Investigating the influence of organisational culture on reliability performance in a selected South African chemical organisation

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DECLARATION

I, **Suzan Makume**, student number **25688537**, declare that this study: **"Investigating the influence of organisational culture on reliability performance in a selected South African chemical organisation",** is my own work apart from where sources are acknowledged.

This study is for the degree Master of Business Administration, submitted to the Faculty of Economic and Management Sciences, North-West University. It has not been previously submitted by me or any other person for a degree at any alternative institute.

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Suzan Makume
Date: November 2022

ABSTRACT

The study aims to assess the influence of the prevailing organisational culture on the plant reliability performance of the selected chemical industry in South Africa. The organisation under study aspire to be world-class with reliable and stable operation. A thorough literature assessment was conducted to investigate the conceptual foundation that served as the basis for achieving the study objectives.

The research was guided by the positivistic philosophy design, which supports the quantitative method. A self-administered set of questionnaires was employed to gather the data. The OCAI from CVF was used as a measuring instrument developed by Cameron and Quinn (2011). Due to time constraints and cost, the cross-sectional time horizon was followed. The primary data was collected from 651 operations leaders, and the secondary data was historical FY18-FY21 OEE reliability data. The 43% response rate was achieved from the sample.

The descriptive and inferential statistics data were analysed utilising SPSS software. The descriptive mean, standard deviation, reliability, and confirmatory factor analysis were interpreted. The findings showed that the hierarchy culture was supported, and moderate positive correlation between the clan and adhocracy culture type. The secondary data were analysed and compared to the world-class recommended OEE target of 85%. The findings showed that the OEE performance is below the recommended target. It was concluded that the dominant hierarchy culture influences plant reliability performance.

It was further recommended that the executive leadership explore the current culture gaps together with the possibility of combining the clan and adhocracy culture as a winning strategy to improve the plant's reliability and achieve world-class performance.

Keywords:
Culture, High-reliability organisations, Operational Effectiveness Equipment (OEE), Organisational culture, Organisational performance

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LIST OF ABBREVIATIONS

AMOS	Analysis of Moment Structure
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
CVF	Competing Value Framework
Df	degree of freedom
EFA	Exploratory Factor Analysis
FY	Financial Year
GFI	Goodness of Fit Index
HRO	High-Reliability Organisations
M	Mean
NWU	North-West University
OC	Organisational Culture
OCAI	Organisational Culture Assessment Instrument
OEE	Overall Equipment Effectiveness
RMSEA	Root Mean Square Error of Approximation
SA	South Africa
SD	Standard Deviation
SEM	Structural Equation Model
SPSS	Statistical Package for Social Sciences
SRMR	Standardised Root Mean Square Residual
TPM	Total Productive Maintenance
TTR	Total Response Rate

CHAPTER 1 – NATURE AND SCOPE OF STUDY

1.1 INTRODUCTION

Organisational culture is a popular topic (Alvesson, 1990), and it has grown to become an important method in supporting an organisation's strategy. The management of organisational culture is being taken as critical in the development and survival of companies (Tedla, 2016).

Positive cultures can assist a business with fewer resources to develop, whereas destructive cultures can destroy one with plenty of resources and ability (Van Rooij & Fine, 2018). Accordingly, this study investigates the influence of organisational culture on reliability performance in the selected chemical organisation in South Africa.

1.2 BACKGROUND

The recent economic and Covid-19 challenges caused most organisations to re-align their operations to be competitive. According to Kumpf *et al.* (2020), Covid-19 has affected chemical manufacturers and their divisions. For the chemical industry, the subsiding of oil prices added more strain, and Kumpf *et al.* (2020) argue that the organisations were already struggling with long-term demands.

Despite these challenging times, companies must retain and increase their market share. Kumpf *et al.* (2020) state that the chemical sector players have opted to concentrate on continuous improvement and operational excellence to improve reliability engineering. Reliable operation is one of the required factors to realise the business stability objective.

Reliability performance is critical for the selected chemical organisation to achieve its business strategic goals and objectives: predictable, reliable, safe, and stable operations. A reliable system or plant has three vital elements: people, processes, and technology. According to Prodan *et al.* (2015:1), these three elements are critical for improving organisational effectiveness. Youngberg (2004:13) mentioned a need to

manage the elements to control complicated tasks for satisfying performance. Without a people interface, the plant cannot achieve its intended function. The people element leads to organisational culture (OC).

The study was conducted in an operations management environment for a selected chemical organisation company in the Free State, South Africa. The research primarily examined how this company's prevailing OC affects performance on engineering reliability. The reliability performance scale requires a paradigm shift in how the OC influence the employed workforce in maintaining and operating the plant as a system. In management, it is critical to accomplish extraordinary business results through a culture where individuals are engaged and motivated (DuBois *et al.,* 2015:32-34).

The chapter's overview for the following sections included the problem statement, the primary and secondary objectives, the research question, and the study's scope. Furthermore, the empirical study that describes the research instrument, the participant, the information collection techniques, and the statistical analysis approaches were discussed. The ethics and moral standards were considered, and the chapter concluded with research limitations and the project's overall design.

1.3 PROBLEM STATEMENT

The selected chemical company's vision statement declares that the organisation aspires to be world-class. In pursuit of this, the organisation depends on reliable operations performance to produce quality chemical products on time to create sustainable value for all stakeholders. Chikwendu *et al.* (2020:1) affirm that the need to embrace an extraordinary production method that will re-position the business for world-class construction will decrease the losses and augment the throughput and productivity. The measurements are required to reduce the losses. According to Eureka (2010:20), measurement is essential for improvement.

The reliability performance is measured through the Operational Effectiveness Equipment (OEE) metric, a key performance indicator for reliability. According to Chikwendu *et al.* (2020:1), in Total Productive Maintenance (TPM), the performance of a practical framework is estimated with a quantitative measurement known as OEE,

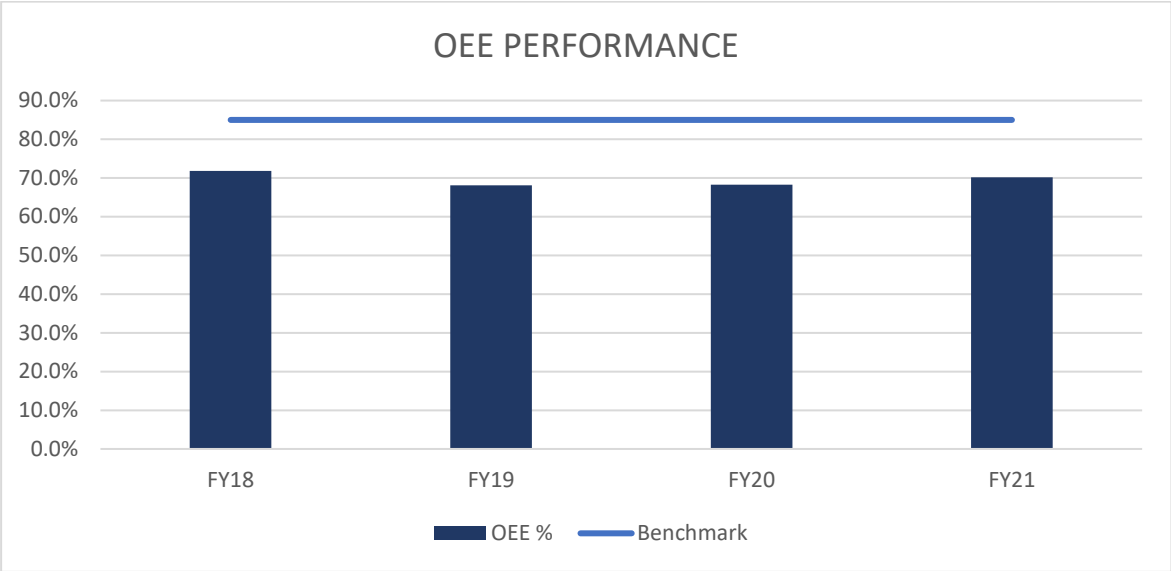
which is one of the successful methods of examining the performance of equipment in a manufacturing organisation.

Companies that value and understand reliability have great-performing plants (Smith & Mobley, 2008:8). The benchmark for assessing manufacturing productivity is OEE. It includes performance, availability, and quality, which are the proportions of machine losses (Chikwendu *et al*., 2020:1). The human factor relates to organisational culture, which is pivotal for organisational success and affects the OEE (Tedla, 2016:4). Therefore, OC plays a critical role in reliability performance.

The corporate challenge was that the reliability performance OEE was lower than the 85% benchmark, as indicated in Figure 1-1. The organisation reported that the average OEE figures for the past four years were 69%. According to Chikwendu *et al.* (2020:2) and Singh *et al.* (2018:253), the OEE benchmark for world-class operations is above 85%. One must ask why reliability performance has not improved and sustained over the years, yet it impeded its world-class aspiration and impacted performance and growth. The people are critical resources required to enable the required reliable performance.

As Tedla (2016:4) stated, the absence of a conducive OC and substandard cultural collaboration can impact organisational performance and reduce shareholder return. Performance below the benchmark levels negatively affects reliability performance, world-class aspirations and competitive advantage. As such, the study aimed to determine what type of organisational culture influences world-class benchmarked reliability performance.

Figure 1-1: The organisation's OEE performance



1.4 RESEARCH OBJECTIVES

The primary and secondary objectives were the two groups into which the study's goals were separated.

1.4.1 Primary Objectives

The primary objective of the research was to investigate the influence of organisational culture on the reliability performance of the selected chemical organisation in South Africa.

1.4.2 Secondary Objectives

Secondary objectives were derived to accomplish the primary aim as follows:

- To undertake a theoretical investigation into the nature and importance of organisational culture and reliability performance.
- To determine the prevailing OC through surveys and data analysis for the selected chemical company.
- To provide a recommendation to help the selected chemical organisation understand and improve the reliability performance from a cultural perspective.

1.5 RESEARCH QUESTION

What is the influence of organisational culture on the reliability performance of the selected chemical organisation in South Africa?

1.6 SCOPE OF THE STUDY

The research was restricted to one operational hub within a renowned chemical company in South Africa. The study examined the influence of the independent variable (organisational culture) on a dependent variable (reliability performance). Furthermore, the scope of the study was structured and dissected into three segments: the study's field, the sector under investigation and the geographical distinction.

1.6.1 Field of the study

The study was carried out in the operations environment and focused on organisational behaviour, investigating the influence of organisational culture on reliability performance.

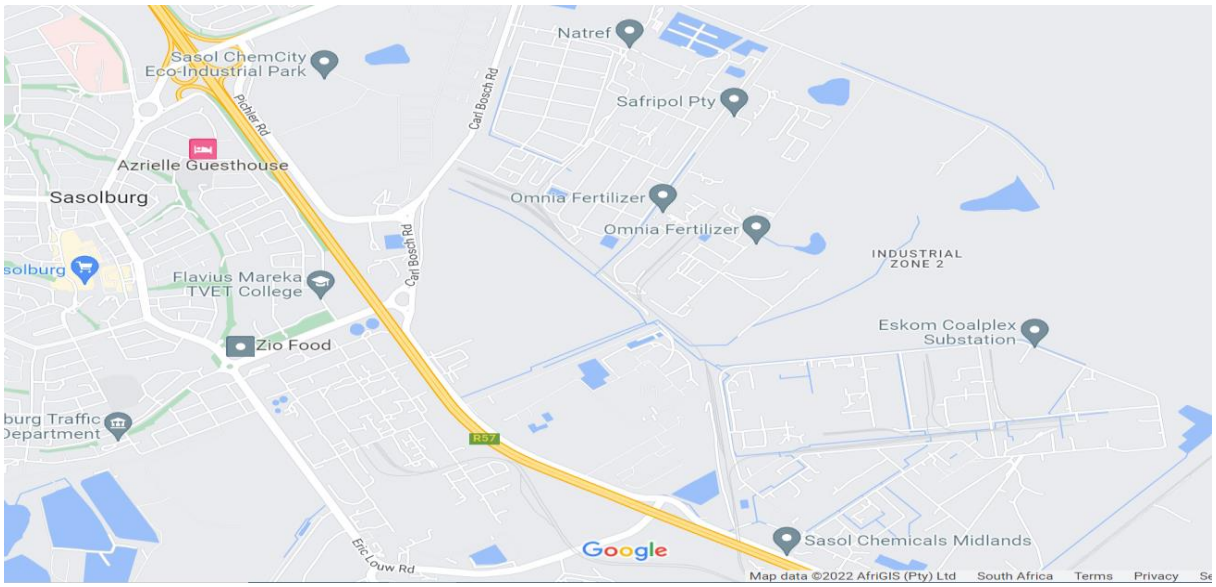
1.6.2 Sector/industry/business under investigation

The business under investigation was a chemical organisation in South Africa based in Sasolburg, Fezile Dabi District, Free State province.

1.6.3 Geographical demarcation

Demarcation is the process that makes the border noticeable on the ground, and it makes the framed reality to all partners, particularly the boundary population (African Union Border Programme, 2014:20). The geographical boundary is indicated in Figure 1-2 to ensure the realisation of the study objectives. The selected chemical organisation is based in Sasolburg, Free State Province, Fezile Dabi District, one of the four districts in Free State Province.

Figure 1-2: Geographical demarcation



Source: Google maps (2022) http://maps.google.com/maps.

1.7 RESEARCH DESIGN AND METHODS

The research methodology outlined the framework to fulfil the study objectives. The study was approached in two steps: The literature review was first pursued, followed by empirical research.

1.7.1 Literature review

Greener and Martelli (2018:20) state that any study for educational objectives, whether inductive or deductive, must always include a survey of pertinent literature. The literature review is a basic assessment of existing studies relating to the phenomena of interest and pertinent hypothetical thoughts (Bryman, 2012:14). Adams *et al.* *(*2014:39) highlight that it establishes links between the intended study and earlier research, particular issue and the larger field, and unique discoveries and those of others. According to Bhattacherjee (2012:21), a literature review serves three purposes:

- To examine the present level of knowledge in the field of study
- To recognise influential writers, publications, concepts, and conclusions
- To pinpoint knowledge gaps in the field

Therefore, the literature review was examined to understand the current organisational culture and reliability performance measured using the OEE metric, the knowledge from subject matter experts involved with the topic and any gaps that still need to be addressed.

The literature study utilised data from different sources to explain the characteristics and factors influencing organisational culture and reliability performance, including its measurements. Bhattacherjee (2012:39) affirms that the literature investigation examines recently gathered and organised information from different sources. This literature was acquired by referring to various scholarly articles, textbooks, conference reports, previous dissertations, internet sources and encyclopedias. The databases used include the North-West University Library, Google Scholar, EBSCOhost and google.

1.7.2 Empirical study

The term “empirical research” refers to the level of understanding that reflects what can be confirmed by experience or observation (Adams *et al.,* 2014:8). The empirical study was conducted to assess the methodology of achieving the study objective. Adams *et al.* (2014:8) state that empirical research must be undertaken to gather proof from the community environment in which one lives. The research design and methods were conducted to meet the empirical study requirements.

According to Adams *et al.* (2014:64), the research design is a master plan outlining the techniques and steps to be taken in order to gather and analyse the necessary data. The methodology could be further broken into parts that include the research design, participants, methods and procedures, and ethical concerns (Saunders *et al.,* 2019:57). For this study, Saunders *et al*. (2019) proposed research ‘onion’ approach was followed as a guiding principle, and it is summarised as follows:

1.7.2.1 Research paradigm

The most well-known and traditional method is positivism (Neuman, 2014:96). Greener and Martelli (2018:22) claim that as opposed to subjective assertions, objective facts

are the focus of this approach, and only the objective claims are seen as falling within the scope of researchers. Due to the importance of objectivity, the study adopted the positivism paradigm.

1.7.2.2 Research approach and methodological choice

A positivist paradigm and an objective perspective of the subjects under study are likely to be linked with a quantitative approach to research since deductive reasoning is frequently used to evaluate theories, often using numbers or facts (Greener & Martelli, 2018:23).

Based on the nature of the study and the research paradigm selected, the adopted study approach was the deductive and quantitative methodological choice. The survey through questionnaires was used.

1.7.2.3 Research strategy and time horizon

A survey strategy is typically used in quantitative research using questionnaires, organised interviews, or potential observation methods (Saunders *et al.,* 2019:178). According to Saunders *et al. (*2019:193), the survey method empowers one to gather the information that one can statistically analyse, utilising descriptive and inferential statistics. The short time horizon was used due to the required resources and limited time to conclude the study. The survey through questionnaires was used to collect quantitative data.

1.7.2.4 Techniques and procedures

1.7.2.4.1 Study population and sample

Neuman (2014:252) explains the target population as the conclusively defined general group of numerous representatives from which a researcher studies a sample and from which findings from the selection are generalised. The study's target population was 651 leaders within the selected chemical company directly involved with operations. Other people are excluded from the study due to their insignificant influence on the plant reliability of performance decision-making.

The non-probability convenience strategy was employed because the target population was easily accessible. According to Bryman (2012:713), this suggests that some demographic units have a higher probability of selection than others.

1.7.2.4.2 Data collection

Data are linked to concepts or theories in any social research, including qualitative and quantitative studies (Neuman, 2014:204). Neuman (2014:204) states that measurement is the technique that connects the theories to the data, but it differs depending on whether the data and research methodology are predominantly quantitative or qualitative. The quantitative primary and secondary were collected in keeping with the study approach.

The primary data collection method was a close-ended structured, self-completion survey in two parts. Part one collected demographic data about their qualification, experience and the number of organisations for which they worked. Part two focused on the organisational culture assessment instrument (OCAI) adapted from Cameron and Quinn (2011). The permission was granted to utilise the questionnaire as indicated in Appendix A. The OCAI questionnaires measure six dimensions covering the four culture types: clan, adhocracy, market and hierarchy. One of the most used methods for assessing attitudes is the Likert scale (Bryman, 2012:253). The Five-point Likert scale: '5 – strongly agree, 4 – agree, 3 – neutral, 2 – disagree and 1 – strongly disagree', was used as a measuring scale.

The historical archived OEE data for the four years (FY18 - FY21) was collected as secondary data. The OEE measure is used to assess the plant reliability performance of the selected chemical firm. The OEE data was collected from the three specific plant areas because it is a total operating plant that directly influences reliability performance. The OEE data is read-only and accessible to all the chosen chemical company employees. Overall reliability performance data is frozen and locked. The OEE data is verified and audited because the reliability performance forms part of the short-term incentives.

The permission was requested and approved by the Senior Vice President of the selected chemical company to access the target population. A survey monkey was used to distribute and collect the primary data from 651 respondents.

1.7.2.4.3 Data analysis

The study is quantitative, requiring a numerical statistical analysis. Descriptive, correlation and inferential analysis were employed. An analytical software program, Statistical Package for Social Sciences (SPSS), was utilised to analyse the data. According to Field (2009:628), SPSS diminishes the mass of disarray to fewer factors that are simpler to process. The descriptive analysis discussed the mean and standard deviation (SD) for the collected primary data.

In addition, non-parametric inferential statistics were conducted to test the validity and reliability. Cronbach's alpha, α, was employed to test data reliability. Field (2009:674) claims that it is the most prominent proportion of scale reliability. Maat *et al.* (2015:642) state that confirmatory factor analysis (CFA) can be used to validate questionnaires. The structural equation model (SEM) was used to quantify and evaluate the interactions between hidden and visible factors and Spearman's correlation coefficient.

The collected historical secondary data were analysed to understand better the plant reliability performance of the selected chemical company.

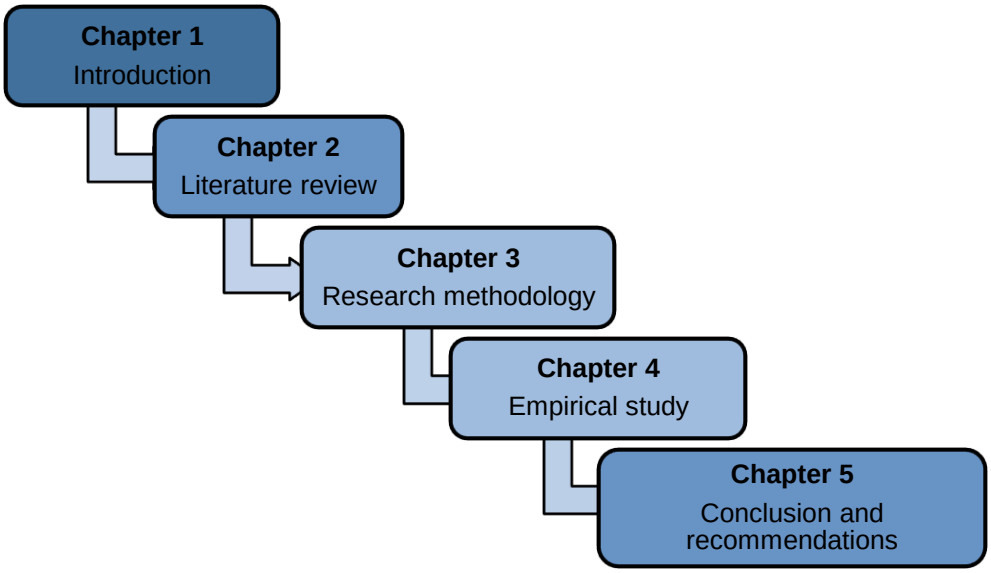
1.8 ETHICAL CONSIDERATIONS

The researcher should be mindful of the ethical issues when studying research that includes human involvement (Fowler Jr., 2014:140). Informed consent was part of the questionnaires to ensure adherence to ethical requirements. Permission was granted to access the population and the secondary data, and ethical clearance was obtained from the university to permit the study.

1.9 STUDY LAYOUT

The study will be presented and configured into five chapters, as shown in Figure 1-3 below.

Figure 1-3: Study layout diagram



The summary of each chapter is as follows:

Chapter 1 – summarises the study nature and scope of the study. It further elaborates on the research introduction, problem statement, research objectives, research question, and the study methodology to achieve the research goal.

Chapter 2 – studies the literature, the theoretical foundation, and the research-related constructs.

Chapter 3 – addresses and discuss the procedures employed to recognise, select, measure, and analyse the research.

Chapter 4 – analyses and discuss the gathered data results**.**

Chapter 5 – provides the key findings, conclusion and recommendations. The study implications, limitations and recommended further studies are discussed.

1.10 SUMMARY

The chapter provided the introduction and background to the research study, outlining the research problem, objectives and the main research question.

The scope of the study explained the field, sector and location. The research methodology was discussed to achieve the objective and research question. Lastly, ethical consideration is required.

CHAPTER 2 – LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will explore the definition of organisational culture, its origins and meaning, intrinsic elements, levels, importance, and typology and identify the dimensions used to measure corporate culture.

Secondly, it will explore the elements that characterise high-reliability organisations, the performance as a non-monetary measure in companies and the specific measurement using the Overall Equipment Effectiveness (OEE). Lastly, the literature describes specific studies on the link between organisational culture and reliability performance.

2.2 ORGANISATIONAL CULTURE DEFINITION

Due to its intricacy, corporate culture has been widely researched for years (Deal & Kennedy, 1982; Goffee & Jones, 1998; Hofstede, 1980; Schein, 2004) and has resulted in different definitions (Schneider *et al.,* 2017:468). Tharp (2009:2) argues that culture made its first appearance in the Oxford English Dictionary around 1430, and it was based on Latin culture and signified “cultivation” or “tending the soil.”

On the contrary, Dan (2020:227) and Merz (2020:131) argue that the principal meaning of culture is owned by Sir Edward Tylor (1871), who characterises it as: “*that complex whole which includes knowledge, belief, art, moral, law, custom and any other capabilities and habits acquired by man as a member of society”* (Tylor, 1920:1). Many writers have described culture utilising Tylor’s term or developing a new concept independently (Dan, 2020:227).

The study of culture is ambiguous (Dan, 2020:227; Schein, 2004:11). Szydło and Grze’s-Bukłaho (2020:2) agree with Dan (2020) and Schein (2004) and state that Kroeber and Kluckhohn proved it. They explored 160 meanings of culture by indicating culture as many qualities made by humankind. Tharp (2009:5) added that a 1998

survey found 54 various conceptions in the 1960-1993 scholarly literature. Szydo and Grzes-Bukaho (2020:2) emphasise that corporate culture can signify different things depending on whether it refers to a perspective or an action strategy.

Rita (2022:22) posits that despite today's enterprises' structural diversity, they all have certain traits that might be described as organisational cultures. The author additionally states that this culture affects how workers interact with each other and conduct themselves. The concepts, values, behaviours, and beliefs that make up an organisation's culture can be used to define it (Woods & West, 2020:454).

Culture is the diverse taught structure and practice of the leaders and followers who collaborate to create a past that will influence the present (Schein & Schein, 2019: ch.1, par. 7). According to Schein and Schein (2019: ch1, par. 9), culture includes observed behaviour, rituals and rites that the group chooses to follow, espoused values that the community selects to uphold, learning and adaptable systems and practices that the group develops, fundamental and unquestioned assumptions that give importance to daily behaviour, and ultimately, culture even includes what the team reviews as leadership.

Culture cannot characterise people; instead, humans' diverse manners in which they draw in and their general surroundings result in different social characteristics essential for being human (Merz, 2020:136). Ndlovu *et al.* (2017:244) articulate that a company's tactics, processes, and strategies are all covered under organisational culture.

Schein (2004:17) define organisational culture as a set of shared fundamental beliefs that a group develops as it deals with external adaptation and internal integration issues. The author further states that these beliefs have proven effective enough to be accepted as accurate and, as a result, are passed down to new members as the right way to perceive, think about, and feel about those issues. In addition to Schein's (2004) definition, Table 2-1 indicates the definition of organisational culture from different researchers' points of view.

Schein's definition is compatible with an emic approach to corporate culture, that is, a methodology that considers culture as a representation of the entire association to such an extent that everything about the organisation, including its performance, is viewed as a component of its culture (Kummerow & Kirby, 2013:6).

Table 2-1: Organisational culture definition from the different author's perspectives

Author's	Organisational culture definition
Arokodare *et al.* (*2*019:5).	Organisational culture is a collection of widely held mental assumptions that clarify and direct administrative activities by outlining appropriate behaviour under various conditions.
Dan (2020:227).	Culture is shared between individuals in a similar gathering or society.
Flamholtz and Randle (2011: What Is Corporate Culture? section).	Organisational culture can be viewed as the "character" of a corporation – including how they deal with customers, hold themselves to high-performance standards, and are creative.
Goffee and Jones (1996:134).	Simply put, culture is society, and it results from how people interact with one another.
Hofstede Insights (2021).	The collective training of the brain that sets one group or type of individuals apart from another is known as culture.
Mercadal (2021).	Organisational culture alludes to the official climate and standards that describe an organisation, including the casual behaviour and social circumstances that happen among people in an organisation.
Merz (2020:135).	Culture is a method of seeing things, a perspective.
Nasaireh *et al*. (2019:976).	Organisational culture is the collection of significant, frequently unstated presumptions that all members of an organisation share.
Ndlovu *et al.* (2017:243).	Corporate culture is the beliefs and guiding concepts that all members of a particular organisation adhere to.
Oluwa and Ibrahim (2021:486).	A firm's organisational culture is made up of a number of distinctive traits that develop over time.

Author's	Organisational culture definition
Padhi (2017:77).	Organisational culture refers to an organisation's long-standing beliefs and values, as well as the employee's views and the anticipated value of their job, all of which will affect their attitudes and behaviour.
Rita (2022:23).	A group of beliefs, principles, traditions and other norms that all members of an organisation adhere to when interacting inside its boundaries is known as organisational culture.

From the stated definitions, it is clear that culture only exists in groups and that organisational culture refers to the shared values, beliefs, and behaviours inside an organisation. The corporate culture brings people together and impacts how they behave.

2.3 ORGANISATIONAL CULTURE ORIGINS

The early methods used by culture scholars were descriptive, emphasising the value of exploration in the configuration to be researched and pursuing the overt and covert ways that culture is transferred to participants as well as the collaborative impacts of culture on the common attitudes and behaviours of those there (Schneider *et al.,* 2017:469). These methods emerged from more sociological and anthropological sources (Schneider *et al.,* 2017:469; Woods & West, 2020:453). Anthropologists have utilised culture to allude to the traditions and customs that social orders foster throughout their experiences (Schein, 2004:7).

According to Haydon (2018:Coda, par.1), the corporate structure was employed in writing to experiment with conceptualisations of national identity, religion, and trade, corporations (particularly in the 1660s and 1690s) were locations for cultural expression. Tharp (2009:3) argues that organisational culture was first studied by organisational behaviour and its related discipline, management science, in the 1930s. Furthermore, Tharp (2009:3) states that the famous Hawthorne investigations at the Western Electric Company's concluding stage were the first organised effort to use the idea of culture to comprehend the workplace.

Alvesson (2013:7) posits that organisational culture investigations were led around the 1940s; however, they were inadequate and dispersed until the corporate culture blast of the 1980s. On the contrary, Tharp (2009:3) contends that the economic circumstances of the 1970s, when worldwide rivalry had increased and more foreign corporations were operating factories in the United States, are primarily responsible for the late-century increase in interest in organisational culture. Many were interested in the Japanese's success in various industries because they had different corporate principles, attitudes, and behaviours (Tharp, 2009:3).

Tarver (2021) claims that company culture consciousness emerged in corporations and other institutions, such as colleges, in the 1960s. Akpa *et al*. (2021:363) and Cameron and Quinn (2006:12) attests that in the late 1980s and early 1990s, management researchers examined how and why American organisations could not compete with their Japanese counterparts. During this time, the concept of organisational culture gained traction. Tarver (2021) concurs with Akpa *et al*. (2021) and states that corporate culture was created in the mid-1980s and became well-known by the 1990s, utilised by directors, sociologists, and different scholastics to depict the personality of an organisation.

According to Tarver (2021), by 2015, national cultures and traditions, market indicators, global trade, firm size, and goods all had an impact on corporate culture in addition to the founders, leaders, and workers of a firm. However, Grusin (2020:114) proclaim that if it is true that the study of culture has "no future," then culture, as it has been understood for more than three centuries, will no longer be an independent or self-sufficient domain.

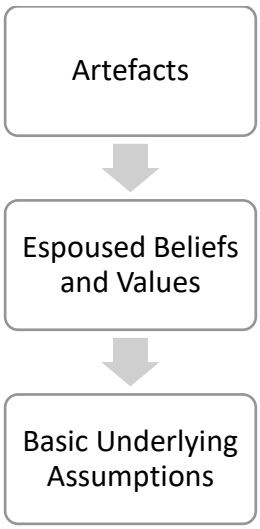
In addition, Grusin (2020:114) argue that the study of media technologies, the Anthropocene, or surveillance technologies will eventually take over the study of culture, rendering it nonsensical. According to Bachmann-Medick *et al*. (2020:13), scholars must take the cultural, symbolic, experiential, affective, and discursive ramifications of the crisis into account in the study of culture. Additionally, it might provide conceptual tools to address the growing demand for international networking, solidarity, and cooperation (Bachmann-Medick *et al*., 2020:13).

From above, there are different perspectives and views from researchers about the origin of organisational culture. However, there is a common understanding that management and researchers employed corporate culture to understand the employee's behaviour towards performance. In addition, recent authors foresee a need to expand organisational culture from humanities to include contemporary work practices such as sustainability and technology.

2.3.1 Organisational culture elements

According to Schein (2004:25), culture can be examined on various levels, from the overt expressions that are extremely obvious and that one can see and feel to the deeply ingrained, unconscious, fundamental presumptions that constitute the essence of culture. Most researchers (Akpa *et al*., 2021:362; Bremer, 2017; Dan, 2020:227; Druckman *et al.,* 1997:68) discussed Schein's elements of culture, highlighting the three levels: artefacts, espoused beliefs and values, and basic underlying assumptions shown in Figure 2-1.

Figure 2-1: The three different cultural levels



It comprises every phenomenon one experiences interacting with a new population with a foreign culture (Schein, 2004:25).

It includes aims, objectives, principles, standards, beliefs, and justifications (Dan, 2020:227).

The strongly ingrained, unconscious and assumed views, ideas, and emotions. (Akpa *et al*., 2021:366 & Druckman *et al*., 1997:68)

Source: Adapted from Dan (2020:233).

Woods and West (2020:456) assert that the number of levels in the hierarchy, the pay scales, records, meeting procedures, and ceremonial celebrations are examples of artefacts. The firm's corporate identity, branding and what differentiates it from others are known as artefacts. Joseph and Kibera (2019:2) posit that signage and the actual

physical surroundings of an organisation are characteristics of artefacts, which are the visible and concrete layers of culture.

Joseph and Kibera (2019:2) state that verbal communication and audible objectives, ideologies, and methods reflect values, which are the socially constructed principles that direct conduct. Espoused values are noticed in statements of purpose, goals and corporation leaflets (Woods & West, 2020:456). Espoused values are part of how employees treat and interact with each other. Morcos (2018:2) claims that any organisation's internal standards govern how employees carry out their duties and provide for customers, how they collaborate with one another, whether they feel motivated to reach goals, and whether they sincerely believe in the overall purpose of the company.

According to Woods and West (2020:456), basic unstated assumptions reveal a lot about the underlying principles of a company. Assumptions are unspoken and invisible actions amongst team members. Joseph and Kibera (2019:2) concur with Woods and West (2020) that assumptions are not easily noticeable. Furthermore, the authors claim that assumptions are the mental level of culture and are deduced from organisational norms and artefacts.

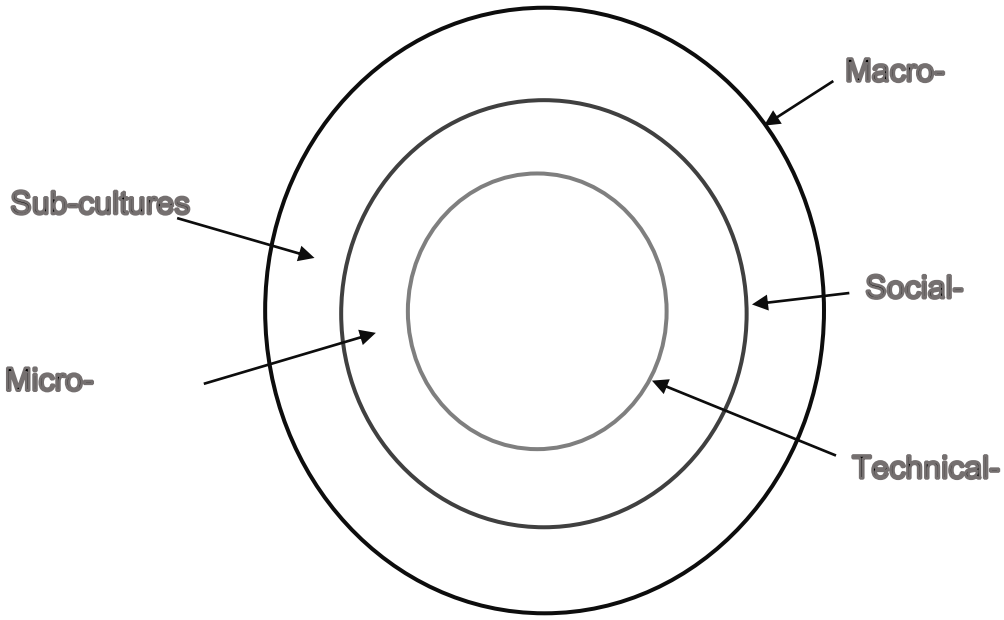
On the other hand, Rita (2022:24) asserts that it is not unusual for a company to provide a range of different native cultures, demonstrating the many ways of separating culture into different levels (like departments), divisions (like age groups), and nationalities (such as countries). The author further elaborates that a counterculture may coexist with or add to the established organisational culture based on the circumstances.

Irimias and Pop (2022:155) state that corporate culture exists at all levels of the business, regardless of how uniform or diverse the organisational elements are. Cameron and Quinn (2011:18) affirm that in evaluating an organisation's culture, one can choose to analyse the entire organisation as the unit of study, or one can analyse many component cultures, discover their shared prominent characteristics, and then aggregate them. They additionally highlight that this combination can give a rough idea of the organisational culture.

Schein and Schein (2019: ch.2, Cultural Elements: A More Refined Concept of Culture section) concur with Irimias and Pop (2022) and Cameron and Quinn (2011) that as corporations age, they may create subdivisions inside their borders that progressively establish their subcultures, which may or may not be like the subcultures of other sections. Schein and Schein (2019) illustrated different elements, as indicated in Figure 2-2.

The figure demonstrates the aspects of macro, social, technical, micro and subcultures. The authors refer to the macro-culture as the outer world, the technical culture as the assigned task, and the social culture as the internal environment. When evaluating a company's culture, identifying each component makes it easier to decide which element of the prevailing culture to emphasise (Schein & Schein, 2019:ch.2, Cultural Elements: A More Refined Concept of Culture section).

Figure 2-2: The Bull's-Eye of Cultures



Source: Schein and Schein (2019).

The element features are summarised in Table 2-2, as per Schein and Schein's (2019) explanation.

Table 2-2: Organisational culture elements features explanation summary

No.	Element	Explanation
1	Macro-cultures	The broad cultural context in which the organisation functions reflects the values, beliefs, and customs common to entire nations, ethnic groups, and professions. It further expresses the relationship, human behaviour, and common understanding.
2	Social-cultures	People engaged in employment arrange themselves, establish hierarchies or frameworks of status, and develop rules that guide how they desire to interact with one another. The group adopted • A similar language. • An identification that establishes collective borders. • A relationship that sets the degree of power and closeness. • Reward and control that distributes status can be considered components of the company's inner social culture.
3	Technical-cultures	Can be dissected as the common viewpoints, standards, and guidelines relating to: • its core purpose, strategy, and objectives; • the organisation's work structure, methods, and procedures; and • and the assessment and corrective mechanisms it employs to stay on track.
4	Sub-cultures	Organisations develop divisions based on roles, regions, markets, and goods. These groups that have been stable throughout the organisation develop their own cultures within the overall organisational culture.
5	Micro-cultures	This type includes systemic subgroups that are only tenuously linked to one another and have a specific job to complete.

Source: adapted from Schein and Schein (2019:ch.2, Cultural Elements: A More Refined Concept of Culture section).

From the above, one can deduce that any organisation has visible and hidden cultural aspects, and the invisible culture is robust and often senseless. Organisational culture aspects are practised at various company levels, resulting in subcultures within the same operating organisation. The study acknowledges the existence of subcultures within the divisions of the selected chemical industry. It thus aggregates leadership culture in different operating divisions to form part of the organisational culture analysis.

2.3.2 Importance of organisational culture

Organisational culture is the most fundamental aspect that distinguishes an organisation and is seen as the correct method by many members (Nasaireh *et al*., 2019:976). Schein (2004:63) claims that the reality that culture is a cohort, meaning that an individual will hold to certain fundamental presumptions to confirm their belonging in the group, gives it balance and durability. Schein (2004:263) and Tharp (2009:3) augment that culture is viewed as the “glue” that binds an organisation collectively and the “navigation” that points the way by others.

Cameron and Quinn (2011:5) mention that most organisational researchers and observers today acknowledge that corporate culture significantly impacts an organisation’s efficacy and long-term success. Schein (2004:7) affirms that there is the belief that there are good, poorer, stronger, and weaker cultures and that the “correct” type of culture will affect an organisation’s effectiveness.

Odiakaose (2018:26) posits that when an organisation has a strong culture that values employees’ contributions through monetary and non-monetary awards, it will be reciprocated, enhancing motivation and, as a result, performance. Eventually, employees will experience a higher level of motivation due to the positive organisational culture. Based on the culture that most individuals adhere to, an institution’s interactions with its inside and outside settings in the search for solutions to problems like productivity and survival will differ (Joseph & Kibera, 2019:3). Employee morale is increased when company members identify with the culture and like working there (Odiakaose, 2018:27).

Nasaireh *et al*. (2019:976) state that employee collaboration is necessary for an organisational culture shift to be successful and seamless. Thus, the organisation will be better able to survive the new expected growth phase along with the transition. It is further highlighted that the goal of change is to assist the company in prospering and achieving its objective; this is achieved by adhering to the firm's standards of conduct and principles.

According to Odiakaose (2018:27), efficiently applying a robust organisational culture with good values can be a potent people management approach, and its significance will only increase. In addition, the author affirms that a corporation's competitive performance is directly correlated with organisational culture. However, Druckman *et al.* (1997:68) argue that corporate cultures may improve performance in relative stability, but they can obstruct necessary change when conditions deteriorate.

Omazić *et al.* (2020:2) emphasise that the organisational culture is the most powerful and extensive corporate control system because it guides management and employee decisions and behaviour, encourages organisational development, helps with realising the vision, and provides individual and group direction. Furthermore, Wahyuningsih *et al.* (2019:149) concur with Omazić *et al.* (2020) that organisational culture plays a significant part in determining the overall success and growth of the organisation.

From the above, one can attest that the organisational culture can be positive or toxic, and the influence can either result in a high or poor-performing organisation. Employees connect with a positive culture, which associates the workplace with a home with enjoyment, motivation and enhanced morale. As a result, there is better collaboration, knowledge transfer, trust, openness and receptivity to new ideas.

2.3.3 Organisational culture models

Some researchers (Cameron & Quinn, 2011; Deal & Kennedy, 1982; Denison, 1990; Goffee & Jones, 1998; Harrison, 1992; Hofstede, 1980; Quinn & Rohrbaugh, 1983; Schneider, 1999) have widely developed organisational culture models. The following are discussions of four cultural models:

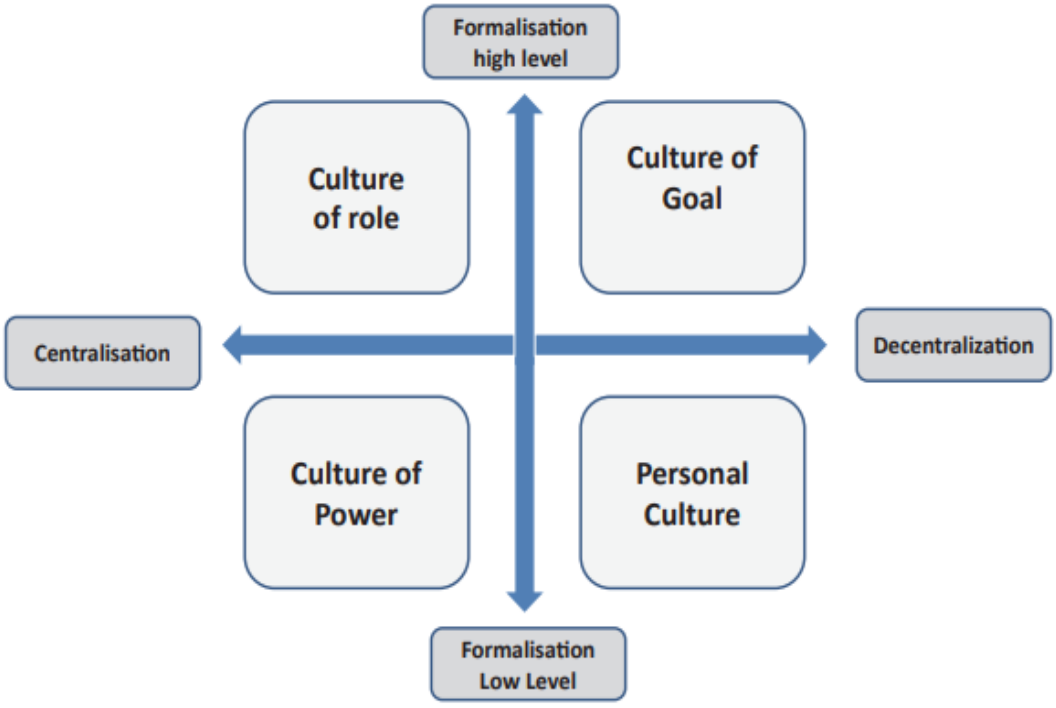
2.3.3.1 Handy's cultural model

Researchers (Karapancheva, 2020; Nasaireh *et al*., 2019) discussed Handy's (1996) cultural model. According to Karapancheva (2020:46), this model was extended by Roger Harrison.

Figure 2-3 shows this model represented on the grid showing the power dispersion from low to high on the y-axis, and the x-axis illustrates the degree of collaboration from low to high (Mulder, 2018). Nasaireh *et al.* (2019:976) summarise them as follows:

- *Power orientation* - connects with the degree to which a focal figure impacts others in the association,
- R*ole culture* - connects with how work ought to be organised and techniques to be continued in achieving assignments,
- T*ask culture* - is job-oriented because impact in the association relies upon the degree of skill of the focal figure rather than personal power, and
- P*erson culture* - is a surprising culture where the individual is the point of convergence.

Figure 2-3: Handy's model of organisational culture



Source: Domańska-Szaruga (2020:273), adapted from Krukowski, (2016: 218).

2.3.3.2 Deal and Kennedy's cultural model

Deal and Kennedy (1982) is another model explained by Maximini (2018:191) as the model that proposed an aspect in light of the speed of criticism (rapid to low momentum) and a level of-risk factor (high to low risk). Deal and Kennedy's (1983) and Harrison's (1972) models have the same principles with minor differences, resulting in Schneider (1999) working on the gaps to find an acknowledged and general corporate culture model (Maximini, 2018:192).

Deal and Kennedy (1982) distinguished four conventional kinds of cultures, as shown in Figure 2-4, to depict the corporate culture, particularly the tough-guy/macho culture, the practice work-life balance culture, the bet-your organisation culture and the process culture. The different types of culture, as explained by Karthikeyan (2019), are:

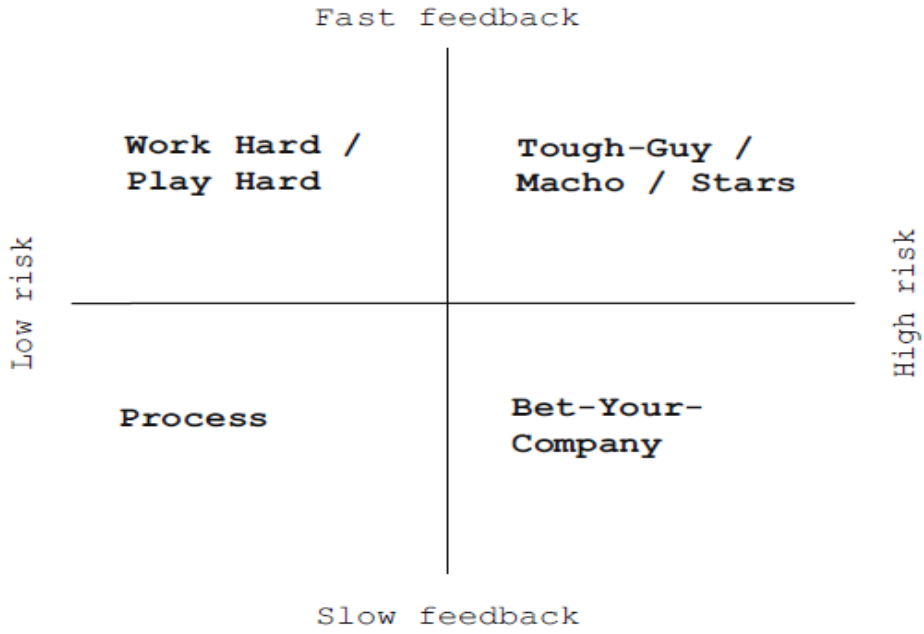
- *Tough-guy/macho culture*: This has significant risk, quick feedback, and results: Significant risk and possible reward/loss scenarios add anxiety. Place more emphasis on the here and now than the longer-term future.

- *The practice of work-life balance culture:* This has quick feedback/reward and reduced risks; therefore, stress is caused by the sheer volume of work rather than unpredictability. The high-speed activity is followed by high-speed entertainment.

- *The bet-your organisation culture:* This has more danger, slow response, and results in anxiety resulting from excessive uncertainty over the results of activities. The long view is taken, yet much effort is put forward to ensure everything proceeds as intended.

- *The process culture:* This has minimal risk as well as slow feedback/reward, leading to the following outcomes: Low stress, tedious job, protection, and convenience. The pressure was brought on by systemic ineptitude and internal politics—the creation of bureaucracy and other mechanisms for preserving the status quo. Pay attention to both current and future protection.

Figure 2-4: Deal and Kennedy's culture model



Source: Maximini (2018:191).

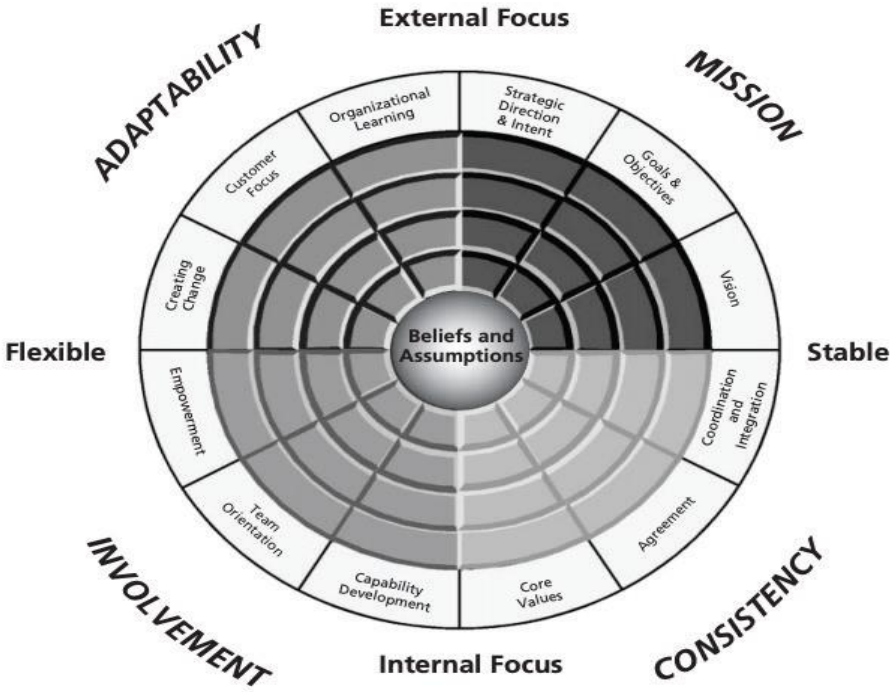
2.3.3.3 Denison's cultural model

According to Akpa *et al*. (2021:362); Karthikeyan (2019:11) and Wahyuningsih *et al.* (2019:149), Denison's organisational culture model includes involvement, mission, consistency, and flexibility, shown in Figure 2-5. Wahyuningsih *et al.* (2019:149), in their study using Denison's model, found that organisational culture can be applied to assess the leadership approach and could act as a measure of business competitiveness. Furthermore, their study indicated that business effectivity could result from the organisational culture with inner and outer elements.

The technique has mainly been used to identify organisational cultural issues (Karthikeyan, 2019:11). However, the model applied in this exploration rejects other factors that are forerunners and outcomes of the corporate culture (Wahyuningsih *et al.,* 2019:149). According to Karthikeyan (2019:11) and Wahyuningsih *et al.* (2019:145), the following three sub-dimensions additionally characterise each of these fundamental aspects:

- *Mission* – Priorities and outcomes, plan, and strategy. It measures a mission's capacity to communicate a future vision (Wahyuningsih *et al.,* 2019:145).
- *Adaptability* – Change-making, customer-centeredness, and organisational learning. Wahyuningsih *et al. (*2019:145) posit that the ability of a business to change, take chances, learn from mistakes, and adapt to the needs of its customers is measured by its adaptability.
- *Involvement* – Empowerment, a focus on the team, and the growth of capabilities. The involvement characteristic enables businesses to create different decision frameworks by integrating other and new ideas into the decision-making processes, allowing employees to care about the organisation with a sense of ownership and dedication and empowering the motion of group dynamics to remedy challenging problems (Boyukaslan & Aşıkoğlu, 2022:154).
- *Consistency* – Core principles, consensus, and cohesion. The consistency attribute briefly discusses if the organisation is well-structured and has a cohesive, synchronised internal culture that the individuals can see (Boyukaslan & Aşıkoğlu, 2022:154).

Figure 2-5: The Cultural Aspects and Attributes of the Denison Corporate Culture Model



Source: Boyukaslan & Aşıkoğlu (2022:153), adapted from Denison and Neale,1996.

2.3.3.4 Cameron and Quinn's cultural model

The other organisational culture model with four quadrants is the one developed by Cameron and Quinn (2011), known as the competing value framework model. Gustafson *et al.* (2018:148); Maximini (2018:194) and Ziyarani *et al.* (2022:229) posit that the model introduced by Cameron and Quinn (2011) positions corporates in a spectrum of four fundamental beliefs: Flexibility, Stability, Differentiation, and Integration. The framework comprises two aspects, represented on the x-axis and y-axis, resulting in four quadrants (Cameron & Quinn, 2011; Daft, 2010:79; Hartnell *et al.,* 2019:834; Kim & Chang, 2019:67; Woods & West, 2020:458).

Maximini (2018:197) utilised Cameron and Quinn's organisational culture model as a suitable cultural method because of the primary database's quality, reality, and availability, including the typically cultivated practice. Woods and West (2020:458) contend that a significant power of this model is its deduction from four central directions in the investigation of corporate viability. The model is known for its strength in organisational success and ability to diagnose its cultural stability, type and compatibility (Cameron & Quinn, 2006:37). Yu and Wu (2009:37) added that the model coordinates most corporate culture aspects proposed in research.

As discussed above, organisational models are constructed to help businesses as a tool to understand their corporate culture. The models concerned are similar in structure and mapping, comprising four quadrants, but the factors that affect the organisational culture differ. Some authors (Maximini, 2018; Woods & West, 2020; Yu & Wu, 2009) give recognition to Cameron and Quinn's (2011) model. According to Cameron and Quinn (2006:33), the reliability and validity of the adopted questionnaires were done. Bryman (2012: 264) states that one will be able to determine the measurement qualities of the currently being used questions if any reliability and validity testing has been done. Additionally, they enable comparisons with other studies. Thus, Cameron and Quinn's (2011) model was adopted to fulfil the study objectives, which are discussed below.

2.3.4 Competing value framework

Karanjgaokar (2021) claims that one of the most mainstream cultural models created comes from Quinn and Cameron from the University of Michigan. The famous approach to moving toward the investigation of corporate culture is the competing value framework (CVF) used by different authors such as Joseph and Kibera (2019), Khedhaouria *et al. (*2020), Kim and Chang (2019) and Reino *et al.* (2020).

Gong *et al.* (2022:855) state that Quinn and Rohrbaugh (1983) fostered the first CVF by investigating connections among thoughts of corporate adequacy. However, David *et al.* (2018:183) claim that Campbell (1974) outlined 30 distinct success criteria; Quinn and Rohrbaugh invited 52 organisational scholars to rank the Campbell criteria list (from 1973). They deduced three value dimensions: internal-external, control-flexibility, and means-ends, and created the CVF by integrating the third dimension into the other two (David *et al.,* 2018:183; Reino *et al.,* 2020:377).

Domańska-Szaruga (2020:273) claims that the CVF model is a goal-oriented culture because it can either impede or facilitate the attainment of a company's objectives. An association does not have an isolated, stable culture but competing values (Calciolari *et al.,* 2018:1404).

According to Hartnell *et al. (*2019:834), the four cultural quadrants of the CVF define core values that emphasise primary organisational objectives and specify recommended methods for achieving them. The system's four quadrants present esteemed results and an organisational methodology for accomplishing them (Woods & West, 2020:458). Calciolari *et al.* (2018:1403), Gong *et al.* (2022:855) and Reino *et al*. (2020:377) assert that the system recognises four cultural types: Clan, Adhocracy, Market and Hierarchy. The four types of culture are summarised in Figure 2-6.

Flexibility alludes to an association's capacity to adjust to inner and outer powers, and dependability is utilised to indicate the association's capacity to stay steady in any event when there is a recession (Ziyarani *et al.,* 2022:229). They further mentioned that internal focus implies how workers behave, frameworks, and processes inside an

association. In contrast, the external focus is utilised to infer the capacity of the association to figure out the association's outside viewpoints.

Figure 2-6: Organisational Culture Indicators (adapted from Cameron & Quinn, 2011)

<table>
<tr><td colspan="4">Flexibility and discretion</td></tr>
<tr><td rowspan="2">Internal Focus and integration</td><td><u>Clan culture</u>
Collaborate
Advances adaptability
Synergy
Acceptance
Enablement
Active engagement</td><td><u>Adhocracy culture</u>
Create
Stimulate revolution
Ingenuity
Risk-takers
Strength
Change and transformation acquainted</td><td rowspan="2">External Focus and differentiation</td></tr>
<tr><td><u>Hierarchy culture</u>
Control
Concentrate on rules and targets
Arrangement of errands with overall targets
Unity of order
Solidarity of direction
Enhanced internal and external productivity</td><td><u>Market culture</u>
Compete
Stimulate revolution
The ability to adjust to changes
Objective accomplishment
Intense competition
Capacity to explore worldwide business sectors without any problem</td></tr>
<tr><td colspan="4">Stability and control</td></tr>
</table>

Source: Oluwa and Ibrahim (2021:487).

OCAI Online (2019) summarises the organisational culture types of CVF application in terms of the critical qualities, initiative types, esteem drivers, ways to deal with change, and speculations of viability, as indicated in Table 2-3.

Table 2-3: Competing value framework for culture, leadership, effectiveness and value drivers

Organisational Culture Type	Leader Type	Value Motivators	Principles of Effectiveness	Quality Strategies
Clan culture	facilitator, coach, and group developer.	responsibility, correspondence improvement.	human growth and participation construct effectiveness.	Empowerment, group building, worker inclusion, Human Resource improvement, open correspondence.
Adhocracy culture	trendsetter, business person, and visionary.	Innovative results, change, agility.	creativity, vision and new assets produce adequacy.	Surprise and joy, making new norms, expecting needs, persistent improvement, tracking down creative solutions.
Hierarchical culture	facilitator, monitor, coordinator.	Effectiveness, reliability, uniformity and consistency.	Control and productivity with proper processes produce viability.	error detection, estimation, process control, deliberate critical thinking, quality instruments.
Market culture	hard driver, contender, producer.	market share, objective accomplishment benefit.	aggressive rivalry and client focus produce adequacy.	measuring client preferences, further developing efficiency, making outer organisations, improving intensity, including clients and providers.

Source: Cameron and Quinn (2006:46).

According to Reino *et al.* (2020:377), the Clan and Adhocracy categories are similar in terms of dynamics and flexibility, but they vary in terms of external focus. Kim and Chang (2019:68) argue that although adhocracy culture is theorised as the most grounded, it is close to market culture in influencing innovative behaviours, and clan culture is as solid as market culture in affecting functional performance.

Cameron and Quinn (2011) found that several associations were powerful if they indicated adaptability and flexibility. However, different associations were successful if they exhibited stability and control. Also, a few associations were successful if they kept up with proficient internal processes. According to Calciolari *et al. (*2018:1404), the degree to which a similar social sort is predominant may change across the associations sharing it.

The first aspect identifies whether an organisation emphasises control, stability, flexibility, and dynamism. For example, some organisations are deemed effective if they adopt change and transformation to meet market demands, while others are efficient if they are steady and consistent (Khedhaouria *et al.,* 2020:517). Khedhaouria *et al.* (2020:517) further elaborated that the second component identifies whether an organisation emphasises an internal orientation that promotes collaboration and coordination or an outward direction that emphasises distinction and rivalry. For instance, although some firms are deemed efficient if they distinguish their operations to remain competitive in the market, others are considered adequate if their internal processes are unified and collaborative. The CVF identifies four categories of cultures explained as follows:

2.3.4.1 Clan culture

A clan culture is situated toward adaptable designs, concentrating on inward collaborative cycles by ‘doing things together (Khedhaouria *et al.,* 2020:517). It is known as a clan due to its likeness to a family-type association (Cameron & Quinn, 2006:41). Calciolari *et al.* (2018:1403) assert that the association values faithfulness, custom, and the company further advances cooperation, engagement, and agreement. Kim and Chang (2019:68) argue that an organisation’s culture is described as a clan that upholds people-centred principles through interpersonal dynamics and harmony if it prioritises internal integration and flexibility over exterior differentiation and control.

Ramadista and Kismono (2020:306) mentioned that this kind of culture also underscores the organisation’s long-term benefits produced through worker improvement programs, particularly those connected with faithfulness and the glow of the connections between workers.

Its guiding principle incorporates responsibility, correspondence, furthermore improvement (Hartnell *et al.,* 2019:834). Calciolari *et al.* (2018:1403) claim that the construction of such an association is adaptable and can change comparable to the thoughts created to fulfil the dynamic outer need.

Research discoveries in the space of corporate culture showed how clan culture positively connects with organisational performance and supported a few past studies (Ramadista & Kismono, 2020:314). Joseph and Kibera (2019:3) believe that since clan culture is people-focused, it has the persuading power on workers; it supports collaboration and makes collective energy prompting better performance results. According to the OCAI Online (2019:7), this culture is more evident in medical care, training, government organisations, and non-profit organisation.

2.3.4.2 Adhocracy culture

Calciolari *et al.* (2018:1403) and Khedhaouria *et al.* (2020:517) posit that an adhocracy culture is arranged towards dynamic structures that appreciate the invention, focusing on outside differentiation by ‘doing things first’. It integrates discretion and flexibility with an emphasis on the outside world and distinctiveness (Hartnell *et al.,* 2019:834). Joseph and Kibera (2019:2) state that it is development driven and shows adaptability and value change-making. Hartnell *et al.* (2019:834) and Oluwa and Ibrahim (2021:488) concur with Joseph and Kibera (2019) that adhocracy cultures strongly emphasise creative thinking, vision, responsiveness, and environmental adaptation (Oluwa & Ibrahim, 2021:488) and the capacity to anticipate each impediment as challenging to foster something better.

Alsaqqa and Akyürek (2021:4) argue that security and power give way to flexibility and preference. New companies, innovation-driven ventures, and service companies such as Airbnb and Uber (OCAI Online, 2019:6) are sectors that observe this type of culture.

2.3.4.3 Market culture

A firm's culture is described as a market that appreciates tangible returns by utilising quantitative and tested business methods if it prioritises differentiation and control over the competition (Kim and Chang (2019:67). Market culture is regarded as the culture of accomplishment (Omazić *et al.* 2020:5).

Khedhaouria *et al.* (2020:517) announce that a market culture is situated towards results that value competition and accomplishment, focusing on outer separation by "doing things quickly". Market culture highlights the significance of setting and accomplishing objectives, forcefully contending, and paying attention to clients (Hartnell *et al.*, 2019:834). The outside climate (market) is viewed as an expected threat locally, whereas benefit, danger recognition and competitive advantage are of utmost concern (Alsaqqa & Akyürek, 2021:4).

Competing values of a market culture assist a business in intently connecting with clients and market difficulties opposite strategic arrangement of long-term corporate objectives (Asif & Sajjad, 2018:73). OCAI Online (2019:8) claims the typical models in consultancy, bookkeeping, sales and advertising, administration, and fabricating.

2.3.4.4 Hierarchical culture

Khedhaouria *et al.* (2020:517) state that a hierarchical culture is situated toward organised and controlled activities, concentrating on the consistency of internal processes by "doing things correctly". Pathiranage (2019:8) elaborated that this is a culture of strength and consistency. This culture keeps working when the corporate environment is secure and straightforward, and efficiency is the primary goal (Alsaqqa & Akyürek, 2021:4). Cameron and Quinn (2006:47) mentioned that when hierarchy culture rules an organisation, the leaders are adept at planning, directing, controlling, overseeing, administering, coordinating, and upholding efficiency.

However, Cameron and Quinn (2006:159) argue that strong correlations were found between the hierarchy culture and formalisation, resistance to change, stability, a reactive attitude toward transformation, and low morale.

According to Calciolari *et al.* (2018:1403), corporate adequacy is characterised by consistency, control, and resilience. Hartnell *et al.* (2019:834) claim that hierarchy cultures concentrate on proficiency and consistency by creating formal functions, rules, and working techniques. These effectively implemented systems and procedures slow down decision-making, and they are intended to uphold control and homogeneity inside the company (Banton, 2022).

Alsaqqa and Akyürek (2021:4) argue that cohesion and power are preferred over adaptability and prudence. Reliable delivery, ongoing planning, and minimal expense characterise achievement; pharmaceutical, atomic energy, army, state, banking and insurance, and transportation are typical organisations prevailing in this culture (OCAI Online, 2019:6). Cameron and Quinn (2006) discussed the OCAI, as a tool used to evaluate these four identified organisational culture types.

2.3.5 Organisational culture types in relation to OCAI

The CVF serves as the foundation for the OCAI (Cameron & Quinn, 2006:31). The Corporate Culture Assessment Instrument is designed to evaluate six essential aspects of organisational culture (Cameron & Quinn, 2006:24). According to Cameron and Quinn (2006:150), the elements of the CVF are consistent with how corporate culture is naturally understood. Consequently, identifying components of the organisation that represent important values and presumptions in the organisation is the key to evaluating organisational culture (Cameron & Quinn, 2006:150). The six essential aspects and characteristics in relation to the culture types are shown in Table 2-4.

Table 2-4: Types of organisational culture in relation to measured items

Organisational culture type	Dominant Characteristics	Organisational Leadership	Management of Employees	Organisation Glue	Strategic Emphasis	Criteria of Success
Clan	The workplace is a fairly private space. It resembles a large family. People appear to share a lot of personal details and characteristics.	The organisation's leadership is typically seen as an excellent example of coaching, enabling, or nourishing.	The organisation's management style is defined by involvement, collaboration, and engagement.	Loyalty and trust between members of the organisation serve as its glue. This organisation has strong support.	A major focus of the organisation is personal evolution. High levels of participation, transparency, and confidence continue.	The organisation bases its definition of success on the growth of its human capital, collaboration, employee dedication, and care for people.
Adhocracy	The company has a thriving entrepreneurial environment. People are open to taking chances and sticking out their necks.	The organisation's leadership is frequently given as an example of entrepreneurship, inventiveness, or pushing boundaries.	Individual risk-taking, creativity, independence, and individuality define the firm's managerial style.	The institution's dedication to creativity and growth serves as its glueing agent. The need to be state of the art is stressed.	The organisation places a strong emphasis on gaining new capabilities and posing fresh problems. They appreciate attempting new things and looking for opportunities.	The company measures success by having the newest or most distinctive products. It is a market pioneer and product developer.

Organisational culture type	Dominant Characteristics	Organisational Leadership	Management of Employees	Organisation Glue	Strategic Emphasis	Criteria of Success
Market	The company places a strong emphasis on results. Getting the task done is a top priority. People are very goal-oriented and ambitious.	Leadership is often viewed as an example of a no-nonsense, assertive, outcome-oriented emphasis.	The company's management style is expected to intensify, with high standards and success.	The group's insistence on success and goal attainment acts as its glue. There are recurring themes of aggression and success.	The organisation places a strong focus on success and competition. Reaching goals and succeeding in the marketplace is essential.	The company measures success by outperforming the competitors and succeeding in the market. Leadership in a competing market is crucial.
Hierarchy	The organisation is an extremely organised and regimented setting. In general, formal procedures regulate what individuals do.	The leadership in the company is typically viewed as an example of organising, controlling, or efficient operation.	Job security, compliance, reliability, and relationship stability define the managerial style in the company.	Formal practices and regulations act as the group's go-to glue. This is crucial to keep the organisation operating efficiently.	Continued existence and steadiness are emphasised by the business. Efficient processes, stability, and performance are crucial.	The organisation bases its definition of success on productivity. It is essential to have consistent delivery, flexible scheduling, and economical operation.

Source: Cameron and Quinn (2006:26-28).

2.3.6 Performance Culture

For any organisation to achieve its strategic goals, it is imperative to deal with the transformation of OC. According to Wahyuningsih *et al*. (2019:143), OC assumes a significant part in the accomplishment of the business unit, and there has been abundant proof of a positive relationship between organisation presentation and culture. Omazić *et al*. (2020:2), Pathiranage (2019:4), and Wahyuningsih *et al*. (2019:145) say that OC determines the achievement and improvement of the organisation. The culture in the organisation decides on different perspectives, such as performance (Sengottuvel & Aktharsha 2016:56).

Organisations that prioritise culture realise performance improvements and growth. Morcos (2018:3) says that culture-centred organisations enhance their revenue. In addition, Pathiranage (2019:10) elaborates that unless business leaders set up a compelling OC, the undeniable degree of generalisation drives them to unsatisfactory results. However, Pathiranage (2019:3-4) argues that a weak OC translates to the opposite of a strong culture.

The authors (Cameron & Quinn, 2006; Deal & Kennedy, 1982; Goffee & Jones, 1998; Hofstede, 1991; Schein, 2004) investigated different organisational typologies and continually improved them. The CVF typology is used and selected by different scholars due to the empirical reliability and validity test proven. It is crucial to recognise that organisational culture may traverse several quadrants, creating a distinct performance culture. The corporate culture must be adaptable to adjust to either the external or internal environment. The employees behave and react based on the culture portrayed in the organisation. Based on the researcher's perspectives regarding the CVF typology, it is a suitable model to assist the study in achieving its objective.

2.4 RELIABILITY PERFORMANCE

2.4.1 High-Reliability organisations (HRO)

Enya *et al.* (2018:4) state that the University of California Berkeley researchers presented the underlying idea of the high-reliability organisation worldview. Cantu *et*

al. (2021:1) explain that HROs have existed since 1986. However, Cantu *et al.* (2020:1) argue that after the 1979 Three Mile Island nuclear plant catastrophe, Perrow (1983) asserted that "accidents happen," suggesting that malfunctions were unavoidable. This notion was refuted by research, leading to the development of the concept of HRO. According to Cantu *et al.* (2021:1), the initial HRO study comprises on-site observations of three companies chosen based on their track records of exceptional operational and outcome reliability despite inherent operational risks that could cause catastrophic damage to themselves and the public. Sanders (2020:357); Sawyerr and Harrison (2020:81); Veazie *et al*. (2019:1) claim that the first three recognised companies as nuclear plants, air traffic control systems and navy nuclear aircraft. Medical fraternities follow suites due to medical errors (Veazie *et al.,* 2019:1).

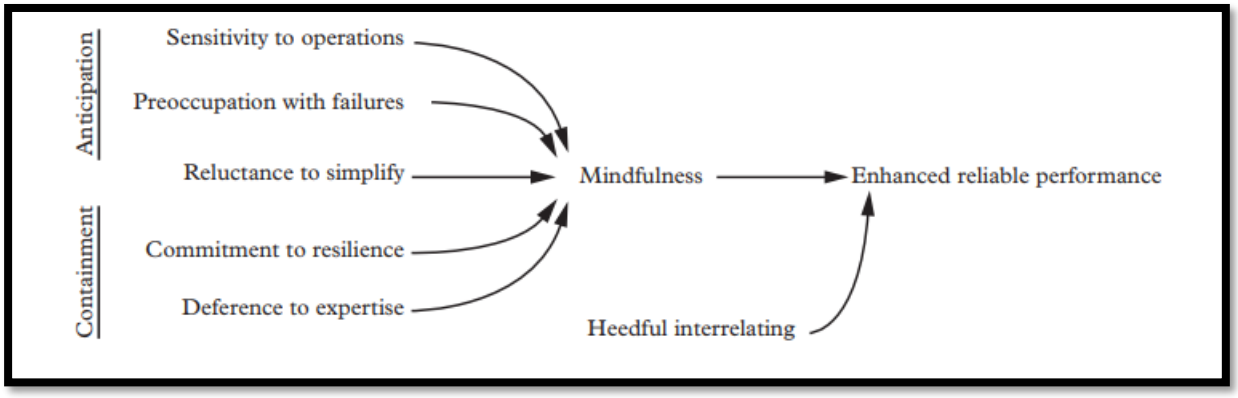
Reliability is generally characterised as "the capacity of a product to execute its normal work under the predefined states of purpose over an expected timeframe" (Elsayed, 2021:5; Shrivastava & Jugdaw, 2021:2). The failure occurs but being in control of the breakdown results in reliability principles. Understanding the breakdown event is a significant reliability idea (Heizer *et al.,* 2020:701). Reliability enhances when the quantity of investigations diminishes or the period of the breakdown decrease (Shabangu *et al.*, 2020:2)

Enya *et al*. (2018:1) explain that high-reliability organisations employ mistake-free in complicated and unclear conditions, overseeing complex frameworks and requirements using complex techniques, innovation, and rules. Thus, error-free and reliable conditions are possible for any given organisation. Scholtenhuis and Doree (2014:661) argue that the basis that traditional "HROs" place such a heavy emphasis on safety does not indicate that reliability should be limited to safety or focus only on high-hazard situations. They further mentioned that the practice does not prevent businesses from operating in less dangerous areas to improve their reliability using the HRO lens.

Veazie *et al*. (2019:4) argue that despite working in challenging, high-risk situations, an HRO is a company that encounters fewer accidents or injury incidents than expected. The HRO intends to improve reliability, minimise catastrophic failures and ensure sustainable performance and significant organisational reliability in all states

(Bienkowska *et al*., 2020:1). Understanding and defining organisational performance is vital for a high-reliability organisation. Cantu *et al.* (2021:1) argue that, in actuality, "high reliability" was a type of organisation rather than a goal to be attained. The cornerstone of HRO is a culture of "collective mindfulness," in which all employees seek out and report minor issues or risky situations before they pose a severe threat to the company (Veazie *et al*., 2019:4).

Figure 2-7: Guidelines for mindfulness and the HRO idea of sensible concepts of systems



Source: Scholtenhuis and Doree (2014:659).

According to Scholtenhuis and Doree (2014:659), mindfulness is divided into anticipation and containment, as illustrated in Figure 2-7. The goal of anticipation is to recognise and avert potential undesirable circumstances, and containment is about responding to and moving past such conditions (Scholtenhuis & Doree, 2014:659).

Veazie *et al*. (2019:1) explain that HROs are businesses that use five key concepts to accomplish things in safety, reliability, and efficiency:

a) responsiveness to operations - increased awareness of pertinent structures and procedures status.

b) A *resistance to simplification* - which acknowledges that work is complex and has the potential to go wrong in novel and unexpected ways.

c) O*bsession with failure* - seeing near-misses as improvement opportunities rather than evidence of success.

d) R*espect for expertise* - emphasising insights from personnel with the most relevant safety knowledge over those with greater seniority.

e) *Putting resilience into practice* - prioritising emergency preparation for numerous unlikely but potential system breakdowns.

Scholtenhuis and Doree (2014:660) claim that when HRO concepts are introduced, it is sometimes argued that only companies with a reputation for being “very reliable” may use the HRO lens to improve performance.

Furthermore, planning, education, new or updated processes and procedures, reporting and tracking systems, and data analysis are Other identified factors that play an important role in examples of the systems and techniques needed to be highly reliable when using HRO-like methods (Cantu *et al.,* 2021:2).

The organisations, irrespective of type, can implement the practice, in the author’s view of HRO. HRO began with high-risk operational companies where the need for safety is paramount. Reliable performance is crucial because organisations are concerned about their reputation and competitive advantage. HRO and its tenets are necessary for the chosen chemical industry, which values reliable, stable and predictable operations, and it operates in a hazardous environment. HRO is not an option but a necessity for organisations that needs to stay ahead of their competitors.

2.4.2 Organisational performance

Tamunomiebi and Chika-Anyanwu (2020:591) contend that it has been studied in various fields, with many definitions of what constitutes successful performance. Performance is an accomplishment or level of progress accomplished by an individual or an association conveying work in a specific period (Hayati *et al.,* 2021:345). Elena-Iuliana and Maria (2016:180) explain that performance implies both practices and results; thus, they define performance as firmly identified with conduct (input) and outcomes (output). Performance in the organisation addresses all that adds to the accomplishment of vital targets (Elena-Iuliana & Maria, 2016:181).

Tamunomiebi and Chika-Anyanwu (2020:591) claim that high organisational performance must be reachable for individual employees, groups, and managers’ intellectual propensities to be crucially effective. According to Joseph and Kibera

(2019:2), performance results demonstrate the outcome level in tending to the contending interests of key partners comprising clients, workers, and investors. Employees are the core of the company and work individually or collectively (as a team) to achieve the firm's goals and objectives; hence the organisation's performance is heavily dependent on its workforce (Tamunomiebi & Chika-Anyanwu, 2020:592).

Joseph and Kibera (2019:2) claim that the literature explain**s** that organisations evaluate their achievements by utilising both monetary indicators and market measures. On the contrary, Akpa *et al.* (2021:364), Tamunomiebi and Chika-Anyanwu (2020:592), and Tulcanaza-Prieto *et al*. (2021:3) agree with Joseph and Kibera (2019) about financial indicators but differ on market measures and instead included non-financial measures. In addition, Tamunomiebi and Chika-Anyanwu (2020:592) emphasise that financial and operational success, company performance, and organisational outcomes are the three dimensions of business. Tamunomiebi and Chika-Anyanwu (2020:586) utter that customer perception, financial perception, internal perception, and learning perception of the company are some of the typical criterion variables or measurements typically taken into consideration for organisational performance.

There is a need to foster an establishment and reliable information base (Shrivastava & Jugdaw, 2021:2). They further state that the product's ability ought to be quantifiable to consider the performance of a wide range of products and frameworks.

2.4.3 Overall equipment effectiveness (OEE)

Most researchers (Corrales *et al.,* 2020:1; Hassan, 2020:10; Purba *et al.,* 2018:397; Singh *et al.,* 2018:247) posit that OEE was first introduced inside the Total Productive Maintenance (TPM) theory by Nakajima (1988), and it is used to quantify the equipment efficiency in a manufacturing framework. On the contrary, Hugghins (2020:20) argues that OEE was a critical component of the TPM idea presented in the late 1960s at Japan's Nippon Denso Company (Hugghins, 2020:20). It is noticeable that the OEE principles originate from Japan and play a significant role in TPM.

The performance of a productive system is estimated with a core quantitative measurement known as OEE (Dadashnejad & Valmohammadi, 2019:470), which is one of the powerful approaches to breaking down the performance of at least one machine in a manufacturing company (Chikwendu *et al.,* 2020:1).

Dadashnejad and Valmohammadi (2019:470) define OEE as a conventional measurement of assembling operations to produce in a wide range of ventures, permitting comparisons across unique processes. Singh *et al.* (2018:248) describe OEE as the proportion of the amount of an item or part being made deformity free versus how much could be made by the equipment's plan. It is a proportion determined as a rate from 0 to 100 per cent, with 100 per cent addressing completely functional equipment and 0% handling equipment with no functioning parts (Hadroug *et al.,* 2021:26).

Šajdlerová *et al*. (2020:19) state that the OEE metric can highlight and measure losses, with reliability benefits such as recognisable proof of losses, reduced stoppages, higher efficiency, and improved quality and reduced cost. Herry *et al.* (2018:3) utter that the OEE strategy integrates measures of all machine and equipment conditions into an estimation framework. OEE can develop machine performance by recognising applicable performance opportunities (Chikwendu *et al.,* 2020:2). Zubair *et al.* (2021:4) argue that the losses in a production line and its maintenance problems must be identified in a practical study using effective approaches to manage production at a sustainable level.

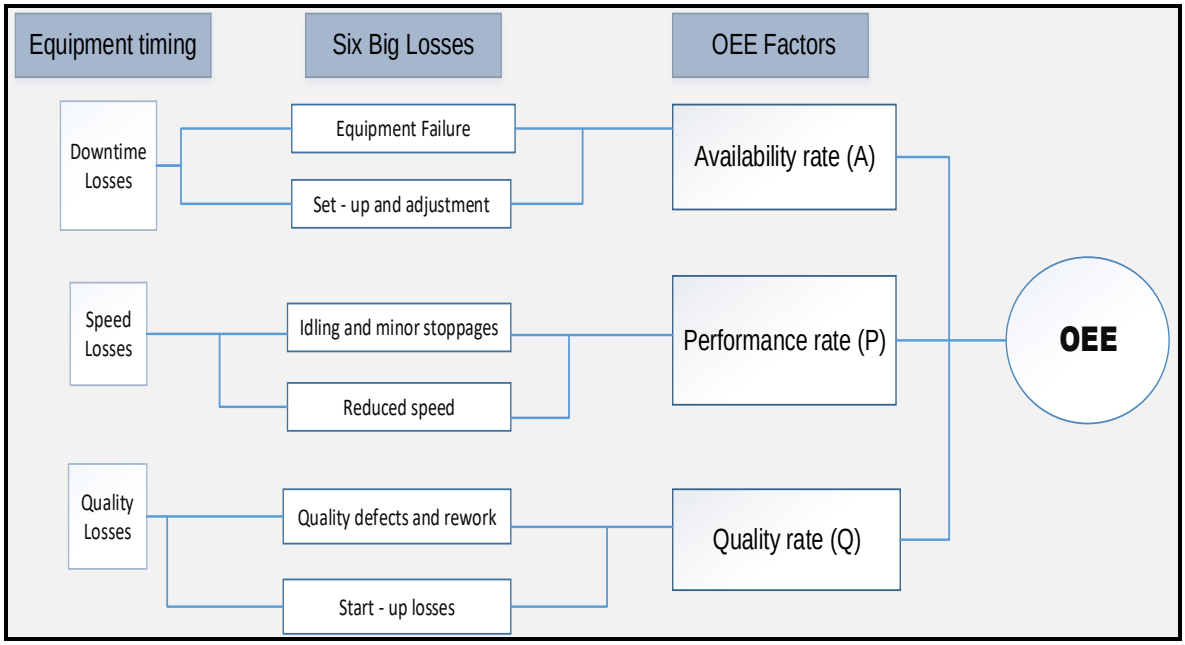
Singh *et al.* (2018:253) claims that OEE is used in TPM to statistically monitor a manufacturing system's performance. Since it is the primary criterion for calculating the effectiveness of the TPM deployment of the system, increasing OEE is the primary purpose of TPM (Singh *et al.,* 2018:253).

OEE includes the method involved in observing the availability, performance and quality of producing equipment within the organisation (Hugghins, 2020:18; Purba *et al.,* 2018:399; Samat *et al.,* 2011:204; Singh *et al.,* 2018:248).

2.4.4 Elements of OEE

According to Corrales *et al.* (2020:2), OEE distinguishes six significant losses, including parts of availability, performance and quality that lessen the equipment viability. Every three factors are promptly evaluated, utilising the "Six Big Losses" rules described by Seiichi Nakajima in the mid-1970s (Hugghins, 2020:18). Figure 2-8 illustrates the elements of OEE losses.

Figure 2-8: OEE elements and losses



Source: Barletta *et al.* (2014:1097), adapted from Nakajima (1988).

Zubair *et al.* (2021:4) indicate that OEE can be estimated by calculating the product of performance, availability, and quality. Table 2-5 shows the formulae to calculate different OEE elements.

Table 2-5: Formula's to calculate OEE's elements, including authors

Dimension and author	Formula
OEE (Zubair *et al.,* 2021:4)	Availability x Performance x Quality

Dimension and author	Formula
Availability Hassan (2020:32); Purba *et al.* (2018:399); Singh *et al.* (2018:252); Zubair *et al.* (2021:4)	$\frac{\text{Operating Time}}{\text{Planned Production Time}}$
Breakdown Purba *et al.* (2018:400)	$\frac{\text{Breakdown Time}}{\text{Loading Time}}$
Set Up and Adjustment Purba *et al.* (2018:400)	$\frac{\text{Set} - \text{up Time}}{\text{Loading Time}}$
Performance Chikwendu *et al. (*2020:2)	$\frac{\text{processed amount} \times \text{cycle time}}{\text{Ideal Run Rate}}$
Idling Minor Stoppages Purba *et al. (*2018:401)	$\frac{\text{Non} - \text{Productive Time}}{\text{Loading Time}}$
Reduce Speed Losses Purba *et al. (*2018:400)	$\frac{\text{Operation Time} - (\text{Ideal Cycle Time x Total Product})}{\text{Loading Time}}$
Quality Purba *et al. (*2018:400)	$\frac{\text{Processed Amount} - \text{Defect Amount}}{\text{Processed Amount}}$
Rework Losses Purba *et al. (*2018:401)	$\frac{\text{Ideal Cycle Time x Rework}}{\text{Loading Time}}$
Reject Losses Purba *et al. (*2018:401)	$\frac{\text{Ideal Cycle Time x Reject}}{\text{Loading Time}}$

2.4.5 Availability

Hugghins (2020:18) highlights that availability compares to the management in the comparable model and alludes to the time the asset can produce an outcome. It considers any occurrence that stops arranged output for an impressive period, such as equipment malfunction, material deficiencies, and change over time; the surplus available time is known as operative time (Singh *et al.,* 2018:251). The significance of availability is that we can understand what per cent availability of adequacy on the machine (Purba *et al.,*2018:399).

Chikwendu *et al. (*2020:2) state that malfunction and set-up alterations are two losses related to the availability factor. They further claim that equipment failure is an intermittent malfunction brought about by the breakdown of machines or equipment and set-up alterations as the deficiency of operation time because of equipment changes. However, Singh *et al.* (2018:250) mention that breakdowns exist under time losses because of periodic and persistent failures.

2.4.6 Performance

Singh *et al.* (2018:252) mentioned that performance considers any variables that make the interaction operate at not the most significant conceivable speed while running, like machine wear, inappropriate materials, misfeeds, and operator inefficiency.

According to Chikwendu *et al.* (2020:2) and Purba *et al.* (2018:400), working out the value of performance productivity requires information on process duration, activity time, and complete product information. Singh *et al.* (2018:252) explain ideal process duration or nameplate capacity as the base process duration that a cycle is anticipated to accomplish in ideal conditions. Performance is covered at 100 per cent, so if a mistake is made in determining the perfect process duration or ideal run rate, the impact on OEE will be restricted (Singh *et al.,* 2018:252).

Two essential issues undermine the customary idea of equipment performance productivity: decreased rates and minor stoppages (Hugghins, 2020:20). Purba *et al.* (2018:400) state that idling and minor stoppage losses result from machine stops, machine jams, and idle time. Purba *et al.* (2018:400) argue that the *speed loss* is a loss because the machine does not work ideally (reduced speed of working), and it happens if the actual rate of the machine working is not precisely designed for the perfect speed.

2.4.7 Quality

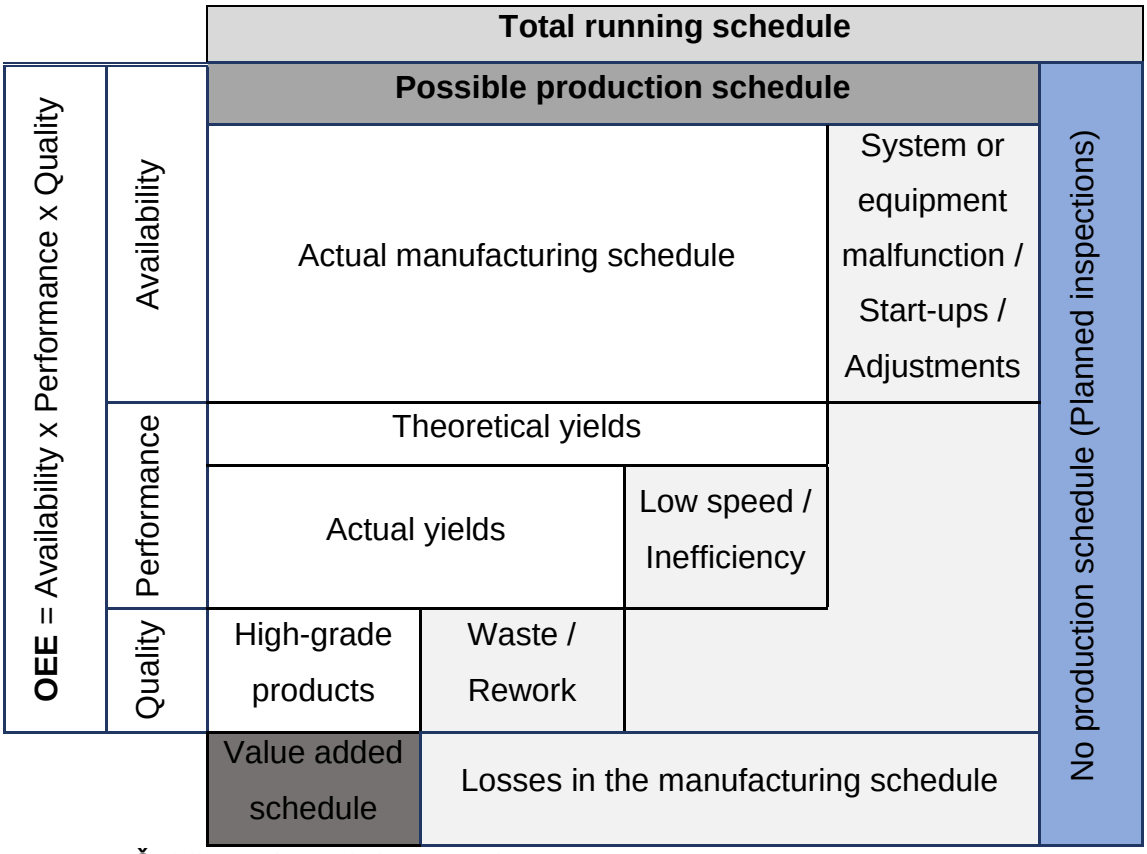
It considers delivered pieces that do not fulfil quality guidelines, including parts that need rework (Chikwendu *et al.,* 2020:2; Hassan, 2020:80; Singh *et al.,* 2018:252).

According to Hassan (2020:80), the quality rate is determined as the proportion of good parts of all-out made pieces.

Defects and rework are losses caused by faulty machines and equipment to fabricate quality results of laid-out principles (Chikwendu *et al.,* 2020:3). Reject losses because unused materials or unrefined substances are wasted (Purba *et al.,* 2018:401), and to ascertain the worth of rejected losses can utilise the accompanying condition.

Figure 2-9 summarises the OEE outline and illustrates the link between the elements influencing association effectiveness.

Figure 2-9: OEE outline



Source: Šajdlerová *et al*. (2020:20).

According to Chikwendu *et al.* (2020:2), the manufacturing company's maintenance performance is assessed using the world-class OEE standard. They further mentioned that the benchmark strengthens the structured methodology and drives steady growth in industrial systems. According to Chikwendu *et al.* (2020:2) and Singh *et al.*

(2018:253), world-class objectives for each OEE element differ, as illustrated in Table 2-6. the measures should be greater than 90%, 95% and 99% for availability, performance and quality, respectively.

Table 2-6: OEE world-class performance

OEE element	*World-class*
Availability	90%
Performance	95%
Quality	99.9%
OEE	85%

Source: Singh *et al.* (2018:253).

Based on the OEE explanation from the researchers, the OEE is a crucial tool for identifying potential manufacturing line constraints and places in need of maintenance. The selected chemical industry uses the OEE as a measure to visualise the reliability performance and understand the variables that influence the production outcomes. The authors Chikwendu *et al.* (2020:2) and Singh *et al.* (2018:253) highlight the world-class OEE of 85% as a benchmark for organisations that aim to improve and sustain their performance continuously. Thus, the selected chemical industry practices and applies the same guidelines suggested by the scholars. The aggregated OEE measurement for the three operating divisions forms the study.

2.5 ORGANISATIONAL CULTURE AND RELIABILITY PERFORMANCE

Past research indicated that organisational culture contributes to corporate practices identified with the organisation's performance (Asif & Sajjad, 2018:70; Joseph & Kibera, 2019:1; Tedla, 2016:26; Veazie *et al*., 2019:4). Omazić *et al*. (2020:2), Pathiranage (2019:4), and Wahyuningsih *et al*. (2019:145) say that corporate culture determines the achievement and improvement of the organisation.

Furthermore, Aćimović *et al.* (2021:162) state that many writers consider the corporate culture one of the paramount origins of maintainable competitive advantage. Ramadista and Kismono (2020:302) utter that corporate culture is one possible factor that impacts performance. According to Akpa *et al*. (2021:361), attention to

organisational culture has become a significant part of daily corporate work since performance has been seen to rely upon the organisation's culture. Joseph and Kibera (2019:3) explain that the organisational culture plays an essential capability in demonstrating the way of behaving and performance of the firm through the aggregate endeavours of individual members.

Organisational culture assumes a significant part in the accomplishment of the business unit, and there has been abundant proof of a positive relationship between organisation presentation and culture (Wahyuningsih *et al*., 2019:143). Morcos (2018:3) states that culture-centred organisations enhance their revenue. In addition, Pathiranage (2019:10) claims that unless business leaders set up a compelling organisational culture, the undeniable degree of generalisation drives them to unsatisfactory results.

According to Joseph and Kibera (2019:4), studies evaluating the impact of various organisational cultures on performance have revealed blended discoveries. Calciolari *et al*. (2018:1410) find that the predominant market culture is reliably connected with better competitiveness contrasted with the other organisational culture types, except for clan culture, which does not have a statistically significant coefficient. In support, Joseph and Kibera's (2019:8) study indicates that adhocracy, market, and hierarchical culture positively impact performance and do not support clan culture.

Hierarchy culture breeds structural rigidities making it hard for the company to change inside and respond quickly to outside climate changes (Joseph & Kibera, 2019:3). However, Kuo and Tsai (2019:268) argue that hierarchical structures have clear accountability, control, well-managed work and systematic. Therefore, this culture is organised and procedural, suitable for large companies with a stable market.

In their research, Aboramadan *et al.* (2020:445) prove the connection between corporate culture and a bank's performance, showing a positive link between hierarchical culture and performance. However, Kim and Chang (2019:68) argue that most culture types would do their part in improving corporate performance, except for hierarchy culture. Based on Kuo and Tsai's (2019) and Aboramadan *et al.* (2020)

argument and the risk associated with the selected chemical company, where strict controls, high regulations and procedures guide the organisation, the researcher expects a positive link between hierarchy culture and reliability performance.

From the previous studies shared above, one can infer that organisational culture affects a firm's performance. For any organisation to achieve its strategic goals, it is imperative to deal with the transformation of the corporate culture. Organisations that prioritise culture realise performance improvements and growth. It is worth investigating the influence of the selected chemical company culture on reliability performance because different studies showed and proved a mixture of organisational culture types that influence corporate performance.

2.6 SUMMARY

The chapter offers a systematic approach to conceptualise the organisational culture and its influence on reliability performance as a quantitative indicator of organisational performance. The studied literature adamantly upholds organisational culture at various levels and the importance of this factor in determining how well an organisation performs. The literature review on the origins and significance of corporate culture was reviewed.

Furthermore, the chapters included the four organisational culture models, Handy's, Dean and Kennedy's, Denison's, and Cameron and Quinn's cultural model. Cameron and Quinn's model was selected as a theoretical framework based on its characteristics to achieve the study's objectives.

The CVF highlighted four cultural types, which were discussed: clan, adhocracy, market and hierarchy. This culture used OCAI as a measurement tool; therefore, this culture's relation to six-dimensional constructs formed part of the chapter.

The high-reliability organisation were discussed, including the organisational performance. The chapter covered the plant reliability performance as a dependent variable measured as OEE, with its elements to assess the plant reliability performance of the selected chemical company. The chapter concluded with the organisational culture and reliability performance.

CHAPTER 3 – RESEARCH METHODOLOGY

3.1 INTRODUCTION

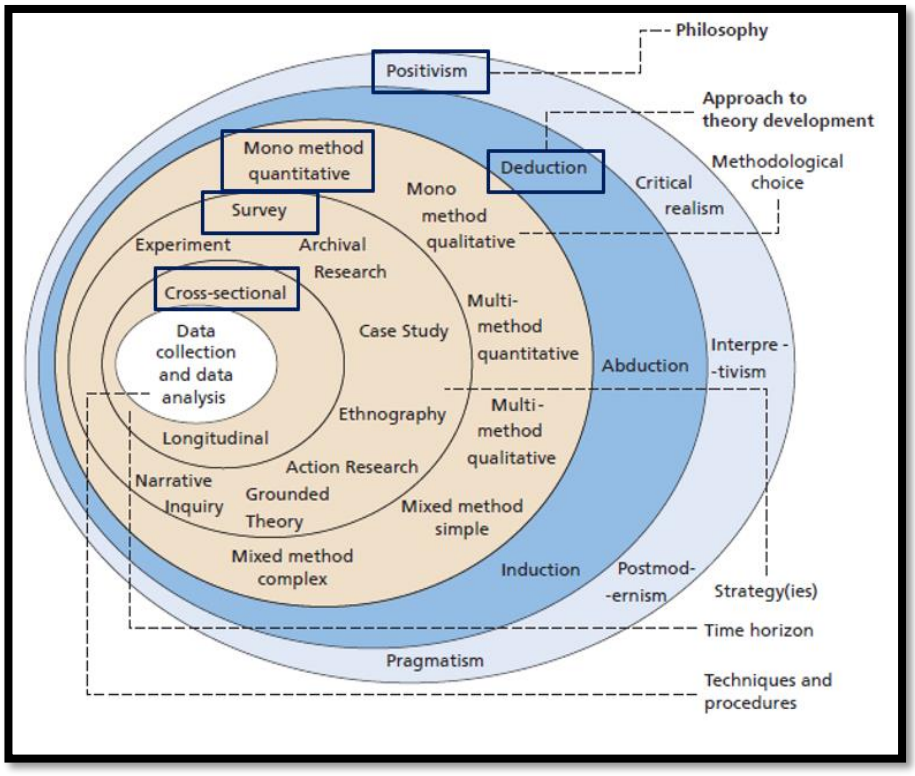
This chapter describes the empirical research performed to determine how the organisational culture affected the plant reliability performance of the chosen chemical plant in South Africa. The section presented details on the research paradigm, approach, methodological choice, study, time horizon, data collection and analysis techniques to achieve the study objectives.

3.2 RESEARCH METHODOLOGY

The research methodology outline the framework followed to fulfil the study objectives. The primary quantitative data collected for the study was in the form of a written questionnaire. Kabir (2016:204) explains primary data as information gathered from direct personal observation and is well-grounded, original and unbiased.

According to Saunders *et al.* (2019:128), how the researcher gathers information has a place in the focal point of the exploration ‘onion’. The Saunders *et al.* (2019:130) graph in Figure 3-1 was adopted to portray the framework for selecting information-gathering methods and investigation techniques. The technique used was a guiding principle to develop a research methodology and the blueprint for the research.

Figure 3-1: Research Onion



Source: Saunders *et al.* (2019:130).

3.2.1 Research paradigm

The term research philosophy alludes to an arrangement of convictions and assumptions about the advancement of information (Saunders *et al.,* 2019:130; Žukauskas *et al.,* 2018:122). According to Žukauskas *et al*. (2018:123), the research philosophy permits the researchers to produce thoughts into information regarding research. There are distinctive research philosophies discussed in the literature (Davies & Fisher, 2018:21; Neuman, 2014:92; Saunders *et al.,* 2019:149; Walsh *et al.,* 2021:75). Saunders *et al.* (2019) share the five significant standards that exist for executives and business research: positivism, critical realism, interpretivism, postmodernism and pragmatism.

Neuman (2014:542) asserts that the positivist perspective maintains that science is impartial, detached, and neutral. Positivism information is presented through factual gathering (Bryman *et al.,* 2014:12). It highlights leading an extremely close, definite perusing of text to secure a significant, profound arrangement. Positivistic philosophy

was adopted because of the importance of obtaining objective and unbiased results through the study.

3.2.2 Research approach

Bryman *et al.* (2014:30) mention that the research approach implies an overall direction to the research lead. Saunders *et al.* (2019) second layer on the model highlight the three research approach, which is more related to testing, building or altering the hypothesis. The research-based request might take one of two potential structures: inductive or deductive (Bhattacherjee, 2012:3).

Neuman (2014:69) articulates that an idea can be developed or supported using the deductive reasoning method, which starts with theoretical relationships and conceptual notions and moves toward more specific empirical data. The research study will be theory-driven and use a deductive approach where one wishes to embrace a defined theoretical stance that will be tested through the data gathering (Saunders *et al*., 2019:51).

If the deductive methodology is embraced, the theory guides the study plan and the translation of results (Neuman, 2014:87). Therefore, the deductive theory was found to be suitable, which allows existing organisational culture theory to deduct testable arguments concerning the plant's reliability performance.

3.2.3 Methodological choice

In Saunders *et al. (*2019) research onion, three methodological choices are available: quantitative, qualitative and mixed-method. Bhattacharjee (2012:35) and Bryman *et al.* (2014:31) state that quantitative information includes numeric scores and measurements. Meanwhile, qualitative information incorporates interviews and monitoring.

Bryman *et al.* (2014:31) state that quantitative research tends to embrace a deductive approach to consolidate the practices and standards of positivism. Of the nature and goals of this research, the suitable research approach undertaken was quantitative.

3.2.4 Research strategy

The next layer after the methodological choice is the research strategy—the technique highlights how the research data can be collected. The survey research involves a cross-sectional plan to gather information fundamentally by questionnaire, which was done to gather a group of quantitative information regarding at least two factors (Bhattacherjee, 2012:73; Bryman *et al.,* 2014:107; Neuman, 2014:49).

According to Bhattacherjee (2012:73), the survey technique has become an exceptionally mainstream strategy for quantitative examination in sociologies. Kabir (2016:204) and Neuman (2014:316) state that the survey is a popular data-gathering technique. Surveys can give exact, dependable and substantial information (Neuman, 2014:317). Since the data was collected through the questionnaires and statistically analysed, adopting the survey research strategy was suitable for the study.

3.2.5 Time horizon

Time is an element of each investigation (Neuman, 2014:44). The time horizon layer explains a specified period in which research occurs. The two types are cross-sectional and longitudinal. Cross-sectional research assembles information at a one-time point. It makes a ‘depiction’ (Neuman, 2014:44). Bryman *et al.* (2014:113) state that longitudinal studies occur over a long time and may add an extra longitudinal component by examining documented data. Longitudinal research is complex and needs additional resources (Neuman, 2014:44). The study gathered data at one point, resulting in cross-sectional adoption.

3.3 STUDY POPULATION

According to Bryman *et al.* (2014:170), the population is the universe of units similar to individuals, countries, urban areas, districts, and firms from which the example is selected. The target population of the organisation was 2 507 employees at the time of compiling the list because the number of employees in the organisation is not static. However, as shown in Figure 3-2, the study’s sample consisted of 651 leaders in the selected chemical company, based in Free State in South Africa, responsible for

maintenance, production and technical support from the three operating units from the point of list compilation.

Table 3-1 illustrates the profile of leaders selected for the study. The permanent leaders were selected based on their influence on organisational culture, knowledge of the reliability performance and the decisions they made that directly influenced the plant reliability performance. For the employees, organisational culture is also crucial, but leaders can transform it using their authority, influence, and innovation (Streimikiene *et al.,* 2021:498).

Figure 3-2: Population graphical presentation

Source: Adapted from Saunders *et al.* (2019:296).

Table 3-1: Selected chemical industry: Target population profile

Operating Area	Vice Presidents	Senior Manager	Area Managers/ Engineering Leads	Foreman / Engineers	Grand Total
Plant A	1	6	38	97	142
Plant B	1	8	38	157	204
Plant C	1	6	32	93	132
Plant D	1	9	42	121	173
Total	**4**	**29**	**150**	**468**	**651**

3.3.1 Sample size

Kaur (2017:48365) states that a sample is a portrayal of a population, which is valuable if it accurately depicts the population. Deciding how many observations or replicates to use in a statistical analysis is known as sample size determination (Kaur, 2017:48365). According to Neuman (2014:269), sample size relies on population attribute, the kind of information investigation to be utilised and the level of trust in sample precision required for research purposes. Hair *et al.* (2019:20) argue that the author must be constantly mindful of how sample size can either make a statistical test too sensitive (at small sample sizes) or too insensitive (at large sample sizes).

There are several available methods for choosing the sample size. These criteria can be categorised into several groups, including population-sample tables, item-sample ratios, and general guidelines for determining sample size (Memon *et al*., 2020:4). The sample-to-item ratio was selected to determine the required sample size.

Hair *et al.* (2019:133) claim that the general recommendation for the ratio of observations to variables is to have at least five times as many observations as variables. A ratio of 10:1 would be considered a more suitable sample size. Some researchers (Memon *et al.,* 2020:4) suggest a minimum of 20 cases for each variable.

Determining the sample size was crucial because it allowed for proper analysis, the desired accuracy level, and the statistical significance's validity (Kaur, 2017:48365). Data were gathered from 651 leaders who made up the sample. Given that the OCAI measuring instrument consists of four factors and 24 items as variables, it was determined that this sample size was adequate for factor analysis and to generate reliable factors.

3.3.2 Inclusion and exclusion

Inclusion criteria are characterised as the critical highlights of the objective population that the agents will use to respond to their examination question, and exclusion criteria are depicted as highlights of the potential examination members (Patino & Ferreira, 2018:84). Some leaders within the operating hubs were excluded. According to Hulley

et al. (2013:142), inclusion and exclusion models aim to distinguish a population where it is achievable, moral, and pertinent to concentrate on the mediation effect on results. Employees with limited access to computers were excluded due to the possibility of completing questionnaires in a group, which might compromise the study outcome. The inclusion and exclusion standards were set for those participating in the review. Table 3-2 below indicates the summary of exclusion and inclusion criteria of the cross-section at the selected chemical organisation.

Table 3-2: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Permanent leaders in selected operating plant	Construction and pilot (test) sites within the selected operating plant
Employees with > 1-year experience	Non-technical / operations employees. e.g. administrators
Maintenance, production and technical support	Employees with limited or no access to computers
All gender, ages and races	OEE measurement for new plants (commissioned in the past two years) and pilot plant
OEE measurement between 2018 and 2020	
Internet users – due to web-based questionnaires	

3.4 SAMPLING STRATEGY

Sampling was required to perform the research study due to the time horizon to be selected, which restricts research from being executed on the entire population. Saunders *et al.* (2019:204) state that it will be difficult to gather or examine all accessible information due to schedule, cost, and access limitations. Sampling is the statistical process of choosing a subset of a population of interest for motivations behind mentioning objective facts and measurable deductions about that population

(Bhattacherjee, 2012:65). The sampling justifies the conclusion and the importance of the survey (Kabir, 2016:216).

3.4.1 Sampling method

According to Kumar (2014:228), sampling in quantitative research aims to draw deductions, regarding the focal point of your enquiry, about the gathering from which you have chosen the sample. The sample should be a representative test to summarise the discoveries to the whole population (Bryman *et al.,* 2014:168). Various studies (Adams *et al.,* 2014:73; Bhattacherjee, 2012:66; Bryman, 2012:181; Bryman *et al.,* 2014:171; Greener & Martelli, 2018:71) discuss two sample techniques as probability and non–probability.

As articulated by Bhattacherjee (2012:67) and Bryman *et al*. (2014:173), probability sampling is wherein every person in the population has an equivalent likelihood of being chosen (a methodical or probabilistic example). On the contrary, non–probability sampling indicates that other units in the population stand a better chance of being selected over others. Creswell (2014:204) suggests choosing a random sample for the quantitative method, but Neuman (2014:248) argues that the non–probability technique can be an alternative if probability sampling is unfeasible, expensive and cumbersome.

Most authors (Bhattacherjee, 2012:69; Bryman, 2012:201; Neuman, 2014:248) describe non–probability sampling characteristics: convenience, snowball, and quota. A convenience sample is simply easy to access (Bryman, 2012:201). Opportunity or convenience sampling is a procedure in which a sample is drawn from that section of the population that is near hand, readily accessible, or convenient (Bhattacherjee, 2012:69).

Since convenience sampling considers the choice of research members given availability and accessibility, the non-probability convenience strategy was selected as appropriate, productive, easy to manage, inexpensive and less exorbitant for the type of study.

3.5 DATA COLLECTION

Data collection is a method of collecting and analysing data on pertinent variables in a predetermined, structured way so one can respond to stated research questions, test theories, and assess results (Kabir, 2016:202). Permission was granted by the gatekeeper, Senior Vice President, and Human Resource Vice President of the selected chemical organisation to access the target population as per Appendix B.

According to Neuman (2014:46), data collection techniques can be grouped into two categories, depending on the data to be collected. The quantitative study was executed in two sections. In section one, the questionnaire was administered to satisfy the independent variable. Section two used the secondary data, existing plant reliability performance data for the dependent variable, measured as OEE.

3.5.1 Primary data collection

The primary data collected was in the form of questionnaires. Bhattacherjee (2012:74) and Bryman *et al*. (2014:382) define questionnaires as a selection of inquiries asked of respondents in a systematised way. The anonymous, self-managed, close-ended and web-based (online) questionnaire was formulated. Kabir (2016:204) contends that questionnaires are a rundown of open-ended or closed-ended inquiries for which the respondents offer responses.

The questionnaire was structured into two segments: Part one was a multiple-choice questionnaire related to the respondent's demographic information such as qualification, years of employment with the company and number of organisations worked.

Part two was derived from the existing CVF organisational culture literature. According to Bryman (2012:264), one can consider utilising questions that different researchers have used as it is a typical practice among researchers. The current OCAI survey questionnaire was adopted to quantify the organisation's culture through the reactions of the company's workers developed by Cameron and Quinn (2011). Formal

permission was granted from Quinn Association to use the questionnaires, and the association granted the consent as per the evidence discussed in section 1.7.2.4.2.

The four different cultural types are represented by a total of 24 items in the OCAI tool (Alsaqqa & Akyürek, 2021:4), consisting of six criteria as discussed below:

Dominant characteristics: Alsaqqa and Akyürek (2021:4) explain that the dominant characteristics are the extent of collaboration and belongingness, the degree of creativity and dynamism, the importance of objectives and competition, the reliance on processes, and the concentration on productivity. What the organisation's defining traits are, or how it functions as a whole (Cameron & Quinn, 2006:151). The specific questions that were asked are shown in Table 3-3.

Table 3-3: Dominant characteristics questionnaires

Dominant Characteristics	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A1. The organisation is a very personal place. It is like an extended family. People seem to share a lot of personal information and features.					
B1. The organisation is a very dynamic entrepreneurial place. People are willing to stick out their necks and take risks.					
C1. The organisation is very result oriented. A major concern is getting the job done. People are very competitive and achievement-oriented.					
D1. The organisation is a very controlled and structured place. Formal procedures generally govern what people do.					

Source: Cameron and Quinn (2006:26).

Organisational leadership: Alsaqqa and Akyürek (2021:4) claim that organisational leadership refers to the management style used within the organisation. The leadership roles of mentorship, facilitator, inventor, distributor, promoter, proprietor, organiser, and monitor are formed. The company's overall management styles and methods (Cameron & Quinn, 2006:151). The questions asked are indicated in Table 3-4.

Table 3-4: Organisational leadership questions

Organisational Leadership	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A2. The leadership in the organisation is generally considered to exemplify mentoring, facilitating, or nurturing.					
B2. The leadership in the organisation is generally considered to exemplify entrepreneurship, innovation, or risk-taking.					
C2. The leadership in the organisation is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.					
D2. The leadership in the organisation is generally considered to exemplify coordinating, organising, or smooth-running efficiency.					

Source: Cameron and Quinn (2006:26).

Management of employees: Table 3-5 indicate the questions asked that are related to this item. Workplace culture, levels of consultation, participation, and agreement are all reflected in how the company manages its workforce (Alsaqqa & Akyürek, 2021:4). Cameron and Quinn (2006:151) added that management of employees is the way that employees are managed, or the manner in which the working environment is characterised by how people are treated.

Table 3-5: Management of employees' questions

Management of Employees	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A3. The management style in the organisation is characterised by teamwork, consensus, and participation.					
B3. The management style in the organisation is characterised by individual risk-taking, innovation, freedom, and uniqueness.					
C3. The management style in the organisation is characterised by hard-driving competitiveness, high demands, and achievement.					
D3. The management style in the organisation is characterised by the security of employment, conformity, predictability, and stability in relationships.					

Source: Cameron and Quinn (2006:27).

Organisation glue: Cameron and Quinn (2006:151) explain the construct as the ties or bonds that hold the organisation together or organisational glue. In addition, Alsaqqa and Akyürek (2021:4) state that organisation bond refers to the principles and practises that bind an organisation together, such as objective congruence, competitiveness, entrepreneurship, trust, and other traits. Specific questions are shown in Table 3-6.

Table 3-6: Organisation glue questions

Organisation Glue	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A4. The glue that holds the organisation together is loyalty and mutual trust. Commitment to this organisation runs high.					
B4. The glue that holds the organisation together is its commitment to innovation and development. There is an emphasis on being on the cutting edge.					
C4. The glue that holds the organisation together is an emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes					
D4. The glue that holds the organisation together is formal rules and policies. Maintaining a smooth-running organisation is important.					

Source: Cameron and Quinn (2006:27).

Strategic emphasis: The organisational strategy is driven by strategic priorities that specify the areas of attention (Cameron & Quinn, 2006:151). The corporate strategy's strong interest outlines what motivates the organisation, such as the long-term productivity of human resources, resilience and competitive edge, innovation, growth, expansion, or achieving goals (Alsaqqa & Akyürek, 2021:4). Table 3-7 illustrates the questions used to answer the specific item.

Table 3-7: Strategic emphasis questions

Strategic Emphasis	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A5. The organisation emphasises human development. High trust, openness, and participation persist.					
B5. The organisation emphasises acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.					

Strategic Emphasis	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
C5. The organisation emphasises competitive actions and achievement. Attaining targets and winning in the marketplace are dominant.					
D5. The organisation emphasises permanence and stability. Efficiency, control and smooth operations are important.					

Source: Cameron and Quinn (2006:28).

Success criteria: Success criteria illustrate how a company defines and awards performance (Alsaqqa & Akyürek, 2021:4). Cameron and Quinn (2006:151) describe the success factors that govern what constitutes triumph, what is honoured, and what is applauded. Table 3-8 shows the questions asked.

Table 3-8: Criteria of success questions

Criteria of Success	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A6. The organisation defines success based on the development of human resources, teamwork, employee commitment, and concern for people.					
B6. The organisation defines success based on having the most unique or newest products. It is a product leader and innovator.					
C6. The organisation defines success based on winning in the marketplace and outpacing the competition. Competitive market leadership is key.					
D6. The organisation defines success based on efficiency. Dependable delivery, smooth scheduling and low-cost production are critical.					

Source: Cameron and Quinn (2006:28).

The complete questionnaires, attached in Appendix C, show the demographic and the construct questions. Quantitative research includes the investigation of implications as attitude scales, for example, the Likert scaling strategy (Bryman, 2012:620).

The OCAI using a psychometric scale or Five-point Likert scale questions was employed. The respondent selected between choices based on '5 – strongly agree, 4 – agree, 3 – neutral, 2 – disagree and 1 – strongly disagree' shown in Table 3-9.

Table 3-9: Five-point Likert scale response and empirical weight

Response	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Empirical weight	5	4	3	2	1

3.5.2 Secondary data collection

The secondary data, numerical technical data representing the OEE report, was presented in section two. According to Greener and Martelli (2018:110), secondary data is information the authors did not obtain directly from respondents and could have been gathered during routine business operations. The historical data from the three operating plants were collected from the organisation's yearly performance report from FY18 to FY21, and the financial year of the selected chemical industry is from July to June. Using secondary data requires knowing where to find it and authorisation (Greener & Martelli,2018:110). The data was taken from the organisation's archives in read-only excel spreadsheet format, and the data is protected to prevent any manipulation. It is publicly available to internal employees. Permission was granted to access the OEE data from the organisation as per the approval letter attached in Appendix B.

The study used the existing or reported plant reliability measures as a dependent variable to assess its actual performance that is influenced by the organisational culture. The OEE data was used in the study for background purposes only; thus, it was not statistically analysed.

Secondary data included the OEE as a percentage and losses categories quality, availability and performance rate (Barletta *et al*., 2014:1101; De Ron & Rooda, 2005:192; Muchiri & Pintelon, 2008:3518). However, the selected chemical industry

uses the same principle for each variable. The planned and unplanned internal and external losses are each measured with the three percentage losses categories. The factors for each category's measurements are shown in Table 3-10.

Table 3-10: Selected Chemical industry OEE losses categories

Internal Planned Losses	Internal Unplanned Losses	External Losses
Shutdowns (%)	Internal availability (%)	Demand (%)
Rate / Utilisation (%)	Rate and quality (%)	Feed and utility (%)
Quality (%)		Supply chain (%)

Due to time constraints, the cascaded OEE data for the whole organisation was used, whereby the three selected plant areas were combined. The recent data was extracted because it meets the latest demands, and the respondents can easily relate to the current reliability performance.

3.6 DATA ANALYSIS

Fowler Jr. (2014:127) emphasises that after a survey has gathered data, it should be converted into a structure fit for analysis. The data analysis process entails identifying and measuring variation in a group of variables, either within the group of variables or between a dependent variable and one or more independent variables (Hair *et al.,* 2019:11). First step is conducted as data preparation followed by response analysis, descriptive statistics, reliability and validity, and secondary data analysis.

The respondent's answers were exported from the cloud-based survey design, survey monkey software, to the SPSS (Statistical Package for Social Sciences) package. According to Bhattacherjee (2012:119), Bryman *et al.* (2014:312), and Field (2009:206), SPSS for windows is the popular software used for quantitative data analysis. Answers were coded to convert the questionnaire into a data matrix**.** Saunders *et al.* (2019:532) state that question responses must be coded before input as one uses a computer to analyse the data.

3.6.1 Data coding

Data is first encoded before being converted to a quantitative form (Bhattacherjee, 2012:119). The questions indicating the four organisational cultures were lumped together with hidden constructs headings. The measured constructs configuration was known to the researcher, prescribing which dominant culture is linked to which construct. Hence the need to code.

Bhattacherjee (2012:119) states that for detailed studies with numerous variables and measurement items, coding is essential to ensure that the data are coded consistently by the coding team and that the coded data is easily comprehended and interpreted by others. Thus the questionnaire was coded to be compatible with SPSS Amos version 27 to link the respondent's responses to the correct constructs and ensure consistency and accuracy. The dominant characteristics, organisational leadership, management of employees, organisational glue, strategic emphasis and success criteria constructs were measured for each organisational culture.

In addition, the four organisational culture types and their linkage to the six OCAI dimensions were coded as shown in Table 3-11. Where A, B, C, D, E and F represent the six constructs discussed in section 4.4.

Table 3-11: OC Questionnaires coding

Organisational culture type	OC type Coding	Items Coding
Clan Culture	OC1	A1, B1, C1, D1, E1, F1
Adhocracy Culture	OC2	A2, B2, C2, D2, E2, F2
Market Culture	OC3	A3, B3, C3, D3, E3, F3
Hierarchy Culture	OC4	A4, B4, C4, D4, E4, F4

Once the coding was completed, the data was cleaned-up. According to Bhattacherjee (2012:120), any empirical data set will inevitably have incomplete information. The respondents are not obliged to answer some of the questions; if a question is vague or overly sensitive, the respondent might not answer it (Bhattacherjee, 2012:120). The missing data were removed. Bhattacherjee (2012:120) attests that most software applications handle missing values during data analysis by automatically deleting the

entire observation if there is a single missing value. The data clean-up enabled the response rate analysis.

3.6.2 Response rate

The total response rate (TRR) is the proportion of all respondents in the original sampling frame who were identified, contacted, determined to be eligible, accepted to engage, and finished the entire questionnaire (Neuman, 2014:342). Neuman (2014:342) states that questionnaire non-response bias percentages vary widely; for academic institutions, they are between 25 and 33%. It happens whenever some selected respondents are unwilling to cooperate, cannot be reached, or cannot provide the necessary data (Bryman, 2012:187; Greener & Martelli, 2018:74).

Greener and Martelli (2018:74) claim that when people are sampled, non-response is a source of non-sampling error that is especially likely to occur. However, Greener and Martelli (2018:74) provide a formula to calculate the response rate:

Equation 1: Total response rate formula

$$\boldsymbol{Total\ response\ rate} = \frac{\boldsymbol{Number\ of\ responses}}{\boldsymbol{Total\ sample - unsatisfactory\ information}}$$

Thus, the total response rate for the study was calculated using the proposed formula.

The collected data were statistically analysed because Greener and Martelli (2018:49) state that data gathering and survey information can be impacted by participant mistakes, participant partiality, analyst error, and analyst bias. The respondent's general information and independent variables (organisational culture) were statistically analysed with IBM SPSS AMOS (Analysis of Moment Structures), version 27.

Descriptive and inferential analysis are two distinct ways statistical tools can be used to analyse numerical data (Bhattacherjee, 2012:119; Creswell, 2014:192). On the contrary, Greener and Martelli (2018:89) argue that there are three types of statistics:

descriptive, correlation, and inferential. As Greener and Martelli (2018) explained, three types of statistics were employed for the study.

Greener and Martelli (2018:53) claim that descriptive statistics are frequently used in descriptive research as the statistical technique for its evaluation. According to Gosselin (2019:29), researchers may prefer to use so-called descriptive statistics to explain the samples' features. The descriptive analysis was carried out for respondents' demographic information and each item of the constructs from the questionnaires, and each mean and standard deviation was analysed and discussed. Univariate analysis was conducted, given that only a single variable at a time was considered (Field, 2009:650; Greener & Martelli, 2018:86).

The correlation coefficient, in particular, is employed in correlational statistics to evaluate the connection between two or more variables (Field, 2009:783; Greener & Martelli, 2018:89). Thus, correlation statistics were conducted to measure the relationship between the respondent's demographic information and the organisational culture constructs.

Neuman (2014:422) define inferential statistics as a field of mathematical modelling that uses random sampling and enables scholars to make exact claims about the degree of confidence they can have that measurements in a sample are equivalent to population characteristics. According to Field (2009:49), inferential statistics help confirm or disprove the hypothesis by revealing whether it is likely true. Bhattacherjee (2012:129) argues that inferential measurements vary from descriptive ones in that they are expressly intended to test hypotheses. In this study, it is crucial to determine whether sample results generalise to the population and assess whether results are significant enough to suggest that a relationship is genuine and not just the consequence of chance, as highlighted by Neuman (2014:422).

3.6.3 Descriptive statistics

Simple descriptive statistics with mean and variance can validate a questionnaire's constructs (Yin *et al.,* 2016:99). The standard deviation, minimum, maximum and mean were calculated to report the data analysis. Standard deviation is a single-

variable measurement of distribution that shows the typical distance between the scores and the mean (Neuman, 2014:401). According to Greener and Martelli (2018:86), a higher standard deviation indicates greater dispersion from the mean.

3.6.4 Inferential statistics – Validity and reliability analysis

Greener and Martelli (2018:53) claim that by using inferential statistics, the researcher can extrapolate statistically sound generalisations from a sample to the entire population. Field (2009:32) states that if one wants to draw correct conclusions, the statistical model developed must accurately reflect the data gathered (the observable data). Behavioural researchers frequently put forth theoretical process models that explain how certain hypothetical elements might affect or "cause" other hypothetical factors (Hair *et al.,* 2019:601).

3.6.5 Reliability

The second factor is the tool's ability to be consistently construed in various contexts (Field, 2009:9). Reliability is the ability of an instrument to be consistently interpreted in various contexts (Field, 2009:11; Hair *et al*., 2019:763). According to Hair *et al.* (2019:761), Cronbach's alpha, a metric for internal consistency reliability that ranges from 0 to 1, is based on the assumption that all indicators have equal (unadjusted) loadings. (Hair *et al.* 2019:8) claims that Cronbach's alpha yields lower results than composite reliability because the items are not weighted, a less accurate reliability indicator.

The authors argue that composite reliability is more appropriate when SEM is utilised with reflectively measured constructs. Despite that, Cronbach's alpha is still considered a conservative indicator of the reliability of content validity (Hair *et al.,* 2019:761). The adopted Cronbach's alpha was selected because it measures people's perceptions of organisational culture. The development of scales designed to assess perceptions and other emotion constructs is frequently reported to have used alpha (Taber, 2017:3). Thus, Cronbach's alpha was used as a preferred method to measure the reliability of the study.

The OCAI questionnaires were used and tested before, and the previous studies have tested their reliability and validity. Thus, sending the questionnaires for testing was optional before data gathering. Tests for validity and reliability were necessary because organisational cultures change over time.

According to Field (2009:674), There is also a standard version of the coefficient, which primarily employs a relatively similar equation except for the utilisation correlation coefficients. Therefore, the selected Cronbach alpha used the formula with correlations. The Cronbach's alpha adopted from Field (2009:674) is expressed as follows:

Equation 2: Cronbach's Alpha formula

$$\alpha = \frac{N^2\overline{cov}}{\sum S^2_{item}+\sum cov}$$

The top data indicates the number of items and covariance between items, and the below information shows the sum of the components in the correlation matrix of items used in the equation's bottom half. According to Bryman (2012:174), Field (2009:675), and Hair *et al*. (2019:776), Cronbach's α value below 0.7 is unacceptable and indicates unreliable data. Although Kline (2011:70) argued that there are no absolute minimums for coefficients that define "excellent" score reliability, the following recommendations were instead suggested: reliability coefficients in the range of 0,90 are regarded as exceptional, those in the range of 0,80 as very good, and those in the range of 0,70 as sufficient. A value of less than 0,50 is considered unsatisfactory.

3.6.6 Validity analysis

Inferential statistics can be divided into parametric and non-parametric categories (Greener & Martelli, 2018:89). Field (2009:32) claims that if one wants to draw correct conclusions, the statistical model developed must accurately reflect the data gathered (the observable data). Behavioural researchers frequently put forth theoretical process models that explain how certain theoretical elements might affect or "cause" other theoretical factors (Hair *et al*., 2019:601).

Field (2009:786) states that factor analysis is a multivariate method for determining if the correlations between a group of observed variables are based on the fact that they are connected to one or more latent variables in the data, each of which takes the shape of a linear model. According to Hair *et al.* (2019:23) and Knekta *et al.* (2019:6), the two distinct kinds of factor analysis are confirmatory and exploratory. They are the best methods to analyse the variables' structure (Hair *et al.,* 2019:25).

A data set's fundamental characteristics can be investigated using Exploratory factor analysis (EFA). As a result, EFA can clarify the connections between various concepts and structures and contribute to creating new ideas (Knekta *et al.,* 2019:6). On the contrary, A conceptual approach suggested earlier is supported by CFA. Using CFA, the researcher is determining whether the data they have gathered validates a model that has been proposed (Knekta *et al.,* 2019:7).

The organisational culture constructs developed by Cameron and Quinn (2011) are well understood, tested and used in the past. Knekta *et al. (*2019:7) added that CFA might be relevant when a writer uses an existing questionnaire with a defined structure and a comparable respondent demographic. Some authors (Cameron & Quinn, 2006; Huy *et al.,* 2020; Wudarzewski, 2018) utilised and validated the OCAI questionnaire in the prior study.

Hair *et al.* (2019:27) state that in CFA, the scholar can evaluate each scale item's input and how accurately the scale reflects the idea (reliability). According to Hair *et al.* (2019:131), the researcher is better off analysing each set independently for their distinctive structure rather than in a combined analysis because EFA analysis cannot differentiate between groups of variables, as can be accomplished in CFA. Maat *et al.* (2015:642) state that one approach is to use CFA to validate questionnaires. Due to the study's objective and the CFA statistical technique's characteristics that suit the study, the CFA model was selected.

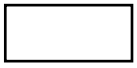
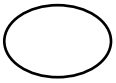
Blunch (2008:127), Kline (2011:91), and Knekta *et al. (*2019:9-11) highlighted the six fundamental steps as follows:

3.6.6.1 Defining the standard

The specification displays the concepts as SEM (Kline, 2011:912). According to Hair *et al.* (2019:661), path diagrams are graphical representations that can illustrate SEM. Kline (2011:92) iterates that academics frequently create a model diagram as the first step in the definition process, utilising a collection of more or less common graphical symbols. A path diagram shows the theoretical arrangement of connections and restraints between particular measured variables, the theories linked to them, and the interconnections among the concepts (Hair *et al.,* 2019:662). These authors (Blunch, 2008:127; Hair *et al.,* 2019:662; Kline, 2011:95; Knekta *et al.,* 2019:7) explain the symbols and description of the path model diagram, which are illustrated in Table 3-12.

An estimation relationship links latent constructs to the relevant, measurable variables (Hair *et al.,* 2019:610). Furthermore, Blunch (2008:5) claim that since latent variables cannot be observed directly, they are evaluated using manifest variables, items from a questionnaire. Reflective versus formative measurement models are two different measurement strategies resulting from the differing causality directions (Hair *et al.,* 2019:668).

Table 3-12: Symbols and description of the path models diagrams

Symbols	Description
	The shape illustrates the observable or measured variables
	The image represents the latent variables
	Single-headed arrows from the latent construct to the measured variable, also known as factor loadings, are used to illustrate the links between the variables.
	Two-headed curving arrows are used to represent correlational (or covariance) connections.

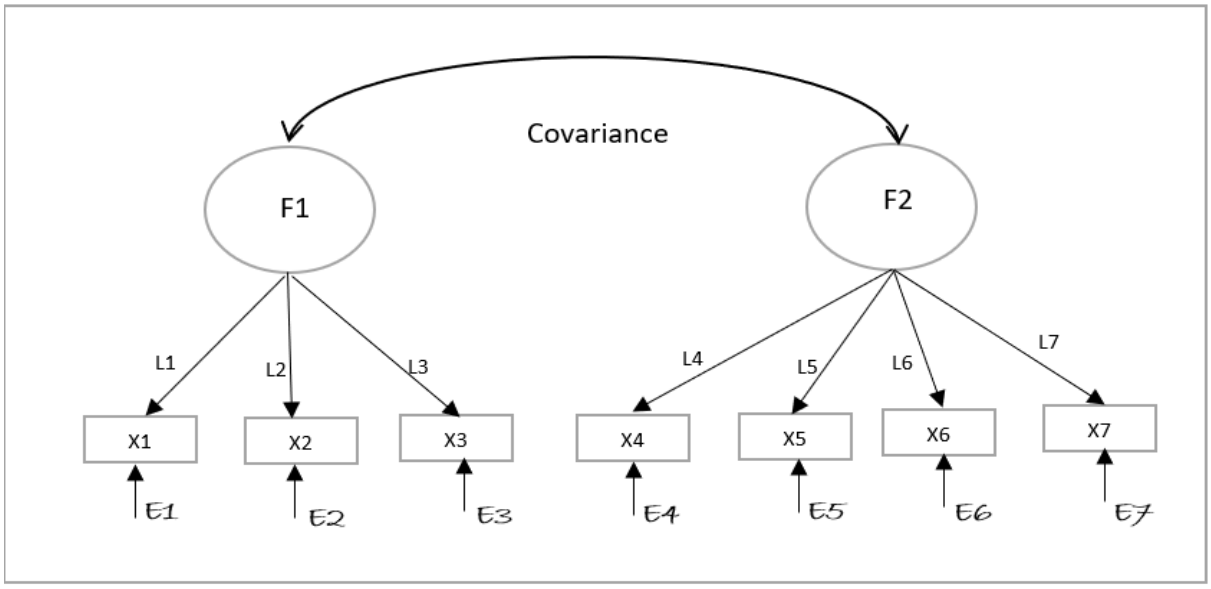
The suitable model for the analysis was determined to be a reflective measurement model with the error terms. Reflective indicators assume that the construct “causes” the measurement (or, more specifically, the covariation) of the indicator variables, as indicated by the direction of the arrows, which point from the construct to the indicator variables (Hair *et al.,* 2021:7).

Hair *et al. (*2019:612) mentioned that a construct is somewhat endogenous whenever it is connected to other constructs or factors in addition to its indicators or error variance terms. Exogenous constructions are incompatible with construct dependencies, and exogenous or endogenous constructs may be necessary for endogenous constructs to function (Hair *et al.,* 2019:700).

The five components for creating a measurement model when conducting a CFA are highlighted by Hair *et al.* (2019:662) as follows: latent structures are first listed, followed by measured variables (indicators), then item loading patterns on various constructs, linkages between constructs, and error variance and covariance terms for each indicator.

Assessment connections for the items and concepts, confirmatory factor relationships among the structures, and item error terms are used in the description of the complete measurement model (Hair *et al.,* 2019:628). Figure 3-3 is an illustration of a sample measurement model, and there are 15 estimated values in the model. Seven loading estimates, seven error estimates, and one estimate of the correlation between constructs are among the 15 free parameters. Each variable’s loading, or how closely it is connected to the construct, is estimated for each arrow connecting a construct to a measured variable.

Figure 3-3: Complete sample measurement model



3.6.6.2 Model identification

Each factor must be given a scale to achieve identification, either by fixing its variance or one of its regression weights, and the same is true for the error terms (Blunch, 2008:129). Knekta *et al. (*2019:9) state that some techniques include unweighted least squares, maximum likelihood, robust maximum likelihood, principal axis factoring, alpha factoring, and picture factoring.

According to Blunch (2008:131) and Hair *et al.* (2019:670), one of two methods must be used to accomplish setting the scale for both exogenous and endogenous constructs:

- Setting a particular value for one of the factor loadings on each construct.
- Adjust the construct's variance value.

Due to the usage of AMOS, the software automatically limits, or restricts, one of the factor loading estimations to "1" (Hair *et al.,* 2019:670). However, Hair *et al.* (2019:671) argue that it should be noted that setting a loading to "1" does not indicate a complete correlation when defining the scale of a build.

Although factor loadings of ± 0,30 to ± 0,40 are minimally acceptable, values greater than ± 0,70 are generally considered necessary for practical significance (Hair *et*

al., 2019:153). Field (2009:644) mentioned that researchers consider a loading significant if its absolute value is greater than 0,3. However, the sample size will determine how vital factor loading is. Hair *et al.* (2019:152) suggested the approaches be used for determining significant factor loadings founded on sample size.

3.6.6.3 Estimating the model

The necessary mathematical characteristics for identification are the order and rank conditions (Hair *et al.,* 2019:671). The rank constraint specifies the number of degrees of freedom, and the order condition specifies that each parameter must be predicted via a different relationship (Hair *et al.,* 2019:671). Kline (2011:101) explains that another restriction that needs to be included in the design is the total number of parameters that can be calculated. The sum is constrained not by sample size but by the number of observations available for analysis (Knekta *et al.,* 2019:9).

Equation 3: Number of observations

$$Number\ of\ observations = \frac{v(v+1)}{2}$$

A straightforward Equation 2 can be used to get the number of observations, where v is the total number of observed items (Kline, 2011:101). Knekta *et al.* (2019:10) argue that the estimated parameters must be less than the number of variances and covariances observed to evaluate if the data fit the theoretical model. The model's degree of freedom is the difference between the number of observations and the number of its parameters (Kline, 2011:101). Kline (2011:102) further state that the condition that there must be at least the same number of observations as parameters can be stated as the condition.

In summary, Knekta *et al.,* 2019:10 provide a thumb of rule for the model's degree of freedom as explained below:

- dfm <0 –under-identified, bad
- dfm = 0 – just identified, neutral
- dfm > 0 – over-identified, good

According to Hair *et al. (*2019:671), the researchers use more generic rules like the three-indicator rule due to difficulties in establishing the rank condition. Furthermore, the rule is acceptable when all factors in a congeneric model have at least three indications. Each of the four factors in the study comprises six indicators, which satisfy the proposed three-indicator rule.

3.6.6.4 Correlational statistics

The strength of the linear connection between two ranking or quantitative variables can be quantified using a correlation coefficient (Greener & Martelli, 2018:89; Saunders *et al*., 2019:615). Furthermore, Saunders *et al*. (2019:615) state that the correlation coefficient is typically denoted by the letter $\boldsymbol{r_s}$. This coefficient can have any value between plus one and minus one, and perfect positive and negative correlations are represented by a value of + 1 and a - 1, respectively. 0,00 denotes the absence of any relationship between the variables (Greener & Martelli, 2018:89).

The formalised scientific method employs statistical significance to establish whether to accept or dismiss a null hypothesis. In addition, when results are referred to as statistically significant, they are unlikely to be the consequence of random variables (Neuman, 2014:422). Greener and Martelli (2018:93) argue that it is common to suggest that a p-value of 0.05 or lower is acceptable.

Bivariate and partial correlations are the two distinct types of correlation. A partial correlation examines the relationship between two variables while “controlling” the impact of one or more additional variables, as opposed to a bivariate correlation, which examines the correlation between two variables (Field, 2009:175). Spearman’s rho is a model of the bivariate correlation coefficient. Field (2009:794) define Spearman’s correlation coefficient as a standard indicator of how closely two variables are related that does not rely on the premises of a parametric test.

Since Spearman’s rho, $\boldsymbol{r_s}$, is a non-parametric statistic, it can be employed in situations where the data do not conform to parametric assumptions, for instance, when the data are not normally distributed (Field (2009:179). Spearman’s rho requires only ordinal data for both variables (Field, 2009:186), which suits the Likert scale used for the study.

Table 3-13, as suggested by Mukaka (2012:71), illustrates the interpretation of the correlation.

Table 3-13: Correlation interpretation guideline

Measurement rating	Description
0,00 - 0,30	Negligible correlation
0,30 - 0,50	Weak correlation
0,50 - 0,70	Average correlation
0,70 - 0,90	Solid correlation
0,90 - 1,00	Significant correlation

Source: Mukaka (2012:71).

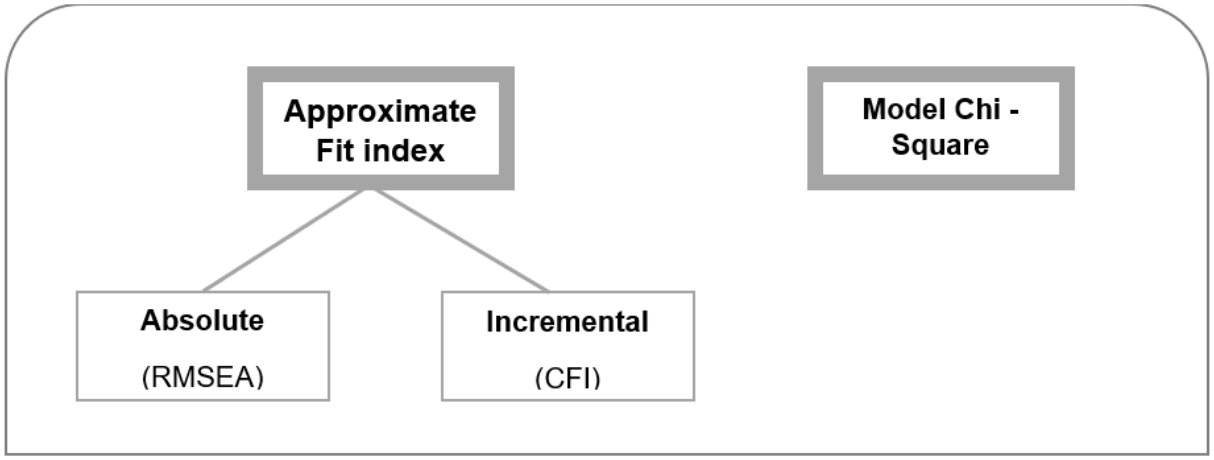
3.6.6.5 Assessing Measurement Model Validity

According to Hair *et al.* (2019:685), the next step is to evaluate the outcomes of testing this measurement theory by contrasting the idealised measurement model with the sample covariance matrix's representation of reality. Hair *et al.* (2019:635) claim that the user-specified model's ability to replicate the observed correlation matrix among the indicator items statistically is measured by its goodness-of-fit (GOF). A model test static determines if the covariance matrix suggested by the researcher's model is sufficiently similar to the covariance matrix of the sample that the discrepancies could be safely attributed to sampling error (Kline, 2011:193).

Figure 3-4 illustrates the overview of the measures of model fit employed in the study. Before conducting the study, the researcher should choose the model fit indices to employ and the cut-off values that will be regarded as a reliable measure of the model fit the data (Knekta *et al.,* 2019:10).

Hair *et al.* (2019:604) and Knekta *et al.* (2019:10) claim that the model chi-square test is the statistic that most closely resembles an omnibus test of model fit. Hair *et al.* (2019:671) defined the chi-square as the statistical measure of fit between the observed and conceptually inferred predicted covariance matrices. As a result, it empirically evaluates a given theoretical structure's validity (Hair *et al*., 2019:604).

Figure 3-4: Measures of model fit employed in the study



Source: adapted from UCLA (2021).

Estimators robust against nonnormality, such as maximum-likelihood estimation with solid standard errors (MLR) or weighted least-squares estimation (WLS), are frequently appropriate for conducting CFA (Knekta *et al.,* 2019:9). Hair *et al.* (2019:635) and Kline (2011:201) argue that chi-square is directly proportional to the sample size.

Similarly, the number of observed variables and constrained parameters affect the predicted correlation matrix, so the model degrees of freedom raise the chi-square GOF value (Hair *et al.,* 2019:635). The normed chi-square metric is calculated by dividing the value by the degrees of freedom (CMIN/DF), which measures the Minimum Sample Discrepancy divided by Degrees of Freedom (CMIN/DF) (Hair *et al*., 2019:638). Overall, better-fitting models have CMIN/DF ratios of about 3:1 or less (Hair *et al.,* 2019:638). Maat *et al.* (2015:643) confirm that relative chi-square (CMIN/DF) values are recommended to be set as significant as 5, which helps to lessen the dependence on sample size. Researchers created various goodness-of-fit measures to offer various viewpoints on model fit (Hair *et al.,* 2019:636). Thus, the study explored other model fits.

Kline (2011:204) states that the four approximate fit indexes, Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Comparative Fit Index (CFI), and Standardised Root Mean Square Residual (SRMR), are among the most widely used. However, the study selected one absolute (RMSEA) and incremental (CFI), as

shown in Figure 3-4. Absolute fit indices provide a clear indicator of how effectively the researcher's chosen model replicates the data under study (Hair *et al.,* 2019:637).

According to Hair *et al.* (2019:637), the RMSEA is one of the most commonly employed metrics that try to adjust for the propensity of the chi-square GOF test statistic to reject models with large samples or a high number of observable variables. It specifically tries to account for the model's sample size and complexity in its analysis (Hair *et al.,* 2019:637). Blunch (2008:116) states that models with RMSEA values greater than 0,10 should not be approved, and values about 0,05 indicate an acceptable fit. Hair *et al.* (2019:637) state that lower RMSEA values indicate a better fit. McDonald and Ho (2002:72) claim that the authoritative argue that an RMSEA less than 0,05 equates to a "good" fit, and less than 0,08 equates to an "acceptable" fit was commonly accepted by those who relied on the RMSEA

In contrast to absolute fit indices, incremental fit indices evaluate how well the predicted model fits compared to a different baseline method (Hair *et al*., 2019:638). Kline (2011:208) argues that the incremental fit index (CFI) indicates how much better a model fits the study's data than a baseline method, usually the independence model. CFI higher values indicate a better fit and are validated so that values range from 0 to 1 (Hair *et al.,* 2019:639; van Laar & Braeken, 2021:2). The CFI has emerged as the index most frequently provided in complement to the chi-square and degrees of freedom (Hair *et al.,* 2019:637).

According to the general CFI rule of thumb, the CFI must be at least ≥ 0,95 to be considered adequate goodness of fit; or else, if CFI < 0,95, the model should be turned down (van Laar & Braeken, 2021:7). However, other authors, as highlighted by Kumar *et al.* (2019:33) propose the CFI ≥ 0,9 to be acceptable.

3.7 ETHICAL CONSIDERATIONS

As it relates to the welfare of and the interactions of sentient creatures, ethics is a systematic approach to comprehending, analysing, and differentiating problems of morality and wrong, good and evil, and commendable and lamentable (Butts & Rich, 2019:4). Adherence to ethical principles is required to ensure compliance. The

university panel might need to verify compliance to show that the authors have considered moral issues that may emerge from the review (Bryman *et al.,* 2014:120).

According to Fowler Jr. (2014:140), researchers should consider ethical issues when undertaking human interaction research. The following ethical principles by Hulley *et al.* (2013:209-210) were considered: respect for persons, beneficence and justice stipulated.

- The principle of respect for person mandates that researchers obtain informed and voluntary permission from research respondents, permit them to revoke their permission at any time and safeguard respondents with diminished decision-making capacity. The informed consent, attached as Appendix D, was included and made compulsory in recognition that every person has the right to decide whether or not to participate in research.
- According to the beneficence principle, risks must be kept to a minimum, and the scientific understanding learned from the study must balance the inconvenience and danger to research respondents. The researcher is an employee at the studied organisation but working in a different division from the targeted population. The human resources representative extracted the employee information from the employee (HR) payroll list, and survey monkey was used. The research questionnaire did not request personal information that can identify the individuals. Consequently, no respondents suffered harm.
- The distribution of the advantages and disadvantages of research must be equitable in order to uphold the justice concept; if alternative populations would also be suitable to answer the study questions, disadvantageous and vulnerable populations should not be recruited explicitly as participants. The target population was all leaders in operations, and everyone was included to ensure justice.
- No rewards or compensation were paid to the respondents because the participants did not incur additional charges, and the time to complete the questionnaires was insignificant.
- A qualified or competent statistician from the North West University statistical department was used for data analysis to ensure data integrity and that data is not misinterpreted.

- The deception was irrelevant to this study because the study's goals were specific and not harmful. The permission to access the population and secondary data was requested and approved by the organisation and the gatekeeper, as indicated in section 3.2.8.

Completed returned surveys were accessible to the stakeholders directly involved with the study. Due to the online web-based platform, computer access is password secured and encrypted. The access to survey monkey was subscribed for a year. Afterwards, access to the information will be unavailable and destroyed.

The Protection of Personal Information (POPI) Act took effect on the 1st of July 2021, focusing on personal data protection for citizens. The Act requires the processing of only important information with a provided motivation. Procedures for ensuring privacy incorporate coding research information, securing or obliterating the key that recognises members, and restricting staff who approach identifiers (Hulley *et al.,* 2013:215). Therefore, the following demographic questions were not asked: age, gender, level/position of employment in the organisation, plant currently working under and the population group. These questions are explicit identifiers.

The researcher adhered to the academic code of conduct stipulated in Appendix E. The approved application for ethical clearance requested by the research ethics committee at the North West University Faculty of Economics and Management Sciences is included in Appendix F.

3.8 SUMMARY

The chapter outlines the research methodology employed to achieve the study objectives. The research methodology was structured and guided by the research 'onion' developed by Saunders *et al.* (2019:130). In addition, the ethical consideration was discussed. The empirical study is summarised in Table 3-14 below.

Table 3-14: Study methodology summary

Research Layer	Suitable chosen study method
Research Paradigm	**Positivism** – is a coordinated strategy for consolidating deductive rationale with accurate empirical perceptions of individual conduct to find and affirm probable causal laws utilised to anticipate general examples of human action (Neuman, 2014:97). The theory was investigated to describe the influence of independent variables on the dependent variable.
Research Approach	**Deductive** – The hypothesis guides the research (Bryman, 2012:19). The intent is to establish an assumption about the organisational culture predicated on widely acknowledged facts or principles.
Methodological Choice	**Mono-method – Quantitative** data is mathematical and can be numerically figured (Kabir, 2016:203). Examination of mathematical patterns for the study.
Research Strategy	**Survey** – Bhattacherjee (2012:39) states that field surveys are non – experimental plans that do not control free factors yet measure these factors and test their belongings utilising factual techniques. Questionnaires were sent to the respondents.
Time Horizon	**Cross-sectional** – Bhattacherjee (2012:39) mentioned that independent and dependent factors are estimated points similarly on the schedule in cross-sectional field surveys. The study was conducted over a short period (One year).
Sampling	**Non-probability, convenience strategy –** Neuman (2014:248) argues that the non–probability technique can be an alternative if probability sampling is unfeasible, expensive and cumbersome. A list of respondents was available and easily accessible.
Technique and Procedure	Self-completion survey questionnaires were collected and analysed using the SPSS, AMOS version 27, tool. Descriptive, correlation and inferential analysis were employed. CFA and Cronbach's alpha are used.
Ethical Consideration	Informed consent, permission to access the target population and secondary data, ethical clearance and POPI Act consideration

CHAPTER 4 – RESULTS AND DISCUSSION

4.1 INTRODUCTION

The chapter presents study results on descriptive statistics, CFA analysis, and the correlations between variables. The strategy was to assess each aspect and ascertain how it affected the performance of the company's reliability.

Firstly, the response rates and descriptive statistics are presented, and these show the characteristics of each measured construct on the questionnaire. The CFA was utilised to confirm the validity. By using the CFA technique, researchers can assess how well the observed data represents a collection of latent theoretical constructs (Hair *et al*. (2019:658). The reliability (Cronbach's alpha) of the constructs was discussed as well as Spearman's rho correlation coefficient assessment. The chapter concludes with a summary.

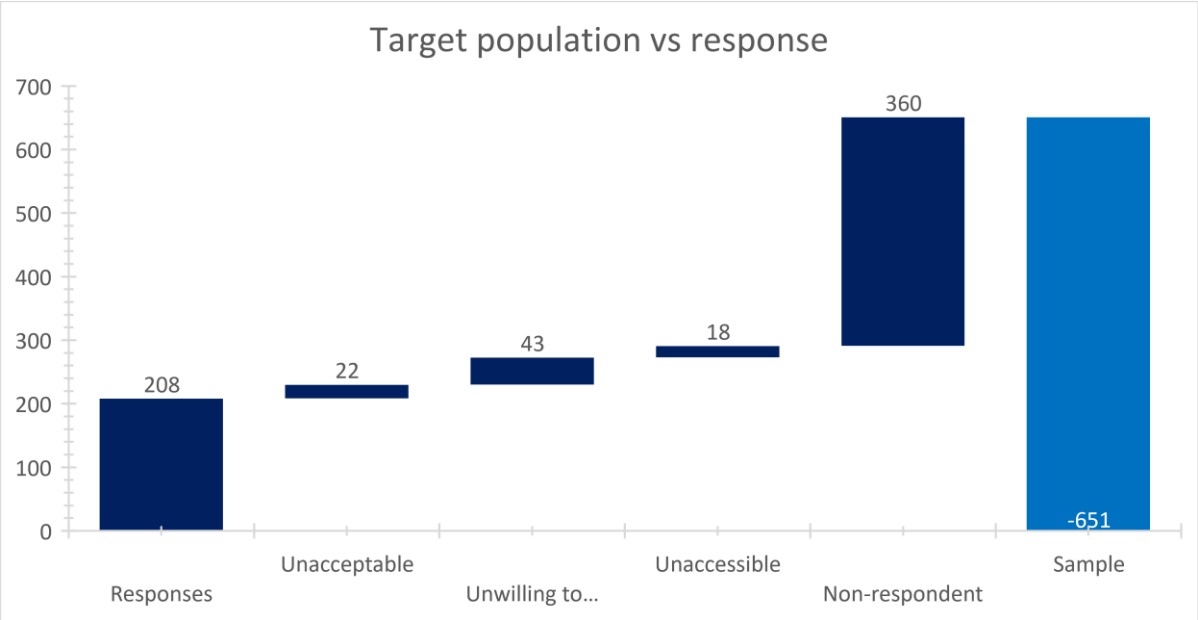
4.2 RESPONSE RATE

The questionnaires were distributed to 651 leaders within the selected chemical industry. Figure 4-1 illustrates the target population and response numbers that participated in the research.

After reaching the questionnaire saturation point, 360 did not respond, and 18 were unreachable because they had left the organisation. Two hundred seventy-three respondents (273) participated. Out of these, 43 opted out in the middle of the survey (did not complete the survey), and 230 did complete it.

Of the completed 230 responses, 22 had questionnaire gaps (missing data) and could not be used in the analysis.

Figure 4-1: Responses summary



The response rate was, therefore, 43%, calculated using the formula in section 3.6.2. as shown below:

$$Total\ response\ rate = \frac{Number\ of\ responses}{Total\ sample\ -\ unsatisfactory\ information}$$

$$= \frac{273}{651-22} = 43\%$$

Effectively, 208 had complete responses. Thus, the study was analysed and concluded based on 208 respondents.

4.3 PART ONE – DEMOGRAPHIC RESULTS

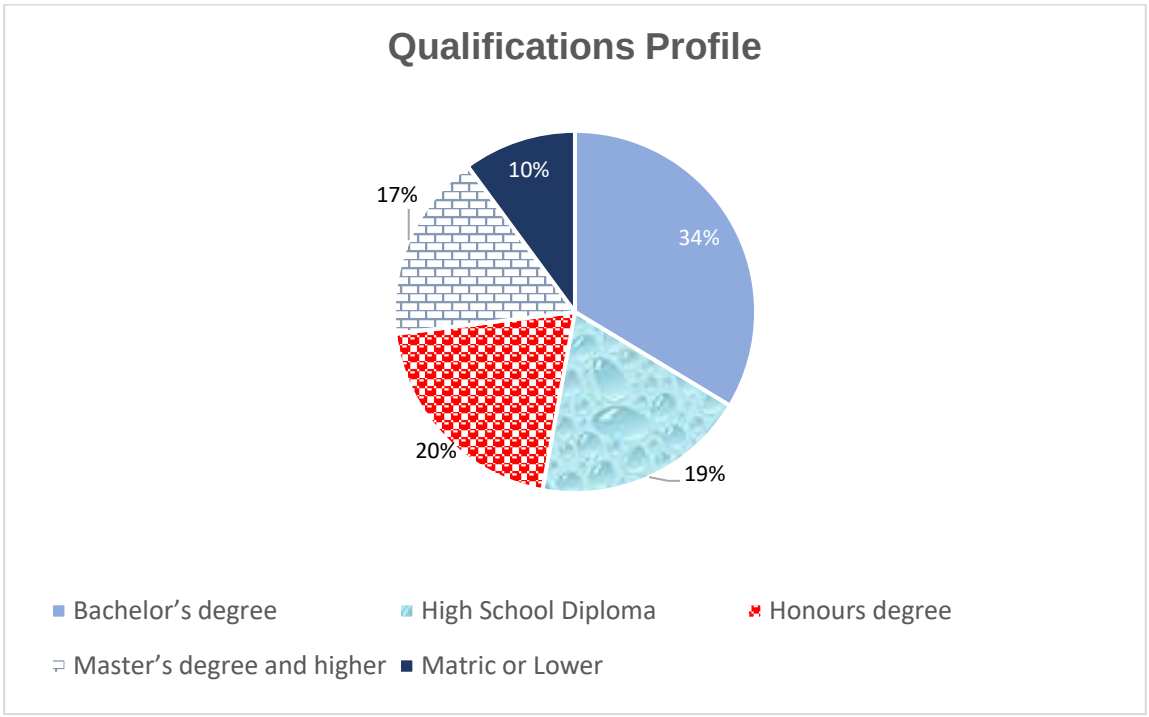
The section focuses on the respondent's demographic results, and the respondents were asked three questions: about their qualifications, years of experience and the number of organisations they worked for.

4.3.1 Respondent's qualifications

Figure 4-2 indicates the respondent's qualification profile. The results show that the majority (34%) of the sample hold bachelor's degrees, and few have matric (10%) or

lower. Most respondents have completed tertiary qualifications, so they can evaluate the data and deliver the most accurate or reliable results. In general, 90% of the sample has at least a diploma.

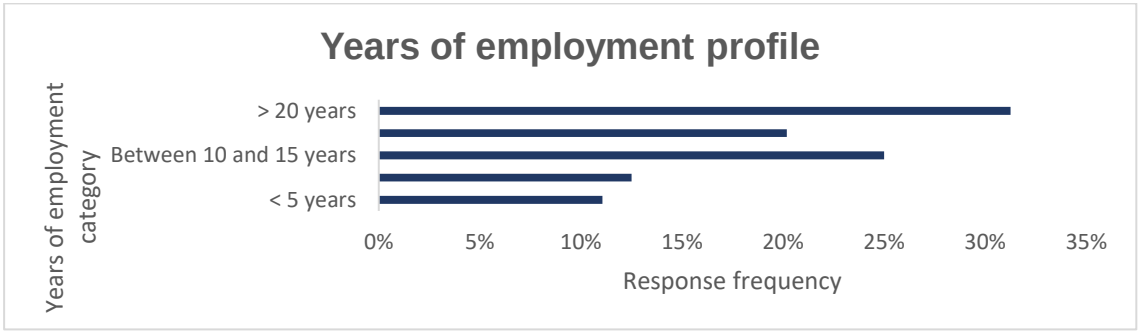
Figure 4-2: Qualifications profile



4.3.2 Years of employment question

Figure 4-3 shows years of employment profile. The outcomes show that the sample consists of considerably experienced individuals at the company. Thirty-one per cent (31%) of the respondents worked for more than 20 years, and only 11% have less than five years in the industry or working environment.

Figure 4-3: Years of employment categories



4.3.3 Number of organisations worked for question

Table 4-1 illustrates the number of organisations the respondents worked for and the results. The results show that 48% of the sample has worked for two to three companies, and very few, two percent have worked for more than seven companies. It is also observed that 33% of the respondents have worked only for the company under study.

Table 4-1: Organisations worked for profile

Number of organisations worked for	1	2 - 3	4 - 6	> 7
Respondent's frequency	33%	48%	17%	2%

4.4 PART TWO – CONSTRUCTS RESULTS

Part two provides the descriptive results feedback of the organisational culture questionnaire. The section is categorised into three segments, the explanation of the constructs summary or overview, and the constructs link to organisational culture type.

The section provides the descriptive means and standard deviations on the six constructs of the organisational culture questionnaire. These constructs were:

- Dominant characteristics
- Organisational leadership
- Management of employees
- Organisational glue
- Strategic emphasis, and
- Success criteria.

The mean scores were interpreted as shown in Table 4-2:

Table 4-2: Likert scale interpretation

Mean score	Explanation
<1	Strongly oppose
1 – 2	Oppose

Mean score	Explanation
2 - 2,9	Somewhat oppose
3	Average
3 - 3,4	Somewhat support
3,5 – 3,9	Support
> 4	Strongly support

4.4.1 Dominant characteristics constructs

Table 4-3 illustrates the respondent's results regarding the dominant characteristics.

Table 4-3: Dominant characteristics descriptive results

Dominant characteristics construct		
Items	**Mean**	**Std. Deviation**
A1. The organisation is a very personal place. It is like an extended family. People seem to share a lot of personal information and features	3,55	1,094
A2. The organisation is a very dynamic entrepreneurial place. People are willing to stick out their necks and take risks.	2,87	1,095
A3. The organisation is very result oriented. A major concern is getting the job done. People are very competitive and achievement-oriented.	3,74	0,923
A4. The organisation is a very controlled and structured place. Formal procedures generally govern what people do.	4,06	0,941
	3,55	**1,01**

Item A4 scored the highest at 4,06. This shows that the organisation is highly controlled and structured and highly formal in its approach to business. Secondly, a score of 3,74 on A3 indicates that the process is result oriented as well.

The outcome shows an overall mean value of 3,55, which means that the respondents recognise the dominant characteristics within the organisation. The SD of 1,01 indicates a dispersion much more centred on the mean. Respondents show support on items A3 (M=3,74; SD=0.923) and A1 (M=3,55; SD=1,094), which indicates that although the company drives performance, it is also caring.

A poor response rate of 2,87 indicates that the company has a subdued entrepreneurial environment.

4.4.2 Organisational leadership

Table 4-4 shows the organisational leadership construct's mean (3,39) and SD (1,02).

Table 4-4: Organisational leadership descriptive results

Organisational leadership construct		
Items	**Mean**	**Std. Deviation**
B1. The leadership in the organisation is generally considered to exemplify mentoring, facilitating, or nurturing.	3,56	1,048
B2. The leadership in the organisation is generally considered to exemplify entrepreneurship, innovation, or risk-taking.	3,00	1,070
B3. The leadership in the organisation is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.	3,35	1,043
B4. The leadership in the organisation is generally considered to exemplify coordinating, organising, or smooth-running efficiency.	3,64	0,917
	3,39	**1,02**

The respondents support the company's core management styles and strategy, and the distribution is centred around the mean. B4 (M=3,64; SD=0,917) and B1 (M=3,56; SD=1,048) items support that the organisational leaders lead by example in controlling the efficient operation and nurturing. The B3 (M=3,35; SD=1,043) item somewhat supports that leaders are characterised as assertive and demanding. However, B2 (M=3,00; SD=1,070) items are average or neutral regarding leadership perceived as creative.

4.4.3 Management of employees

Table 4-5 shows the management of employees' descriptive results.

Table 4-5: Management of employee's descriptive results

Management of employees construct		
Items	**Mean**	**Std. Deviation**
C1. The management style in the organisation is characterised by teamwork, consensus, and participation.	3,57	1,114
C2. The management style in the organisation is characterised by individual risk-taking, innovation, freedom, and uniqueness.	2,93	1,108
C3. The management style in the organisation is characterised by hard-driving competitiveness, high demands, and achievement.	3,70	0,890
C4. The management style in the organisation is characterised by the security of employment, conformity, predictability, and stability in relationships.	3,55	1,030
	3,44	**1,04**

The mean score of 3,44 results indicates that the sample is somewhat supporting the way in which people are managed or the manner in which the working environment is characterised. The SD score of 1,04 is close to the mean. Item C3 (M=3,70; SD=0,890), C1 (M=3,57; SD=1,114) and C4 (M=3,55; SD=1,030) support that the management style in the organisation is characterised by high expectations and success, collaboration, job security and uniformity. On the other hand, C2 (M=2,93; SD=1,108) somewhat oppose or contrasts in that the management style in the organisation is seen as individual risk-taking.

4.4.4 Organisational glue

The organisational glue descriptive results are shown in Table 4-6.

Table 4-6: Organisational glue descriptive results

Organisational glue construct		
Items	**Mean**	**Std. Deviation**
D1. The glue that holds the organisation together is loyalty and mutual trust. Commitment to this organisation runs high.	3,52	1,142

Organisational glue construct		
Items	**Mean**	**Std. Deviation**
D2. The glue that holds the organisation together is its commitment to innovation and development. There is an emphasis on being on the cutting edge.	3,34	1,042
D3. The glue that holds the organisation together is an emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes	3,64	0,884
D4. The glue that holds the organisation together is formal rules and policies. Maintaining a smooth-running organisation is important.	3,82	1,043
	3,58	**1,03**

The sample score mean of 3,58 indicates the support for the bonds or organisational glue that keep the organisation together. The SD score of 1,03 shows that the dispersion is close to the mean. D4 (M=3,82; SD=1,043), D3 (M=3,64; SD=0,884), and D1 (M=3,52; SD=1,142) items support that policies and regulations, success and accomplishment, loyalty and trust between members serve as the organisation's binding agent. Lastly, D2 (M=3,34; SD=1,042) somewhat support that organisation's dedication to creativity and development serves as its glueing agent.

4.4.5 Strategic emphasis

Table 4-7 shows the mean and SD results for strategic emphasis.

Table 4-7: Strategic emphasis descriptive results

Strategic emphasis construct		
Items	**Mean**	**Std. Deviation**
E1. The organisation emphasises human development. High trust, openness, and participation persist.	3,42	1,056
E2. The organisation emphasises acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.	3,55	1,001

Strategic emphasis construct		
Items	**Mean**	**Std. Deviation**
E3. The organisation emphasises competitive actions and achievement. Attaining targets and winning in the marketplace are dominant.	3,82	0,875
E4. The organisation emphasises permanence and stability. Efficiency, control and smooth operations are important.	3,94	0,928
	3,68	**0,96**

The results indicate a mean score of 3,68, meaning the support for the organisational strategy is driven by the strategic emphases that specify the focus areas. The SD of 0,96 is distributed near the mean. E4 (M=3,94; SD=0,928), E3 (M=3,82; SD=0,875), and E2 (M=3,55; SD=1,001) items support that the selected chemical organisation prioritises stability and permanence, places a strong focus on success and competition, highlight on gaining new resources and posing fresh problems. However, somewhat support is indicated for human development, as shown by item E1 (M=3,42; SD=1,056).

4.4.6 Success criteria

Table 4-8 illustrates the success criteria construct mean and SD results.

Table 4-8: Success criteria descriptive results

Success criteria construct		
Items	**Mean**	**Std. Deviation**
F1. The organisation defines success based on the development of human resources, teamwork, employee commitment, and concern for people.	3,37	1,099
F2. The organisation defines success based on having the most unique or newest products. It is a product leader and innovator.	3,41	1,082
F3. The organisation defines success based on winning in the marketplace and outpacing the competition. Competitive market leadership is key.	3,73	0,925
F4. The organisation defines success based on efficiency. Dependable delivery, smooth scheduling and low-cost production are critical.	3,92	0,850

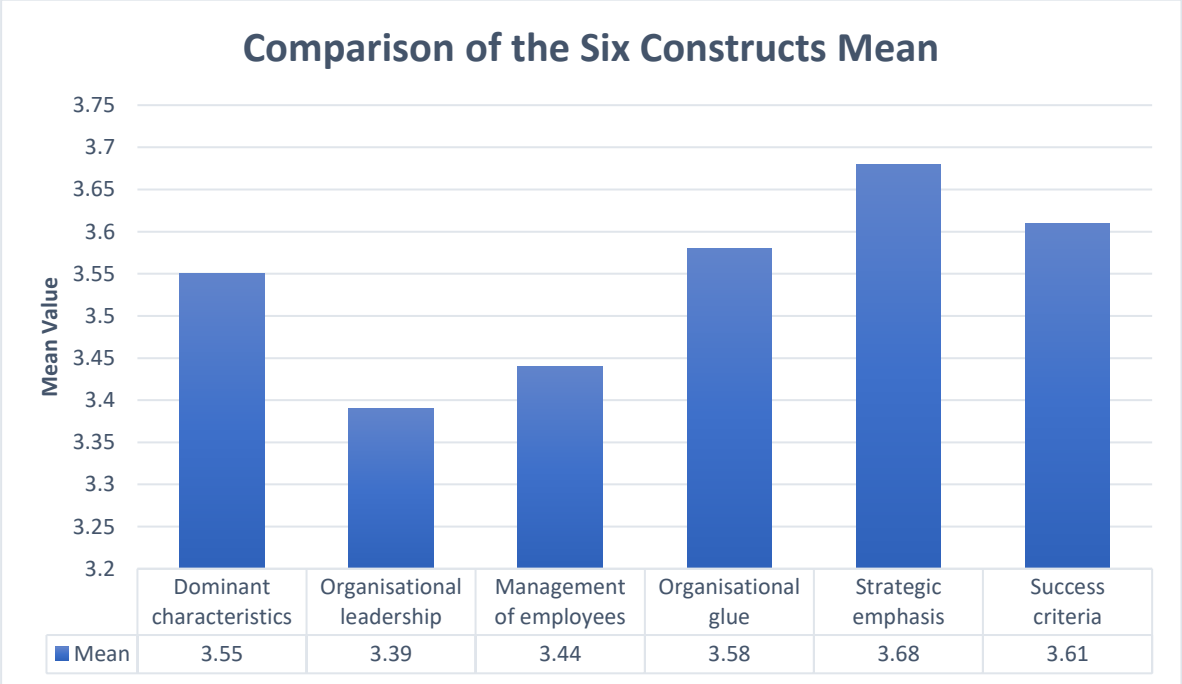
Success criteria construct		
Items	**Mean**	**Std. Deviation**
	3,61	**0,99**

The average for this construct is 3,61. This means that the organisation is generally success oriented. Of particular importance is that the organisation defines success based on efficiency, dependable delivery, smooth scheduling, and low-cost production, as evidenced by the mean score of 3,92 on this specific question. In summary, this is a winning organisation driven by the notion of achieving success.

4.5 CONSTRUCTS COMPARISONS

This section compares the mean scores of the six constructs in the questionnaire. Figure 4-4 results show the respondents most supporting the strategic emphasis (M=3,68; SD=0,98) construct.

Figure 4-4: Six constructs mean comparison



The high score of 3,68 means that the company places a strong emphasis on organisational reliability and longevity, efficient operations, stability, and effectiveness. In addition, it is an organisation that reaches ambitious goals and aims to dominate the market.

The success criteria scored the second-highest mean. Apart from being an organisation that emphasises strategy, the organisation is also driven by a desire to succeed.

The organisation was viewed as having an average drive in organisational leadership. The organisation's management is perceived as aggressive and not taking risks. Based on the mean and score comparisons between the constructs, one can conclude that flexible scheduling and economical operation are essential in this organisation.

4.6 CONSTRUCTING AN ORGANISATIONAL CULTURE PROFILE

The chosen chemical company's overall culture type was determined using the six construct responses. The constructs' items were grouped and linked to the four organisational culture types, as shown in Table 4-9.

Table 4-9: Organisational culture type grouping to construct items

Organisational culture type	Items Coding
Clan Culture	A1, B1, C1, D1, E1, F1
Adhocracy Culture	A2, B2, C2, D2, E2, F2
Market Culture	A3, B3, C3, D3, E3, F3
Hierarchy Culture	A4, B4, C4, D4, E4, F4

The organisational culture types to be discussed are:

- Clan culture,
- Adhocracy culture,
- Market culture, and
- Hierarchy culture.

4.6.1 Clan culture descriptive analysis

Table 4-10 illustrates the clan culture descriptive results. The overall mean (3,50) supports a corporation prioritising internal upkeep while being adaptable, caring about people, and sensitive to customers. The SD is 1,09. C1 (M=3,57; SD=1,114), B1 (M=3,56; SD=1,048), A1 (M=3,52; SD1,142) relating to employee management best described by teamwork, leadership embodying mentoring, recognition of the workplace as a personal space, and highly loyal employee behaviour as supported. The E1 (M=3,42; SD=1,056) and F1 (M=3,37; SD=1,099) are somewhat supported; that is, an organisation prioritises human capacity building and bases its definition of success on the growth of human resources.

Table 4-10: Clan culture descriptive results

Clan culture		
Items	**Mean**	**Std. Deviation**
A1. The organisation is a very personal place. It is like an extended family. People seem to share a lot of personal information and features	3,55	1,094
B1. The leadership in the organisation is generally considered to exemplify mentoring, facilitating, or nurturing.	3,56	1,048
C1. The management style in the organisation is characterised by teamwork, consensus, and participation.	3,57	1,114
D1. The glue that holds the organisation together is loyalty and mutual trust. Commitment to this organisation runs high.	3,52	1,142
E1. The organisation emphasises human development. High trust, openness, and participation persist.	3,42	1,056
F1. The organisation defines success based on the development of human resources, teamwork, employee commitment, and concern for people.	3,37	1,099
	3,50	**1,09**

4.6.2 Adhocracy culture descriptive results

The mean and SD for the adhocracy culture are shown in Table 4-11. The mean (3,18) shows somewhat support for the company that strongly emphasises outward positioning and values originality and flexibility. The SD (1,07) shows a distribution

close to the mean. The E2 (M=3,55; SD=1,001) item is supported regarding the organisation, and the emphasis is on developing new capabilities and posing new problems. F2 (M=3,41; SD=1,082) and D2 (M=3,34; SD=1,042) items are somewhat supported regarding the organisation's definition of success based on having the most innovative or cutting-edge products and a dedication to innovation and development as organisational glue.

Table 4-11: Adhocracy culture descriptive results

Adhocracy culture		
Items	**Mean**	**Std. Deviation**
A2. The organisation is a very dynamic entrepreneurial place. People are willing to stick out their necks and take risks.	2,87	1,095
B2. The leadership in the organisation is generally considered to exemplify entrepreneurship, innovation, or risk-taking.	3,00	1,070
C2. The management style in the organisation is characterised by individual risk-taking, innovation, freedom, and uniqueness.	2,93	1,108
D2. The glue that holds the organisation together is its commitment to innovation and development. There is an emphasis on being on the cutting edge.	3,34	1,042
E2. The organisation emphasises acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.	3,55	1,001
F2. The organisation defines success based on having the most unique or newest products. It is a product leader and innovator.	3,41	1,082
	3,18	**1,07**

On the other hand, the B2 (M=3,00; SD=1,070) item displays neutral or average. C2 (M=2,93; SD=1,108) and A2 (M=2,87; SD=1,095) questions differ slightly in their treatment of leadership that exhibits entrepreneurship and organisational settings that are thought to be entrepreneurial.

4.6.3 Market culture descriptive results

The overall mean is 3,66, and the SD is 0,92 for the market culture illustrated in Table 4-12. The mean indicates the support to a company that prioritises external positioning

and demands stability and control. All items, E3 (M=3,82; SD=0,875), A3 (M=3,74; SD=0,923), F3 (M=3,73; SD=0,925), C3 (M=3,70; SD=0,890) and D3 (M=3,64; SD=0,884) are supported pertaining the management style in the organisation, which is characterised by solid profitability, results-oriented, describes excellence by dominating the market and surpassing the rivalries, and the focus on attainment and objective achievement is what holds the entity together. However, B3 (M=3,35; SD=1,043) is the only somewhat supported item regarding the organisation's leadership that is frequently cited as an example of a no-nonsense.

Table 4-12: Market culture descriptive results

Market culture		
Items	**Mean**	**Std. Deviation**
A3. The organisation is very result oriented. A major concern is getting the job done. People are very competitive and achievement-oriented.	3,74	0,923
B3. The leadership in the organisation is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.	3,35	1,043
C3. The management style in the organisation is characterised by hard-driving competitiveness, high demands, and achievement.	3,70	0,890
D3. The glue that holds the organisation together is an emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes	3,64	0,884
E3. The organisation emphasises competitive actions and achievement. Attaining targets and winning in the marketplace are dominant.	3,82	0,875
F3. The organisation defines success based on winning in the marketplace and outpacing the competition. Competitive market leadership is key.	3,73	0,925
	3,66	**0,92**

4.6.4 Hierarchy culture descriptive results

Table 4-13 demonstrates the hierarchy culture mean and SD results. The overall mean (3,82) is supported by a corporation that prioritises internal upkeep and demands control and order. The SD (0,95) is spread around the mean. A4 (M=4,06; SD=0,941) item is strong in favour of a strictly managed organisation and well-organised setting. All the items, E4 (M=3,94; SD=0,928), F4 (M=3,92; SD=0,852), D4 (M=3,82;

SD=1,043), B4 (M=3,64; SD=0,917) and C4 (M=3,55; SD=1,030) supports the organisation that:

- Prioritises constancy and consistency,
- Gauges result based on effectiveness,
- Holds everything together with formal rules and policies,
- Leadership is typically seen as an example of coordination, and
- Managerial style is classified by job security and compliance.

Table 4-13: Hierarchy culture descriptive results

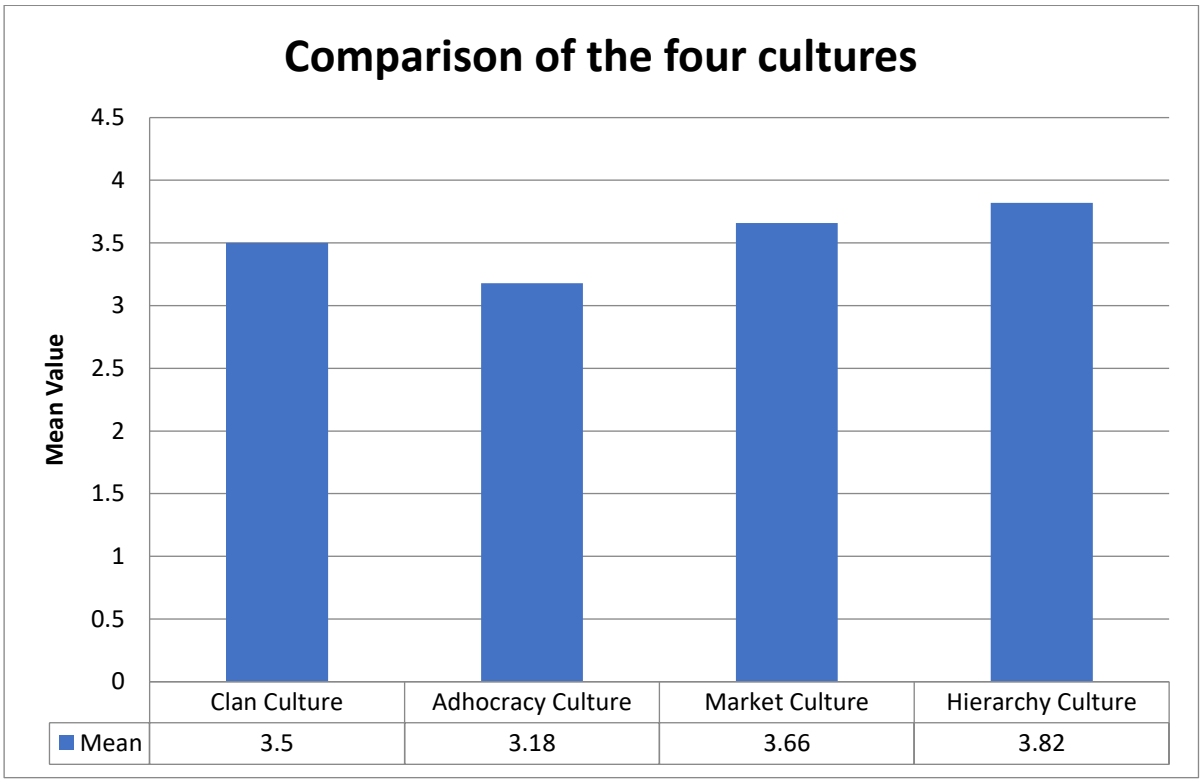
Hierarchy culture		
Items	**Mean**	**Std. Deviation**
A4. The organisation is a very controlled and structured place. Formal procedures generally govern what people do.	4,06	0,941
B4. The leadership in the organisation is generally considered to exemplify coordinating, organising, or smooth-running efficiency.	3,64	0,917
C4. The management style in the organisation is characterised by the security of employment, conformity, predictability, and stability in relationships.	3,55	1,030
D4. The glue that holds the organisation together is formal rules and policies. Maintaining a smooth-running organisation is important.	3,82	1,043
E4. The organisation emphasises permanence and stability. Efficiency, control and smooth operations are important.	3,94	0,928
F4. The organisation defines success based on efficiency. Dependable delivery, smooth scheduling and low-cost production are critical.	3,92	0,850
	3,82	**0,95**

4.6.5 Prevailing organisational culture

Figure 4-5 shows that the prevailing culture is a hierarchical type at 3,82, followed by a market culture at 3,66. Section 4.5 highlighted the strategic emphasis constructs as the main supported and dominating, which is in support of section 4.6.4 outcomes. It is indicated that the OEE reliability performance in the selected chemical organisation emphasises efficiency, control and smooth operations.

As discussed in the literature, this type of company is characterised by a maintenance-oriented organisational structure that demands stability and control. Employees in hierarchical organisations have well-defined positions, specific procedures, and a formal and structured organisation, line of authority, and top-down decisions. The most important thing in this hierarchical type of culture is to keep the organisation working smoothly. However, the decision-making process tends to be slower due to red tape. Coercive power and increased bureaucracy are factors.

Figure 4-5: Four culture types comparison



On the other hand, the adhocracy culture was the least prevalent at 3,18. The lower adhocracy culture means that there are fewer suggestions from employees, less creative process design and less prudent risk-taking.

Pertaining to the problem statement, the respondents preference indicated that the hierarchy culture that is linked to the strategic emphasis has an influence on the OEE reliability performance in the organisation.

4.7 RELIABILITY ANALYSIS

The reliability of the study was determined using Cronbach's alpha. Each of the four latent variables underwent a separate reliability test, as shown in Appendix G. 208 valid cases were measured for each construct. No items were deleted to improve the reliability because all the alpha values were below the overall Cronbach's alpha coefficient. Field (2009:678) confirms that to make the scale more reliable, any items that produce values that are noticeably higher than the average α may need to be eliminated. The cut-off value of Cronbach's alpha is 0,70, as proposed by Kline (2011), and was used as a guideline for interpreting the alpha value:

- ≥ 0,90 – Exceptional
- 0,80 – Very good
- 0,70 – good
- < 0,50 – Unsatisfactory

Table 4-14 shows the measured organisational culture types Cronbach's alpha results. The number of items was six constructs for each organisational culture type. The results indicated that the clan culture variable (α = 0,794) and adhocracy culture (α = 0,786) as very good. The two, market culture (α = 0,685) and hierarchy culture (α = 0,658), although below 0,7, they are still higher than 0,50. Therefore they are satisfactory or acceptable. Based on the tested values, the instrument was found to be internally reliable. Thus, the scores are a true representation of the organisational culture constructs.

Table 4-14: Reliability statistics - Cronbach's Alpha results

Reliability Statistics		
Variables	**Cronbach's Alpha**	**N of Items**
OC1 – Clan culture	0,794	6
OC2 – Adhocracy culture	0,786	6
OC3 – Market culture	0,679	6
OC4 – Hierarchy culture	0,655	6

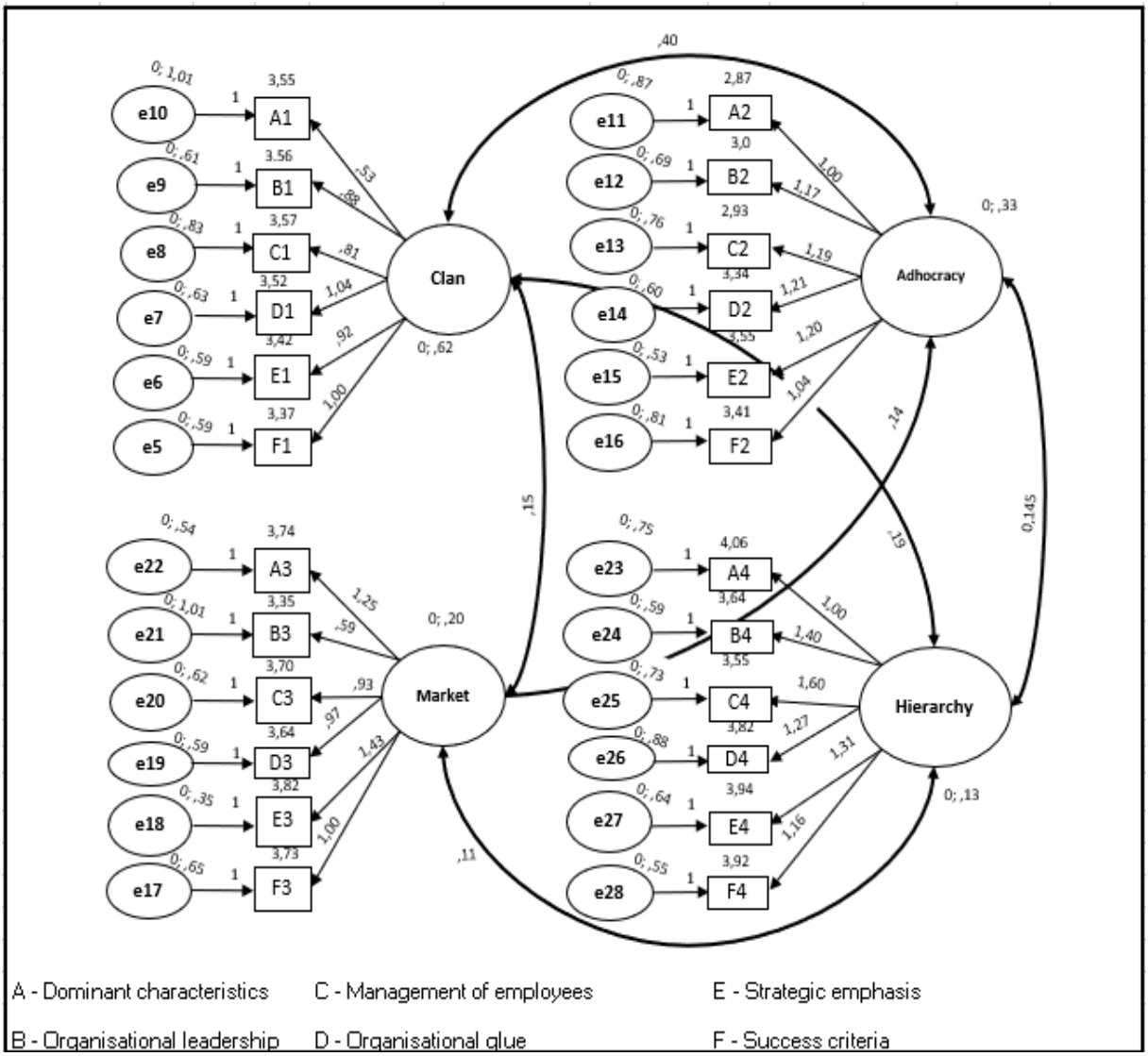
4.8 VALIDITY TESTING

The CFA was employed to test the validity of the questionnaires used computed using SPSS AMOS version 27. In Figure 4-6, the study's standardised estimates on a path diagram are illustrated. It shows the four-factor (clan, adhocracy, market, hierarchy), each with six indicators (A, B, C, D, E, F). The model consisted of 52 variables, 28 exogenous and 24 endogenous variables, and six covariances. The six indicators are:

- A – Dominant characteristics
- B – Organisational leadership
- C – Management of employees
- D – Organisational glue
- E – Strategic emphasis
- F – Success criteria

The maximum likelihood was employed for the study since questionnaires are on an ordinal level (Likert scale) and occasionally slightly non-normally distributed. The number of variances and covariances in the data was 300, more than the total number of parameter estimations. The model was thus overidentified.

Figure 4-6: Theorised relationship among the organisational dimensions and culture type



4.8.1 Factor loading results

4.8.1.1 Factors vs variables results

Factor loadings were evaluated for each item as part of the CFA method. The estimates of all loadings are statistically significant, as illustrated in standardised regression weights in Table 4-15. The p-value for all estimated paths between the constructs was less than 0,001, except for the market type culture (OC3) relating to the organisational leadership (B3) item, but still significant (p-value = 0,003).

The 21-item factor loadings were above the recommended 0,30, ranging from 0,735 to 0,436. The results show that the market culture has a significant impact on E3 strategic emphasises (B3=0,735), including clan culture on the criteria of success (F1=0,717). On the contrary, the other three items range from 0,385 to 0,255, with the market culture showing weak positive loading to organisational leadership (0,255), just below the proposed 0,3 threshold. Thus, the B3 (organisational leadership) variable was retained for the analysis.

Table 4-15: Standardised Loadings (AMOS = Regression Weights)

Items		Culture Type	Estimate	p-Value
F1 – Criteria of success	<---	OC1 - Clan	,717	
E1 – Strategic emphasis	<---	OC1 - Clan	,683	***
D1 – Organisation glue	<---	OC1 - Clan	,720	***
C1 – Management of employees	<---	OC1 - Clan	,575	***
B1 – Organisational leadership	<---	OC1 - Clan	,662	***
A1 – Dominant characteristics	<---	OC1 - Clan	,385	***
A2 – Dominant characteristics	<---	OC2 - Adhocracy	,524	
B2 – Organisational leadership	<---	OC2 - Adhocracy	,627	***
C2 – Management of employees	<---	OC2 - Adhocracy	,617	***
D2 – Organisation glue	<---	OC2 - Adhocracy	,664	***
E2 – Strategic emphasis	<---	OC2 - Adhocracy	,686	***
F2 – Criteria of success	<---	OC2 - Adhocracy	,551	***
F3 – Criteria of success	<---	OC3 - Market	,486	
E3 – Strategic emphasis	<---	OC3 - Market	,735	***
D3 – Organisation glue	<---	OC3 - Market	,492	***
C3 – Management of employees	<---	OC3 - Market	,468	***
B3 – Organisational leadership	<---	OC3 - Market	,255	,003
A3 – Dominant characteristics	<---	OC3 - Market	,607	***
A4 – Dominant characteristics	<---	OC4 - Hierarchy	,381	
B4 – Organisational leadership	<---	OC4 - Hierarchy	,546	***
C4 – Management of employees	<---	OC4 - Hierarchy	,556	***
D4 – Organisation glue	<---	OC4 - Hierarchy	,436	***
E4 – Strategic emphasis	<---	OC4 - Hierarchy	,507	***
F4 – Criteria of success	<---	OC4 - Hierarchy	,488	***

Note: *** $p < 0,001$

4.8.1.2 Loadings between two factors

Table 4-16 indicates a significant p-value for all the measured factors. The latent variables factor loadings range from 0,888 and 0,431. A strong relationship is evident between the clan and the adhocracy culture type (0,888), which is the highest. It is followed by the hierarchy and adhocracy culture (0,711), hierarchy and clan (0,684), and hierarchy and market (0,670). The results indicate that hierarchy culture had a strong relationship with most of the other cultural types.

Adhocracy and market (0,577) show a strong relationship above the threshold. A weak relationship is observed between the clan and market culture (0,431), lower than the cut-off of 0,50 and closer to the recommended cut-off. Thus the model fits well, and the data demonstrates the measurement model's convergent validity.

Table 4-16: Latent variables standardised loading

Culture type			Estimate	P-Value
Clan	<-->	Adhocracy	,888	***
Clan	<-->	Market	,431	***
Hierarchy	<-->	Clan	,684	***
Adhocracy	<-->	Market	,527	***
Hierarchy	<-->	Market	,670	***
Hierarchy	<-->	Adhocracy	,711	***

Note: *** $p < 0,001$

4.8.2 Correlation coefficient

An approach comparable to evaluating the statistical significance of correlation coefficients could be utilised to establish a significance level for the understanding of loadings (Hair *et al.,* 2019:151). Spearman’s correlation was employed to analyse the correlation coefficient. Table 4-17 indicates the output of Spearman's rho correlation coefficient. The correlation was measured for the respondent's demographic information and between the organisational culture types.

Table 4-17: Spearman's rho correlation coefficient output

Correlations

			Highest qualification	Years of employment at the company	Please select how many organisations did you work for	Clan culture	Adhocracy culture	Market culture	Hierarchy culture
	Clan culture	Correlation Coefficient	-0.117	-0.024	.139*	1.000	.647**	.264**	.447**
		Sig. (2-tailed)	0.091	0.728	0.046		0.000	0.000	0.000
		N	208	208	208	208	208	208	208
	Adhocracy culture	Correlation Coefficient	-0.114	-0.037	0.121	.647**	1.000	.277**	.406**
		Sig. (2-tailed)	0.102	0.597	0.083	0.000		0.000	0.000
		N	208	208	208	208	208	208	208
	Market culture	Correlation Coefficient	-0.015	-0.031	.177*	.264**	.277**	1.000	.326**
		Sig. (2-tailed)	0.830	0.654	0.010	0.000	0.000		0.000
		N	208	208	208	208	208	208	208
	Hierarchy culture	Correlation Coefficient	0.125	-0.048	0.125	.447**	.406**	.326**	1.000
		Sig. (2-tailed)	0.072	0.492	0.073	0.000	0.000	0.000	
		N	208	208	208	208	208	208	208

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

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

4.8.2.1 Respondent's demographic correlation

The three questionnaires addressing the respondent's demographic correlations are discussed.

4.8.2.1.1 Qualifications questionnaire

For the highest qualification, a very weak negative correlation is observed for all three organisational culture types, the clan (r_s=-0,117), adhocracy (r_s=-0,114) and market (r_s=-0,015), and the relationship is insignificant. However, the hierarchy culture type had an insignificant positive (r_s=0,125) correlation. The results indicate that the

respondent's qualifications are unrelated or inversely connected to the six aspects of the questionnaire.

4.8.2.1.2 Years of employment at the company questionnaire

The effect of the respondent's years of employment at the company indicates a very weak negative correlation for all the measured culture types, clan (r_s =-0,024), adhocracy (r_s =-0,037), market (r_s =-0,031), and hierarchy (r_s =-0,048) —the relationships are insignificant with the p-value > 0,01. Thus, the years of employment at the company are inversely proportional to all the measured culture-type variables.

4.8.2.1.3 A number of organisations worked on the questionnaire

On the contrary, the number of organisations the respondents worked for shows a significant, negligible and positive relationship between the clan (r_s=0,139; p=0,046) and adhocracy (r_s=0,177; p=0,010) culture. However, the adhocracy (r_s=0,121) and hierarchy (r_s=0,125) cultures indicate a negligible, insignificant relationship. Therefore, this indicates that the more organisations the individuals worked for, the more they related to the clan and market culture type. Since about 48% of respondents worked for 2-3 companies, it can be concluded that employees who experienced different organisational cultures prefer competing effectively, delivering outcomes, caring and an organisation that cultivates a cooperative partnership.

Based on the demographic correlation coefficient results, it is clear that the qualifications and the years of employment at the company have no relationship with organisational culture. However, the number of organisations worked for showed a significant but negligible positive relationship between clan and market culture and is a driving factor for the current reliability performance.

4.8.2.2 Correlation between organisational culture types

The relationship between all the culture types, clan, adhocracy, market and hierarchy resulted in a positive correlation and was statistically significant. Table 4-17 shows that the clan and adhocracy (r_s=0,647) were moderately positively associated with each

other, according to Spearman's statistical examination of the strength and direction of links between the four organisational culture types. As a result, there is a moderate positive correlation between each of these factors. Additionally, it was shown that there is only a weak association between hierarchy and clan culture (r_s =0,447), adhocracy (r_s=0,406), and the market (r_s=0,326). However, adhocracy and market culture type (r_s=0,277) and clan and market culture type (r_s=0,264) showed a positive, negligent correlation, with a value close to zero. It translates to no meaningful relationship between these culture types.

4.8.3 Measurement model fitness test

The study conducted the following three tests to evaluate model fitness: the Chi-square test, CFI and RMSEA. The first test carried out was chi-square. Hancock and Mueller (2010:379) state that most researchers perceive the chi-square test to be too demanding, considering its ability to identify even minor differences between a set of data and the suggested model. Thus, Hair *et al*. (2019:638) suggest dividing the chi-square test statistic by the number of degrees of freedom. The overall model chi-square was 434,218 with a degree of freedom of 246.

A chi-square value of 1,765 was obtained from the model, and the model fit summary output is shown in Table 4-18—the CMIN/DF of less than five is an excellent value, making the model a good fit. Thus, the data fit the theoretical model.

Table 4-18: Model fit summary

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	78	434,218	246	,000	**1,765**

The next test conducted was CFI. Hair *et al.* (2019:635) state that the CFI are the most popular iterative fit indices. Table 4-19 indicates the AMOS output summary for CFI. The actual results for the study indicate CFI = 0,856. Thus, the 0,856 CFI value is close to 0,9 and can be accepted as a goodness of fit.

Table 4-19: CFI output summary

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	,726	,693	,860	,839	**,856**

The last test conducted was RMSEA. For a model with 24 measured variables and responses of 208, the actual RMSEA value is less than the 0,08 threshold. Since the upper estimate of the RMSEA is low (0,070) in this instance, the RMSEA gives extra support to the model's ability to fit data. An RMSEA absolute fit index had a value of 0,061 for the study, as illustrated in Table 4-20. The model is a good fit.

Table 4-20: RMSEA output summary

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	**,061**	,051	,070	,031

Table 4-21 is a summary of the model measurement of fit. The CFI=0,856, CMIN/df = 1,765 and RMSEA = 0,061. These numbers show that the data fit the theoretical model of organisational culture very well. Therefore, there is validity in the data.

Table 4-21: Model for measuring Goodness-of-Fit Statistics

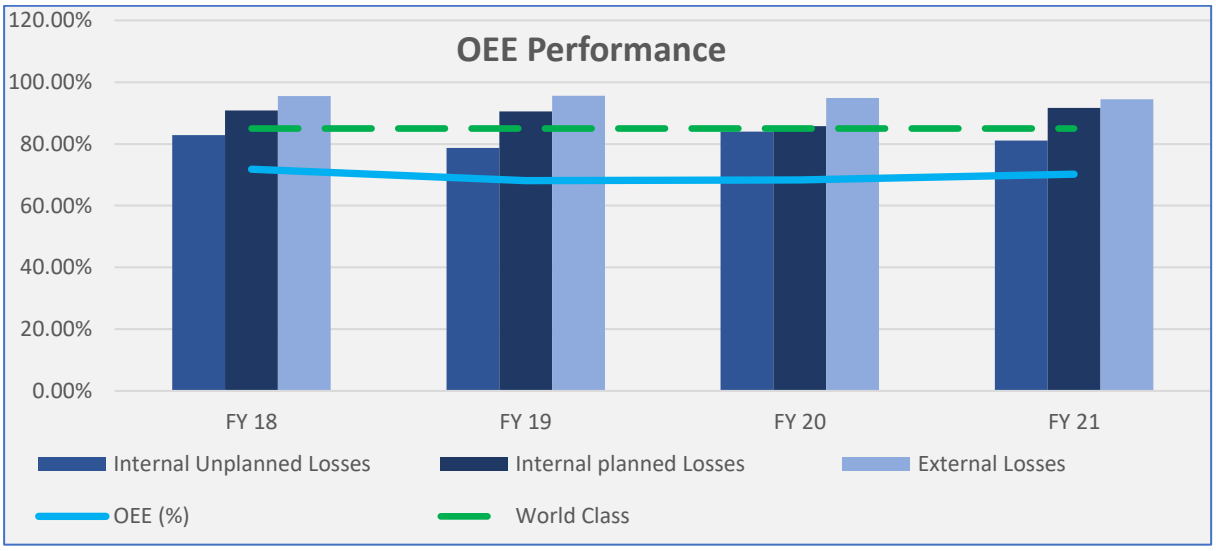
Indicator	Recommended value	Source	Study Results value	Comment
CFI	≥ 0,90	Carmines *et al.* (1981)	0,856	Acceptable, close to Carmines *et al.* (1981) recommendations and van Laar and Braeken's (2021:7) statement
CMIN/df	< 5	Tabachnick and Fidell (2007)	1,765	Acceptable goodness of fit within recommended practice
RMSEA	≤ 0,05 ≤0,08	Byrne (1998) McDonald and Ho (2002:72)	0,061	Acceptable goodness of fit based on (McDonald & Ho, 2002:72)

Source: Adapted from Kumar *et al*. (2019:33).

4.9 SECONDARY DATA ANALYSIS

The OEE organisational data for the selected chemical industry was collected for four years, as indicated in Figure 4-22. The FY18, FY19, FY20 and FY21 OEE results were 71.81%, 68,11%, 68,30% and 70,19%, respectively. Most losses are related to internal, unexpected losses, which the organisation entirely controls, and minimal external losses influence. The internal, unplanned losses are an indication of unreliable and unpredictable operations. The improved reliability performance can be achieved by reducing the failures.

Figure 4-7: FY18-FY21 OEE performance



4.10 SUMMARY

This chapter began by presenting the discussion on response rate and respondent data, which supported the conclusion that the number of responses was adequate for demographic generalisation. The analysis and interpretation discussion of the descriptive statistics relevant to the OCAI and demographic questionnaires related to organisational culture followed. The outcome of the descriptive analysis yielded the prevailing hierarchy culture.

The following key elements best describe the outcomes of the reliability and validity data analysis:

- Cronbach's alpha coefficient was utilised to test the reliability, the clan and adhocracy yielded a very strong alpha, above the 0,7 cut-off. Hierarchy and market resulted in an acceptable alpha value, below but close to the recommended cut-off.
- CFA and SEM were used to test for validity. Spearman's correlation coefficient has resulted in a significant positive relationship for a number of organisations that worked on the questionnaire. Clan and adhocracy resulted in moderately positively associated with each other.
- The measurement model yielded a good fit for chi-square (CMIN/df), an acceptable fit for CFI and a good fit for RMSEA. Data fit the theoretical model.

Furthermore, the secondary data analysis indicated four years of reliability performance that is below the recommended world-class performance.

CHAPTER 5 – KEY FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

The study's empirical findings were covered in the preceding chapter. The purpose of the subsequent chapter is to describe and discuss how organisational culture affects plant reliability performance at a selected chemical firm.

The key findings are then briefly discussed and contrasted with results from earlier studies. The study's limitations, implications and recommendations for further studies are discussed.

5.1.1 The study’s objective summary

The study's primary objective was to investigate the influence of organisational culture on plant reliability performance in the chosen South African chemical industry. The secondary objectives were highlighted to support the primary objective.

One of the study's secondary objectives was to undertake a theoretical investigation into the nature and importance of organisational culture and reliability performance.
The other secondary objective was to determine the prevailing OC through surveys and data analysis for the selected chemical company.

The last secondary objective was to provide a recommendation to help the selected chemical organisation understand and improve the reliability performance from a cultural perspective. The current chapter elaborates on the essential findings and proposals to accomplish the objective, including an answer to the research question.

5.2 KEY FINDINGS AND CONCLUSION

The key findings aimed to answer the main research question, "What effect does organisational culture have on the performance reliability of the chosen chemical organisation in South Africa?

This organisation's prevailing dominant hierarchy-type culture influences the plant's reliability performance. According to Asif and Sajjad (2018:79) and Joseph and Kibera (2019:8), there is a link between a company's performance and its hierarchical culture. As illustrated in the collected secondary data, the organisation's reliability performance is below the world-class performance due to many unplanned failures.

From the literature, Cameron and Quinn (2006:51) explained that companies must use several hierarchical cultures practises, such as better measurement, process control, and methodical problem solving, to nurture unique quality requirements. The top-down style can be effective in hierarchical organisations, and employers and employees are obliged to respect their designated workplace areas. As highlighted by Ramadista and Kismono (2020:306), staff conduct in this culture is distinguished by a distinct hierarchical structure, adherence to rules, and formalisation of efficiency-focused tasks.

5.2.1 Demographic information findings

The respondents were highly qualified with more than ten years of experience, with 31% above 20 years. Most respondents (48%) have worked for 2-3 companies, and 33% have worked for the same company. Furthermore, the sample was management or leaders in the organisation.

5.2.2 Discussion of the dominant culture

The organisation's culture is dominated by hierarchy. The overall descriptive outcomes confirm hierarchy culture as dominating, followed by the market, clan, and adhocracy as the least recognised culture, as shown in Table 5-1. The study findings are similar to those of Acar and Acar (2014:23) and Asif and Sajjad (2018:78), where hierarchy dominates, followed by market, clan and adhocracy. Reino *et al.* (2020:385) results

indicated the opposite compared to the current study, whereby the market was dominant, followed by a hierarchy culture.

Table 5-1: Dominating culture summary

Culture type	Hierarchy	Market	Clan	Adhocracy
Mean	3,82	3,66	3,5	3,18

Given that the chosen chemical business is characterised by a formalised, structured, hazardous and operates in a highly complicated and high-risk work environment, the hierarchy culture as the dominant is understandable. According to Cameron and Quinn (2006:37), companies whose main task was to provide practical, reliable, well-organised, and consistent production widely adopted the traditional bureaucratic characteristics in the hierarchy. The result is in line with earlier discoveries made by Cameron and Quinn (2019).

The study outcome is found to be similar to Joseph and Kibera's (2019:5) findings, whereby the adhocracy culture was found to be present to a reasonable degree. Kim and Chang (2019:78) argue that although change and innovation have been stressed, and significant resources have been invested over the years, the lowest culture, adhocracy, does present a challenge. According to Cameron and Quinn (2006:45), commitment to creativity and exploration serves as the firm's glue, and it is crucial to be open to change and capable of taking on new tasks.

5.2.3 Correlation findings

5.2.3.1 Demographic correlations findings

The results indicated that qualifications and years of employment showed a weak or no relationship to the organisational culture. The correlation coefficient values are negative but close to zero. However, there is a strong relationship between the clan and market culture concerning the number of organisations individuals worked for. The finding is that whether working for the same or different companies, the people relate with the clan and adhocracy cultural type. People perceive a company as exhibiting a distinctly caring attitude toward its employees and place particular emphasis on

fostering a sense of personal responsibility in them. Thus, this translates to the observation that people felt internally accepted and part of the organisation. It also suggests that they find it easy to adapt to changes.

5.2.3.2 Constructs correlation findings

A positive, moderate relationship between clan and adhocracy culture type was found. The finding is similar to Reino *et al*. (2020:380) study, and the two possess a unifying trait of dynamics and flexibility. Based on Reino *et al*. (2020:380) study, they concluded that a solid and positive relationship between the two cultures has a favourable impact on performance.

5.2.4 Secondary findings

Table 5-2 demonstrates the OEE performance summary for four FYs. The collected OEE results found that the organisation performed consistently in the previous studied year below the world-class performance. The hierarchy-type culture influence the current plant reliability performance. Although the type of culture is expected in this type of organisation, one can conclude that it impacts this performance.

Table 5-2: OEE performance summary

Financial Year (June – July)	World-class OEE (%) performance	Organisation OEE (%) performance	Internal Unplanned Losses	Internal planned Losses	External Losses
FY 18	**85%**	71,81%	82,82%	90,81%	95,48%
FY 19		68,11%	78,70%	90,56%	95,56%
FY 20		68,30%	84,01%	85,71%	94,6%
FY 21		70,19%	81,06%	91,62%	94,51%

5.3 RECOMMENDATIONS TO MANAGEMENT

It is known that reliable operations result in safe operations and reliable performance and safe operations which are crucial for the company under study. Creative ways of

working, problem-solving, benchmarking and being flexible, and discernment takes the place of authority and stability—the adhocracy culture values state-of-the-art performance.

Although hierarchy culture organisations tend to focus internally, external flexibility will be crucial for the selected company if it aspires to compete or be comparable with world-class performance. The chosen chemical industry should be robust in innovation, creativity, and adaptation to changes, in addition to developing formal norms and regulations that will bind the organisation together to boost plant reliability performance.

The following suggestions are made to management as a result of this research study to assist the organisation in improving plant reliability performance and achieving the goal of being a world-class performing organisation.

- Based on the organisation's objective to achieve a world-class reliability performance and the importance of predictability and stability, a hierarchy culture combined with the adhocracy culture type is recommended. The proposed recommendation can be obtained by assessing the strength and weaknesses of the prevailing hierarchy culture and the required attributes of adhocracy culture that will complement the hierarchy culture. For example, the company can reduce bureaucracy and unnecessary processes and encourage innovation. The proposed action plan is indicated in Table 5-3.

- It is recommended that the organisation assess the influence of the mixture of internal and externally appointed managers and whether this combination is conducive to performance by analysing the exit interview results and interviewing new employees after a year. Compile, report and track action plan from the assessment.

- Since there is a strong relationship between clan and adhocracy, it is recommended that the relationship be maintained because people tend to excel when they feel cared for and are allowed to be innovative.

Table 5-3: Proposed action plan

Proposed Action Plan – Selected chemical company in SA							
Goal: Organisational culture transformation **Objective:** *Transform and sustain organisational culture from a hierarchy culture type to a combination of hierarchy and clan culture type*		**Current Status** Dominating hierarchy culture - OEE below the world-class performance		**Medium-term (one year) expected status** OEE performance increased by 5% from the baseline (FY22 - OEE performance)		**Long-term (3-5) expected status** Sustainable and fully embedded organisational culture transformed - World-class OEE performance at 85%	
Action Steps	**Responsible person**	**Timeframe**	**Available Resources**	**Required Resources**	**Impediments**	**Evaluation Process How to determine goal has been reached?**	**Evidence of Success Measures?**
1. Set up the organisational cultural centre of excellence - to actively and continuously discuss (the way we do business and for monitoring progress	Senior vice president	Jan-23	- Communication Technology - Senior management (leaders) - Objective and passionate chairperson	- Coaching - Appoint a change owner or a sponsor	- Commitment - Availability	Recurring quarterly meeting booked.	Meeting attendance and participation.
2. Conduct a **SWOT** analysis (to understand the current hierarchy culture and the adhocracy culture attributes required) and develop an **action plan** to implement the outcome	Human resource vice president	End March 2023	- Leadership representatives for all levels	- Capital - Outsourcing of facilitator (consultant)	- Openness from participating team members - Lack of buy-in - availability of key stakeholders	Progress tracked in the monthly report A SMART Action plan submitted on time.	% action completion against the plan

Proposed Action Plan – Selected chemical company in SA

Goal: Organisational culture transformation **Objective:** *Transform and sustain organisational culture from a hierarchy culture type to a combination of hierarchy and clan culture type*		**Current Status**		**Medium-term (one year) expected status**		**Long-term (3-5) expected status**	
		Dominating hierarchy culture - OEE below the world-class performance		OEE performance increased by 5% from the baseline (FY22 - OEE performance)		Sustainable and fully embedded organisational culture transformed - World-class OEE performance at 85%	
Action Steps	**Responsible person**	**Timeframe**	**Available Resources**	**Required Resources**	**Impediments**	**Evaluation Process How to determine goal has been reached?**	**Evidence of Success Measures?**
3. Perform change management and awareness	Human resource vice president	End June 2023	- Training rooms - Trainers - Trainees	- training material - Awareness communication plan material	- Resistance to change	Assessments of surveys done yearly	% of trained individuals
4. Review, update and communicate the organisational mission and values	Strategy manager	End September 2023	- Visualisation platform	- Capital - Billboards and posters printing	- Misinterpretation - Lack of understanding of the values	Roadmap developed and tracked quarterly	% action completion against the plan
5. Conduct exit and entry interviews for resigning and new employees, focusing on organisational culture	Human resource manager	As and when required	- Medical exit platform	-interview skills focusing on culture	- Fear of speaking up	Report on the HR monthly report - Personnel movement	% of interviews completed in relation to personnel movement

Source: Adapted from Alliance for Research in Chicagoland Communities (ARCC), (2022).

5.4 MEETING RESEARCH OBJECTIVES

The study was conducted to address its objectives and answer a specific question. Adams *et al.* (2014:277) mentioned that the study ending must demonstrate which of the study objectives have been met and which still need to be addressed. This section assesses whether the study has reached its objectives, and the evaluation is presented in Table 5-4.

Table 5-4: Objectives assessment

No.	Research objectives and question	Objectives evaluation Comment	Status
1.	Investigate the influence of organisational culture on the reliability performance of the selected chemical organisation in South Africa.	The prevailing hierarchy culture was investigated through the study approach, analysis and findings.	Successfully achieved.
2.	To undertake a theoretical investigation into the nature and importance of organisational culture and reliability performance.	This secondary goal was addressed in a literature review discussed in chapters two and three.	Successfully achieved.
3.	To determine the prevailing OC through surveys and data analysis for the selected chemical company.	The empirical study results in chapter four yielded to the prevailing hierarchy culture. Figure 4-5 in section 4.6.5 indicates the dominating culture.	Successfully achieved.
4.	To provide a recommendation to help the selected chemical organisation understand and improve the reliability performance from a cultural perspective.	The current chapter elaborates on the essential findings and proposals to accomplish the objective; section 5.3 discusses the recommendations and action plan in Table 5-3.	Successfully achieved.
5.	What is the influence of organisational culture on the reliability performance of the selected chemical organisation in South Africa?	The dominating hierarchy culture influenced the plant reliability performance to be unsatisfactory. The findings showed that the organisation's OEE performance is below the world-class target of 85%, as shown in Table 5.2.	Successfully achieved.

5.5 CONTRIBUTION OF THE STUDY

The study contribution was divided into two categories: theory and organisation.

- **Theoretical contribution** – the research will contribute to the existing body of knowledge associated with the organisational culture influence within South African businesses. It understands the current corporate culture and the preference to improve reliability performance.
- **Industry contribution** – Although various studies have been conducted regarding organisational culture's influence on business performance, the study did not cover the chemical organisation environment in South Africa. Thus, the study will add value to the chemical organisation in South Africa by understanding the prevailing organisational culture and how the corporate culture practice can be implemented or reviewed to improve reliability performance.

5.6 LIMITATIONS

The study has several restrictions. First, the study's cross-sectional conceptual framework prevented it from including all people who impact organisational culture. As a result, the study's conclusions cannot be generalised to the entire chemical industry's influence on plant reliability performance.

Second, the study only employed one reliability performance indicator. However, the study identified the operational leadership dominant organisational culture type that influenced reliability plant performance assessment by using the OEE measurement. Using a reliability metric like the mean time between failures would be more insightful.

Third, the study exclusively employed quantitative methods, such as questionnaires and objective OEE reliability performance measures. A more comprehensive organisational culture perspective will be presented using objective (quantitative) and subjective (qualitative) criteria. Reino *et al.* (2020:390) claim that quantitative investigations are essential but often restrict how the data can be interpreted.

5.7 IMPLICATIONS

Oluwa and Ibrahim (2021:488) assert that hierarchical cultures are believed to discourage innovation, creativity, and risk-taking because they are preoccupied with internal processes and predetermined norms and procedures. From the secondary data, it is evident that the organisation's performance is below world-class standards. The adhocracy culture is essential as the world is developing and new ways of working are emerging. Adhocracy culture emphasises developing a strategy for the future, structured anarchy, and disciplined creativity because it believes adaptation and innovation lead to new resources and prosperity (Cameron & Quinn, 2006:43). Thus, a low adhocracy poses a challenge to the organisation's reliability performance.

Adapting to agility, new generations entering the workspace and technologies is crucial for organisations. Unlike markets or hierarchies, adhocracy lacks centralised authority structures (Cameron & Quinn, 2006:44). In light of these observations, it is possible to state that the chosen chemical industry still needs to develop a cutting-edge, competitive structure that keeps up with changing market conditions.

Considering the role of adhocracy culture, it could boost the ability to recognise each obstacle as a challenge to create something better by admitting a need to enhance present reliability performance.

5.8 AREAS FOR FUTURE STUDY

It is recommended that the management of the selected chemical industry investigate the shortcomings and resilience of the current organisational culture and develop action plans to address the gaps that prevent them from having an improved plant reliability performance that conforms to world-class performance.

An opportunity for more research is proposed for a less salient result for adhocracy culture. It is advised that future researchers consider the impact of adhocracy culture on the performance of hierarchy-dominated organisations.

It is further recommended that additional research be conducted to employ a mixed-method approach to collect both objective and subjective data. In addition, the study can be further expanded to other operating units in the selected chemical industry.

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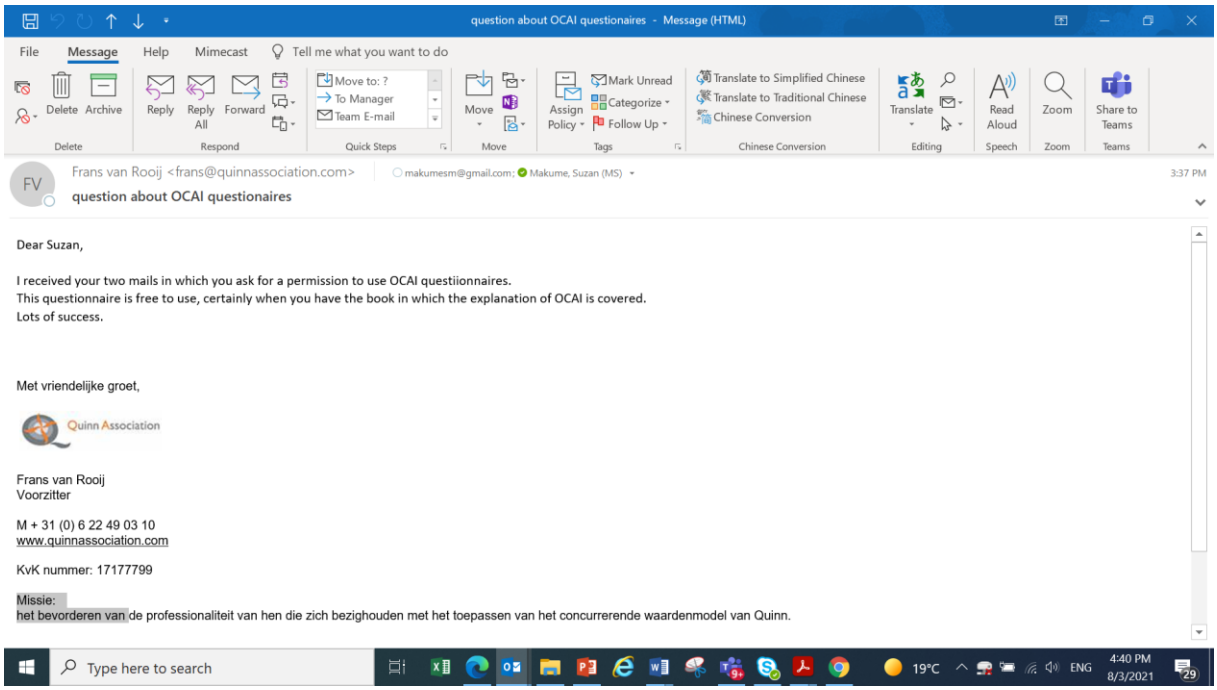
APPENDIX A – OCAI QUESTIONNAIRE APPROVAL

Approval was requested, and a response was received from Frans van Rooij as per the email below. Information was found at (https://www.quinnassociation.com/en/about_us/robert-quinn).



APPENDIX B – PERMISSION TO ACCESS POPULATION AND SECONDARY DATA

REQUEST TO CONDUCT RESEARCH WITHIN SASOLBURG & EKANDUSTRIA OPERATIONS (SEO)

EMPLOYEE DETAILS

Name	Suzan
Surname	Makume
Control number	01023222
Position title	Improvement SME
Department	Operations Improvement Programme Delivery
Line manager	Ernst Uys
Vice President	Nico Botha

QUALIFICATION DETAILS

Qualification:	Masters
Field of study:	Business Administration
Year of study:	2021 - 2022
Institution:	North West University

RESEARCH STUDY DETAILS

Topic:	Investigating the influence of organisational culture on reliability performance in a selected South African chemical organisation
Purpose of the research:	The purpose of the research is to fulfil the academic requirement and share the outcome of the study with the organisation
Sample Population size:	The sample size is 651 Sasolburg Operations Management within the three Operating Hubs, from maintenance, production and technical support.
Method of data collection (interviews / questionnaire):	Data gathering will be accompanied by a questionnaire and FY18 to FY21 consolidated OEE data for the Sasolburg Operations.

Page 1 of 2

Approval Letter

To:	Rhandu Nqubane, Vice President Human Resources Rightwell Laxa, Senior Vice President
From:	Name & Surname, Designation OME and Area/Section
Date:	17 May 2022
Subject:	**Approval to conduct research within Sasol, Sasolburg**

Research topic: Investigating the influence of organisational culture on reliability performance in a selected South African chemical organisation

Brief description of research, including method of research.

- Data gathering will be accompanied by a questionnaire and OEE data for FY18 to FY21 for the three operating Hubs.
- The targeted population will be leaders within the three operating Hubs, only operations and technical support.
- Confidentiality and anonymity will be assured
- No names will be requested
- Only aggregated data will be provided
- Data will be stored without identifiers

Supported:

Rhandu Nqubane
Vice President HR
SEO Natref & R&T

Approved:

Rightwell Laxa
Senior Vice President
Sasolburg & Ekandustria Operations

APPENDIX C – QUESTIONNAIRES

Kindly answer the following questions by ticking the appropriate box or filling the spaces provided.

PART A: GENERAL INFORMATION

1. Please indicate your highest qualification.

Matric or Lower		1
High School Diploma		2
Bachelor's degree		3
Honours degree		4
Master's degree and higher		5

2. Years of employment at the company

< 5 years		1
Between 5 and 10 years		2
Between 10 and 15 years		3
Between 15 and 20 years		4
> 20 years		5

3. Please select how many organisations did you work for

1		1
2 - 3		2
4 - 6		3
>7		4

PART B: Competing Value Framework (Organisational Culture).

Indicate on a scale of 1-5 to what extent you agree with the following about your company.

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

Dominant Characteristics	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
	5	**4**	**3**	**2**	**1**
A. The organisation is a very personal place. It is like an extended family. People seem to share a lot of personal information and features					
B. The organisation is a very dynamic entrepreneurial place. People are willing to stick out their necks and take risks.					
C. The organisation is very result oriented. A major concern is getting the job done. People are very competitive and achievement-oriented.					
D. The organisation is a very controlled and structured place. Formal procedures generally govern what people do.					

Organisational Leadership	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
	5	**4**	**3**	**2**	**1**
A. The leadership in the organisation is generally considered to exemplify mentoring, facilitating, or nurturing.					
B. The leadership in the organisation is generally considered to exemplify entrepreneurship, innovation, or risk-taking.					
C. The leadership in the organisation is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.					
D. The leadership in the organisation is generally considered to exemplify coordinating, organising, or smooth-running efficiency.					

Management of Employees	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
	5	**4**	**3**	**2**	**1**
A. The management style in the organisation is characterised by teamwork, consensus, and participation.					
B. The management style in the organisation is characterised by individual risk-taking, innovation, freedom, and uniqueness.					
C. The management style in the organisation is characterised by hard-driving competitiveness, high demands, and achievement.					
D. The management style in the organisation is characterised by the security of employment, conformity, predictability, and stability in relationships.					

Organisation Glue	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A. The glue that holds the organisation together is loyalty and mutual trust. Commitment to this organisation runs high.					
B. The glue that holds the organisation together is the commitment to innovation and development. There is an emphasis on being on the cutting edge.					
C. The glue that holds the organisation together is an emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes					
D. The glue that holds the organisation together is formal rules and policies. Maintaining a smooth-running organisation is important.					

Strategic Emphasis	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A. The organisation emphasises human development. High trust, openness, and participation persist.					
B. The organisation emphasises acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.					
C. The organisation emphasises competitive actions and achievement. Attaining targets and winning in the marketplace are dominant.					
D. The organisation emphasises permanence and stability. Efficiency, control and smooth operations are important.					

Criteria of Success	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
A. The organisation defines success based on the development of human resources, teamwork, employee commitment, and concern for people.					
B. The organisation defines success based on having the most unique or newest products. It is a product leader and innovator.					
C. The organisation defines success based on winning in the marketplace and outpacing the competition. Competitive market leadership is key.					
D. The organisation defines success based on efficiency. Dependable delivery, smooth scheduling and low-cost production are critical.					

APPENDIX D – INFORMED CONSENT

Dear Participant

This **Informed Consent Statement** presents the confirmation of information relating to the research approval at the North-West University on "**investigating the influence of organisational culture on reliability performance in a selected South African chemical organisation**."

The researcher is a Master of Business Administration (MBA) student at the North-West University Business School. The study target to assess the effect of organisational culture on the plant reliability performance of the chemical industry in the Free State province, South Africa. This study forms part of a mini-dissertation submitted in fractional satisfaction with the North-West University MBA requirements. A globally certified degree expects adherence to strict moral principles as essential to leading this exploration.

The researcher acknowledges your willingness to participate in the study. Your partaking in this research study is voluntary, and you are not obliged to answer any questions you do not want to answer. If you do not wish to continue completing the questionnaire at any time or withdraw, you may stop without penalties or consequences. The researcher will collect limited demographic information to portray the participants and the selected organisations.

The Protection of Personal Information (POPI) Act took effect on the 1st of July 2021, focusing on personal data protection for citizens. The Act requires the processing of only important information with a provided motivation. Therefore, the following demographic questions will not be asked: age, gender, level/position of employment in the organisation, plant currently working under and the population group. These questions are explicit identifiers.

The study's outcome will be used for scholarly purposes, and recommendations will be shared with the participating organisation. Additionally, note that this study does not have a right or erroneous response to any inquiries. This implies that in looking at the profiles of respondents, there is no right or inaccurate social profile.

The researcher will notify you by email, and you will be able to access the questionnaires through the attached link. The online survey monkey will take you approximately eight minutes to complete. The completed questionnaires will be captured and analysed by the Statistical Consultation Services at North-West University. The researcher or statistician will save data in a password-secured electronic format. And the researcher will destroy the collected data or statistical analyses after three years. The surveys will exclude information that will personally identify you to help protect your confidentiality.

Your contribution is of utmost importance to this research, and the researcher acknowledges your assistance in providing this information.
Selecting "Yes" below shows that you have read the information above and given your consent to voluntary participate.

If you do not wish to engage in the research study, kindly reject participation by clicking "No" underneath.

Yes	
No	

Regards,
The researcher,
NWU Business School

North-West University, Potchefstroom

Supervisor,
Badnock Manda
Contact number: 071 889 8674
NWU Business School
North-West University, Potchefstroom

APPENDIX E – CODE OF CONDUCT

CODE OF CONDUCT FOR RESEARCHERS

This code of conduct is applicable to all NWU researchers.

As a researcher of the North-West University (NWU), I subscribe to the rules of the NWU Institutional Research Ethics Regulatory Committee (IRERC), all applicable policies of the NWU as well as all national and international laws and regulations applicable to my field of study. Furthermore, I commit myself to abide by the ethical principles and responsibilities as set out in the Singapore statement on Research Integrity (22 September 2010), in any and all research endeavours that I undertake as a researcher of the NWU.

The four major principles of research integrity to which I will adhere and that will guide my research are:

- Honesty in all aspects of research
- Accountability in the conduct of research
- Professional courtesy and fairness in working with others
- Good stewardship of research on behalf of others

Consequently I will also adhere to the following ethical responsibilities:

1. I will take responsibility for the originality and trustworthiness of my research.

2. I will stay abreast of and adhere to all institutional, national, and international laws, regulations, and policies applicable and related to my research.

3. I will at all times employ appropriate research methods, base my conclusions on critical analysis of the evidence and report my findings and interpretations fully and objectively.

4. I will keep clear and accurate records of all research that I have conducted in a manner that will allow verification and replication of my work by others, if applicable.

5. I will, where applicable, share my data and findings openly and promptly, in line with external funding rules. This will be done as soon as possible after I have had an opportunity to establish priority and ownership claims.

6. I will take responsibility for my own contributions to publications, funding applications, reports and other representations of my research. I will also and only include authors who meet valid authorship criteria.

7. I will acknowledge the names and roles of those who made significant contributions to my research in publications, including writers, funders, sponsors, and others, but do not meet authorship criteria.

8. In my peer reviews, I will provide fair, prompt and rigorous evaluations and I will respect confidentiality when I review others' work.

9. I will disclose all conflicts of interest (financial and other) that could compromise the trustworthiness of my work in research proposals, publications, public communications, and in review activities.

10. When I publically address a community in the spirit of academic freedom, I will in all stages base my professional comments on research findings (if applicable) and my expertise. I will distinguish between professional comments and opinions based on personal views.

11. Should any irresponsible research practices and/or research misconduct become known to me or brought under my attention, I will report such irresponsible research activities to the appropriate authorities.

12. I will respond to irresponsible research practices or conduct, by taking prompt actions as set out in the procedures of the university. I will also protect those who report misconduct in good faith, to the best of my abilities.

13. I will endeavour to create and sustain an environment that encourage research integrity through education of students, research teams and peers, as well as abide by policies, and reasonable standards for advancement.

14. I will at all times weigh societal benefits against the risks inherent in my work.

Name: Suzan Makume Signature:  Date: 08 February 2022

APPENDIX F – ETHICAL CLEARANCE

Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Fax: 018 299-4910
Web: http://www.nwu.ac.za

Senate Committee for Research Ethics
Tel: 018 299-4849
Email: nkosinathi.machine@nwu.ac.za

13 May 2022

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Economic and Management Sciences Research Ethics Committee (EMS-REC)** on 22/04/2022, Round Robin, the Economic and Management Sciences Research Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-RERC) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title: Investigating the influence of organisational culture on reliability performance in a selected South African chemical organisation
Study Leader/Supervisor (Principal Investigator)/Researcher: Dr B Manda - MBA
Student: Makume, SM (25688537)

Ethics number: N W U - 0 0 6 4 0 - 2 2 - A 4
Institution Study Number Year Status

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application Type:
Commencement date: 13/05/2022 **Risk:** Low
Expiry date: 13/05/2023
Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.

Special in process conditions of the research for approval (if applicable):

-

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- *The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the EMS-REC:*
  - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EMS-REC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for an external audit.*
- *The date of approval indicates the first date that the study may be started.*
  n the interest of ethical responsibility, the NWU-SCRE and EMS-REC reserves the right to:
  - *request access to any information or data at any time during the course or after completion of the study;*

- *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*
- *withdraw or postpone approval if:*
  - *any unethical principles or practices of the study are revealed or suspected;*
  - *it becomes apparent that any relevant information was withheld from the EMS-REC or that information has been false or misrepresented;*
  - *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
  - *new institutional rules, national legislation or international conventions deem it necessary.*
- *Please note that the ethics approval of this application is subject to the Covid-19 protocols.*

The EMS-REC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the EMS-REC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely,

Mark Rathbone

Digitally signed by Mark Rathbone
DN: cn=Mark Rathbone, o=North-West University, ou=Business management, email=mark.rathbone@nwu.ac.za, c=ZA
Date: 2022.05.14 11:10:54 +02'00'

Prof Mark Rathbone
Chairperson: NWU Economic and Management Sciences Research Ethics Committee

APPENDIX G – RELIABILITY STATISTICAL RESULTS

Reliability Statistics: Clan Culture							
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items					
0.794	0.794	6					
Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	0.392	0.238	0.501	0.263	2.109	0.008	6
Item-Total Statistics							
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted		
A1	17.44	16.692	0.367	0.140	0.803		
B1	17.43	15.203	0.595	0.365	0.751		
C1	17.42	15.288	0.532	0.292	0.766		
D1	17.46	14.685	0.591	0.376	0.751		
E1	17.56	15.155	0.595	0.381	0.751		
F1	17.62	14.797	0.610	0.385	0.747		
Reliability Statistics: Adhocracy Culture							
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items					
0.786	0.786	6					
Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	0.380	0.277	0.505	0.228	1.823	0.004	6
Item-Total Statistics							
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted		
A2	16.23	14.420	0.502	0.277	0.762		
B2	16.10	14.207	0.551	0.347	0.750		
C2	16.17	13.754	0.586	0.370	0.741		
D2	15.75	14.350	0.552	0.320	0.750		
E2	15.54	14.684	0.536	0.313	0.754		
F2	15.68	14.604	0.486	0.284	0.766		

Reliability Statistics: Market Culture							
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items					
0.679	0.685	6					
Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	0.266	-0.002	0.432	0.434	-249.169	0.013	6
Item-Total Statistics							
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted		
A3	18.25	8.244	0.515	0.302	0.601		
B3	18.63	8.901	0.295	0.203	0.682		
C3	18.28	9.016	0.378	0.170	0.648		
D3	18.34	8.592	0.474	0.243	0.617		
E3	18.16	8.414	0.521	0.338	0.601		
F3	18.25	9.271	0.302	0.199	0.673		
Reliability Statistics: Hierarchy Culture							
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items					
0.655	0.658	6					
Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	0.243	0.147	0.315	0.167	2.133	0.004	6
Item-Total Statistics							
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted		
A4	18.87	9.170	0.345	0.139	0.627		
B4	19.28	9.325	0.332	0.136	0.631		
C4	19.37	8.630	0.386	0.168	0.613		
D4	19.11	8.636	0.375	0.156	0.618		
E4	18.99	8.584	0.474	0.227	0.581		
F4	19.00	9.203	0.407	0.184	0.607		