turnaround time

Ultimately, by the time Treasury released its new standard, Wits was already compliant. MWC1 and the panel noted how Wits procurement policy subsequently helped to shape the Treasury's policy.

Separate construction procurement policy

Procurement templates developed

Wits procurement policy helped shape Treasury's new policy

With proper systems in place, it was easier to fit into roles and responsibilities. This fosters confidence in roles and prevents delays due to assumptions on who should have done what. It also ensures more cordial relationships

6.6.7.4 Governance/Tenders

The panel took time to explain the entire tender process that was followed. They emphasised that governance was still the same with checking of procurement documents, tender evaluations and tender committee adjudications. The difference was in the micro level procurement documents and evaluation.

The tender process was executed as follows:

1. Expressions of interest for those interested in the tender. Contractors need to provide their portfolio of evidence and company profile (Not too many contractors required as this was more of a job interview than a tender process)
2. Contenders asked particular questions to see how they would align to Wits objectives and thinking (This process reduced numbers by maybe half). Examples include:
    a. How will you manage cost control?
    b. How will you match your systems to how NEC works?
    c. How will you achieve empowerment objectives?
    d. How will you price a certain project?
3. Given a bill of quantities and a very short tender period
4. Three stage tender process entered into

a. Competitive tendering where contractors given BOQ so as to tender their BOQ total. They need to provide a proposal based on price, program or any other
b. Tenders evaluated based on BOQ information
c. Tenders reduced to final 3. These are provided drawings and asked to give an activity schedule – program, activity schedule, lump sum price which cannot be more than what was originally tendered unless there is a good reason

5. Contractors afforded chance to meet with client and the rest of the professional team to ask any questions they may have.
6. Contractor given a chance to fine tune percentages etc where there are misunderstandings
7. Contractors then come with a comprehensive and detailed full program
8. Final evaluations are done with interest in their value add

The process employed means that by the time contractors get to the meeting in step 5 they tend to know the project better than the architects. This helps with reducing risk especially in terms of price as thorough work will have been done on the envisaged project. When contractors come in on the Framework Agreement, they are both the builder and the design specialists

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A three-stage tender process was employed that ensured that by start of the project the contractor knew the project even better than the designer

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Document D also revealed the use of Rotating Electronic Databases. An annual call in a suitable newspaper would be made for expression of interest for admission to the database of contractors. Those with the required capacity and capability in the specified field would be encouraged to apply to enable a wide spectrum of suitably qualified and eligible tenderers to access the opportunities presented

The issue of the Approved List was also addressed. A list of approved contractors could be established for a period of 18 months for the supply of goods or services irrespective of their value. A call for expressions of interest advertised in a suitable national newspaper subject to the approval of the designated person as a means of placing contractors on the approved list

Another major issue to be addressed was that of Health and Safety. The Policy was strict on the University not appointing a contractor who could not demonstrate an ability to manage the occupational health and safety risks in accordance with the provisions as relevant to the Occupational Health and Safety Act

The scope of work was utilised to specify the overarching framework within which contractors were required to demonstrate compliance with certain requirements for OH&S; it would specify the Health and Safety responsibilities for the contractor

6.6.7.5 Disputes and Risk Management

The panel disclosed that they have had a dispute go into adjudication only once and it involved an indemnity issue with the insurer. CX2 affirmed this, noting that they have never had serious disputes needing adjudication.

WCPD tried to avoid massive litigation by acknowledging issues and trying to find compromises together; there was always a collaborative effort in resolving issues. PD1 and PD2 would monitor communication in the team especially between the PM and contractor such that when things became too heated, they would step in to address it. PS1 was also involved when his expertise was required.

PD3 explained how the NEC provides a formal Early Warning System which is driven by the PM. Participants felt the EWS was one of the best features of the NEC. If a relevant team member ignores an early warning, they have to explain why, an assessment is conducted, and appropriate action taken. CC1 weighed in on this detailing how compensation events are considered when warnings are provided, and mitigation is impossible. CC2 pointed out that when conflict occurs, there are clauses available in the contract to deal with them ensuring that formulas are available for dealing with compensation events.

CC2 and CX1 were not really impressed with the EWS saying the big issue is playing well together regardless of contract. The NEC EWS is formalised but only works as well as its implementation; there is need for it to be properly utilised with procedures followed as a means of reducing stress in projects.

Document D detailed how disputes could be resolved in a number of ways:

- Disputes arising during the performance of a contract could be referred to an Adjudicator appointed in terms of the contact data
- Disputes raised by a contractor could be referred to the University's designated person to obtain advice and how to respond within the time period allocated in the contract
- Disputes could finally be resolved by arbitration on advice from the University's designated person

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The EWS was a great means of reducing risk. Disputes were solved in a collaborative manner such that no project team issues have every gone to arbitration in the last 10 years

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6.6.7.6 Documentation and Administration

All participants agreed that collaborative working means a whole lot more documentation and administration. WCPD had to ensure the needed resources were available and an individual dedicated to actually monitoring the documentation. In-spite of the overload in quantities, there was general agreement that the documentation was necessary to reduce issues in the project and also to prevent problems with clauses; there is no denying something that is available in black and white.

According to Document D, a documentation review team is a must for this type of contract (NEC). The team was appointed as necessary to review project procurement documents and ensure that everything was in order from formatting to required signatories.

Use of the NEC creates massive documentation

It was necessary to appoint a document review team and a document controller

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6.6.8 Health and Safety

Participants noted how PD1 had an uncompromising stance on Health and Safety. Training was provided to everyone and there were strict expectations of compliance. Health and

Safety agents were employed and empowered to stop work if there were breaches in H&S. implemented measures included the use of proper attire for construction workers e.g. the proper shoes.

There was no compromise on Health and Safety

WCPD was focused on client driven Health and Safety before the amended Construction Regulations

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6.6.9 Resistance and Regression

It is a well-documented fact that change in the construction industry has generally been met with scepticism and a reluctance to move from well-established practices of lowest price and adversarial relationships (Constructing Excellence, 2009). In addition to this, in general any change affecting social relationships tends to take longer to implement (Erdogan et al., 2014). It was therefore no surprise that resistance was faced from different stakeholders

PD3 noted how people are not open to change as they tend to view it negatively. One has to be aware and manage it accordingly.

Participants noticed regressive behaviour from the project team and programme directors and members of the panel had to address it strictly as they were to lead by example. Such issues were addressed as they came up according to the particular circumstance. Contractors were privy to some of this behaviour as it directly impacted how they functioned.

PD2 explained how problems with contractors involved transparency especially with their finances. The monthly audits helped in enforcing transparency. He noted how all parties need to have a mindset change; they need to understand processes such as target costs, deliverances and basically doing it all within a limited time frame.

Participants noted how most regression was observed with the NU projects as the teams adjusted to working differently. WCPD had been doing this for a while and they had the collaborative culture. The new teams needed a client and by extension PMs who were strong

in working collaboratively otherwise regressions kept happening until they bought into and understood the culture

Common issues included both consultants and contractors wanting to run NEC as JBCC. As noted by PD2, the former would want to maintain the master/slave status quo while contractors would be focused on maximising their gain and bottom line. The panel described how PMs revert to old behaviour because it is more comfortable. Initially in one of the NU, PMs kept changing because they could not work with the changes; this was eventually overcome through strict adherence to collaboration and PMs grasping the change. They now understand that their fortunes and those of the contractor are intertwined.

CX2 summed up the issues and action taken against this behaviour at the NU as follows: "*Some needed fists on the table and PD1 to lose his good humour and that really worked. Needed a leader to insist on change. There are those who are motivated to change and those who are hurt before they change. So, some got hurt because they did not accept changes, they did not do the documents they should have, they did not utilise the EWS, they did not put in the necessary time and effort - this resulted in overruns and pain on their part*"

PD1 commented on this, confirming that to prevent PMs from moving back to their old way of doing things, he had to keep everyone honest and on the straight and narrow with constant reminders of the equality of contractors in the project team.

Management of change is crucial as a means of reducing resistance. Sources of resistance include fear of the unknown, lack of information/knowledge/skill, threats to status, fear of failure, lack of perceived benefits, uncertainty regarding required outcomes and internal politics (Erdogan et al., 2014). Management has a role to play during the change period that involves exhibiting the expected behaviour with constant reinforcement of new behaviour as a means of ensuring stakeholders internalise change (Pryor et al., 2008).

Some proved resistant to change and engaged in regressive behaviour

Issues with transparency especially in terms of finances

Some project team members wanted to implement the NEC as though it were the JBCC

The Programme Director had to actively manage project teams to check any deviations from collaborative behaviour

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6.6.10 Making Changes

Programme directors explained their stance on making changes in the middle of a project. If a team member wants to give a works instruction because they did not think through their design properly, they need to bring a saving otherwise they cannot change it. Three options were provided, bring a saving, don't change it or literally pay for it out of your fee. It turns out ten times out of ten the team brought a saving. CC1 also noted how teams learnt to utilise value engineering

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Changes impacting the budget were implemented if a corresponding saving was provided to prevent budget overruns

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6.6.11 Budget Control

The panel reiterated the importance of cost control. If one wanted to increase cost, they had to find a saving somewhere to accommodate the cost without compromising on quality as there was no extra available.

A1 and cost controller described the preliminary process to budget control. Prioritised work was allocated broadly with SP1 working with clients to determine sizes. Allocation of funds starts with the cost controller doing a high-level rough budget. Once that estimate is approved the architects and engineers then get down to design. Design had to be done in a clever, tight way as there is no funding for things like passages and storerooms. Iterations of the design are done using value engineering till the budget is reached. There are times when it is necessary to determine what is critical and fit it into the budget. Where only a certain amount is available, the whole project is costed then specific plan is done for whatever fits in the existing budget. The next step is the tender process.

CC1 explained how they were involved in managing the budget with the contractors and design team. Cost controllers are involved from day 1 and the design was according to budget. Cost consultants had a huge role in informing the design disciplines what they could or could not do.

They further explained how while the budget is set up front, there are constant evaluations within the project. If contractors are above targeted costs, audits and rough checks reveal this and queries are sent to the contractor. Both parties also receive monthly ledgers as a means of providing transparency on how both sides are using the budget

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High level rough budgeting preceded design which was then value engineered

Cost consultants managed the budget with contractors and designers

The Target Cost contract was especially useful in setting the budget (which barring uncontrollable situations) could not be changed

Monthly ledgers were available to keep everyone informed on the budget

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6.6.12 Values

PD3 remarked on how you cannot construct a building if you are not aligned with what the client wants. In his book, values should include honesty and hard work. PD2 expanded on this explaining that values influence everything especially the manner people engage and the manner they engage with the student body. An example was provided on how construction workers would be whistling at females and this was a practice that was stopped as it did not reflect the values of the University.

WCPD tried to create an environment that promoted the sharing of similar goals and motives, extending to similar values.

According to Document A, after relying on the Construction Industry to impose its values on the manner in which construction procurement was implemented, the CDP moved to reflect

values that are encapsulated in the University's values. Table 6.15 below summarises these values

Table 6.15 - Values of the University of Witwatersrand

Value	Implementation
Leadership	Applying vision, experience and effort in pursuit of spatial development and project value
Conduct	1) Professionalism and integrity, 2) Open consultation and feedback to Wits stakeholders and sponsors 3) Collaborative approach to spatial development project delivery and risk management
Innovation	The promotion of new ideas in search of the best practice from project inception through to design procurement and the construction process
Clients	1) Delivering the built environment needs of Wits University, 2) Supporting faculties, schools, staff and students through meeting their needs
Stakeholders	Working with both stakeholders and sponsors to achieve the vision for Wits role in education and research
Partnerships	Building trust and drawing on the expertise of a partners, sponsors, associates and contractors
Health, safety and environment	Integrating health safety and environmental principles into all facets of campus development and project delivery
Jobs, skills and empowerment	The repeat work provided through established framework agreement as create a sustainable jump skills development and improve health and safety practices across all construction sites. Between 2008 and 2011 1400 jobs were generated, and more than 200 skills developed

WCPD started working in a manner that represented the University's core values of collaboration, transparency, trust and best practice

6.6.13 Sustainability

An important point PD1 made about change is how you can never be sure that people will not revert back to their old ways especially if those currently involved in change leave and there are no huge construction programmes. He was optimistic about the future of WCPD though as the team had bought into collaboration.

PS1 maintained that WCPD capital projects will not fail as everything has been set up and the culture has been built. PD2 concurred, saying that change will be maintained but improvements always need to happen. PMs were also confident of the change explaining how procedures and processes are already in place and the new way of working has become a

culture with people working towards best practice. Teams need to continue to use documentation, monitoring and dedicated managing.

The panel's view was that there is no one size fits all when it comes to projects; teams need to choose the right tools for the right job e.g. for a once off job there is no point in engaging in FAs. Chosen tools should match the specific context. They also emphasised the fact that culture needs to change with the client, that is the only way in which to embed successful change.

Sustainability possible as all systems and processes are in already in place

Culture will be maintained as focus will be on using the right tools in the right context

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6.7 Sharing/Replicating Change

The biggest test for the effectiveness of the procurement changes came with the need for replication of the processes in the development of the New Universities. This assignment came about due to a request from DHET as will be explained in Section 6.7.3

6.7.1 Government Uses

Participants were eager to point out that Government is one of the biggest users of the NEC. One PM pointed out how Eskom for example moved from JBCC to the NEC in 1995 and utilises their readily available inhouse consultants. They utilise NEC option B which is the BOQ. Other examples include TransNet, municipalities and parastatals. CX2 noted how outside the public sector, the Big 5 in construction are also specialising in NEC as they realise the demand for it.

CX2 also related how Government is changing; they are interested in more Design and Build projects as they realise, they cannot handle all the control that comes with Design, Bid and Build. CX2 believed that the practice of having too many people involved in this control is what paves the way for irregularities and corruption.

The panel explained how Wits has become a catalyst in the public sector. PS1 remarked on how no one has come near to delivering projects to budget as Wits has; Wits is even used as

a case study at Treasury. The panel believe this was because of a combination of factors that all point to culture as the means for driving change.

The factors driving change include:

Client function – Client takes on an active role within projects

PM function – shift from use of PAs to Project Managers whose sole interests are those of the Client

Contracting choice – Selecting of appropriate contracts based on the project

Bringing whole team on board – Involving all project team members from as early in the project as possible

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6.7.2 DHET

MWC1 recounted how there was recognition from the Ministry of Higher Education and Training of the outstanding work Wits had accomplished and the proper governance they employed in their projects. The Minister's office thus commissioned Wits to help with the development of the two new universities. Wits was entrusted with all the monies for new infrastructure at these universities until they built capacity to manage their own projects.

He also noted that the DHET is talking about keeping the Wits team as a national resource

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WCPD a national asset because of the success of its collaborative work

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6.7.3 New Universities

As a means of accommodating the ever-growing student numbers, two universities were commissioned hereafter referred to as UniX and UniY. As these were new, there was no capacity in terms of infrastructure development and MWC1 shared how all funds had to be

entrusted to the university that was putting up the infrastructure. The NU were in trouble because there was no one to entrust the money to and the Minister could not be involved in handling the money.

PD2 recounted how MWC3 and MWC1 were instrumental in motivating Wits Council to assist the new universities.

Document J provided further details on how Wits came to be working on the New Universities. An amendment was made to the original MOA signed with DHET which set out the appointment of Wits to manage the project and resource the planning and development of the two New Universities on behalf of DHET.

Amendment 1: In November 2012 the MOA was extended to March 2013 with no changes in scope or the original budget of R50 million

Amendment 2: The March 2013 amendment was further extended to 31 March 2014 and extended the scope and budget to R131.29 million

Amendment 3: A further extension was implemented to 31 March 2015. The infrastructure components of the scope were extended into a limited implementation phase with a corresponding budget of R504.47 million

Amendment 4: This was signed in September 2014 and extended the implementation period to 31 March 2016 and further extended the scope and budget to an amount of R1 951 506 053

Amendment 5: This was signed in April 2016 confirming the implementation handover date of 31 March 2016. It extended the scope to include a closeout process and accordingly extended the MOA period to 31 July 2017. This amendment also reduced the budget to R1 768 506 053 to take into account the fact that 183 million was transferred by DHET directly to the universities. R100 million went to UniY while R83 million went to UniX to enable them to start the construction programs

The outcome of these amendments resulted in the following summarised scope

1. The delivery of a draft implementation plan for the establishment of the two universities

2. The identification and implementation long lead items that might otherwise cause delay

3. Assisting the interim councils of the new universities to establish institutional and academic capacity

4. Assisting the University and the interim councils to establish infrastructure delivery capacity for each University

5. The implementation of a handover plan which would set out the face handover of responsibilities to the new universities

6. The implementation of a proposal plan and aftercare process

A breakdown of the events that occurred during this period was also provided. The information is provided in Table 6.16 below

Table 6.16 - Timeline of events for New Universities

Date	**Event**
25 March 2010	The minister of Higher Education announced the establishment of two task teams to explore appropriate models for new universities in Mpumalanga and the Northern Cape
September 2010	The final report on the establishment of the new universities in the Northern Cape and Mpumalanga province is submitted to the minister
October 2011	NU PMT commences work on identification of sites for UniX and UniY
June 2012	Recommendations on the seats for the new universities published
23 February 2012	MOA is signed between DHET and Wits formally establishing the New Universities Project Management Team (NU PMT)
July 2012	The development framework for the establishment of new universities in the Northern Cape and Mpumalanga provinces is completed setting out the unfolding vision for the new universities
30 September 2012	Submission to National Treasury of detailed feasibility studies for the new universities
November 2012	National Treasury confirms and allocation of slightly more than 2 billion over the 2012/14 - 2015/16 medium term expenditure framework (MTEF) for development of the new universities
January 2013	Arrange of partnerships with universities established to support academic program development and delivery
April 2013	Detailed spatial plans for the University of completed
5-6 July	Workshop held to brief the interim Council of both universities on the planning work that has already been undertaken by the DHET and NU PMT

Date	Event
18 September 2013	Winners of the architectural competition for SP University announced as a build up to the main launch event
19 September 2013	Formal launch of the UniX
30 October 2013	Winners of the architectural competition for the University of Mpumalanga announced as a build up to the main launch event
31 October 2013	Formal launch of the UniY
April 2014	Appointment of the project managers to manage construction of new infrastructure for UniX and UniY
September 2014	Main contractors appointed under framework agreements for construction of new buildings
October 2014	Start of construction of new buildings and infrastructure
24 October 2014	Joint MOA signed between DHET, UniX, UniY & Wits confirming UniY & UniX support for its continued role in planning and delivery of infrastructure up until 31st March 2016
February 2016	Completion of first new buildings at each University facilitates the enrolment of 700 students at UniX and 1 255 students at UniY

The goal was to start work on site in September 2014 in order to complete by February 2016. The team succeeded in getting procurement and design sufficiently advanced to be able to start on site in October 2014 a month later than planned and to achieve an adequate level of completion to enable the 2016 academic start

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The WCPD team was tasked with Project Management for the New Universities

Work began in 2014 with 2016 academic year start as target of first cycle

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6.7.3.1 Replicating the Process

With WCPD handling the capital programme, they quickly moved to continue in the manner they had procured for the Wits programme. As change is fluid, there were tweaks here and there according to the needs. MWC1 related how PD1, PS1 and SP1 were appointed by the NU in their own capacity

One PM noted that Wits was selected for the NU projects because of the great systems and processes it had in place. Apparently, there were “nice procedures and templates for everything and it was all so transparent audits could be done with no fear”. CC1 emphasised

that Wits had provided an example that could be replicated as seen by the NU results where projects came in within budget and on time

6.7.3.1.1 Capacity

Document J revealed how the universities established core capacity to manage the massive infrastructure development challenges ahead. The responsibility for consolidation of in-house capacity fell to those remaining at the project close out phase.

6.7.3.1.2 Strategy

Document J further revealed how procurement was undertaken in accordance with the Wits construction procurement policy and also approved by the Wits tender adjudication committee. Representatives of both universities participated in the tender evaluation panels

The developed Program Management Systems proved critical to project administration especially in terms of the reporting and approval processes of the various project governance structures. It was also useful in the handover of responsibility to each University for the ongoing capacity building processes. The work at both universities proceeded under the supervision of professional project managers appointed as part of the procurement process.

A 5-year development plan was built for each university and worked as the basis for ongoing DHET infrastructure funding. With long-term perspective established it was possible to establish a program of concrete construction development targets during construction that included the following

- Local participation goals relating to the employment of local people local subcontractors and local suppliers of between 30 and 50%
- Broad Based Black Economic Empowerment spend of 60% calculated in accordance with the scorecard for preferential procurement
- Direct employment goal for people who are local of between 30 and 95% with sub targets for youth and women
- Skill Development goal of 250 hours per million-rand expenditure

As can be observed, the construction development strategy promoted empowerment of local contracting, supply capacity from local employment and skills. The strategy achieved strong

empowerment results in terms of the BBBEE scorecard. Of 27 contracts awarded, over 97% were awarded to BBBEE levels 1 and 2 companies

6.7.3.1.3 Budget

Further information revealed how all projects subject to final account, except one in the NU were completed on time and within the control budget which included the allowed for contingency 5% and escalation cost. The one exception was due to a structural design defect that took time to correct.

It should also be noted that a significant amount of interest was earned on the budget which was incorporated within the overall budget to maintain a contingency reserve as indicated within the control budget

6.7.3.1.4 Risk

According to Document J, in the "refinement" of the handover strategy it became clear that risk would be better managed by handing over responsibility for infrastructure management during the design process and prior to the start of construction. This resulted in the handing over of 183 million to the respective universities to deal with risk.

6.7.3.1.5 Health and Safety

Document J also noted how in the 18-month construction period to 31 March 2016 there were no serious accidents resulting in permanent disability or fatality at either university. This was particularly noteworthy given that four main contractors were operating simultaneously at UniX (three in close proximity) and five at UniY. Fortnightly H&S inspections and monthly audits contributed to an improved and sustainable culture of safety and respect for people. Once a problem was identified during a site inspection audit, the contractors on each project made a concerted effort to remedy non-compliance as soon as possible.

6.7.3.1.6 Empowerment

Close out documents summarised in Document J showed how contractors were required to spend 60% of procurement on Broad-Based Black Economic Empowerment.

At the start of the construction programme in October 2014 a total of 194 people were employed at the construction site of both universities. This number increased to 1353 by March 2016 with local employment at 878 people. At the start of the program only seven women were employed on site, but this increased to 186 by March 2016. On average the number of women represented 10% of workers employed on site with nearly 75% of all workers as young people

In one year, these projects enabled 545 people to access opportunities for structured workplace learning experience towards a qualification. Contractors were required to provide four methods of structured work learning opportunities towards the attainment of:

- A part or full occupational qualification registered on the National Qualification Framework
- A trade qualification leading to a listed trade
- A national diploma registered on the National Qualification Framework
- Registration in a professional category by a recognised professional body or statutory council

In UniY, contractors were able to exceed their target level or local expenditure as early as March 2015. Contractors committed to achieving 44% of construction spend on local expenditure. At the end of March 2016 contractors had spent 73% of total construction spend locally through local labour, subcontractors and suppliers amounting to R174 million.

Contractors at UniX made a slow start and were only able to achieve a targeted level of local expenditure of 36% by September 2015. By the end of March 2016 contractors had achieved local expenditure of 38% amounting to R188 million

Joint Ventures were increasingly considered as a meaningful way to build capacity as smaller construction companies were exposed to the technical requirements of large projects.

At UniX, a subcontractor incubation project (SCIP) was initiated to deliver targeted business development and technical support to subcontractors the construction. The construction

program at the University was pegged at 10 years. This provided the opportunity to take a long-term view on the development of subcontractors and suppliers that are able to increase their workload and the quality of delivery over time. The construction program provided a platform for the identification of local black owned companies that could be developed. These were then linked to main contractors and worked with these enterprises to develop their capacity over time.

An example is provided of a female and black owned subcontractor which started with 10 employees and a CIDB grading of 1. This company managed to increase employment to 40 people and increased its CIDB grading designation to 4

Contractors demonstrated their commitment to the achievement of the set targets. Negotiations with contractors in respect of increasing the targets were completed. The target for BBEE was increased to 65% and 70% for UniY & UniX contractors respectively. Local expenditure target increased to 40% and 35% for both respectively.

Main contractors continue to identify and work with capable local subcontractors and suppliers. Contractors also identified subcontractors with the potential for development and provide mentoring and skills development support to optimise their growth potential.
In the future participants will place greater emphasis on achieving impact over and above the target. Furthermore, project managers at UniX would continue to strengthen the incubation initiative to support emerging contractors and suppliers. The initiative placed emphasis on the role of main contractors in the provision of on the job mentoring support.

6.7.3.2 Contracts

PD3 gave an overview of how one of the NU functioned. This university was happy to use NEC as they found it is a cleaner contract because of timelines which force all parties to do specific things at specific time. It is also a fair contract. The university settled on option C which is the activity schedule. They found this was beneficial as the contractor got a more accurate price because he needed to “practically build” the project. BOQ on the other hand has the contractor not taking responsibility and mimics working with JBCC

They did acknowledge that both BOQ and TC had pros and cons. While BOQ is straight forward as everyone understands it, the activity schedule tends to be more work for the cost consultant. Because of how detailed it is BOQ provides very accurate quantities while the TC takes a lot of time to vet and assessing compensation events is lengthy. BOQ is easier as its re-measurable at the end of the project but this is also a problem as you may find out you overspent after the end of the project. It must be noted that Wits has used BOQ on some projects.

One difference between Wits and the NU is the fact that in one university the PMs were outsourced though some have moved to the capital projects departments of the NUs. Another difference was that consultants were also given FAs.

CC1 described the relevant criteria for consideration in a FA.

- Having previously worked for DHET
- Particular project size within the last 3 years
- Educational buildings experience

They also briefly mentioned that one of their roles at the NU was to let them know when and what to build based on tracking cash flows for long term projects. PD1 mentioned that they have had savings on NU projects and pain though it did not exceed the contingency funds. PS1 also shared how the NU were the pilot for the Treasury standard

Document J shared further observations. Following a comprehensive tender process undertaken by Wits during 2014 and 2015 over 32 framework agreements were awarded at each University to contractors, professional service providers and suppliers

All the new buildings on the campuses of UniX and UniY were constructed in terms of a target contract with early contractor involvement on a fast track basis. In order to promote a supportive contracting environment and longer-term commitment, design team members and contractors were appointed on a three-year framework agreement.

The fast track approach meant that on most projects only a portion of the work was priced by the contractor at the time the target was agreed, and total fees could not be finally assessed.

At UniX, six contracts were awarded to Level 1 BBBEE contributors and three to level 2 BBBEE contributors. At UniY, five contracts were awarded to level 1 BBBEE contributors, nine to level 2 contributors and one to a level 6. The tender results demonstrated that the procurement processes that were comparative and gave value for money in terms of cost quality and Empowerment preference.

The development objectives translated into key performance indicators with required targets as follows

- Local participation goal relating to the employment of local people local subcontractors and local suppliers of between 30 and 50%
- Broad-Based Black Economic Empowerment spend of 60% calculated in accordance with the scorecard for preferential procurement
- Direct employment goal (percentage of the total number of equivalent days worked by people employed on the site who are local) of between 30 and 95% with Sub Target for youth and women
- Skills development goal (skills development opportunities which results in nationally accredited outcomes) of 250 hours per million-rand expenditure

Damages for low performance were contractually stipulated in order to penalise contractors should they fail to achieve a specific KPI

WCPD was able to replicate the systems and success of their Wits projects

"Fine tuning" of systems and processes was employed as necessary as the collaboration was not meant to be prescriptive

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6.7.3.3 Adjusting to Change

While the experiences of each of the NUs have been different, both took time to adjust. Participants recounted how in one university the consultant and contractor relationship is very good implying the likelihood that they are in an equal partnership.

One participant noted how the background of senior management makes a difference in how they adjust to change. A strong JBCC background tends to lead to manifestations of non-collaborative behaviour while an NEC background makes the transition easier.

CC2 noted the differences between Wits and the NU attributing them to the fact that Wits has more experience:

- There was a steep learning curve as Wits was only available for the first programme
- Systems needed to be put in place e.g. contracts, finances
- Processes were taking longer as project teams are still trying to catch up and understand their different roles
- There was still a lot to learn still in terms of maintenance

According to the panel and PM1, by its second cycle of projects, WCPD had adapted to working collaboratively and the project team understood how they were to work and interact. It is expected that the project teams in the New Universities will adapt and find their best practice methods that work best for their context.

Adjusting to change was dependent on the type of leadership

A learning curve was expected as had happened at WCPD

6.7.3.4 Personalising Change

The dynamic characteristic of change meant change could be adapted to specific needs or goals. One university remodelled the manner in which FAs were done by breaking work down into a larger roster so as to have a mix of contractors and a wider spectrum of opportunities, spreading the work a little further.

Each institution made the change their own, fitting into their context

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6.7.3.5 Challenges

Change tends to come with challenges. The NU were not exempt. PD1 explained some of the issues he had to deal with:

- Some contractors had to be cut because they could not adjust to new way of working
- Consultants were still involved in the blame game on contractors, with PMs protecting them as they do in JBCC
- Project team members did not understand their role (A1)
- In one university it was a struggle getting contractors on the 1st cycle. This has improved with even a couple of smaller companies working in NEC
- At one of the universities, everyone always wanted to go back to JBCC logic
- Lack of systems in place and having to work via Wits (A1)
- PMs slacking on the job (A1)
- Allegations of sexism (A1)
- Not always easy to get e.g. materials in some areas so have to rely on the ingenuity of the contractors
- Wrong people are making the right decisions and right people find fault because someone else made the right decision e.g. NU. Wits and DHET designed and managed the projects. Now NU has capacity and questions asked on why things were done a particular way. Where possible have had to change things halfway through

Document J noted how mastery of the necessary project management systems for projects of this type of scope including governance processes remains tenuous. The reliance on a fully functional procure to pay process linked to budget is putting both entities under pressure as these systems are still being ironed out.

Challenges revolved around:

Local Capacity

Relationships

6.7.3.6 Sustainability

There were mixed feelings on the sustainability of change in the NU.

PD1 felt that change could be sustainable since the NU still have a rolling programme ahead. Others agreed with PD3 saying what PD1 accomplished will continue because he managed to cement that way of working; the legacy will carry on. CC1 agreed, noting that senior management at one university worked closely with PD1 and understood the process.

The panel re-emphasised the need for flexibility. An example was given to illustrate how the NU are not prescribing a one size fits all. In one project, because of time limitations the team had to go for a management contract – cost plus contract to enable the contractor to get on site quickly. With more time would have used different option. Lesson learnt was that circumstances matter, need to be more flexible. They also mentioned how they have had various professions in the team wanting to champion this new way of working in their own spheres of influence.

The one cautious voice on sustainability was that of PS1. In his books, the teams are not performing as well as Wits did in its 1st phase because they are missing a PD1 who was a driving force in the programme. His worry was that the new teams do not necessarily have the same understanding and direction that PD1 had

Regardless of perceptions on readiness, with effect from 1 April 2016, technical competencies previously reported to the project management team were successfully contracted by the new universities themselves with them reporting to the respective directors and showing continuity in the ongoing delivery of infrastructure

Underpinning development at both universities was a comprehensive environmental strategy encompassing transport, health, energy, water and waste. Innovative approaches were also developed to address the climatic conditions of Nelspruit and Kimberley

The governance arrangements established by the MOA between DHET and Wits have continued to guide the development of the University of Mpumalanga and Sol Plaatje University.

Sustainability possible through collaborative leadership, systems in place and flexibility

Sustainability can be derailed by lack of strong collaborative culture in the NUs

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6.8 Perceptions/Reality

Reality should not be expected to be as rosy as depicted in theory. Two decades ago, Bresnen and Marshall made a case for the behind the scenes reality of collaboration. These are the issues they identified (Bresnen and Marshall, 1998):

- There are tensions between trust and development of mutual interest when it comes to change
- Socio -economic conditions tend to predispose contractual partners to adversarial behaviour
- It is unrealistic to expect unity of interest and common frame of reference
- While economic conditions can foster win-win situation they can also have opposite effect with client taking advantage and pushing more risk on contractor
- Partnering should not be viewed as a tool or technique but rather as a process
- Internalisation of change should never be assumed as behaviour can change without corresponding change in attitudes and values

It is therefore of note that participants had different views about the various change initiatives which showed what they experienced as reality when implementing change

6.8.1 NEC[3]

In practice it was found that traditional background and inexperience of teams could result in a control oriented relationship between clients and vendors resulting in information asymmetry, lack of transparency and distrust (Snippert et al., 2015).

A1 could not understand how project managers actually fit into the scheme of things as the architect still needs to coordinate and work closely with the other consultants

Contractors wanted to lay to rest the rumours of corruption where they are involved. The NEC through its fair system provides a platform where the contractor and client share risk. Trust develops between the two and everyone acts honourably.

6.8.2 Framework agreements

One PM mentioned the perception of something fishy when the same e.g. contractor keeps being used for work. They have to be cognisant of the perception and contract in such a way that they appease detractors

6.8.3 Contractors

A1 and CC2 shared similar views on the greedy nature of contractors. Contractors take advantage by putting costs very high before they are negotiated down, also they exploit the situation when they know there is possibility of sharing profits at the end. They manipulate e.g. the target cost, so they can get something at the end. The 3-year FA makes them better able to intentionally manipulate the system. Transparency in the project also means the contractor knows everything including contingencies so he is aware of bottom line and will push the envelope trying to get opportunities

CX2 addressed this saying the perceptions that consultants have of the contractor just wanting to milk the client are not true; contractors price projects at very fair, market related rates. The general feeling was that consultants need to keep in mind that contractors also need to grow their businesses.

[3] It must be noted that confidential information was shared on concerns some project team members had. These will possibly be addressed in future research.

CC2 was of the view that contractors make more money when there is a pain scenario. This he claimed was because the client had to pay part of the pain. PD3 disputed this view, claiming instead that the contractor cannot make more money in a pain scenario unless they have pulled the wool over the cost consultant's eyes.

CC2 shared other perceptions pertaining to contractors

- Contractors are problematic in that they do not cost reports on actual values but based on profit.
- At times contractors do not properly utilise the EWS e.g. with recording changes to drawings; BOQ is better though this is dependent on the type of contractor.
- Contractors have not grasped how to manage costs.
- Contractors do not always follow reporting procedures.
- The learning process which ensures improvements on both sides does not filter down on the contractor side.
- Contractors take risks and ignore problems on drawings
- Projects now BOQ as contractors were not living up to their responsibilities with TC e.g. you find the contractor has not measured something
- Contractors are really not open to the idea of transparency as it limits opportunities for them to cheat the system

CC2 felt there should not be transparency especially on price. Traditional BOQ is preferred because certain people should only know certain things otherwise, they design based on contingency price. In reality the cost consultant is only 100% honest with the client and keeps back certain things from other stakeholders.

The panel shared how they found that smaller contractors (grade 7,8) are better at culture change than higher grades (grade 9) as bigger ones have different departments for everything making seamless continuity harder. With smaller outfits, people handle different departments "together"; it's a one stop shop.

An example was given on two contractors on separate sites, who both lost their cost controllers. The smaller contractor adjusted with no problems; there was continuity and handover with no hiccups. The other site though was a complete mess as there was lack of

familiarity with the replacement not understanding the way things were done; he had no control over the project.

Contractors are viewed as devious and greedy, a reputation they feel is underserved

Smaller contractors are better able to adjust in dynamic situations

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6.8.4 Gain/Pain Share

PD1 described a scenario where WCPD had to share a pain situation because a contractor forgot to carry a value and suddenly there was a R500 000 deficit in the budget. That pain was shared even though consultants did not understand as they believed only the contractor should carry it. In a different place that could have been perceived as corruption; it could only happen where management understood exactly what they had signed up for.

The main issue with the gain/pain share was actually concerning the fact that consultants do not benefit from any of the sharing. Comments included:

- Only the client and contractor share gains, but consultants have to do all the work without any benefits
- Contractors manage to value engineer and reduce costs while working with consultants, but consultants do not gain anything

CX2's response to this was that it is not fair for consultants to want to share in gain as contractors have more responsibility than everyone else. Not only do they build but they monitor the budget to make sure the target cost is not exceeded

CC1 and PD3 responded by pointing out incentive provided through the FAs and the fact that the consultant fee does not change whether a gain or loss is made; they virtually have no risk while the client and contractor are at risk when pain occurs.

Consultants do not understand why they do not share in pain/gain share

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The highlighted perceptions show how in practice various project team members tend to view circumstances and their counterparts with suspicions that are not necessarily true.

6.9 Dynamic Change

6.9.1 Accomplishments

Document A details how from 2007 to 2013 investment in capital projects was to the tune of R1.5 billion and represented a partnership commitment by government Wits and the private sector to address all priority projects. Funding approval on this R1.5 billion program did not exceed more than 5% of the original approved control budgets. It must be noted that some of the project funding increases related to changes in the scope of work. Since the inception of this capital program, Wits received positive infrastructure audit certificates in accordance with international standards on auditing

It is also worth noting that the DHET supported program generated more than 1815 jobs over a combined period of 203 months. More than 610 skills have been developed across a wide spectrum of construction disciplines. 8 undergraduate and 6 post graduate opportunities have also been provided to Wits students in the built environment disciplines in the form of practical experience, temporary jobs and bursaries.

Numerous projects have been completed by WCPD and Document K provided details on what was accomplished in these projects.

Between 2007 and 2010 R240 238 955 was utilised with income at R241 077 842 including interest and from the DHET funds while in 2010 to 2012 R167 680 946 was utilised with income at R275 430 114 including interest from the DHET funds.

The four infrastructure projects undertaken within 2007 - 2010 were effectively completed to the value of 355 million. The Undergraduate Science Centre went into use in July 2011 with teaching commencing in its Laboratories in February 2012. The Science complex was delivered with only R1 million additional to its original budget of R178 million - a 0.6% increase

Of the fourteen (14) projects undertaken in the 2010 - 2012 Cycle two (2) student residence projects were handed over adding 1200 new beds and 100 furnished single bedrooms to the Wits Residence Life Program. In April 2014 the Chamber of Mines Engineering building was

fully refurbished and handed over two (2) months ahead of schedule. All projects in that funding cycle commenced except for two which faced design challenges. These were the Richard Ward building and the extension of the Undergraduate Science Centre.

Some summarised examples of specific projects are provided below:

6.9.1.1 4th Quadrant of the Chamber of Mines engineering building

The final cost for this project came in at R68.4 million. It is of note that R0.6 million was set aside for landscaping with the balance from the R70 million budget reserved for signage, finishing and making good after completion of the refurbishment phase

6.9.1.2 Undergraduate science Laboratories

This project was slightly above the control budget of R178 million. The final control budget was R179.26 million including R260 000 raised by Wits sports for the refurbishment of the sports clubs below the old grandstand (*an overrun of 0.5%*). New building at John Moffat and refurbishment

The project commenced on site in October 2011. A review of the spatial needs led to a total requirement for 1600 square metres as opposed to the originally specified 1100 square metres. Some functional changes also occurred including a requirement for additional staff offices and larger tutorial rooms. Despite significant effort to value engineer the project costs could not be reduced below a budget of R25 million. The university undertook to cover the difference between this revised project budget and the original budget of R16.8 million

6.9.1.3 The Chamber of Mines refurbishment

The reconfiguration and refurbishment component of this project presented daunting logistical challenges and a 20-month construction program was allowed for. Careful planning and close collaboration between the Faculty and the project team enabled good progress with the project expected to be completed and handed over in April 2012 two (2) months ahead of schedule

6.9.1.4 Richard Ward extension

Several challenges constrained progress on the modernisation of the Richard Ward building. These challenges related mainly to first-order occupational health and safety priorities within the building resulting from ad hoc in-situ changes

6.9.1.5 New health science building

This project commenced on site in November 2010. Early foundation problems resulted in delays nevertheless there was confidence that the project could be completed within the budget. The project was on track for completion by September 2012

6.9.1.6 Maths sciences building

This project had delays due to capacity constraints and audit planning considerations relating to the Science Stadium precinct. These were eventually overcome and planning for the precinct was finalized with detailed designs for this phase of the development well advanced. The design team was hard at work for nine (9) months to finalize the exact scope content and value of the appointment.

6.9.1.7 Physics building

The completion of the first phase of the project was reported in 2011. The fast track installation of a steel supported mezzanine floor ensured minimal disruption to the academic programs of the school of physics. The first phase of the project was completed in July 2010 at a cost of 3.1 million. The second phase estimated to cost 3 million was completed by October 2012.

6.9.1.8 Parktown Village

As predicted the first 400 beds were delivered in July 2011 and approximately 600 beds with delivered by the beginning of February 2012. The last approximately 200 beds were delivered in March 2012 as opposed to the envisaged completion in June of 2012. Development costs remained within the approved control budget of R511 million. The DHET contribution of R60.5 million reduced the required loan amounts to R430 million ensuring that student rentals would not exceed those in existing Wits residences of comparable standard.

From the outset the project was driven by loan financing and the need to achieve student occupation in time to meet the loan repayment conditions. The negotiated conclusion of the development contract ahead of final detailed plans necessitated an intensive and ongoing process of design, construction and risk management that required agile decision making throughout the project.

Other improvements to the project included the provision of standby electrical generating capacity to ensure uninterrupted power supply as well as solar powered water geysers that healed operational cost savings into the future. The additional costs were observed within the approved control budget with the budget also including legal fees, financial modelling, Bank administration costs and interest during construction

6.9.1.9 Sunnyside residence

The project commenced on site in November 2010 with an initial control budget of R25.1 million that was subsequently increased to R26.89 million to include the installation of a lift and fixed furniture. The project was effectively completed and handed over in December 2011 with the expenditure reflected R24.6 million at project completion

6.9.1.10 Administration, classrooms and lecture theatre

A design review for this project led to various improvements in functionality as well as reduced academic disruption during construction. These amended plans provided for better outputs within the overall budget of R50 million. Further value engineering resulted in revised costs for the individual projects in the total amount of R53 million with the additional R3 million being funded by the university

6.9.1.11 Bohlaleng Building

The project was in the final stages of completion handover and March 2012. The revised project budget was R3.41 million with records reflecting expenditure of R1.16 million with a further R1 million invoiced

Within these projects - long overdue upgrades to include those with mobility, sight and hearing impairments were included. One example is that of collaboration with the disability unit and a wheelchair bound architectural student in detailing technical design for Bachelor units in the Parktown Village residence

WCPD managed projects to the tune of R1.5 billion

Overruns not more than 5%

Clean audits for every project cycle

6.9.2 Review of WCPD and its Response

The changes implemented did not mean the systems in place were perfect; there was room for improvement. Issues were raised during the review of the WCPD by the Quality Improvement Unit from Wits on the 29th and 30th of October 2013. WCPD conducted a self-evaluation and gave the evaluation forms to the review panel. The review panel consisted of Senior academics, senior professionals and support staff from the University of Witwatersrand and those from other universities in South Africa. WCPD was provided with both commendations and recommendations.

6.9.2.1 Commendations

A summary of the commendations from the review contained in Document G is shown in Table 6.17 below:

Table 6.17 - Commendations from the Review

Commendation	Details
Development of comprehensive spatial development plan	The visual plan helped the university community better understand the University's future size and shape
Meeting agreed objectives within budget and agreed timeframes	There was oversight from the Capital Projects Steering Committee and sound practices in assigning costs
Professionalism, energy and collegiality in WCPD team	Positive engagements with stakeholders who appreciated WCPD's receptiveness to their ideas
Setting an example for Capital Projects management which led to their nomination to manage establishment of the New Universities	WCPD was given the role of scoping and project management agent on behalf of the DHET showing they had national recognition of their efforts

The review panel acknowledged the fact that WCPD was getting a number of things right and proving innovative in their strategies.

6.9.2.2 Recommendations

WCPD received a number from recommendations from the review panel based on what they identified as possible weaknesses of the department. Some recommendations were appreciated, as they did show the flaws in the structure and organisation of WCPD.

A summary of all the recommendations is shown in Table 6.18

Table 6.18 - Recommendations and Responses

#	Recommendation	Response
1	CDP clarifies the relationship, workflow, protocols, roles and responsibilities between CDP and PIMD	Need to better coordinate with PIMD with uniform planning norms and standards where possible
2	CDP increases its focus on long-term strategic infrastructure planning and reviews the operational and Governance structures for consulting with external and internal stakeholders with a view to increasing their effectiveness	Name was changed from Campus Development and Planning to Campus Planning and Development. Also agreed that fewer committees necessary
3	CDP conduct formal benchmarking of its services with similar services or units in other Universities or organisations	Acknowledged need for better benchmarking
4	CDP revisits the model of relying on outsourced project management consultants for its core activities	This was addressed through absorbing the outsourced consultants into Wits
5	CDP considers using a wide range of media and innovative strategies to communicate its services to both its internal and external stakeholders	Agreed on better communication but also felt unfairly maligned in terms of communicating with e.g. fundraising stakeholders as they have little control over availability of finances for example
6	CDP puts in place an appropriate organisational structure that addresses succession planning and retention of specialist knowledge within the university	Acknowledged need for change, more permanent staff were employed
7	CDP puts in place measures to strengthen its capacity and competency in financial management	This recommendation was disagreed with as WCPD had made sure to establish efficient financial systems. Capacity wise, Central Finance provided a Business Manager to work with the department
8	CDP revisits the procurement processes practices with the intention to operate within the provisions of the university procurement policies	This recommendation was disagreed with as goods procurement is not the same as infrastructure procurement
9	CDP senior staff give focused attention to the operational and human resource needs of its core staff	This was acknowledged with pledges to do better

Some of the above recommendations are of special note as they show how there were still misconceptions or misunderstandings on how WCPD approached procurement and the systems it had in place. Recommendation 8 was especially problematic as besides not being factual, the review panel failed to understand the dynamics of infrastructure procurement

and the need for a separate policy. For over five years WCPD had been working differently but efficiently, yet the focus was on bureaucracy.

The basis for Recommendation 5 was sorely lacking especially considering that WCPD had received clean audits from DHET for all its infrastructure development cycles. Considering they had managed to work with a R1.5 billion budget with overruns of not more than 5% in an industry were massive overruns are norm, it can be posited that they had the necessary financial competency

Recommendation 3 is surprising to some extent as WCPD was working innovatively; no other institution was procuring as they were meaning comparisons would have been difficult providing information that was not useful to the growth of the department

As can be seen from the review, as late as 2013, there were some who still did not understand how WCPD functioned especially in terms of their procurement. Implementation of some recommendations would have resulted in the loss of flexibility necessary for the department to fulfil its mandate. Other recommendations though, were necessary and adopted especially in terms of organisational structuring and building capacity in the department.

6.10 Moving Forward

6.10.1 Benefits of Working with Wits

A1 described the advantages as pertaining to being able to work with the NEC contract and having access to FAs. This would open other doors for working in HEIs if working collaboratively becomes an industry norm

CC1 lauded the experience gained at Wits as being important for the work done at the NU as the work would have been more challenging without experience in the NEC and how it works, management and allocation of funds, getting facility ready by set time, managing processes, understanding and advising on cost norms

The consultants also explained how they have become highly specialised in NEC and Higher Education type of work which enables them to produce things such as estimates quicker. While they have a peak efficiency, the experience has been valuable in sustainability or

continued workflow. They also noted how some contractors have even gone up in CIDB gradings because of their experience with WCPD, this was confirmed by PD2.

Contractors added how additionally they have learnt to do their documentation a lot smarter. They have learnt how to work collaboratively, gained a good reputation and better work processes in other projects.

6.10.2 Challenges

CC2 noted that communication in the project team is still a challenge. The team needs to talk more, have manners and stop hiding correspondence. There is also a need for frequent meeting and these meetings need to be the "right kind of meetings.

The panel explained how the main problem for WCPD remains that capital projects are not fully embedded in asset management from start to finish in the asset lifecycle. It's not just about building but also about owning and maintaining the infrastructure. There is still weakness in the system with a lot of finger pointing going around.

Improving assets should always be done in conjunction with operations and maintenance then handed back to them when the process is complete. This poses another challenge; in handing over the completed asset, there is need for a seamless process that fully embeds the developed asset in asset management i.e. in operations and maintenance

Another challenge that was noted was how at times people are so stuck on the familiar. Whatever infrastructure development takes place needs to be cognisant of the changing times, future needs and developments in e.g. technology. There is a need to move beyond building for chalk and boards to integrating technology in the learning process.

6.10.3 Future Needs

The panel noted that capital works have scaled down, but projects will always be there. There are unlikely to be constructing new buildings any time soon but hope to get funding from DHET to develop a dedicated testing and examination centre.

The need for the alignment of Design and Construction with Operations management was discussed again with a suggestion for an active operations manager as part of the improvement process

WCPD was also looking at how to deal with this fragmentation within overall asset management. They have been looking at how the three systems i.e. budgeting and planning, asset management and procurement and delivery management could talk to each other and in essence have a form of integration.

In terms of building sustainably, this will be considered as far as is practical and with passive interventions as the university cannot afford “the glass facades and electronic gizmos”, besides which they lack the maintenance skills and expertise

One PM bemoaned the lack of available funds for projects, better models need to be put in place to fund the crucial infrastructure needed on campuses.

MWC1 commended the Wits team on a great job but stressed the need for transformation, i.e. the team are all white and male. There is need to train those who will take the baton forward. The pioneer professionals need to reflect and note practices, so they can transfer skills. There is also a need to develop more young black women engineers, architects and planners. He emphasised the need to grow the number of people who know how to do this because the alternative is frightening.

Document A also revealed a list of opportunities for improvement:

- Need to find ways to alleviate funding constraints
- There needs to be an improvement in the appointment of professional service providers to ensure compliance with best practice and enhance the procurement of construction partners
- Use of Standard Contractual Documents as University Templates upon their approval
- Income generating project opportunities could be realised in residence development as residences are potential long-term income generators towards their upkeep and development
- There is a need for improved planning and project coordination with the operations cluster as they need a form of ownership of capital program

- There needs to be an improvement in the transfer of ownership of Capital Projects initiatives
- Need to engage more on campus housing sustainability. It was suggested that workshops with both internal and external experts could be utilised to generate a University Sustainability Agenda
- There is need for the capital budget to include ways of improving the historical legacy of the public spatial environment
- Integrated Planning and Development of Standards and Specifications needs development as a means of serving as University guidelines in future projects and events

Of note currently are the new DHET projects that will involve new infrastructure development cycles. In keeping up with evolutionary change, WCPD has established framework agreements to also encompass consultants. This worked with the New Universities and is a model that WCPD will be following. PD1 and PD2 explained how they have learnt lessons from the various cycles and can only keep improving.

6.11 Summary of Chapter 6

The Chapter focused on presenting and discussing the following themes developed from the results:

- The background to change

  Wits received funds from DHET for infrastructure projects and by the end of its first project, realised that changes needed to be made to ensure a successful Capital Projects Programme
- The necessary changes

  Changes were needed in terms of the following: more involvement of Wits as a client in projects, shift to the use of inhouse consultants, change in type of contract and the length of said contracts, health and safety and the management of disputes and risks.
- The implementation of change

  With the implementation of change, the client role had to change, and they were more actively involved in the management of projects. An adjustment to attitudes was a must as construction procurement had to be done differently from the existing procurement policy process. The active role of the client resulted in a differently structured project team that included a programme director, procurement specialist and project managers. All those involved in the project had to undergo training especially in the use of the NEC contract and Framework Agreements. New systems and processes also had to be implemented in terms of finance, procurement and governance. Health and Safety was prioritised even before the industry's new construction regulations came into effect in 2016.

  It must be noted that there was resistance to change from both management and other parties like those in procurement. The changes were a complete evolution from the way capital projects had been completed before. The WCPD was privileged to have change champions in the Wits Council.

  One of the most important outcomes of the changes was budget control, using the NEC projects were strictly managed and overruns were kept at an absolute minimum with savings being possible in come projects
- Sharing and replicating of change

The work done by the Wits team was commended by government resulting in their processes being used as a template for the Treasury procurement directives and the team being commandeered for management of the building of the New Universities. The team was able to replicate the process at the NUs and prepare the teams there to move forward in the same vein (a foundation was laid, and the NUs had to make a decision to move forward the same way).

Of note was the fact that for some reality did not live up to expectation. What caused consternation was the issue of gain being shared by only the client and contractor for example. Contractors also pointed out that collaborative relationships need work, they do not just happen, and some are not willing to take them on as equal partners. Everyone agreed that the NEC came with massive administration and documentation meaning it needs commitment and dedicated personnel. Overall a collaborative procurement culture was appreciated and worked as long as the necessary effort was put in.

- The plan moving forward

  Wits noted that the evolution journey has not ended, changes still need to be made especially in ensuring more collaborative working between the capital projects side and operations and maintenance. Also as tends to be the case when change has occurred, regression needs to be prevented.

The results identified prerequisites for change as including buy in from management, a team to shape the change and a large capital projects programme. The support of management and their championing of change made all the difference in ensuring that change occurred successfully.

Changes were required in Wits' tender process, procurement policies, the type of contracts used and their implementation, the involvement of all pertinent stakeholders at the right stages of the project and most importantly in the relationships of project team members – contractors had to be utilised as equal members of the team, building experts in their own right.

As expected, this caused challenges in terms of resistance from other team members, but by the second cycle teams had adjusted to collaborative working with a push when necessary

from the Programme Director. It also took time for procurement and legal to understand these changes, Wits management came through as a champion when problems arose enabling WCPD to have multiple successful infrastructure development cycles.

WCPD managed to replicate their successful results as the delivery managers for the New Universities. The procurement systems they put in place were flexible enough to be adjusted as needed at the new institutions such that they left robust systems when they withdrew after the first infrastructure development cycle.

Wits went through an intensive change period that resulted in a nationally lauded construction procurement process. Their experiences provided what could be a roadmap to change for other HEIs. While other Institutions may not approach change in exactly the same manner as Wits, their change has provided enough to create a generic model for change in HEIs that can be adapted as needed. This model is discussed in Chapter 7

7 The Change Implementation Model

7.1 Introduction

This chapter has two purposes, namely, to show the process of change that occurred at Wits and to propose a model of change for Higher Education Institutions. This is accomplished using the analysed data.

Wits was a change pioneer. While collaborative working had been utilised in e.g. civil engineering (pipe laying), it had not been used in the erection of buildings or in HEIs. This meant Wits did not have a model of change to work from. An assessment of the Wits experience shows a somewhat messy process which is expected in light of the lack of a model. Change occurred in an ad hoc manner which did not make for an optimal process.

A change model in such a context proves necessary as building off the experiences of Wits will enable other HEIs to implement change successfully while avoiding the implementation inadequacies and problems faced by Wits.

The proposed model is not to be utilised as a "one size fits all" implementation strategy. Its purpose is rather to provide guidance on how the change process can be implemented. It is meant as a generic model from which various HEIs can build their own change strategies.

Three models were developed, and these are described in Table 7.1

Table 7.1 - Developed Models

Model	Code	Description
Wits Model	**WM**	A model was developed based on the analysed data from the study
Wits Validated Model	**WVM**	WM was taken back to members Panel 1 who then made suggestions and "corrections". The resulting model was WVM
Structured Model	**SM**	Because of the ad hoc implementation of the Wits change strategy, a structured model was developed based on WVM and relevant change literature

This chapter delves into the development of these models, the validation process and concludes with a possible generic model for the implementation of change

7.2 The Evolution of Procurement Processes at Wits

Procurement in the South African Construction Industry tends to be biased towards traditional procurement with great emphasis placed on obtaining the lowest price sometimes at the expense of obtaining actual value. The industry tends to be fragmented and adversarial with silos and mistrust among the various members of the project team.

It can be inferred that procurement at Wits has at some point reflected that of the wider industry especially in terms of contracts and relationships within projects. To understand the evolution of construction procurement processes at Wits, it is important to delve into the history of its Facilities Management (FM) services. Ogbeifun (2011) provides this background in a study conducted on FM at Wits.

7.2.1 The 2000 - 2007 Procurement Processes

According to Ogbeifun, pre-2000, Wits utilised an inhouse FM department with managers, artisans and technicians (Ogbeifun, 2011). Only major projects and specialized repairs were outsourced. Following restructuring in 2000, Wits experimented with "double outsourcing" by outsourcing FM to private firms that in turn outsourced operational functions. FM was outsourced for a contract period of three years, with a renewal that was cut short because of unsatisfactory performance (*ibid*). Another firm was awarded the contract but also failed to finish the contract firm due to unsatisfactory performance (*ibid*).

The study further discussed two main problems faced by FM firms. The first resulted mostly from the outsourcing conditions (*ibid*). In 2000 Wits had retrenched staff and management wanted a means of enabling these previous employees to develop and grow businesses. The outsourced FM companies were bound by contract to use these employees and were not able to take decisive action against contractors with poor performance (*ibid*). These constraints resulted in a situation that tied the hands of the FM firms and saddled them with a tainted reputation due to contractor performance (*ibid*).

The second problem was concerning payments. The processing of payments was slow and there were usually delays beyond the normal allocated 30 days (*ibid*). This proved a problem in terms of staying within schedule and liquidity of firms (*ibid*).

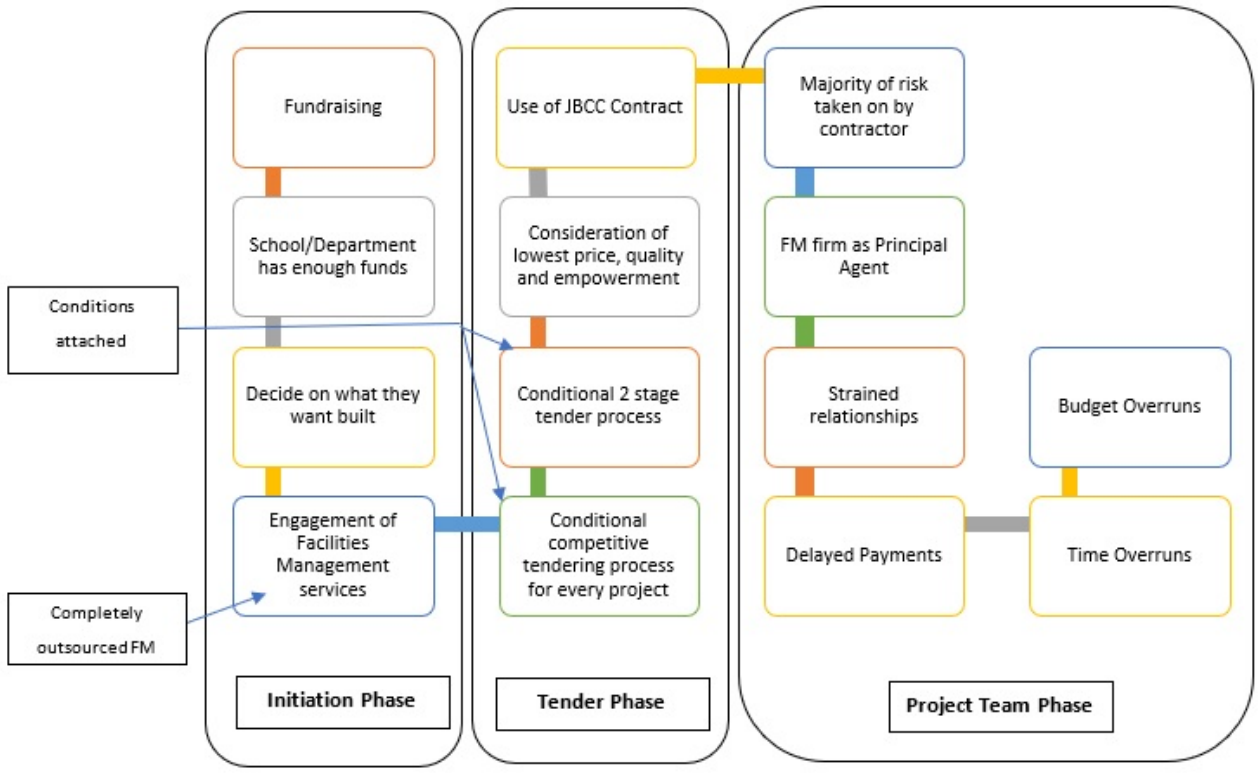

Figure 7.1 - 2000-2007 Procurement Processes

The depiction above shows the processes involved in procurement during this period. These have been divided into three phases reflecting the type of processes in each phase. The information below, explaining these phases was extrapolated from the data analysis and the study by Ogbeifun.

7.2.1.1 Initiation Phase

This phase represents the stages from conceptualization, amassing funding right up to the engagement of the Facilities Management firm. As the university expanded, various Schools and Departments (hereafter referred to as entities) needed extra functional space. While money could be set aside by the HEI, external funding played a critical role in expansion efforts. Through various fundraising platforms, entities managed to raise funds specific to their own needs.

The self-interest of the various entities resulted in an ad hoc expansion process focused on various entities meeting their specific needs with little to no concern on the needs of other entities on campus.

7.2.1.2 Tender Phase

During this phase, selection of the project team occurred. As discussed, the FM firms were contractually bound to utilise ex-employees of the University as a means of alleviating effects of their retrenchment. This meant that even if they had preferred contractors or consultants at their disposal, they were unable to utilise them.

7.2.1.3 Project Team Phase

During this phase the project team would be busy with construction till close-out. It is to be expected that relationships would be hostile especially since the FM firm had limited power over the outsourced service providers. The shoddy work that was reflecting on the FM firm would have also been frustrating compounded by the late payments from Wits for work done.

It was inevitable that the model would fail; conditions were not conducive for working effectively and efficiently.

7.2.2 The 2007 – 2009 Procurement Processes

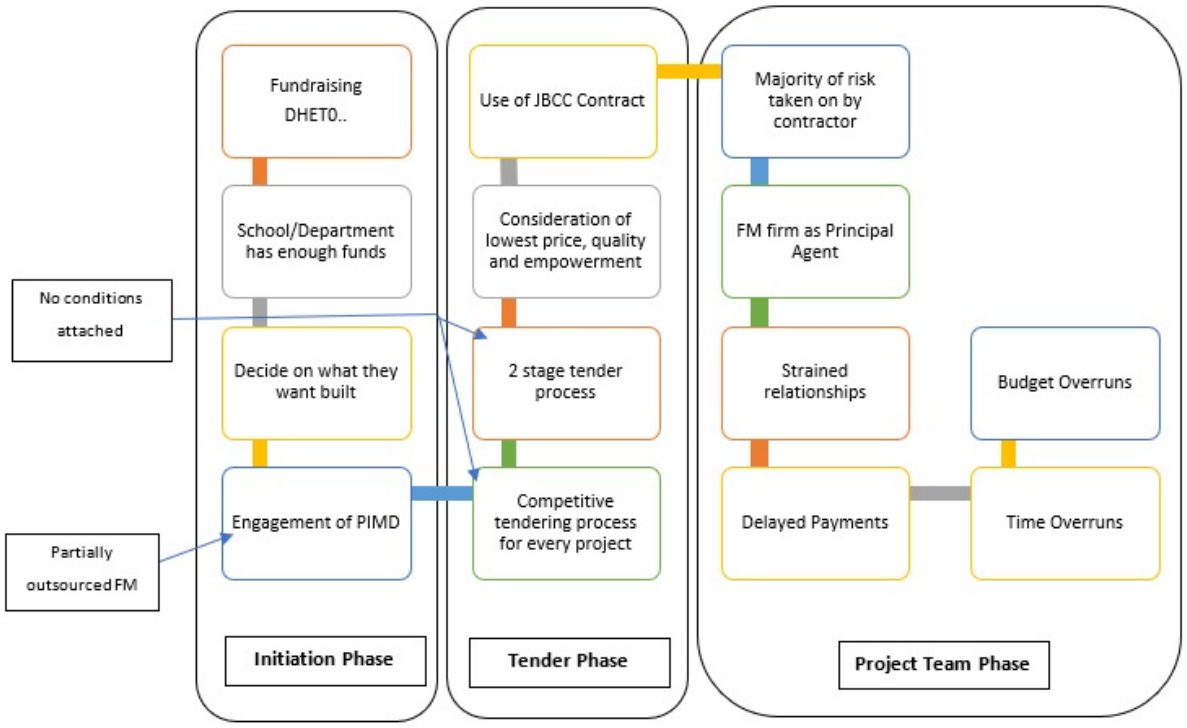

Figure 7.2 - 2007-2009 Procurement Model

After the failures of outsourcing, Wits reverted to an FM structure utilising partial inhouse services. These were provided through the PIMD.

7.2.3 The New Procurement Processes (2009 -)

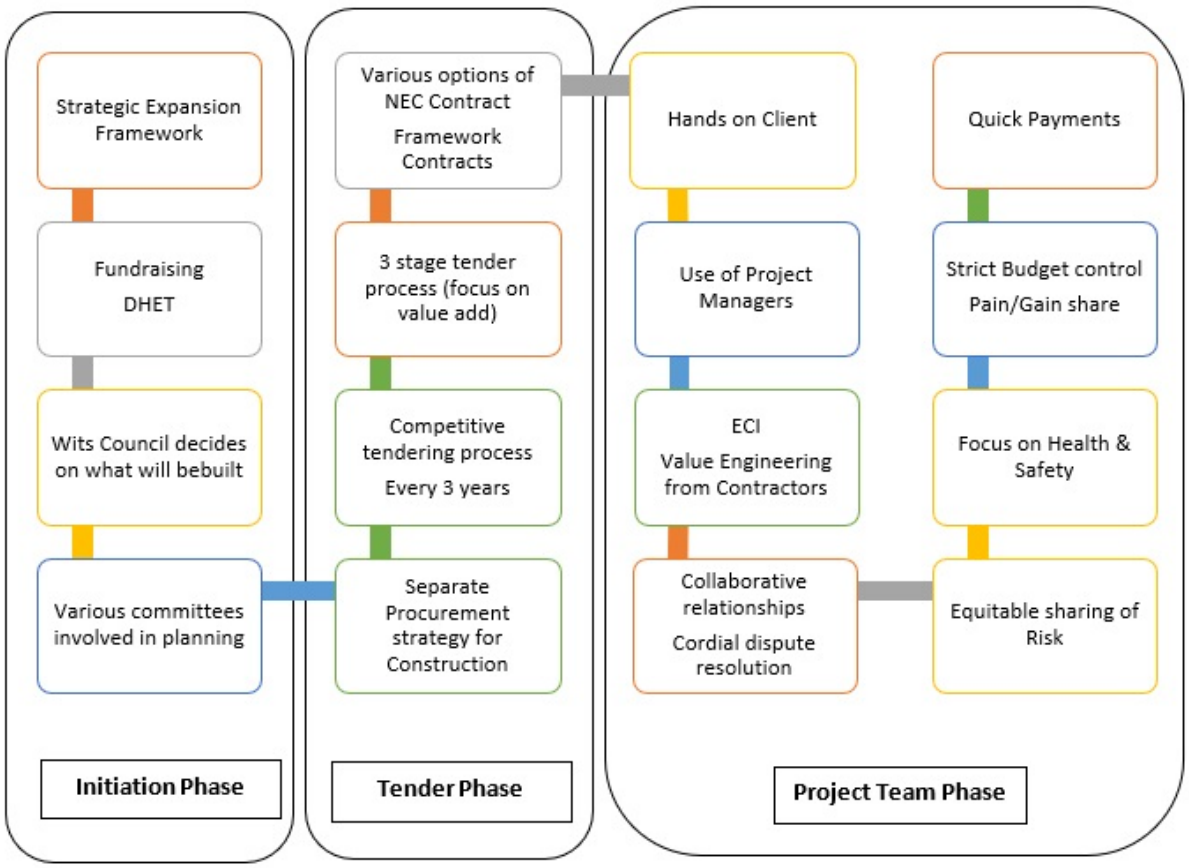

Figure 7.3 - Post 2009 Procurement Model

In 2009 Wits management realised they could not continue procuring the same way especially with the influx of funds they were expecting from DHET. Having partial inhouse Facilities Management did not help as none of the processes changed, it was more of evolution than revolution. The massive cost overruns from the FNB renovation also raised flags about the adequacy of the procurement strategy being used.

Wits Council decided to be strategic about their procurement. PD1 was brought in as an industry expert to lead the Capital Programme. From his previous work in the industry he was able to quickly identify procurement as the problem. He built a project team that was geared for change. Change occurred in the processes described below:

7.2.3.1 Strategic Expansion Framework

A fifty-year plan had already been developed but had not been put into use. With the availability of funds, Wits Council was quick to start developing a strategic expansion to ensure capital works would benefit various entities as opposed to only one. At this juncture,

ad hoc construction was done away with being replaced by an orderly capital programme with multifaceted benefits

7.2.3.2 Fundraising/DHET

Government's provision of funding for infrastructure development in HEIs resulted in a major boost for Wit's expansion programme. The amounts coming from DHET pushed the Council to ensure they had a sustainable procurement strategy for successful projects

7.2.3.3 Wits Council oversight

Various committees were developed to investigate, approve and drive the various possible projects. While this could have been viewed as massive red tape, it actually enabled an environment where projects were done for the greater good as opposed to a single entity's need. WCPD was a member of these committees making it a contributing stakeholder in the proposed projects.

7.2.3.4 Separate procurement strategy for Construction projects

A pertinent problem in HEIs is that of having a generic procurement strategy for both goods and construction. While a building is being purchased, it is overly simplistic to expect that the procurement can be approached as though purchasing goods.

The procurement expert from the group developed a construction procurement policy outlining specifically how construction procurement was to be approached. This initiative was a cornerstone of the new South African Treasury guidelines on construction procurement for public projects.

A separate policy meant more flexibility when it came to projects in terms of procurement strategy, types of contracts used, relationships, payments, incentives and collective responsibility. It enabled the move to a more collaborative type of procurement.

7.2.3.5 Three stage tender process

While the tender process was still competitive, Wits was looking for contractors who could actually add value to projects as HEIs are under extreme pressure to provide good quality education with fewer resources. Besides the common tender evaluations using Financials, Quality and Empowerment, Wits needed contractors who could be innovative where required

so while prior use of the NEC was not a requirement, contributing to the project was. Contractors needed to show they were willing to work towards a common goal in the projects by providing expertise and resources to the project. Wits was looking for value driven procurement as opposed to lowest price procurement.

7.2.3.6 Using NEC and Framework agreements

The issue of which contract to use was driven by the dismal performance of the FNB project which was developed using the JBCC. Industry experts PD1 and PS1 knew that collaboration makes a real difference in project success and since it had worked on the pipeline project PS1 had overseen, they were willing to take a gamble that it would work on the envisioned capital projects. The use of NEC was especially important in ensuring budget control which will be discussed in Section 7.2.3.12. The overruns experienced with the FNB project were unexpected and unsustainable for future projects.

The use of the NEC in HEIs was a relatively new concept as the most commonly used contracts were JBCC, GCC and FIDIC. The intention to use NEC influenced how procurement could be conducted.

The collaborative nature of NEC meant the forging of collaborative relationships which tend to be long term. This unfortunately is not possible when one has to change the project team for each and every project. Framework agreements then came in as a means of continuity in projects, skills transfer and sharing of resources. These contracts with contractors were valid for three years.

7.2.3.7 Hands on Client + Project Managers

In most instances of traditional procurement, the client hands over management of the project to a Principal Agent who has to look after both their interests and the client's which could be interpreted as a conflict of interest. Through PD1, the capital projects had a client deeply involved in how projects were run through Project Managers directly affiliated to the University.

Use of the NEC meant the need for dedicated project managers. While the PM roles were originally outsourced (individuals brought in from a company as opposed to a company taking

over the PM role), by the second set of Framework agreements the outsourced PMs had permanently moved to WCPD as employees of Wits.

PD1 did not simply leave the PMs to function at will. Because of the parallel projects, PD1 was a programme director providing oversight on all the projects on behalf of the client. He was the one reinforcing collaboration, driving the process and championing the new systems and policies put in place

7.2.3.8 ECI and Value Engineering

Contractors played a major role in these collaborative projects as they finally had a voice within the project. When contractors were brought into a project early, they provided invaluable input into especially the design. they were able to value engineer projects on numerous occasions enabling Wits to cut down on costs and build better – same quality of work but cheaper

This use of contractors is most feasible when framework agreements are utilised as contractors will already be on hand. Implementing big changes later in the project lifecycle proves too expensive.

7.2.3.9 Collaborative relationships, disputes

While there is scepticism on how collaborative or cordial relationships can actually be, Wits managed to bring its project teams together working on a common goal. There was a spirit of compromise in all dealings and there were no second-class citizens within the project team; contractors were working at the same level as everyone else.

Long term relationships are best suited for cordial environments. Relational contracting thus becomes important as there is a move from arms-length relationships to obligational relationships. Within construction, collaborative relationships are difficult to create because of the fragmentation of the industry. The common “us vs. them” relationship dynamic puts barriers between project team members. It becomes necessary to systematically break these barriers down. It is not a once of process and team members tend to regress towards what they are used to. PD1 had to be vigilant in ensuring that team members behaved in a manner that was conducive to collaboration and to ensure everyone was treated equally. Treating the

contractor as a professional as opposed to merely the builder went a long way in maintaining equally in the project team.

While it tends to be inevitable that disputes will occur in a project, all disputes were cordially resolved before the litigation stage. All parties were interested in peaceful resolution and realised their fortunes were bound to each other.

When a team work together cordially with the same goals and objectives, it is easier to resolve disputes. The fact that relationships are long term makes team members more circumspect of the manner in which they behave. They take great measures to ensure the preservation of the relationship. The use of the NEC aids in this as it looks at mediation before disputes escalates to arbitration of litigation. Since the contractor is now an equal team member, other team members cannot arbitrarily charge all problem to the contractor, there is collective responsibility for all situations.

7.2.3.10 Equitably shared risk

In traditional procurement contractors take on the most risk and they charge a premium for taking it on. Collaborative working prevents the over-burdening of one party with risk, the party best able to manage the risk is allocated the risk. The open discussions and transparency required in collaboration mean everyone is involved in the process of allocating risk and understands exactly what is involved in preventing or mitigating risk.

7.2.3.11 Health & Safety focus

The Construction Industry tends to be rather lax in the manner in which it deals with Health and Safety. Fatalities on site are rather common and it is norm for construction workers to be on site without the required safety gear. Wits was emphatic about strict Health and Safety standards. Contractors went through training to ensure they knew what was expected from them and lax standards were a violation which could result in shutting down the site. In ten years, there were no fatalities or serious injuries on site. This was one specific manner in which Wits acted as a hands-on client; there was no compromise on the safety of individuals.

7.2.3.12 Strict budget control

The one critical, non-negotiable project success factor was that of budget control. HEIs cannot afford to deal with overruns as they would mean taking money from other worthy projects.

Through the use of Target costing and value engineering, most projects came in at budget or over by less than one percent. Where any changes had to be made, savings elsewhere in the project needed to be found to balance out the costs

One major incentive for budget control was the pain/gain share mechanism. Contractors knew that savings resulted in benefits for them while overruns resulted in shared losses for them. The project team was careful to always stay within budget

While NEC was great as a tool for budget control, PD1 was the driving force in ensuring costs were actually controlled. If extra money needed to be spent, the team had to find a place to reduce a cost elsewhere, there was never room for error in the calculation of costs. One project that went overbudget was at an overrun of 0.5% with other projects actually coming in at savings.

7.2.3.13 Quick payment of contractors

As noted, earlier procurement models were characterised with payment delays that negatively affected both contractors and the Facilities Management firms. PD1 and PS1 insisted on a 21-day payment policy to ensure cordial long-term relationships. If the project team did the work, it was only fair they get paid for it in a timeous manner. This meant less delays caused by contractors scrambling for funds and the prevention of situations where contractors end up charging extra premiums to make up for the delays in payment

Most of the identified changes were immediate and done simultaneously. Table 7.2 details the changes that were slower to implement and why

Table 7.2 - Slower Change

Gradual Change	**Reason**
Strategic Expansion Framework	While an informal document existed, it only became formalised in 2009. The informal document was crucial in Wits receiving a lion's share of the DHET funds in the first programme cycle
Construction Procurement policy	While the principles from the policy were informally utilised, the policy only became official in 2013
In-house Project Managers	A lack of capacity resulted in individuals being attached to WCPD from private firms. After the 1st cycle of the Capital Projects Programme, PMs were absorbed by WCPD and became Wits Employees
ECI	ECI was only effective from the point where contractors had been engaged through the tender process. There were projects where their full contribution was limited because of time

Gradual Change	Reason
Collaborative relationships	Collaboration did not simply come into being, it had to be learnt. By the end of the first cycle of the programme. The in-house project team better understood how to work collaboratively and work cordially with all team members especially the contractor

Models have been drawn reflecting the before and after of change. It is thus important to develop a model for implementing change that could be utilised by other HEIs planning on shifting to more collaborative working in their construction projects.

7.3 The Wits Model for Changing Procurement Practices

In developing the model for implementing change, it was important to verify that the change that occurred was indeed to more collaborative procurement. This was done through a comparison with the practice changes identified by Watermeyer as important for a collaborative culture (Watermeyer, 2012a).

Table 7.3 - Wits Change

From	To	Wits Changes
Master-servant relationship of adversity ("them" and "us")	Collaboration towards shared goals (integrated project team approach)	Collaboration governed by equal status of stakeholders
Fragmentation of design and construction	Integration of design and construction	ECI enabled the integration of design and construction
Constructability and cost model determined by design team and quantity surveyor/cost consultant only	Constructability and cost model developed with contractor's insight	ECI contributed to dealing with constructability and value engineering
Short-term "hit-and-run" relationships focused on one-sided gain	Long term relationships focused on maximising efficiency and shared value	Long term relationships through Framework Agreements
Risks are allowed to take their course	Active risk management and mitigation	Equitable sharing of risk with collective responsibility
Develop the project in response to a stakeholder wish list	Deliver the optimal project within the available budget	Accomplished through value engineering
"Pay as you go" approach to delivery	Discipline of continuous budget control	NEC Target Cost contract for strict budget control
Rigid, bespoke, ill-defined and disjointed procurement system	Flexible, predictable, integrated, documented and auditable procurement system	Construction Procurement Policy developed and implemented
Poorly structured procurement documents based on bespoke or local standards and forms of contract with reliance placed on local knowledge	Structured procurement documents based on international/national standards and forms of contract with minimal customisation/amendments	Standard documentation used for all projects with contracts in clear, concise language

From	To	Wits Changes
	and clear and unambiguous requirements	
Project Management focused on contract administration	Decisions converge on the achievement of the client's objectives	Project team working together to create most value for client
Standard delivery stages prescribe the contracting arrangements and are unrelated to a portfolio of projects	Delivery is managed and controlled through stages which permit the full range of contracting arrangements and commence at portfolio level	An example is the phased work through early starts in projects as necessary
Ill-defined end of stage deliverables and acceptance procedures	Well defined end of stage deliverables and acceptance procedures which enable informed decisions to be made	Well defined expectations and deliverables
Design and construction developed in isolation from operation and asset management considerations	Design and construction aligned with operation and asset management requirements	Still to be accomplished
Procurement strategy focused on selection of form of contracts as all other choices are predetermined	Selected packaging, contracting, pricing and targeting strategy and procurement procedure aligned with project objectives	Procurement strategy based on what needed to be accomplished in project
One project, one contract	Works packaged appropriately to achieve objectives and efficiencies	Framework agreements for 3-year term
Project delivery takes place within predetermined parameters without any conscious thought to objectives	Projects deliver on documented primary and secondary objectives in a measurable and quantifiable manner	Projects always developed to meet measurable objectives e.g. school term dates

As shown by Table 7.3, Wits managed to accomplish the majority of required construction procurement changes to reflect a change from traditional to more collaborative means of working.

The model provided below reflects the manner in which WCPD implemented its changes to a more collaborative procurement culture. It must be noted that WCPD had specific changes that required immediate and urgent implementation. This meant that other necessary changes were slowly implemented as discussed in Section 7.3.

7.3.1 Culture change at Wits

Procurement culture was previously defined as the values, norms and behaviours of an organisation in terms of procurement. As addressed in Chapter 2, values and norms influence

behaviour which in turn influences values and norms. This cyclical relationship shows how change is fluid.

Table 7.2 showed the manner in which change manifested. It is important to determine whether change could actually be termed “culture change”. This requires a definition of the three components of culture utilised in the definition.

Values can be defined as the fundamental beliefs of an organisation reflected in the guiding principles of the organisation and their influence on decision making (Mueller and Straatmann, 2014). Norms can be defined as the unwritten rules or informal guidelines about what is considered normal (Chaurasiya, 2010; WP&C, 2019). Finally, behaviours can be defined as those practices that distinguish an organisation or make it better than other organisations (WP&C, 2019).

7.3.1.1 Values

Figure 7.3 shows examples of values that organisations can encapsulate as adapted from (Forsey, 2019; Heryati R, n.d.). Values relevant to procurement are shown.



Figure 7.4 - Organisational Values

Extrapolation from Table 7.2 provides a snapshot of the values that drove capital projects at Wits. These values are shown in Table 7.3 below

Table 7.4 - Wits Values

Collaborative working within the project team was a priority
There was an appreciation of long term, cordial relationships
The Construction Procurement Policy reflected the values of the Institution
Best value for the client was the driving force of each project

7.3.1.2 Norms

Norms and values are closely related. Where values are considered guiding principles, norms are developed based on these principles i.e. because we have these values, this is the correct manner in which we behave. Examples of norms include the following (TBC, 2019):



Figure 7.5 - Organisational Norms

In the case of Wits, specific processes became norm. These are shown in Table 7.5 below

Table 7.5 - Wits Norms

Integration of design and construction
Phasing work to enable early starts
Procurement strategy based on needs of a project
Well defined expectations and deliverables
Projects being developed to meet objectives that are measurable

The norms reflected above show how big a part values play in these unseen rules. Valuing collaboration for example encourages the integration of the design and construction phases as the project team is more willing to share information. Because the focus is on best value for the client, strategies will always be chosen based on what will create value.

7.3.1.3 Behaviours

Wits was definitely working in a manner that was unique from other HEIs and reaped success in their change efforts. The change in values meant a corresponding change in behaviour i.e. practices and processes

Table 7.6 - Wits Behaviours

Working on buildability with the contractor
Sharing risk in an equitable manner
Value engineering
Use of the NEC suite of contracts
Use of standard documentation
Use of Framework agreements

The manner in which Wits procured changed dramatically. One behaviour change pertaining to Wits was that mentioned in Section 7.1; the payment system. To foster cordial relationships with stakeholders, payments were made in 21 days with no delays from the past.

Wits managed to change its construction procurement by addressing everything from values such as relationships and collaboration to practices such as the type of contract used and standardization of documentation. Changing especially their value system enabled more pervasive and sustainable change which enabled them to replicate the success they had at Wits in the New Universities. The conclusion that cultural change occurs enables the construction of the model Wits used for change.

7.3.2 Wits Implementation Model

The model reflected below in Figure 7.6 was developed based on the interpretation of analysed data such as the given timelines, emphasised events and relevant reports.

Markers are shown on the model as a means of explaining what was happening at each stage in the change.

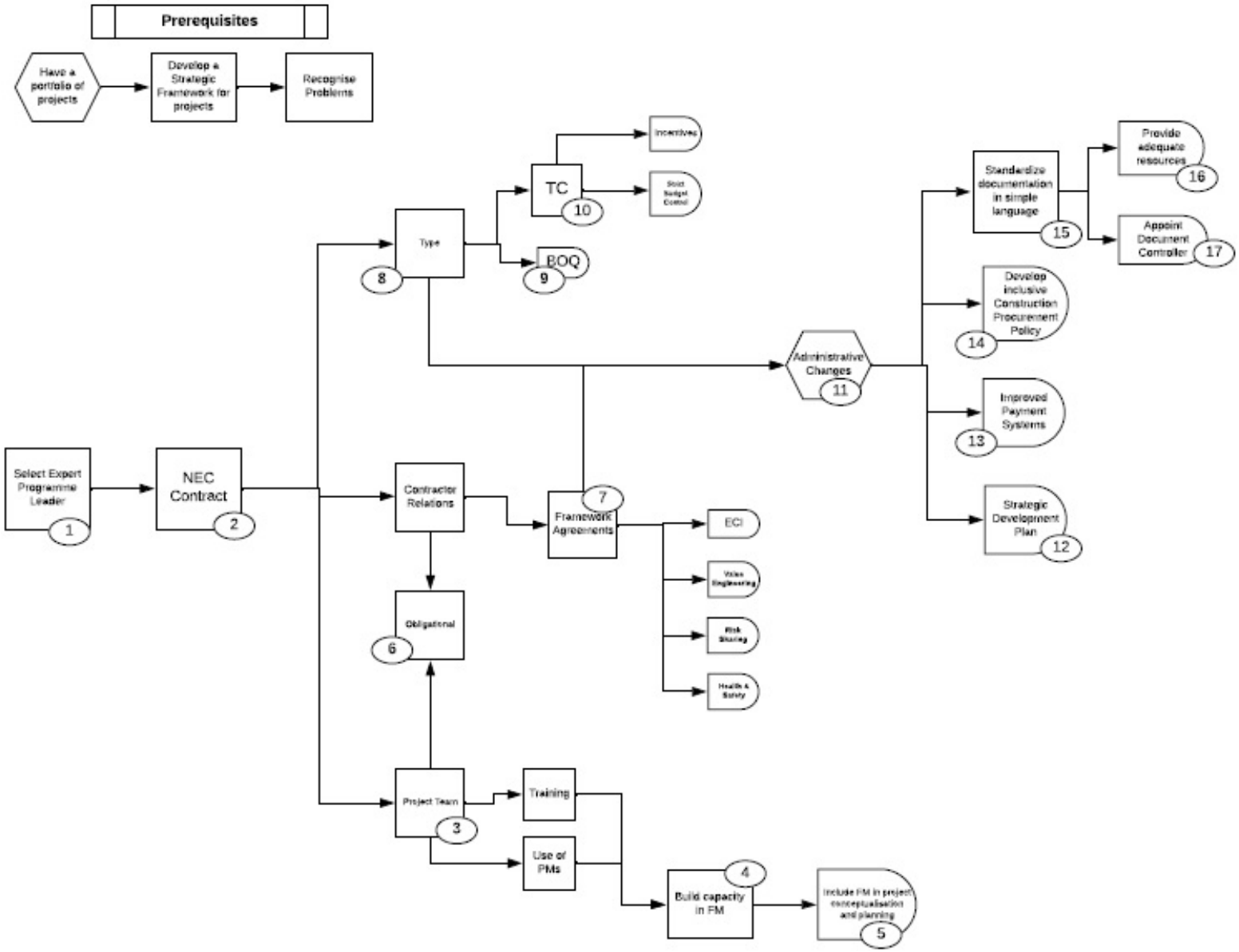

Figure 7.6 - The Wits Model

Markers explained – The Wits Model

The various stages and processes are explained in the table below by their marker numbers. The model focuses on the major changes.

Table 7.7 - The Wits Model (WM)

Number	Title	Details
1	Expert Programme Leader	Wits was looking at an extensive capital programme. The Wits Council recognised the need for an expert to oversee the programme
2	NEC Contract	The first decision made was to change contracts to the NEC as the JBCC was proving unreliable
3	Project Team	An exclusive team had to be set up of individuals who understood collaborative working
4	Build FM Capacity	With the division of PIMD into two departments, there was a need to build capacity in Campus Planning and Development and with time, inhouse Project Managers were utilised
5	Include FM	The FM department needed to be involved in the planning of the projects as opposed to simply being told what to do
6	Obligational contractor relations	Contractors were appointed and treated obligationally. Silos were broken down; information and trust were shared, and contractors were treated as equal partners in the projects
7	Framework Agreements	Long term relationships were opted for as they enabled long term relationships that would enable a collaborative culture to grow and be nurtured
8	Type of Contract	The NEC has a bouquet of possible options, CPD had to select the one that best suited their needs
9	BOQ	This contract is mostly preferred by some cost consultants as they believe it has less loopholes for the contractor to get money
10	TC	TC was best in terms of monitoring budgets. In line with obligational relations, any savings made on the projects were shared with the contractor
11	Administrative Charges	Procurement policies that were in place were not conducive for collaborative change, so changes needed to be implemented
12	Strategic Development Plan	The University had to finalise a strategic plan for the capital programme especially in determining projects to prioritise and funding
13	Improved Payment Systems	Payments to contractors were shifted to a 21-day system to ensure timely payment of their dues. This encouraged cordial relationships
14	Inclusive Construction Procurement Policy	Procurement policies tend to treat construction procurement and goods procurement in a similar manner. Wits then worked on separating the two. With this done, the construction policy also had to be flexible enough to accommodate collaborative procurement
15	Standardized Documentation	Standardized documentation was drawn up for use in all projects and it was in simple language that everyone could understand
16	Provide adequate resources	Collaborative procurement requires an enormous amount of resources in terms of paper and manpower. Wits invested in putting up the systems and they made procurement easier for future projects
17	Appoint document controller	A document controller was a necessity due to the sheer amount of necessary paperwork when using the NEC

This model was discussed with PD1 and PD2 who were available for its validation. They picked up on areas where changes necessary to make the model accurate. This resulted in the validated model shown in Figure 7.7.

7.3.3 Wits validated model

The changes required for the validated model revealed two things; 1) emphasis on issues or processes during data collection interviews did not translate into starting points of change and 2) post rationalisation should be expected and adjusted for as over time the narrative may be viewed differently or collectively.

In this particular case, the change to the use of the NEC was emphasised with an inference to it being the starting point of change. This perception was corrected with the proper emphasis placed on the use of Project Managers as opposed to Principal Agents in projects. Use of the NEC was by default as it is the best fit contract for dedicated Project Manager use.

Post rationalisation on the other hand likely occurred due to a better understanding of the change process. Seeing the model enabled PD1 and PD2 to reflect and correct perceptions possibly to fit an official narrative. This would be necessary because of the multiplicity of truths concerning change.

One very interesting thing that came through in terms of the NEC was the fact that changing from a traditional to a collaborative contract is critical to change. While it is not the crux of change it signals that change is occurring. It is in essence a symbolic decision creating the narrative of how to work in terms of principles and processes. It also turns out that when change has become ingrained, with values and norms adopted, it ceases to be about a specific contract as the project team works collaboratively because they believe in collaboration.

Taking all these issues into account, a validated model was created for the Wits experience as shown in Figure 7.7.

The markers for the model are in Table 7.

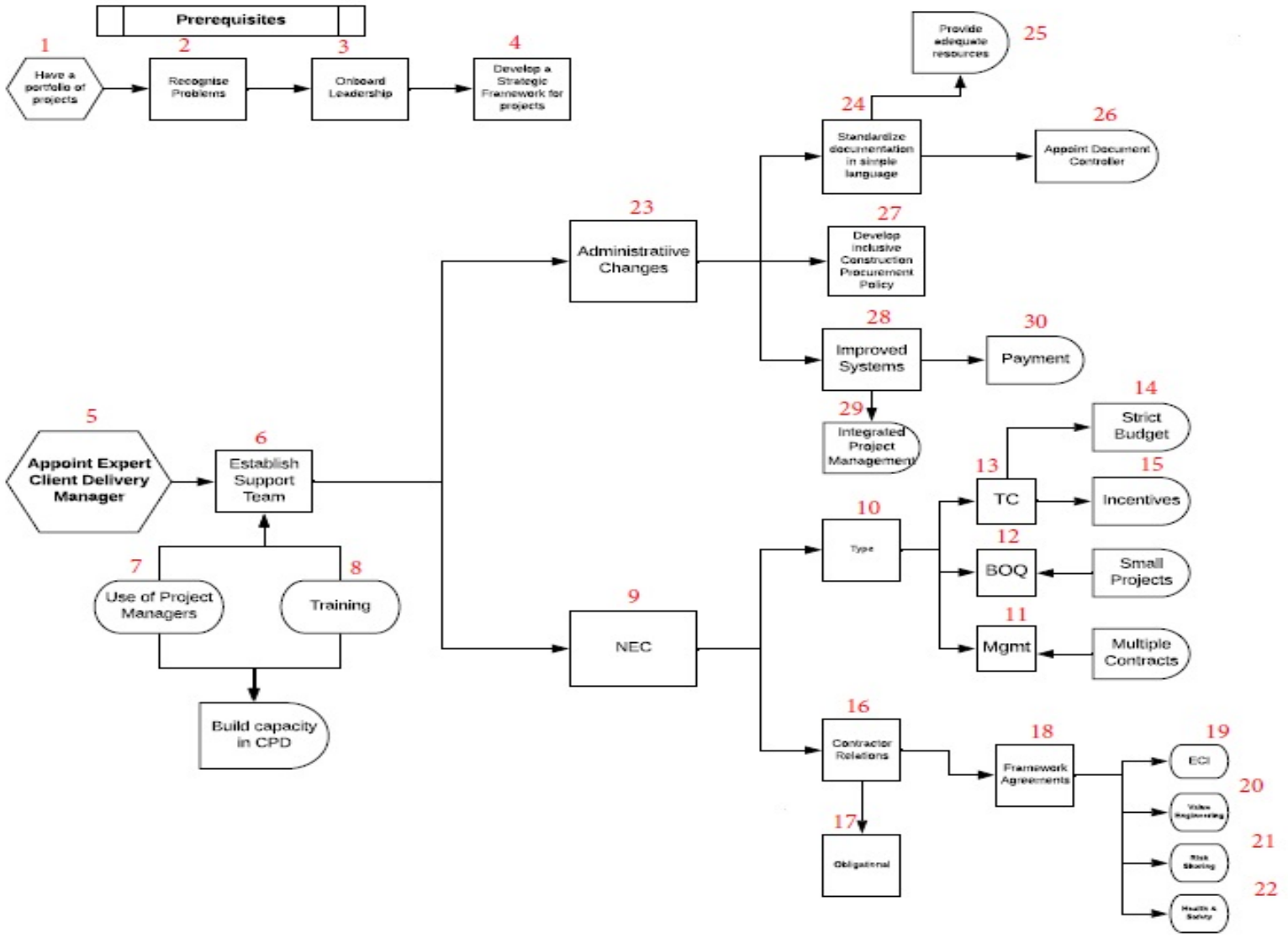

Figure 7.7 - Validated Wits Model

Markers Explained – Wits Validated Model

The various stages and processes are again explained through the various markers.

Table 7.8 - Wits Validated Model

Marker	Details	Stakeholders Involved
1	With DHET providing funds, Wits had a sizeable number of projects they would be working on. The number of projects was a key factor in driving the need for change	Wits Management, Deans
2	They recognised the various problems they were having e.g. a traditional project that was not performing well and lack of capacity to handle the project portfolio	Wits Management
3	The institution's leadership was open to change, realising that a successful capital project would be possible through an overhaul of procurement	Wits Management
4	There was a need for strategic planning for the projects especially in terms of funding and how space needed to be utilised in the institution	Wits Management, Deans
5	Overseeing a portfolio of simultaneous projects requires a manager who is able to push both the work, stakeholders and the agenda of the institution (such as collaboration)	Wits Management, CDM
6	The Client Delivery Manager (CDM) cannot function in isolation. The CDM was able to build a support team to enable change. In this case, the CDM brought the following core team on board: Procurement specialist, Systems Expert and Project Managers	Wits Management, CDM, Support team
7	There was recognition that the use of Principal Agents (PAs) was detrimental to projects as there was no continuity but a constant "back to learning" process with each new PA. The use of Project Managers who would ensure continuity and a more collaborative environment was opted for. This use of Project Managers (PMs) pushed the use of a more collaborative contract such as the NEC. Initially PMs were seconded from their firms before they were absorbed into the institutions staff. Gradually more staff were permanently built into the CPD team (Please see attached organogram in Appendix)	CDM, Support Team
8	Training was a necessity as some in the project team were not well versed in the use of e.g. the NEC. Health and safety training was also included to make sure the team understood the importance of a safe environment for all	CDM, Support Team, Consultants, Contractors
9	Use of the NEC was a first for any educational institutional. It provided the required collaborative environment with more client oversight and control over what was happening in the project	CDM, Support Team
10	The type of NEC contract used depended on the requirements of a project	CDM, Support Team
11	Management contracts used in instances with multiple contracts where CPD did not have capacity or enough time to administer all contracts	CDM, Support Team
12	Bill of Quantities used for smaller projects	CDM, Support Team, Cost consultants, Contractors

Marker	Details	Stakeholders Involved
13	Target Cost used for especially large projects as it enables tight control over the project especially in terms of money	CDM, Support Team, Cost consultants, Contractors
14	Strict budget control was very important in these projects as there was no room for delays or overruns of any kind.	CDM, Support Team, Cost consultants, Contractors
15	The NEC contract was also used as a means of closer cooperation with contractors through pain/gain share which incentivised contractors to make savings in projects	CDM, Support Team, Cost consultants, Contractors
16	Relationships in the project team were approached in a deliberate manner, collaboration was insisted upon especially with contractors	CDM, Support Team, Consultants, Contractors
17	Relationships were obligational with contractors treated as equal partner in the project team. This meant the need for an adjustment in attitude from other project team members	CDM, Support Team, Consultants, Contractors
18	Framework Agreements (FAs) ensured long term relationships with contractors. These were provided for a cycle of 3 year. The FAs encouraged continuity in projects and the building of more collaborative relationships	CDM, Support Team, Contractors
19	FAs helped in ensuring the availability of contractors for Early Contractor Involvement (ECI). This meant contractors were available from the design stage and could provide valuable input	CDM, Support Team, Contractors
20	Value Engineering was one of the best advantages of good relations with contractors. Universities have limited funds and it becomes necessary to cut down on costs. Contractors enabled the reduction of costs through their expert advice	CDM, Support Team, Contractors, Consultants
21	Traditionally the contractor carries the bulk of risk in a project. Collaborative working changed this dynamic by enabling risk to be carried by the best suited stakeholder. The Early Warning System (EWS) in the NEC also proved helpful in keeping the team apprised of potential threats to the project	CDM, Support Team, Consultants, Contractors
22	Health and safety was a priority and could even result in stop orders if standards were not met. This resulted in multiple fatality free cycles during the capital program	CDM, Support Team, Contractors
23	The size of the capital program together with changing to the use of PMs and the NEC meant an overhaul of existing administration systems	CDM, Support Team, Procurement, Legal Office
24	Standardization of contracts was a priority with an emphasis on easy to understand language. This helped everyone be on the same page and understanding their part in a project	CDM, Support Team, Procurement, Legal Office
25	First time use of a contract such as the NEC is time consuming hence the need for a portfolio of projects to make it worthwhile. Human resources who understand and can administer and manage the contract are also a necessity meaning extra costs for professionals. As noted, a support team was put in place with various experts involved in setting up	CDM, Support Team, CPD Staff, Procurement, Legal Office
26	The massive amounts of documentation associated with NEC meant there needed to be a specific individual in place to track and manage all the documents	CPD Staff
27	The development of a Construction Procurement Policy was one of the most necessary critical administration changes. In keeping with most HEIs, it had a single procurement policy	Wits Management, CDM, Procurement Specialist

Marker	Details	Stakeholders Involved
	for both goods and services and construction. The procurement specialist spearheaded the development of the Construction Procurement Policy	
28	Before change, procurement was a sluggish process with a lot of red tape. Systems had to be implemented to accommodate a capital program environment	Wits Management, CDM, Systems Specialist, Procurement
29	Project management is an integral part of collaboration. There was a need for systems that could keep track of projects and the work being done. Implemented systems had to integrate with available University systems	Wits Management, CDM, Systems Specialist
30	One glaring change was that of a 21-day payment system for contractors. The rationale was that for contractors to give their best, they needed to be paid consistently and on time with as few time-consuming hurdles as possible	Wits Management, CDM, Systems Specialist, Procurement

The corrections made on the first WM showed how conceptualisation makes a difference in the thought process. On reflection of how change occurred, participants were better able to organise the precise steps. Interviews had stressed the use of the NEC and the researcher interpreted it as the most important step in change. This perception was corrected, and it was made clear that while the NEC played a major part in change, the move from a Principal Agent system to Project Manager system was actually what confirmed the use of the NEC.

As can be seen from the markers, while Wits implemented its change systematically, it was in a loosely "messy" manner as it was reactionary and not entirely pre-emptive, i.e. problems were already showing with the procurement systems that were in place and measures had to be put in place to both mitigate and prevent failures.

From this validated model, it is possible to build a structured model incorporating the Wits Validated model and change literature as shown in Section 7.4 below.

7.4 The Structured Model

Taking into consideration how Wits approached their change and how change is perceived to occur, the model in Section 7.4 was built as a generic instrument for HEIs to consider when attempting to change to more collaborative procurement.

Models by Mento, Jones, Dirmdofer and Jick were also utilised to build the steps to change shown in Table 7.9 below. These models were found to encapsulate prior models and could thus provide a useful summary of available models.

Table 7.9 – Implementation of change

Mento/ Jones/ Dirmdofer's Model 2002 and Jick's Model 2003	How it is accomplished
Determine what needs to change	The first step is for HEI's to assess their procurement strategies and find where the shortcomings are. Complete honesty is necessary to ensure that change is comprehensive
Define how it needs to change	After identifying what needs to change, there is a need to determine how it actually needs to change
Commit to new way of functioning	There has to be acceptance that the status quo cannot continue and a commitment to working better
Develop a plan of what change will look like	A plan needs to be developed showing what the envisioned changes would accomplish
Have champions/sponsors of change	There need to be those who support change especially in management to show they believe in the change
Prepare those affected by change	Change should not be sprung on those who will be affected, they need to be prepared ahead of time
Develop an implementation plan	There need to be strategic details about how the change plan will be carried out
Have a strong leader to spearhead change and a strong team	Change cannot be accomplished by a single person. A change leader id required who in turn needs a core team for support and decision making
Develop structures that enable change	In the case of HEIs policies especially are important to ensure change can occur e.g. construction procurement policy, payment systems, contracts used. Tradition should not trump moving forward more efficiently
Constantly communicate and involve stakeholders	Stakeholders need to be constantly involved in what is going on so they can better appreciate the process
Constantly reinforce change	The change leader needs to ensure that change is not undone by regression; change needs constant reinforcement
Measure progress of change	Reviews or something similar should be conducted to determine how effective change is and to note further points of improvement
Integrate lessons learnt	Whatever lessons are learnt need to be integrated into the next project as change is about growing and continuously working towards better efficiency
Restart the process when necessary	Since change is considered fluid, the process can be redone as often as is necessary to prevent stagnation of the organisation

The steps shown in Table 7.9 were integrated with the process followed by Wits to develop the model given in Figure 7.8 below.

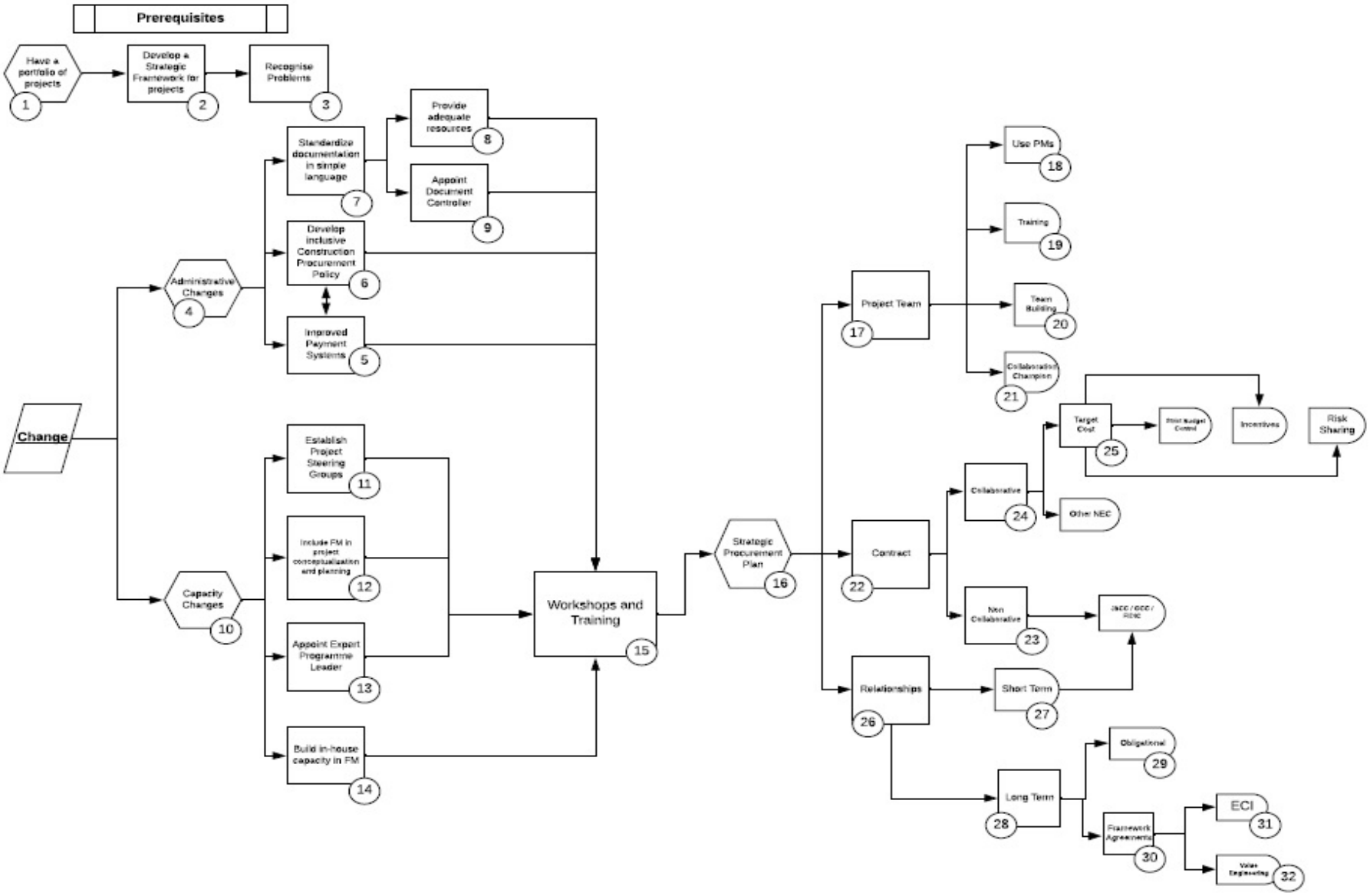

Figure 7.8 - The Structured Model

Markers Explained – The Structured Model

The various stages and processes in the model are explained in Table 7.10 below.

Table 7.10 - The Structured Model

Marker	Title	Details	Stakeholders Involved
1	Have a portfolio of projects	The resources and effort needed to be collaborative mean change makes sense when there is number of projects	Management, Deans
2	Develop a strategic framework for projects	Determine which projects are a priority and funding over the long term	Management, Spatial Planner, FM
3	Recognise problems	Be honest about problems experienced and how they can be solved	Management, FM
4	Administrative changes	Changes need to be made in terms of policies and processes	Management, FM, Legal, affected departments
5	Improved payment system	The industry tends to be problematic in terms of payments, making sure an efficient system is in place helps maintain relations with the contractor	Management, Procurement, Finance, FM
6	Develop an inclusive Construction Procurement Policy	Separate procurement policies for goods and construction are a must	Management, Procurement, Finance, FM
7	Standardize documentation	There have been complaints about the legal jargon in contracts like JBCC. Standardized contracts in simple language leave little room for misunderstandings	Management, Procurement, Finance, FM, Legal
8	Provide adequate resources	Time and effort are needed to set up appropriate systems	Management, FM
9	Appoint Document Controller	The massive amount of documentation means there needs to be dedicated personnel assigned to dealing with it throughout the project	FM
10	Capacity changes	Capacity changes might be needed to ensure the FM department is adequately equipped to handle collaboration	Management, FM, HR
11	Establish Project Steering groups	Within management structures it is necessary to have steering groups with professional experts to assist with the conceptualisation and planning for projects	Management, FM

Marker	Title	Details	Stakeholders Involved
12	Include FM in project conceptualisation and planning	The FM department also needs to be included in conceptualisation and planning	Management, FM
13	Appoint Expert Programme Leader	The capital programme needs to be overseen by professionals who understand collaboration	Management
14	Build in-house FM capacity	Collaboration works best with continuity. It is therefore a good idea to actually build capacity inhouse for e.g. PMs	Management, FM
15	Workshops and Training	Workshops are necessary before any collaborative work is undertaken so everyone understands what is expected	FM
16	Strategic procurement plan	Each project should be procured in a manner best suited to it. At this point, the FM department should be equipped and supported by policy to enable drawing up appropriate plans	FM, Procurement
17	Project Team	It is necessary to have a team that understands collaboration or is willing to learn and understand	FM
18	Use of PMs	The use of collaborative contracts like NEC determine the type of project team to be used. In this case, PMs are a necessity	FM
19	Training	For many who have not used e.g. the NEC, it is necessary for the project team to receive adequate training	FM
20	Team Building	Collaboration works through cordial relationships. These need to be nurtured and team building is one way of accomplishing this	FM
21	Collaboration Champion	There needs to be an individual who is reminding everyone or enforcing the collaborative spirit as it is easy to regress into non collaborative behaviour	FM
22	Contract	It must be noted that being collaborative does not mean exclusive NEC use, the project determines the contract	FM
23	Non-collaborative	Where necessary, non-collaborative contracts can be used as explained in 22	FM

Marker	Title	Details	Stakeholders Involved
24	Collaborative	Within NEC, there are various suites available for use. Again, discretion has to be used	FM
25	Target Cost	This option is the best choice when budget control is a priority. In addition to control it enables the sharing of risk and the use of incentives	FM
26	Relationships	The type of relationships to be shared in the project is very important, there needs to be careful consideration on it	FM, Procurement, Finance
27	Short Term	This type of relationship works best for small e.g. renovation projects. Should be used as appropriate	FM
28	Long Term	These types of relationships are carefully built and nurtured to enable continuity and stronger relationships within projects	FM
29	Obligational	There is collective ownership of a project, with everyone sharing and considering each other's interests	
30	Framework Agreements	These are an integral part of long-term relationships. They are for a term of ¾ years and can be just for the contractor or expanded to include consultants	FM, Procurement, Finance
31	ECI	Contractors are involved in projects early on due usually to the FAs providing their valuable input through-out the project	FM
32	Value Engineering	This is a hidden gem of long-term relationships. With contractors onboard early it is easier to make necessary changes before they are expensive to implement. Also helpful in reducing the cost of a project	FM

The structured model shows the importance of prioritising the administrative aspects of change. These can be summarised as a separate construction procurement policy, standardising documentation, efficient payment systems and most importantly a strong change leader.

While Wits has successfully implemented change, WCPD identified one major problem with their current phases and processes. The limited integration with PIMD means handovers are not as

smooth as they could be. In their view there is a need for the two departments to plan and develop together as it ensures better integration at handover stage and with operations and management. The Structured model incorporates Facilities Management as a whole i.e. both Capital Projects and Operations and Maintenance departments are involved from the very start of each project. This is especially applicable to institutions with decentralised FM as in the Wits case. Those with central FM departments would have limited integration problems.

The developed Structured Model is one with generic processes of change. It does not dictate specifics of implementation of change but rather provides guidelines as to the areas that may need to change for HEIs to become more collaborative.

7.5 Summary of Chapter 7

There is no single way of implementing change; it tends to be specific to circumstances. Wits was pushed to change in order to implement a successful capital projects program. With Treasury and DHET advocating for better procurement strategies and project outcomes, a number of HEIs will also find themselves needing to take drastic steps to ensure successful project outcomes. The generic model provided is meant as a means of showing the issues that will need to be addressed in order to increase the odds of success. The model also provides a snapshot of the possibilities that come with collaboration; procurement is not limited to a single strategy but various strategies best suited for specific projects.

The model was developed as part of the objectives of this research. It is intended to provide a generic way in which change to a more collaborative environment can be accomplished. The model was based on the following conclusions:

1. There are precursors to change
    - A portfolio of projects
    - A strategic framework
    - Recognition of problems
2. Administrative changes are a necessity for successful change
    - Administrative changes in term of procurement policy
    - Capacity changes in terms of expert team leader and inhouse staff
3. The composition of the project team matters
    - Need to use PMs
    - Work more with inhouse staff
4. Change cannot preclude training
    - Ensure everyone understands the changes
    - Ensure they are equipped to handle the changes
5. A contract change is a proxy of change
    - Contract change important in ensuring things are done differently
6. Being more collaborative does not necessarily mean non-collaborative contracts cannot be used anymore
    - Other contracts can be utilised
    - Choose contract most suitable for current needs, utilise it collaboratively

Traditionally procurement has been rigid and done in only one way, collaboration has enabled projects to have options. While administrative issues such as paperwork are overwhelming initially, once the project team has adjusted there are tangible benefits.

8 Conclusions and Recommendations

This chapter provides a summary of the conducted research. This is accomplished through revisiting the research problem and objectives, providing a brief overview of the work conducted, summarising the findings and conclusions, drawing up recommendations to both practice and the body of knowledge and then finally discussing possible recommendations for further work from this research.

The findings and conclusions are sequentially addressed with multiple referrals to Chapter 7 where conclusions were drawn through the developed change models. These referrals prevent the duplication of material already addressed.

8.1 The research problem, aim and objectives

The **problem** for the study was defined as the following:

While clients have been identified as best able to drive procurement change in construction projects, there is limited knowledge on the process they need to follow in order to successfully implement change to a more collaborative procurement culture

With the **aim** defined as that of:

Determining the process that clients can follow to change to a more collaborative procurement culture in construction projects within Higher Education Institutions.

This was accomplished by meeting the following **objectives**:

1. *Determining what constitutes change to a more collaborative procurement culture*
2. *Determining how clients can initiate change*
3. *Determining the prerequisites for change*
4. *Determining the processes involved in implementing change*
5. *Determining the impact of change on major stakeholders*

The meeting of these objectives is further discussed in Section 8.3

8.2 The work conducted

Research was conducted through a case study of the University of Witwatersrand and the embedded cases of the New Universities. These two were preceded by an investigation into whether Wits was the critical case it was purported to be. A summary is provided of the methods used in Table 8.1 below.

Table 8.1 - Data Collection for the study

Phase	Method	Sample
Critical case investigation	Semi-structured interviews	Heads or senior management in FM from other public HEIs
Case Study	Semi-structured interviews	Programme directors, Project Managers, Cost consultants, Designers, Contractors, University Management associated with Wits and the NUs
	Document Analysis	Reports and policy documents from Wits and NUs

Analysis of the findings enabled the development of a timeline of change, the drawing of a clear picture of what change occurred and how, concluding with the development of a generic model of change for HEIs.

8.3 Summary of findings

The findings of the study are summarised below according to the sequential order of events:

8.3.1 Precursor to change

Various change theories show that change tends to occur in reaction to a crisis or as a means of preventing a crisis. The University had a capital program that was at risk because of a lack of budget control (Rhydderch, 2004). Management realised the need for change with multiple change champions playing different roles in promoting change.

8.3.2 Implementing change

There is common consensus on factors enabling successful change. These include having the best project team on the job, stakeholder buy in, stakeholder early involvement, conceptualising and

communicating change and its positive effect successfully and most importantly reiterating/reinforcing change principles (Akgun et al., 2007; CCS, 2018; Marsee, 2002).

Wits accomplished change by utilising the skills of an industry leader who put together a special programme management team to address all the shortcomings of the capital projects. The team shared a vision of completely changing the procurement process and improving relationships within projects. The client was actively involved in the project with the change leader constantly reinforcing the new values and processes. Most procurement changes were implemented all at once with further changes implemented as the need arose. Changes included types of contract, contractor involvement, length of relationships, attitudes among team members and payment system. Even with management buy in and support, change was not an easy process as various in the University did not understand the point of the new processes and how they were to be implemented. Again, reinforcement had to be practiced on external stakeholders

8.3.3 Replicating change

The positive results from the Wits case prompted a request for the project team to be involved in managing the development of the New Universities. This provided the opportunity to show that the changes could be replicated in other institutions. The project teams also managed to adapt change to suit their particular need. This is a rather positive development as collaboration is expected to be flexible and versatile

8.3.4 Modelling change

The Wits experience made it possible to develop a baseline framework for change implementation in HEIs. While change is not implemented the same in all instances, this model provides HEIs with the opportunity to determine how they can possibly approach their own change strategy. It provides an overview of the issues and processes to consider to improve the chances of successful change

8.4 Meeting the Objectives

This section reviews the objectives of the research to ensure they have been met. Detail will be provided on how each objective has been met through the analysis of the collected data.

8.4.1 Objective 1 – Determine what constitutes change to a more collaborative procurement culture

Culture is a reflection of the values, norms and behaviours of an organisation. As previously defined, traditional procurement culture is characterised by the following (Table 8.2) as adapted from (Eriksson and Westerberg, 2011b; Gadde and Dubois, 2010; Lingguang Song et al., 2006; Ng and Skitmore, 2002; Song et al., 2009).

Table 8.2 - Traditional Procurement Culture

Values	Lowest price (Client) Making as much money as possible (Contractor)
Norms	Time Overruns Cost overruns Claims culture Efficiency problems Performance problems Decreased innovation
Behaviours	Adversarial Lack of joint problem solving Lack of a holistic perspective

Watermeyer defined what change encapsulates. Using his model, it is possible to depict what change to a more collaborative procurement culture entails for HEIs through the Wits experience (Watermeyer, 2012a).

Table 8.3 - Required change in HEIs

Collaboration	**HEI Changes**
Collaboration towards shared goals (integrated project team approach)	Contractors treated as equal partner in the project team Need a facilitator such as a PM to push collaboration
Integration of design and construction	Early Contractor Involvement Engage those involved in the project as soon as possible
Constructability and cost model developed with contractor's insight	Early Contractor Involvement Assists with Value Engineering
Long term relationships focused on maximising efficiency and shared value	Long term relationships through Framework agreements (these can be for both consultants and contractors) Continuity through Framework agreements Skills development through Framework agreements
Active risk management and mitigation	Equitable sharing of risk with collective responsibility
Deliver the optimal project within the available budget	Accomplished through value engineering
Discipline of continuous budget control	NEC Target Cost contract for strict budget control Target Cost option

Collaboration	HEI Changes
Flexible, predictable, integrated, documented and auditable procurement system	Development of an inclusive Construction Procurement Policy
Structured procurement documents based on international/national standards and forms of contract with minimal customisation/amendments and clear and unambiguous requirements	Standardized documentation contracts in clear, concise language
Decisions converge on the achievement of the client's objectives	Focus on best value for client as opposed to lowest cost
Delivery is managed and controlled through stages which permit the full range of contracting arrangements and commence at portfolio level	Flexibility based on the project needs and available resources
Well defined end of stage deliverables and acceptance procedures which enable informed decisions to be made	Clear roles and responsibilities PM to manage and allocate responsibilities
Design and construction aligned with operation and asset management requirements	Create smoother handover process by having Capital projects teamwork in tandem with Operations and Maintenance
Selected packaging, contracting, pricing and targeting strategy and procurement procedure aligned with project objectives	Selection of most appropriate procurement strategy based on type of project
Works packaged appropriately to achieve objectives and efficiencies	Can use packages instead of BOQ as appropriate through e.g. Target Cost contracts Framework agreements for 3-year term
Projects deliver on documented primary and secondary objectives in a measurable and quantifiable manner	Have measurable objectives and deliverables as necessitated by the project

Table 8.3 above defines what change to a collaborative culture would entail. As noted with the Wits experience, these changes are possible and HEIs have the liberty to implement change in a manner that best meets their objectives

8.4.2 Objective 2 – Determine how clients can initiate change

The role of the client has been noted as crucial in implementing change as they hold a significant amount of power and influence over projects. In essence clients are best positioned to be change agents in the construction industry.

From the onset, the Programme Director (in essence the Wits Client Delivery Manager) determined to be an actively involved proxy of the client (in this case the faculty/department for which the

construction is being done). Various steering committees were also set up to ensure that the best possible “experts” could be involved in determining what projects needed delivery and how to go about it. This implies a two-pronged client driven change with input from both management and the Capital Projects team.

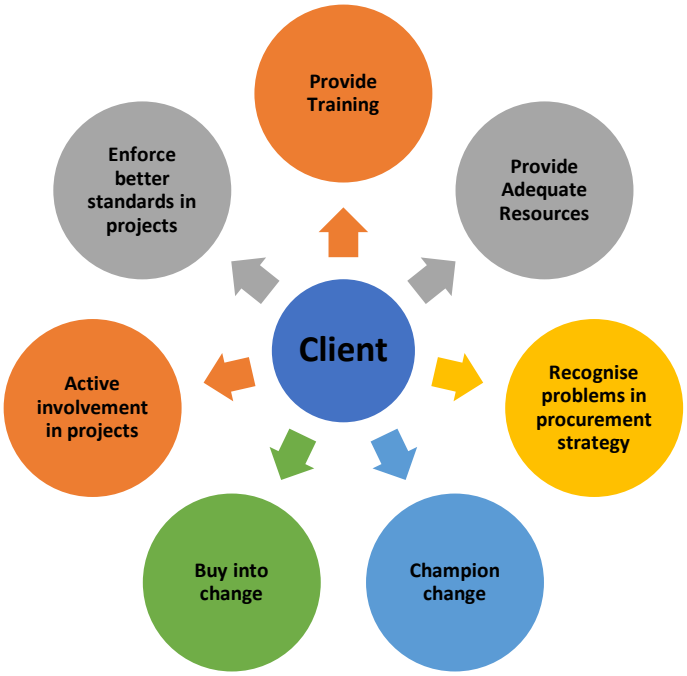

Figure 8.1 - Client driven change

The changes at Wits are explained in Table 8.4 below

Table 8.4 - Client change at Wits

Client Role	HEI Details
Expertise	HEIs need to ensure they have the relevant competent people to take on infrastructure decisions
Recognise Problems	HEIs have a responsibility to move from the status quo by recognising core issues with their procurement strategy
Buy into change	HEIs have to accept the need for change and what it entails
Champion change	HEIs have to push industry for change as they are in a position of power
Provide adequate resources	HEIs need to plan for extra resources as changing to more collaborative working means systems have to be put in place that require both monetary and human capacity
Have a strong client delivery manager	HEIs need to appoint a leader who understands change and preferably has a proven track record

Client Role	HEI Details
Active involvement in project	As a client, HEIs through the Client Delivery Manager are actively involved in the project. Appointment of PMs as opposed to PAs also assists in ensuring active involvement of someone with the client's best interests at heart
Provide training	Working collaboratively means use of a collaborative contract such as the NEC. It is helpful for training to be provided to the relevant members of the project team to ensure a smooth transition to collaboration
Enforce better standards in projects	HEIs need to live up to the values they espouse. This means enforcing of better standards in projects in areas such as Health and Safety and quality

In essence, to initiate change, clients need to be sophisticated/expert clients; they need to understand the construction process, be willing to utilise the most appropriate procurement strategy and provide the necessary resources for change. Most importantly they need to ensure the best possible people are leading the change process

8.4.3 Objective 3 - Determine the prerequisites for change

The prerequisites for change as identified in the Wits case include a portfolio of projects, management buy in, management support and a change leader. These are defined in Table 8.5 below

Table 8.5 - Prerequisites for change

Portfolio of Projects	Extensive changes are required when changing to more collaborative working. This is due to the copious amounts of paperwork that go into setting up the various processes and standardizing of documentation. This in essence means it makes little sense to invest in such systems for a paltry number of projects. Change would be most effectively accomplished over a portfolio of projects with at least a Framework agreement period
Management buy in	Management needs to appreciate the need for change. Decisions have to be made especially in terms of additional resources and in cases where management does not understand or see the need for change it will be difficult to get the change started or maintain momentum of the change
Management support	Change tends to be successful when management shows its support. Support means clearing of obstructions to change e.g. in the Wits case pushing through the procurement policy, financial systems and payment systems. Management has to understand the risks involved and be prepared for whatever happens within the projects e.g. when Wits had to share costs with the contractor over an error both the QS and contractor had missed. Lack of support from management in this case would have crippled the standing of WCPD and put cordial relations at risk
Change leader	It is critical for any change to have a change leader. The use of a well-respected expert helped with management buy in implementation of the envisioned change. The change leader needs to be able to put together a powerful team that understands and also advocates change. The chosen team is critical as they are the support base for the change leader; meaning a change leader also needs to know what human capital is needed and how they should be utilised

The above-mentioned prerequisites were critical for the success of change. It is expected that in general all HEI change will need to incorporate these prerequisites. It is fortuitous that DHET has a long-term infrastructure programme in place as it will enable HEIs to set up systems that can ensure continuity.

8.4.4 Objective 4 – Determine the processes involved in implementing change

The process of change is expounded in Chapter 7 with models showing the Wits processes (Figure 7.6 and Figure 7.7) and a final model reflecting structured change (Figure 7.8).

The processes involved before implementing change are briefly summarized below

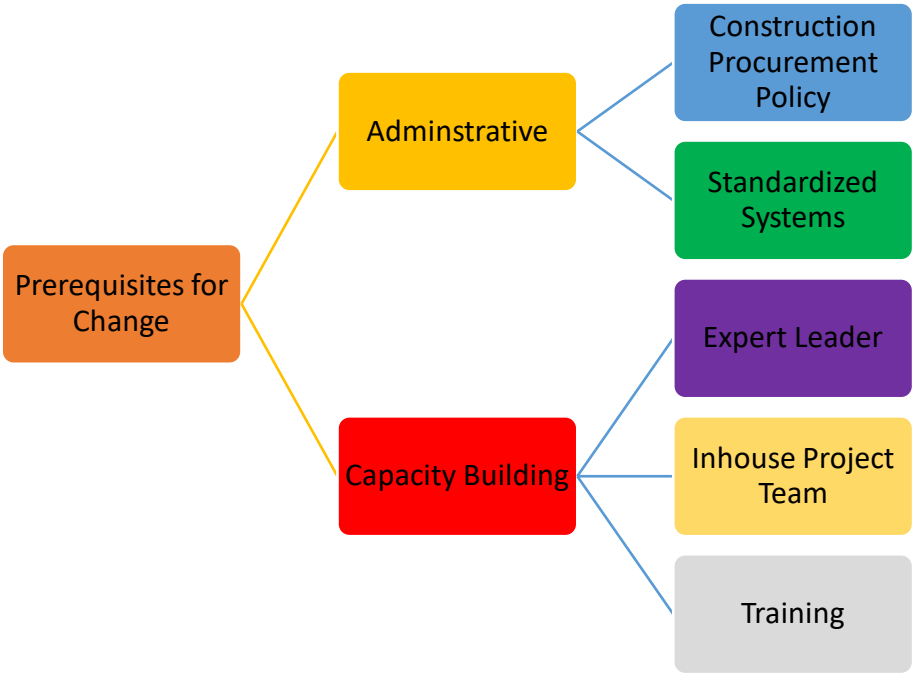

Figure 8.2 - Processes for change

8.4.5 Objective 5 – Determine the impact of change on major stakeholders

For change to occur, there needed to be buy in from relevant and important stakeholders. For some it was a forced buy in but with time as everyone understood and appreciated the manner in which procurement was done, change became easier.

Table 8.6 - Impacts of change

Stakeholder	From	To	Impact
The University	Ad hoc projects	Strategic Spatial Framework	Better strategizing and planning for infrastructure projects. Also gained a great reputation for the way projects were managed
Faculties	Blinkered focus on only their needs	Working together on how to benefit from each other's resources	Better sharing of resources
Procurement & Finance	Combined procurement policy 30-day payment system	Separate policies for Goods and Services and Procurement 21-day payment system	Better systems in place that met specific needs of each type of procurement Less problems from unpaid service providers
Professionals	Elitism	Equality on projects	Inclusivity in the manner in which the team works, no silos or favouritism – better relationships and outcomes
Contractors	Side-lines Builder role	Equal partner Construction Expert and Designer	Status improved as professionals and part of the team. For some, upgrades in CIDB gradings. Great reputation from the work done under the changes meaning better exposure
Operations and Management	Role of being in charge of both capital projects + operations and maintenance	Working only on operations and maintenance of university infrastructure	Less stress especially on its human capital but with disadvantage of being outside the loop in terms of developments etc

While it was not easy to change, change brought various advantages and disadvantages to stakeholders. In essence, change was most positive for clients, project managers and contractors while consultants had to seriously adjust to working on an equal basis with the contractors and having an involved client.

8.5 Implication of findings on propositions

Three propositions were identified in this study. Implications of the findings on these are explained below:

8.5.1 Proposition 1 - Certain pre-existing conditions are necessary for the implementation of collaboration

This proposition was proven true as explained in Section 8.4.3

These have been defined as prerequisites for change and include the following:

- A portfolio of projects preferably over a period of time such as the duration of a Framework Agreement
- Management believing in the change
- Management supporting the change
- Expert change leader to guide the project team through change

8.5.2 Proposition 2 - There is a clear generic process for changing to successful collaborative procurement

This proposition was proven true through the development of the generic model of change in Section 7.4

8.5.3 Proposition 3 – A Culture change is necessary for collaboration to be successfully adopted

The use of e.g. a different contract, utilizing PMs instead of PAs are tangible signs of change yet in the Wits case the change went deeper than that. Project team dynamics changed, and relationships changed. Change went beyond practices to a mind change on the best way to procure – the realisation that people matter and that working together towards the same goal makes for better projects and success.

As explained in Section 7.3.1, successful change was enabled through a change in values, norms and behaviours which were defined as the components of culture.

8.6 Contribution of the Study

With the implementation of treasury legislation on procurement, it is imperative that Higher Education Institutions procure in a manner that provides best value. WCPD has utilised the legislation and acted as a proponent for its use. They have successfully managed to implement change in the manner they procure.

Through the Wits experience it is possible to determine how change can take place. As mentioned in Section 1.3 this is the problem the study was addressing:

While clients have been identified as best able to drive procurement change in construction projects, there is limited knowledge on the process they need to follow in order to successfully implement change to a more collaborative procurement culture

Wits went through a process of change that was successful. The experts involved in the change and various documents were available to track the change process. Wits changed with no yardstick or model to follow; they got the principles right and managed to successfully change.

Analysis of the Wits case study has enabled a generic model for change; that is the major contribution of the research. At a time when National Treasury and DHET are pushing for change to enable better project outcomes, this study has provided a model which can be used by the various institutions to chart their own change course. The model focuses on best practice and value for money in construction procurement.

The study also revealed how Wits was able to successfully replicate change in the NUs. While they may have started haphazardly with their changes, by the time they worked on the NUs they had structures and policies in place to enable a smoother project process. This in essence provides proof of the fact that change can work.

The study also revealed the various challenges and misgivings various stakeholders have about aspects of the collaboration process. Collaboration tends to be positively touted, rightly so as it has many advantages. In contributing to project team dynamics, the study showed that consultants may be a group that has been disenfranchised by collaboration. Their specific roles have to adjust to equal relationships which creates resistance and delays change.

The need for change has been discussed extensively in the construction industry; this study provides a model on how to actually implement this change in HEIs. HEIs are unique in their nature and funding models. This means that while aspects of the change model can be utilised by other sectors looking into implementing change, the model is specifically for use in HEIs.

8.7 Conclusions

Collaboration has long been touted as a solution to the ills of the Construction Industry. For an industry plagued by adversarial relationships and fragmentation, collaboration is not easily accomplished. Additionally, the results of changing to collaboration are explained without a "blueprint" on how to actually get to the expected outcomes.

This study investigated this need for change, with a focus on what change was needed, how change was implemented and the results of implementation. Conclusions based on analysis of the findings provide the following:

- Clients are indeed in the best position to drive change as they in essence hold the most power in the stakeholder relationships
- Expert clients are especially necessary in driving change as they better understand the construction process and the benefits of change
- Project team stakeholders are in a unique position to push change in industry. Their positive experiences with collaboration can be used to push for a collaborative agenda in other projects they embark
- The success of change is not guaranteed through merely a change in process or contract, the attitudes to change and actual embracing of change provide a better formula for collaborative change success
- Lack of management support for change creates a difficult path to change. When management supports and champions change, chances of change success are higher
- Change in HEIs is possible and the development of a model for change makes the process just that much easier. Knowing the sequence, challenges, advantages and results of change mean it is easier to sell and implement

These conclusions have implications for both practice and the body of knowledge. These implications are detailed in the following sections.

8.7.1 Implications for Practice

The results of this study have several implications for practice. These are summarised below

- While collaboration is a worthwhile venture, it has been linked to a heavy administrative workload. It is necessary for clients to count the cost of this administration and determine if it is the best fit for their organisation
- Use of a collaborative contract such as the NEC does not mean a project is collaborative. The invasive collaborative culture is what makes a project truly collaborative. Clients and the Industry need to work towards collaborative values, norms and behaviours to ensure better collaborative success.
- When it comes to change, there is no one size fits all solution. Clients need to take stock of their current standing and make changes based on that. The types of changes and extent of the changes will be based on this assessment. While some change processes are generic, intrinsic change is circumstance specific.
- A change leader who does not understand or believe in the expected change can be detrimental to the success of change as they fail to move past the technicalities i.e., they focus on behaviour change instead of on values and norms too meaning clashes are inevitable when these essential parts of collaboration fail to materialise.
- Industry has to appreciate and push for change to enable faster paced change. Change has become necessary with the advent of Industry 4.0 (4IR). The essence of 4IR is collaboration, various stakeholders have to cordially work together to experience its full benefits.
- Industry has an opportunity to set up centres for best practice where various stakeholders have the opportunity to share how they have accomplished specific goals and help others in the industry accomplish the same. In the case of Wits, other institutions can learn from their experiences and implement changes that are relevant to their sphere

8.7.2 Recommendations for further work

Several recommendations for further work based on the outcomes of this study can be suggested:

- In light of the identified shortcomings of the current processes, a study on how to better integrate the capital projects division with that of operations and maintenance would be beneficial in ensuring change in the complete lifecycle of infrastructure development. This would be especially useful for decentralised FM departments
- Additionally, research into how HEIs fare when funding has decreased, and they are involved in smaller projects would enable a glimpse into how to remain collaborative without an extensive capital works programme.
- A study into why stakeholders can be wary of remaining in collaborative procurement relationships would help with understanding the perceptions or realities behind the avoidance of collaboration

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Appendices

Please note, the appendices are as follows

#	Name	Details
1	Data Collection	Ethics Documentation Questionnaires for validating critical case Questionnaires for the various stakeholders who participated in the study
2	Data Analysis	Examples of themes, manual groupings. Screenshots of the process are provided
3	Collaborative Documentation	Examples of tender documentation

Appendix 1 – Data Collection

Ethics Clearance from Wits

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Kamudyariwa

CLEARANCE CERTIFICATE	PROTOCOL NUMBER: H16/05/32
PROJECT TITLE	Changing procurement culture to enable the adoption of collaborative practices
INVESTIGATOR(S)	Mrs X Kamudyariwa
SCHOOL/DEPARTMENT	Construction, Economics and Management/
DATE CONSIDERED	20 May 2016
DECISION OF THE COMMITTEE	Approved unconditionally
EXPIRY DATE	20 June 2019

DATE 21 June 2016 CHAIRPERSON J Knight
(Professor J Knight)

cc: Supervisor : Professor D Root

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/~~We~~ fully understand the conditions under which I am/~~we are~~ authorized to carry out the abovementioned research and I/~~we~~ guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/~~we~~ undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Signature 23 / 06 / 2016
Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

Participant Information Sheet

Dear potential participant. Thank you for taking time to consider assisting in my research.

My name is Xebiso Blessing Kamudyariwa. I am a researcher studying at the University of Witwatersrand. I would like to invite you to participate in the second phase of a study I am conducting to determine how procurement culture is changed in order to facilitate the adoption of collaborative practices in projects. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

The purpose of this phase is to investigate the processes involved in changing the procurement culture at Wits Campus Planning and Development (WCPD) from an adversarial one to one reflecting more collaboration and to detail the effects of implementing change. You have been asked to participate because you are/have been a part of the project team at WCPD which is at the centre of this investigation.

If you agree to be in this study, you will be required to participate in an interview. The interview will include questions about the changes that have taken place at WCPD since 2007, the processes involved in the change and the effect of those changes. The interview may take up to 2 hours to complete. With your permission, a tape-recorder will be used during the interview. Follow up sessions may be required when clarity is needed.

No risks are anticipated for the study. While there are no personal benefits, it would be beneficial for other universities and client organisations to understand how WCPD has managed to implement changes and start working collaboratively in the construction industry. There will be no compensation for participating in the study.

The data from this study will be kept anonymous. Any reports will not include any information that can possibly identify you as pseudonyms will be used. All data from the survey will be confidential with only the researcher and supervisor having access to it. Soft data will be kept in a database on a password protected computer and any printed information kept in a locked desk. Results from analysis of the data will be available in at least one of the following; journal papers, conference papers and the thesis itself. The final thesis will be available in the University of Witwatersrand's archives and online in the public domain. In the case of tape recordings, tapes will be destroyed after they have been transcribed and it is anticipated that this will take a maximum of 3 months. Transcribed and analysed data will be kept for a minimum of 3 years after the research is completed

Participating in this study is on a voluntary basis. You may skip any questions that you feel unable to answer. If you decide to take part, you are free to withdraw at any time. Withdrawal or any answers you provide will not affect your standing or your job. On withdrawal, permission will be requested before we use any data you have provided till that point. If you require a summary of the results, on the completion of the research this can be provided.

Any questions may be referred to the researcher at xebiso.kamudyariwa@students.wits.ac.za or 074 663 2850 or to the supervisor Prof David Root at david.root@wits.ac.za. Any concerns about the research may be directed to the School of Construction Economics and Management at the University of Witwatersrand on 011 717 7664/3

You will be given a copy of this Participation Information Sheet to keep for your records.

Statement of Consent for Interview

I have read the information contained in the Participant Information Sheet, have had the research explained to me, and have received answers to any questions I asked. I have understood the following:

1. If I consent, I will be participating in an interview
2. Participation is voluntary and I can withdraw at any time
3. If I withdraw, my permission will be sought before any information I have provided will be used in the research
4. There is no compensation monetary or otherwise from being a participant
5. My anonymity is guaranteed by the researcher
6. All data obtained will be treated in a confidential manner by the researcher
7. There are no foreseeable risks associated with my participation
8. The data obtained may be used in journals, conference papers and the final thesis
9. I may request a summary of the results of the research
10. I am free to contact the researcher, supervisor or the School of Construction, Economics and Management if I have any questions or I am dissatisfied with the manner in which the research is conducted

I consent to take part in the study by participating in an interview.

Signature _____ Date _____

Name (Printed) _____

Please Tick Yes ☐ In addition to agreeing to participate, I also consent to having the interview tape-recorded.

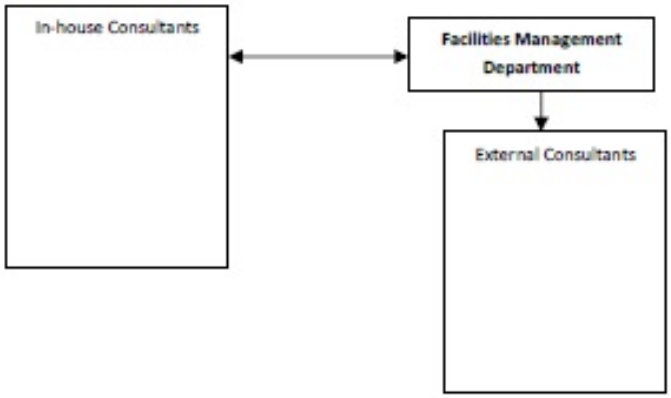
Signature _____ Date _____

Signature of Researcher _____ Date_____

Researcher Name (Printed) _____

Consent form will be kept by the researcher for at least three years beyond the end of the research.

Questions for HEIs

Participant Details	1. What is your profession ? 2. What is your role in the Facilities Management Department? a. Project Manager b. Quantity Surveyor c. Architect d. Engineer 3. How long have you worked in your role? a. 0 - 1 year b. 2 - 5 years c. 6 - 10 years d. More than 10 years 4. How long have you worked in the construction industry? a. 0 - 5 year b. 6 - 10 years c. 11 - 20 years d. More than 20 years 5. How old are you? a. 21 - 30 years b. 31 - 40 years c. 41 - 50 years d. Older than 50 years
Type of University	Please circle correct answer 1. The university falls under this category a. Traditional b. University of Technology c. Comprehensive University 2. The university is _____ years old
Your Department	 Please advise about your department.

Capital Projects	Please detail your department's projects in terms of the following a) When was your last project? b) What was this last project? c) How often do you build? d) Do you assist in projects only for your university? If not please explain e) How are your projects managed?

Contracting	Please answer these questions as they apply to your department **1. Please explain how your department uses the following if at all and the context of use:** a) Traditional procurement b) Public Private Partnerships c) Alliancing d) Early Contractor Involvement e) Integrated Project Delivery f) Other _____ **2. Please detail use of the following contracting strategy (where used) and link to projects used:** a) Design and Build b) Design and Construct c) Develop and Construct d) Construction Management e) Management Contractor **3. How and when does your department use the following pricing strategies** a) Price based (such as Lump Sum, Priced Contract) b) Cost based (such as Cost Reimbursable, Target Cost) **4. Please detail use of these contracts in your department** a) JBCC b) GCC c) FIDIC d) NEC **5. Explain which of the following procurement procedures your department uses (when and why)** a) Negotiation b) Open Competitive Negotiation c) Restricted Competitive Negotiation d) Nominated Competitive Selection e) Open Competitive Selection f) Qualified Competitive Selection g) Quotation Competitive Selection h) 2 Envelope i) 2 Stage Tendering **6. Please select the Tender Evaluation Strategy used by your department and detail its use** a) Financial Offer b) Financial Offer and Quality c) Financial Offer and Preference d) Financial Offer, Quality and Preference

Questionnaires Stage 2 Data Collection

Questions for Panel

Policy

- What is the relationship between WCDP and the University (informed / involved)?
- Has that relationship evolved since pre 2007?
- What prompted the split with PIMD?
- Did the split change policy in any way?
- What were the effects of the split?
- Is there a separate procurement policy for capital projects?
- If yes how does it differ of university procurement?
- Do capital projects use the university procurement department, or they have separate one?

Contracts

- Were there problems with contracts pre 2007?
- What was used in first projects?
- Did this change with subsequent projects?
- What prompted the use of NEC?
- What prompted the use of Target Cost Contracts
- What prompted use of Framework Agreements?
- What prompted use of Early Contractor Involvement?
- How were contractors selected pre 2007?
- How were contractors selected for new contracts?
- How were contractors selected for ECI (conditions in place)?
- How was risk approached pre 2007?
- How was risk approached post 2007?

Procurement

- What was procurement process pre 2007?
- What prompted change?
- Who initiated change?
- Who led the change?
- What exactly changed?
- What is current status of the change (ongoing, reached threshold, regressing)?

- If ongoing, how has procurement evolved over last ten years and where is it going?
- If regressing what has caused this?
- What have been the advantages of the changes made?
- What have been the pitfalls of the changes made?
- Has the model used for Wits been used successfully elsewhere?

Collaboration

- Was collaboration a choice or a consequence of implemented changes?
- Has use of collaborative methods become norm?
- How has collaboration affected dynamics of team?
- How has collaboration affected supply chain / contractors
- How has collaboration affected procurement choices?
- What impact has collaboration had on project delivery?
- What have been the pitfalls of collaboration?

Culture

- Has a culture change has taken place at WCDP (norms, behaviours, values)?
- What has been the staff response to change?
- What has been the university's response to change?
- Has a trickle effect of change been felt in supply chain or by contractors?
- Is change project based or organisational?
- Which came first, change of practice or change in culture?
- Have changes noted in culture change table been experienced?

Questions for Programme Directors

1. What is your background?
2. What are you currently working on?
3. How did you get involved with WCDP?
4. What is your role at WCDP?
5. What drove the need for change at WCDP?
6. What was the situation when you joined WCDP?
7. What changes did you see as necessary?
8. Was there a particular strategy you employed when working with WCDP?
9. How was change achieved?
10. What factors contributed to achieving change?
11. Who spearheaded change?
12. What was the role of the university in achieving change?
13. Who needed to be involved in change?
14. What change was needed in systems/processes? (in-house/external)
15. What change was needed in people's behaviour? (in-house/external)
16. What change was needed in attitude? (in-house/external)
17. How long did it take to change systems/processes? (in-house/external)
18. How long did it take to change people's behaviour? (in-house/external)
19. How long did it take to change attitudes? (in-house/external)
20. What was effect of each change/ was it progressive change?
21. How long did it take to see the effects of change?
22. How did you align client and delivery team objectives/values?
23. What needed to be changed in the procurement policy?
24. What changes are still necessary?
25. Will change be sustainable after your term ends?

<u>Follow Up Questions</u>

1. Gains seem to benefit only the client and the contractor. Don't some specialists help with savings?
2. Is the target cost contract with activity schedule the best to use? QS' feel it may disadvantage client and they prefer taking on the risk themselves
3. What is causing the difference in procurement between SPU and UMP?
4. How is leadership either from the University or the Project team going to affect the longevity of change?
5. Is your specialised role as Programme Director one of reasons for success of change?
6. How can handover of duties be done to ensure continuity of practice?
7. What causes relationship problems when in essence collaboration is about to bring stakeholders together?
8. Is change about the organisation changing or the person leading the change?
9. Please detail the process of change as you see it
10. Since smaller projects in play now at Wits, what happens to procurement when framework agreements not in place?
11. Why are original tenders still being done in traditional manner? Is there a possible way of doing them collaboratively?
12. Early Contractor Involvement difficult to utilise on time sensitive projects. What then is impact of bringing in contractors early?
13. When should Facilities Management come into the project?

Questions for PMs

1. What is your professional background?
2. What projects are you currently working on?
3. How did you get involved with WCDP?
4. What is your role at WCDP?
5. Was there a difference in the way in which projects at WCDP were being run compared to other projects you were involved in? If yes, what was different?
6. How did you adjust to the new environment at WCDP?

WCDP has moved from a traditional procurement environment to a more collaborative one. Some changes were needed in order to achieve this. Please answer the following concerning your experiences / observations

7. Who was spearheading change?
8. Who needed to be involved in change?
9. What change was needed in systems/processes? (in-house/external)
10. What change was needed in people's behaviour? (in-house/external)
11. What change was needed in attitude? (in-house/external)
12. How long did it take to change systems/processes? (in-house/external)
13. How long did it take to change people's behaviour? (in-house/external)
14. How long did it take to change attitudes? (in-house/external)
15. What was effect of each change/ was it progressive change?
16. How long did it take to see the effects of change?
17. What factors do you believe contributed to achieving this change?
18. How did you align client and delivery team objectives/values?
19. What changes are still necessary?

Questions for Architects

1. What prompted you to enter the Wits and UM competitions
2. How long have you consulted on WCPD projects?
3. Did you work with WCPD (PIMD) before procurement changes?
4. How was Cohen and Garson selected for the framework agreements?
5. Which projects were you involved in with WCPD?
6. How many individuals involved in projects?
7. What roles did your organisation have?
8. What responsibilities did they have?
9. What stages of the project were they involved in?
10. Was the WCPD experience any different from your usual consulting projects in this regard?
11. Did you have experience with using NEC?
12. What was different about using NEC
13. Did use of NEC change the manner in which you consulted for the projects?
14. Were there any advantages or disadvantages associated with NEC use?
15. Had you used Framework agreements prior to this?
16. Were there any advantages or disadvantages associated with Framework Agreement use?
17. What was impact of Early Contractor Involvement on your roles/responsibilities etc?
18. Did the contractor come on as an equal partner?
19. Were there any advantages or disadvantages associated with their different role?
20. What motivated working with M&D to reduce WAM costs?
21. Is this standard practice?
22. Have you been involved in something similar since?
23. Was working with WCDP exactly the same as working on UM projects?
24. Does working with different contractors produce different results/vibes?
25. What impact has working with WCPD had on the projects you are involved in now?

Questions for Programme Director NUs

1. What is your professional background?
2. What projects are you currently working on?
3. How did you get involved with the University of Mpumalanga (UMP)?
4. What is your role on projects?
5. What are your responsibilities?
6. Is there a difference in the way in the following at UMP in comparison to other projects you have been involved in? If yes, what is different?

    Systems or processes?

    Team interactions?

    Team attitudes?
7. What preparation was necessary for working on UMP projects?
8. What changes did you have to make to appreciate the manner in which projects were approached?
9. Did you have any experience with NEC?
10. Is there anything different about using NEC?
11. What have been the advantages and disadvantages of using NEC?
12. What is the general reaction to the amount of administration especially that goes into NEC contracts?
13. Did you have any experience with Framework Agreements?
14. Is there anything different about using Framework Agreements??
15. What have been the advantages and disadvantages of using Framework Agreements??
16. What is the impact of Early Contractor Involvement on your roles/responsibilities etc?
17. Does the contractor come on as an equal partner?
18. Are there any advantages or disadvantages associated with their different role?
19. Does everyone always remember to be collaborative?
20. How are disputes settled? Is it different from traditional settlements?
21. How are value and risk management calculated? Is it different compared to traditional contracts?

22. How is incentivising done?
23. How was gain-share, pain-share accomplished?
24. What are your thoughts on gain share primarily being only between the client and contractor?
25. What is the impact of the Early Warning system in the NEC? How is it different from traditional contracts?
26. How do you align client and delivery team objectives/values?
27. What organisational characteristics are needed to enable working on these type of projects?
28. What type of delivery manager is required to enable successful working on projects?
29. With Wits Campus Planning and Development closing out, will this more collaborative manner of working be maintained?
30. Does the University's Executive Management appreciate and support this manner of working?
31. What changes are still necessary?

Questions for Contractors

1. Did Your Company work with (WCPD)Wits Campus Planning and Development (PIMD) before procurement changes?
2. How was Your Company selected for the framework agreements?
3. Did Your Company have prior experience with the NEC and Framework Agreements?
4. What was process of adjustment to “new” manner of working?
5. Was there a learning curve?
6. Was there a difference in relationship between Your Company and WCPD?
7. Which projects did Your Company work on for WCPD?
8. What responsibilities did Your Company have?
9. What stages of the project was Your Company involved in?
10. Was the WCPD experience any different from the usual contracting projects in this regard?
11. Did construction management team have experience with using NEC?
12. What was different about using NEC?
13. Were there any advantages or disadvantages associated with NEC use?
14. Were there any advantages or disadvantages associated with Framework Agreement use?
15. What was impact of Early Contractor Involvement on your roles/responsibilities?
16. Did Your Company come on as an equal partner?
17. How did consultants react to working with contractor from the very start?
18. Were there any advantages or disadvantages associated with the contractor’s extended role?
19. Was there a difference in relationships with e.g. consultants when using NEC and Framework Agreements instead of traditional contracts?
20. Were there significant changes from project to project?
21. Was there difference in terms of communication methods/frequency?
22. Was there a change in relations with subcontractors?
23. How were disputes settled? Is it different from traditional settlements?
24. What happens when errors have been made by e.g. the contractor when using NEC?
25. Is it different from what would happen with traditional contracts?
26. What are the contractual effects of using NEC instead of e.g. JBCC?

27. Is there a form of empowerment for contractors within the project team when NEC used?
28. How was incentivising done?
29. Did it motivate working in a different manner?
30. How was gain-share, pain-share accomplished?
31. How was project risk allocated?
32. Which Target Cost contract was most frequently used?
33. Which is preferred by Your Company
34. What was impact of Early Warning system in NEC?
35. Has use of NEC improved project outcomes?
36. Has experience with the New Universities (NUs) been the same as that for WCPD?
37. Has working with WCPD had an impact on e.g. Your Company values, behaviour and practices?
38. What impact has working with WCPD had on the projects you are involved in now?
39. What organisational characteristics/changes are needed to enable Contractors to work with NEC and Framework Agreements?
40. What has been driving force behind successful change in WCPD procurement?
41. Do you believe change could be accomplished just through changing practices?

Questions for Cost consultants

1. Did Your Company work with WCPD (PIMD) before procurement changes?
2. How was Your Company selected for the framework agreements?
3. Which projects were you involved in with WCPD?
4. How many individuals involved in projects?
5. What roles did your organisation have?
6. What responsibilities did they have?
7. What stages of the project were they involved in?
8. Was the WCPD experience any different from your usual consulting projects in this regard?
9. Did your consultants have experience with using NEC?
10. What was different about using NEC
11. Did use of NEC change the manner in which you consulted for the projects?
12. Were there any advantages or disadvantages associated with NEC use?
13. Had you used Framework agreements prior to this?
14. Were there any advantages or disadvantages associated with Framework Agreement use?
15. How were prices of various items adjusted over time?
16. What was impact on cost escalation when using Framework Agreements? Less cost escalation?
17. What was impact of Early Contractor Involvement on your roles/responsibilities etc?
18. Did the contractor come on as an equal partner?
19. Were there any advantages or disadvantages associated with their different role?
20. How were negotiations on behalf of the client done?
21. Were there significant changes from project to project?
22. How are disputes settled? Is it different from traditional settlements?
23. How are value and risk management calculated?
24. Is it different compared to traditional contracts?
25. How was incentivising done?
26. How was gain-share, pain-share accomplished?
27. What was impact of Early Warning system in NEC?

28. Has experience with the New Universities been the same as that for WCPD?
29. Was WCPD experience have impact on getting to work with the NUs?
30. What impact has working with WCPD had on the projects you are involved in now?
31. What organisational characteristics are needed to enable collaboration?

Questions for Procurement Specialist

1. What is your background?
2. What are you currently working on?
3. How did you get involved with WCDP?
4. What drove the need for change at WCDP?
5. What is your role at WCDP?
6. What was the situation when you joined WCDP?
7. What changes did you see as necessary?
8. Was there a particular strategy you employed when working with WCDP?
9. How was change achieved?
10. What factors contributed to achieving change?
11. Who spearheaded change?
12. What was the role of the university in achieving change?
13. Who needed to be involved in change?
14. What change was needed in systems/processes? (in-house/external)
15. What change was needed in people/individuals? (in-house/external)
16. What change was needed in attitude? (in-house/external)
17. How long did it take to change systems/processes? (in-house/external)
18. How long did it take to change people/individuals? (in-house/external)
19. How long did it take to change attitudes? (in-house/external)
20. What was effect of each change?
21. How long did it take to see the effects of change?

Questions for Wits Council Members

1. What is your professional background?
2. What was your function in the Exec?
3. In what way did you interact with WCPD?
4. What was the envisaged function of PIMD (originally)?
5. What was behind division of PIMD?
6. What was the general procurement procedure at Wits?
7. What drove the need for a different procurement strategy for WCPD?
8. Who was driving change?
9. What was the reaction to change by Exec?
10. What influenced your acceptance of change?
11. What was changed in the procurement policy for WCPD?
12. What factors contributed to the successful change of the procurement strategy at WCPD?
13. How did the changes impact the projects WCPD was involved in?
14. What led to WCPD being awarded the New Universities management contract?
15. As WCPD closes out, has it influenced SPU construction procurement?

Appendix 2 – Data Analysis

Literature Codes

Various codes were available from literature. The table below shows an adaptation of Table 7.3 and Table 5.3.

Table 0.1 - Literature Codes

To	Detailed
Collaboration towards shared goals (integrated project team approach)	Joint problem solving Joint evaluation and monitoring Joint communication Sharing resources Increased coordination
Integration of design and construction	ECI Interdependence Information sharing Innovation
Constructability and cost model developed with contractor's insight	ECI Interdependence Value based procurement
Long term relationships focused on maximising efficiency and shared value	Long term relationships Strategic relationships Trust Informal dispute resolution Close relationships Learning
Active risk management and mitigation	Equitable risk allocation Trust
Deliver the optimal project within the available budget	Sharing of rewards NEC
Discipline of continuous budget control	Sharing of rewards NEC
Flexible, predictable, integrated, documented and auditable procurement system	Flexibility Less competitive tendering Using preferred contractors
Structured procurement documents based on international/national standards and forms of contract with minimal customisation/amendments and clear and unambiguous requirements	Structured documentation
Decisions converge on the achievement of the client's objectives	Shared goals
Delivery is managed and controlled through stages which permit the full range of contracting arrangements and commence at portfolio level	ECI FAs
Well defined end of stage deliverables and acceptance procedures which enable informed decisions to be made	KPIs
Design and construction aligned with operation and asset management requirements	

To	Detailed
Selected packaging, contracting, pricing and targeting strategy and procurement procedure aligned with project objectives	NEC FAs
Works packaged appropriately to achieve objectives and efficiencies	NEC FAs
Projects deliver on documented primary and secondary objectives in a measurable and quantifiable manner	KPIs

While coding did not expressly look for those terms, it looked at any content that fell within the definitions or meaning of the various codes i.e. any content that could be inferred to represent the particular code

Codes from the data

Several codes emerged from the data itself. These were a result of the specific focus on *collaborative construction procurement culture change*.

Collaboration specific

Table 0.2 - Collaboration Codes

Regression
Training
Prerequisites
Health and Safety
Government
DHET
New Universities

Culture change specific

Table 0.3 - Culture Codes

Values
Attitudes
Practices
Clients

Change specific

Table 0.4 - Change Codes

Administration
Systems and Processes

Inhouse
Review
Change reasons
Background

Final Categories



Final Themes

The final categories were then grouped together into their overarching themes. This was an iterative process as categories had to perfectly fit into allocated themes. This meant categories were swapped around several times and themes were also edited as needed to ensure all categories could fit into at least one theme. Final themes and categories are provided below.

Table 0.5 - Themes and Categories

Theme	Categories
Background	Reform Change champions Spearheading change Background to change
Changes	Change Reasons Client role Inhouse NEC ECI FAs Disputes Documentation Budget Control Health and Safety
Implementation	Client Role Attitudes Project team Contractors Training Contracts ECI FAs Health and Safety Resistance Regression Budget control Values Sustainability
Replicating Change	Government DHET New Universities Challenges
Perceptions/Reality	NEC FAs Contractors Gain/Pain
Dynamic Change	Review of WCPD
Moving Forward	Benefits of working with Wits Challenges Future Needs

It must be noted that in some instances, categories had to be divided as their components sat in different themes e.g. NEC and FAs. These two had at least three components i.e. what needed to change, how it changes and the realities of that change.

The analysis process is portrayed below through screen shots and photos of the assembling and disassembling process.

Transcribing

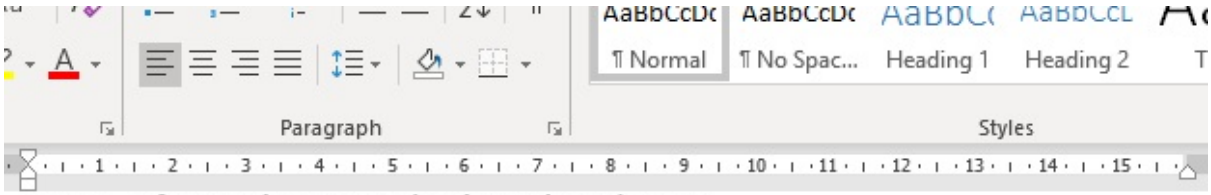


CX2: No remember we getting very involved in design and build contracts these days. Traditionally the main contractor would only get involved after the client and architects and professional teams have got the whole thing designed. We would then get involved. Currently in the last I would think ten years what's happening is the clients are saying we don't wanna employ architects, and engineers and project managers. We wanna employ one company they must do all that. We wanna tell them we want offices for three hundred staff members. Each staff member must have so many square meters around them and there is a site. So what's happening now often more than not is that the main contractors are employing project managers, and architects and engineers. So this process we understand well. So it's not that we had anything to learn in the process. I think we did impact on value. Because what happens is traditionally if the client goes out on a professional team they would design something that will make sense to them. We will fine tune it and value engineer it and make it more cost effective. So I think that benefit in this contract the client gets up front.

CX2: No we out source all consultants. So instead of the architect being employed by the client they are now employed by Trencon that's the only difference.

CX2: Advantages is you are it's a quicker process from design to build because you've got the contractor being collaborating with the team. So it's not just drawing and doing a set of design and then a construct and a value engineer. It all happens at the same time so I think the time

Figure 0.1 - Interview with CX2



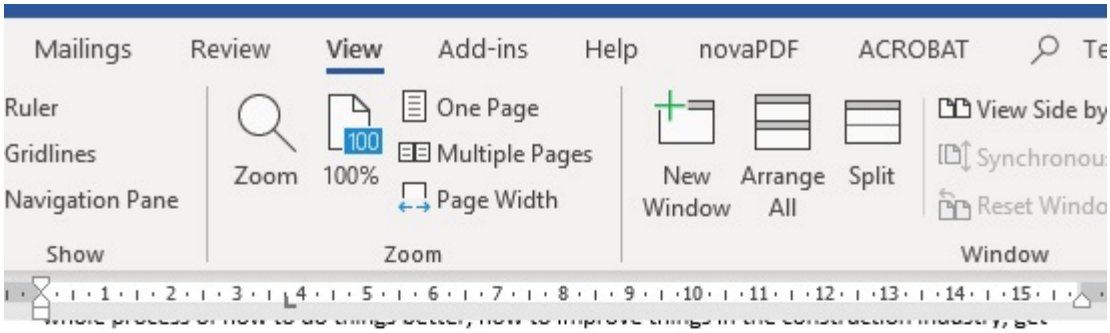
WCPD – refers to Wits Campus Planning and Development

Wits – refers to the University of Witwatersrand

MWC1: I'm a civil engineer by profession, not by profession I should be careful, I'm not registered, I never bothered to register, so I finished my basic degree in 1981, Masters in 1982 and then 1983 to the end of 1988 I spent in the civil engineering industry working construction, and then ran a technical office of a large precast concrete company and I ended up as a technical manager of the company, and then came back to Wits to do PhD .... So I have been an academic for most of my working life, since 1989 and then came back as a research fellow..., doing my PHD and in 1982 I was appointed as a senior lecturer and now I'm the Vice Chancellor, so it's sort of clear now..... I still do active researching .... and my life to update here, so I'm Vice Chancellor at the university, I still hold this post and they still allow me to have an office.

MWC1: What was my function in Council? So I was Deputy Vice Chancellor, Academic I was the Head of Civil engineering from 2001- 2005, which is a 5-year term and 2006-2012, the DVC Academic and Vice Principal, which means that I served on Council and so it was really an executive management council that I served ..... and this is where the history starts so, when I got on to the senior management of the university I realised that Vits' special planning was erratic and irrational very often and so together with Professor Patrick Fitzgerald we were then appointed as the DVC finance. We came up with this idea of developing a 50-year special plan for it, that would have been in 2006 and so what we did was we took a group of architect planners which included L.....and said to them if you didn't have to think too much about resources, what would this look like in 50 years time, if you've got the money, where would you put the next block of residence, where would you put the next academic .... and it was completely a ... exercise, but it was helpful because we thought we should, Vits was already recognised that it was running out of the situational capacity. The student numbers had grown from year 2000 that had 18 000 students, by 2006 we had got 28 000, so the 10

Figure 0.2 - Interview with MWC1



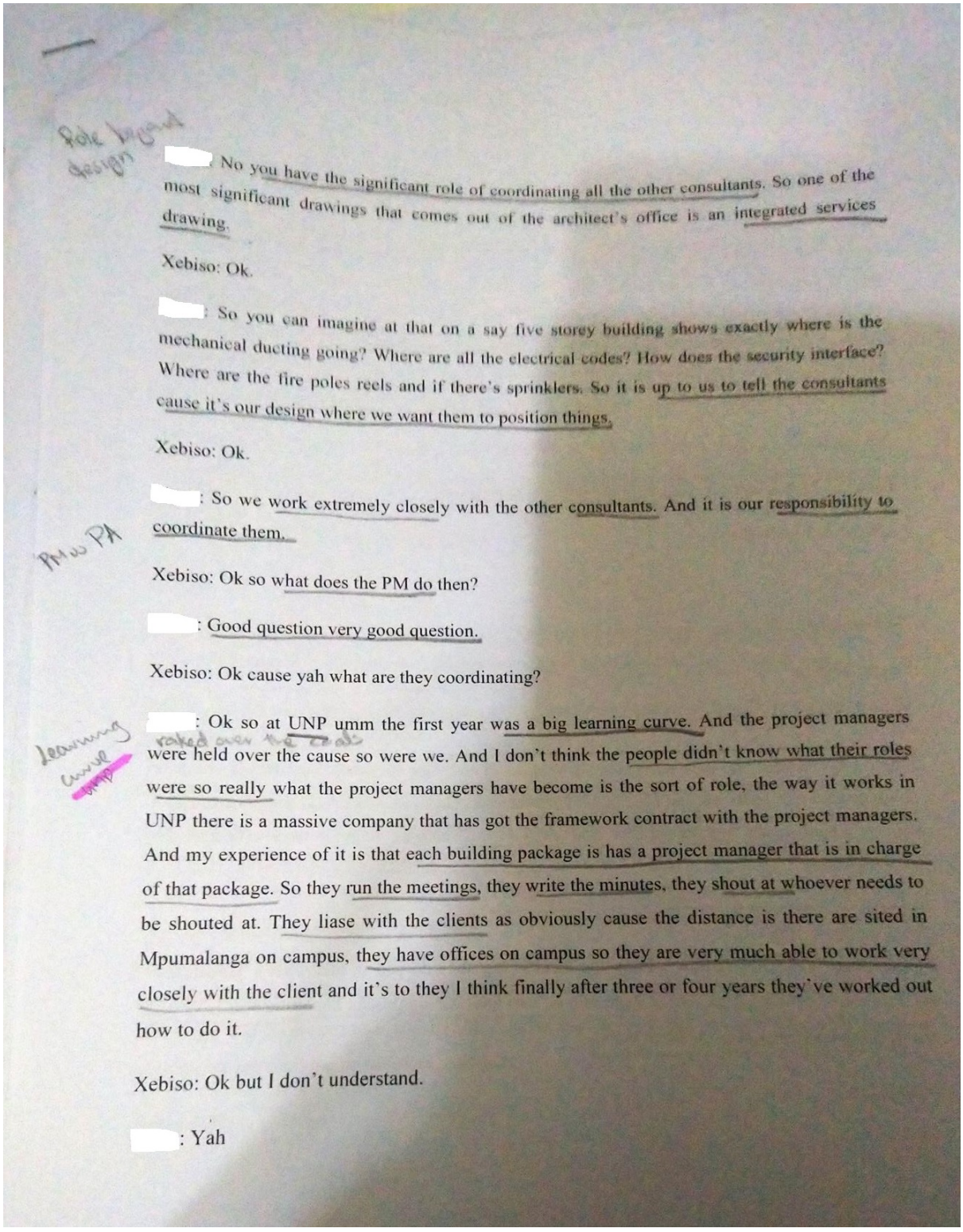
faster delivery, reduce costs all those things, I'd written quite a lot in the CIDB with PD1 prodding me all the time, if you know what I mean trying to get things done. So what happened is the FNB buildings were built at Wits were done under the traditional JBCC traditional pre-planned approach. They ran 30% over budget and the last third of that was only known when the final account was presented to the client. Now you understand at Wits if you get grants from universities you only get X amount, if you spend more than the grant you don't have operational expenditure to cover it, it's called fund-raising so the university takes an extremely dim view of cost overruns. What happened is we said we can't carry on like this because where are you going to get these cost overruns to fund it because then you to go fund raising was getting tight around 2008. So, you hold the enemy and said right all stuff we spoke, we preached about it in the CIDP we are going to implement, how are going to do it differently, so we started like that figuring it out. So that's the sort of, so that's how, you know, to get to why we started that was the sort of driving force: can we do it better, can we do it differently and what can we do so, I've gone through a long journey and in between that in 2007 Cabinet had asked about why the labour intensive world weren't enough on the expanded public works programme why big contractors weren't participating and the business trust said they would sponsor an initiative to get something going. I was asked to put it together to do things it differently, to get larger contractors and to do it labour intensive which I believed was perfectly possible and I asked for a pilot project of maybe 500 million in all and they gave me 1800 kilometres of secondary water mains in eThekwini. So we ran a programme there, where it was to run to, I can't remember what the value was but we did that differently, through framework contracts, target contracts everything else like that, got it up and running and despite all the consternation big contractors couldn't do things labour intensive it won the EPW Programme of the Year Award and to my knowledge there is no programme that comes near to it in terms of contractor development. We had 16 subcontractors to be developed and all of them doubled their CIDP grading in four years. So, well some of these experimental things going in the background so we decided lets go with the target contracting buildings and set up framework contracts so it was learning from, sort of, from the university of hard knocks, if you know what I mean going from one job to the next to see what works so it landed on our feet so that was the sort of background to it.

Ok I have to ask now I mean, if this is working and people can see it's working then why when you are in all these committees are you not pushing this forward, why isn't taking off in government?

Figure 0.3 - Interview with PS1

Breaking interviews down into categories

With categories identified, it was necessary to break down the various interviews into the categories then themes



: No you have the significant role of coordinating all the other consultants. So one of the most significant drawings that comes out of the architect's office is an integrated services drawing.

Xebiso: Ok.

: So you can imagine at that on a say five storey building shows exactly where is the mechanical ducting going? Where are all the electrical codes? How does the security interface? Where are the fire poles reels and if there's sprinklers. So it is up to us to tell the consultants cause it's our design where we want them to position things.

Xebiso: Ok.

: So we work extremely closely with the other consultants. And it is our responsibility to coordinate them.

Xebiso: Ok so what does the PM do then?

: Good question very good question.

Xebiso: Ok cause yah what are they coordinating?

: Ok so at UNP umm the first year was a big learning curve. And the project managers were held over the cause so were we. And I don't think the people didn't know what their roles were so really what the project managers have become is the sort of role, the way it works in UNP there is a massive company that has got the framework contract with the project managers. And my experience of it is that each building package is has a project manager that is in charge of that package. So they run the meetings, they write the minutes, they shout at whoever needs to be shouted at. They liase with the clients as obviously cause the distance is there are sited in Mpumalanga on campus, they have offices on campus so they are very much able to work very closely with the client and it's to they I think finally after three or four years they've worked out how to do it.

Xebiso: Ok but I don't understand.

: Yah

Figure 0.4 - Categorised Interview

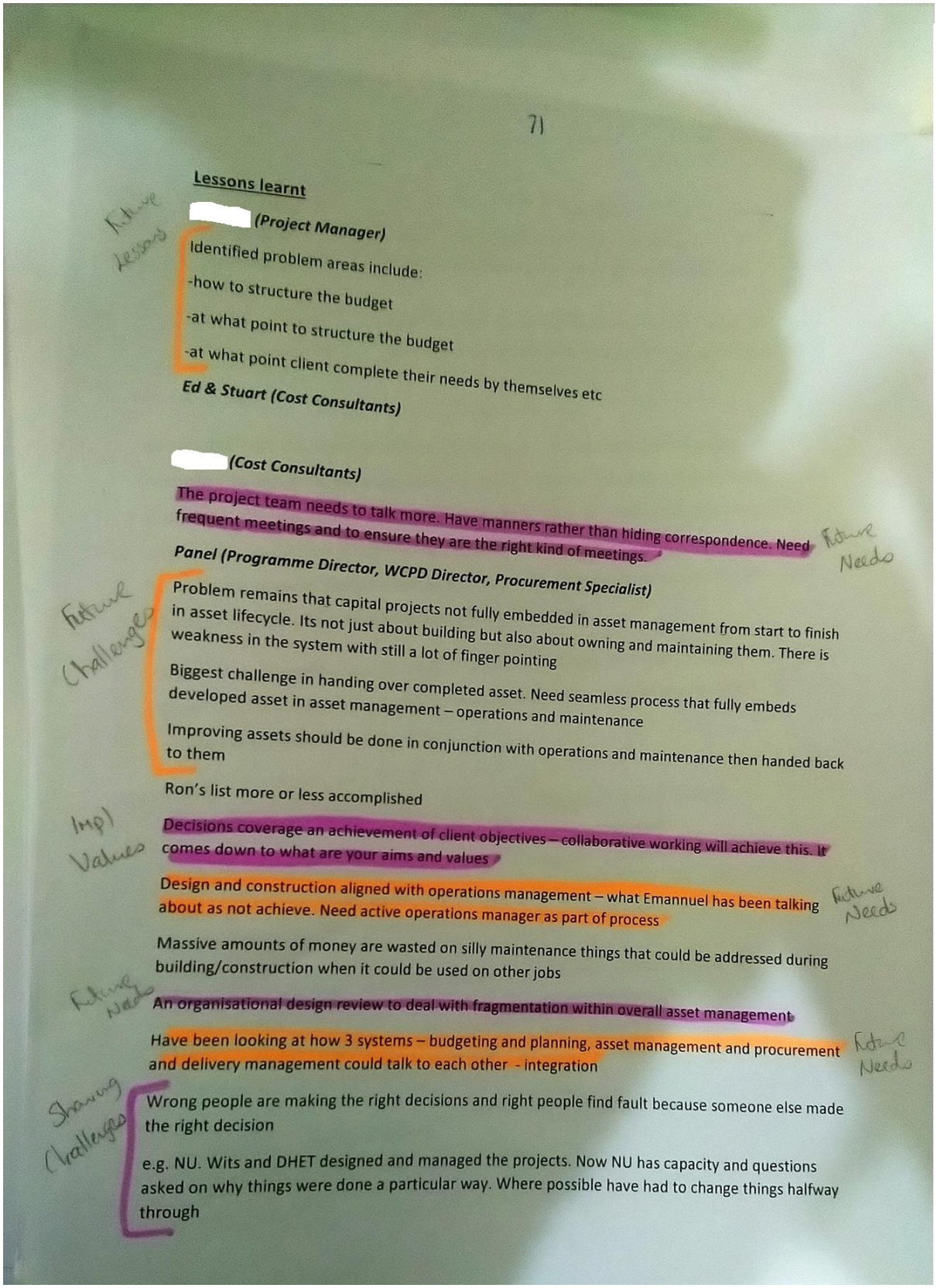
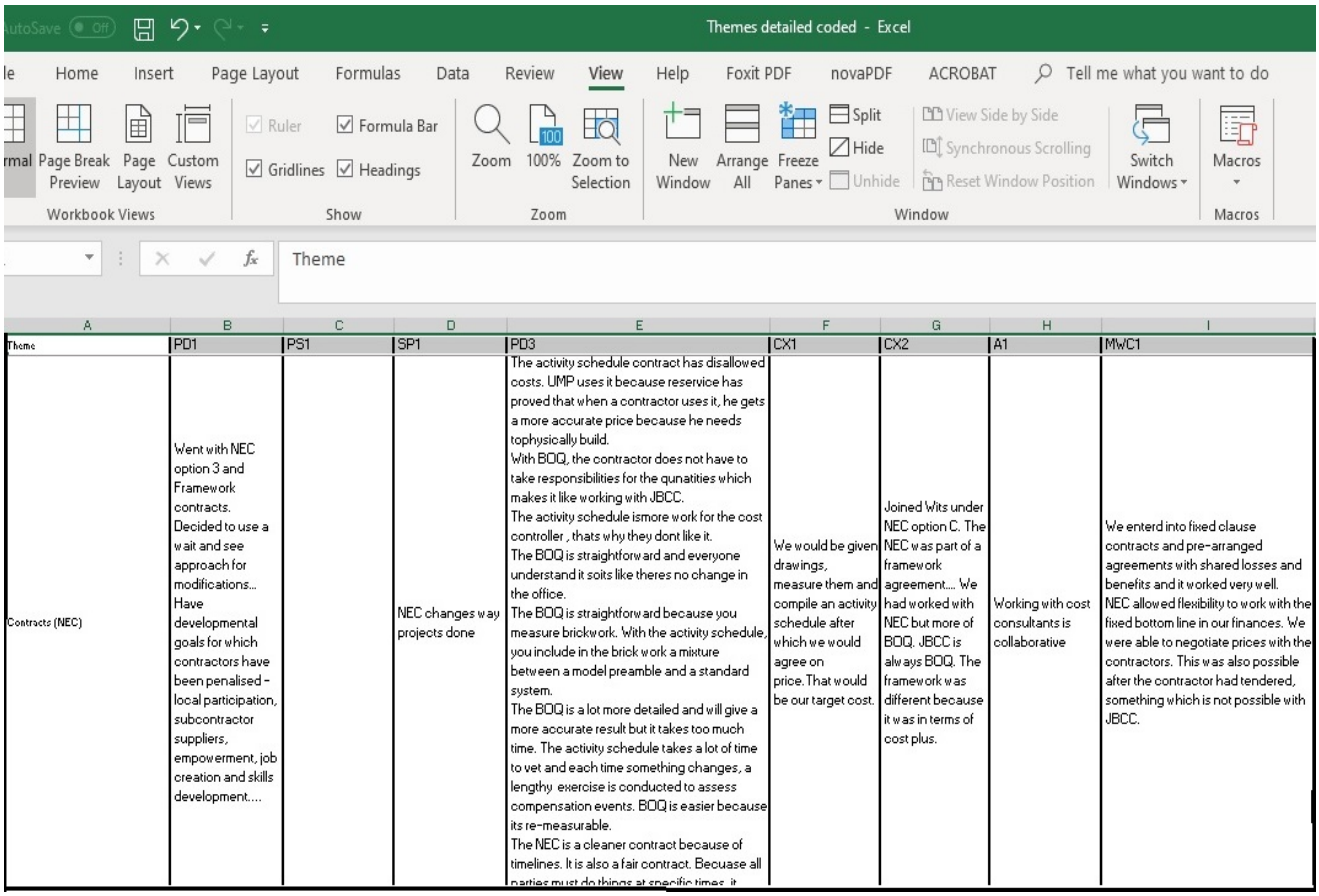


Figure 0.5 - Reassembling interviews into categories

Various parts of interviews put together iteratively to make sure they are in correct category then theme



Themes detailed coded - Excel

Home Insert Page Layout Formulas Data Review View Help Foxit PDF novaPDF ACROBAT Tell me what you want to do

Page Break Preview | Page Layout | Custom Views | Ruler | Formula Bar | Gridlines | Headings | Zoom | 100% | Zoom to Selection | New Window | Arrange All | Freeze Panes | Split | Hide | Unhide | View Side by Side | Synchronous Scrolling | Reset Window Position | Switch Windows | Macros

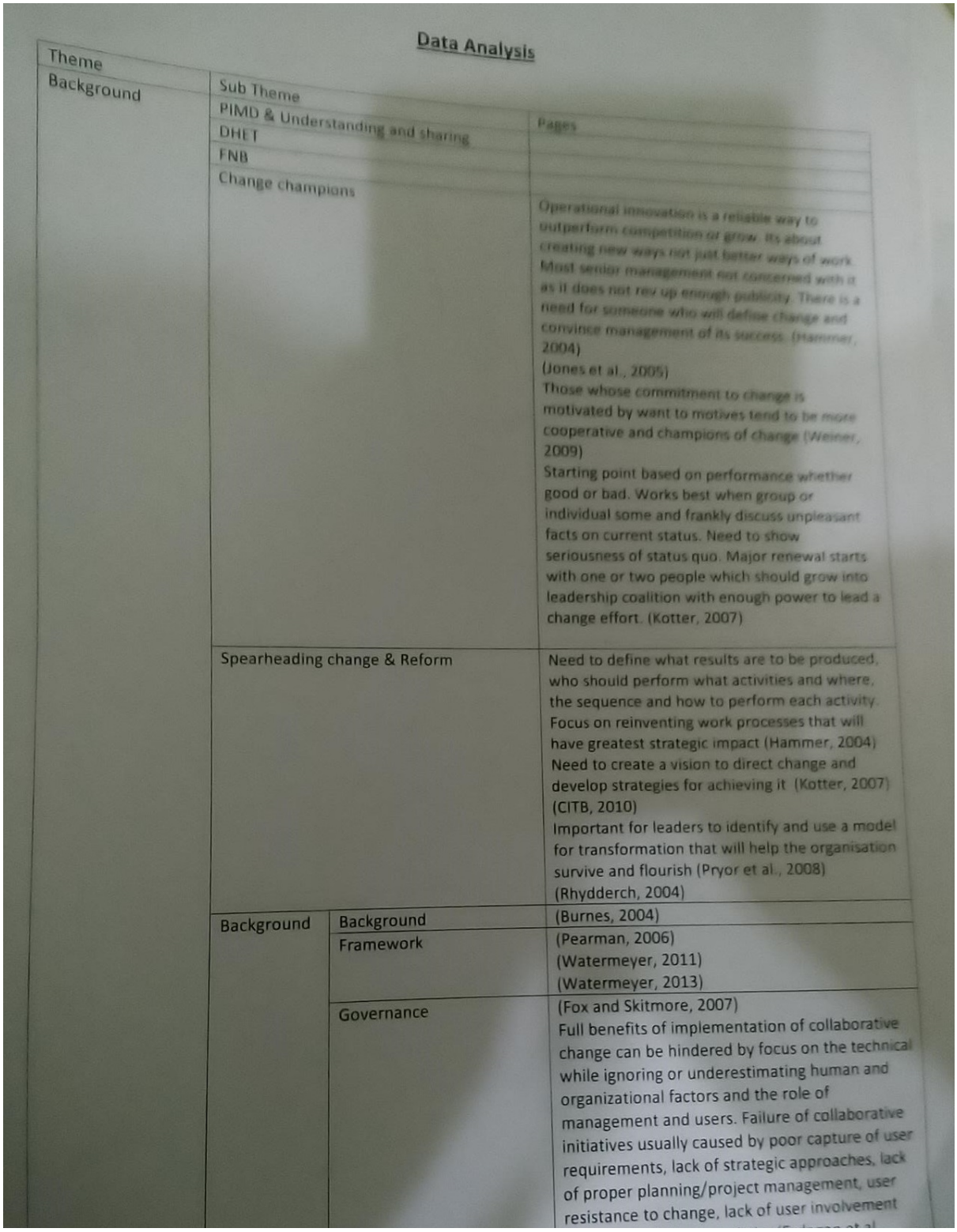
Workbook Views | Show | Zoom | Window | Macros

Theme

A	B	C	D	E	F	G	H	I
Theme	PD1	PS1	SP1	PD3	CX1	CX2	A1	MWC1
Contracts (NEC)	Went with NEC option 3 and Framework contracts. Decided to use a wait and see approach for modifications... Have developmental goals for which contractors have been penalised - local participation, subcontractor suppliers, empowerment, job creation and skills development....		NEC changes way projects done	The activity schedule contract has disallowed costs. UMP uses it because reservice has proved that when a contractor uses it, he gets a more accurate price because he needs tophysically build. With BOQ, the contractor does not have to take responsibilities for the qunatities which makes it like working with JBCC. The activity schedule ismore work for the cost controller , thats why they dont like it. The BOQ is straightforward and everyone understand it soits like theres no change in the office. The BOQ is straightforward because you measure brickwork. With the activity schedule, you include in the brick work a mixture between a model preamble and a standard system. The BOQ is a lot more detailed and will give a more accurate result but it takes too much time. The activity schedule takes a lot of time to vet and each time something changes, a lengthy exercise is conducted to assess compensation events. BOQ is easier because its re-measurable. The NEC is a cleaner contract because of timelines. It is also a fair contract. Becuase all parties must do things at specific times, it	We would be given drawings, measure them and compile an activity schedule after which we would agree on price. That would be our target cost.	Joined Wits under NEC option C. The NEC was part of a framework agreement.... We had worked with NEC but more of BOQ. JBCC is always BOQ. The framework was different because it was in terms of cost plus.	Working with cost consultants is collaborative	We enterd into fixed clause contracts and pre-arranged agreements with shared losses and benefits and it worked very well. NEC allowed flexibility to work with the fixed bottom line in our finances. We were able to negotiate prices with the contractors. This was also possible after the contractor had tendered, something which is not possible with JBCC.

Figure 0.6 - Categories in Excel by interviewee

The various interiews broken up and placed in categories



Data Analysis

Theme	Sub Theme		Pages
Background	PIMD & Understanding and sharing		
	DHET		
	FNB		
	Change champions		Operational innovation is a reliable way to outperform competition or grow. Its about creating new ways not just better ways of work. Most senior management not concerned with it as it does not rev up enough publicity. There is a need for someone who will define change and convince management of its success. (Hammer, 2004) (Jones et al., 2005) Those whose commitment to change is motivated by want to motives tend to be more cooperative and champions of change (Weiner, 2009) Starting point based on performance whether good or bad. Works best when group or individual some and frankly discuss unpleasant facts on current status. Need to show seriousness of status quo. Major renewal starts with one or two people which should grow into leadership coalition with enough power to lead a change effort. (Kotter, 2007)
	Spearheading change & Reform		Need to define what results are to be produced, who should perform what activities and where, the sequence and how to perform each activity. Focus on reinventing work processes that will have greatest strategic impact (Hammer, 2004) Need to create a vision to direct change and develop strategies for achieving it (Kotter, 2007) (CITB, 2010) Important for leaders to identify and use a model for transformation that will help the organisation survive and flourish (Pryor et al., 2008) (Rhydderch, 2004)
	Background	Background	(Burnes, 2004)
		Framework	(Pearman, 2006) (Watermeyer, 2011) (Watermeyer, 2013)
		Governance	(Fox and Skitmore, 2007) Full benefits of implementation of collaborative change can be hindered by focus on the technical while ignoring or underestimating human and organizational factors and the role of management and users. Failure of collaborative initiatives usually caused by poor capture of user requirements, lack of strategic approaches, lack of proper planning/project management, user resistance to change, lack of user involvement

Figure 0.7 - Comparison with Literature

Themes were then compared to literature to determine if they linked to available knowledge

Appendix 3 – Tender Documentation

CAMPUS PLANNING AND DEVELOPMENT DEPARTMENT

