A FOLLOWER-CENTRIC MODEL FOR EMPLOYEE MORALE IN A SAFETY-CRITICAL AIR TRAFFIC CONTROL ENVIRONMENT

by

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submitted in accordance with the requirements
for the degree of

DOCTOR OF BUSINESS LEADERSHIP

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROF SANCHEN HENNING

2020

Declaration

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I, Lonell Coetzee, hereby declare that A FOLLOWER-CENTRIC MODEL FOR EMPLOYEE MORALE IN A SAFETY-CRITICAL AIR TRAFFIC CONTROL ENVIRONMENT is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references. I further declare that I submitted the thesis/dissertation to originality checking software and that it falls within the accepted requirements for originality. I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution

Lonell Coetzee

21 October 2020

Abstract

Background: Low morale is classified as a latent condition for performance variability in safety-critical environments. Morale management may assist in the control of performance variability as part of a systems approach to safety. A context-specific model for measuring and managing morale with reference to followership in a safety-critical air traffic control (ATC) environment could not be found.

Purpose/Aim: The purpose of this study was to develop a model that enables the measurement and management of air traffic controller (ATCO) team morale.

Research Design: An exploratory sequential mixed method design was adopted. A census approach to sampling was used to conduct 21 focus group sessions as the qualitative phase, providing the definition and drivers of morale. The Measure of Morale and its Drivers (MoMaD) survey instrument was created from qualitative data, then administered to 256 ATCOs in the quantitative phase. Statistical methods included exploratory factor analysis, correlation and regression analysis to construct the final MoMaD model.

Results: A context-specific definition of morale is provided and *communication management*, *team cohesion*, *leadership interaction*, *staff incentive*, *staffing level*, *workplace health and safety and mutual trust* were found to be the drivers of morale in a safety-critical ATC environment. A single-item measure of perceived morale reflected the state of context-specific ATCO team morale more accurately than an existing generalisable multi-item measure.

Conclusion: This study contributes to the body of knowledge by integrating applicable aspects of morale, followership, performance variability and organisational culture and climate in safety-critical ATC environments into a new theoretical framework. The MoMaD instrument is presented as a context-specific model for measuring and managing ATCO team morale in an ATC environment.

Recommendations: Future research opportunities include the possible influence of morale as a predictor of morale in safety-critical environments and the development of a context-specific multi-item measure of morale for integration into the MoMaD model.

Key terms: morale; followership; human error; human performance variability; air traffic control; aviation; corporate culture; safety culture; esprit de corps; motivation

Dedication

Dedicated to André Coetzee, the man of my dreams, who taught me that anything is possible with enough hard work and determination…and with someone who believes in you. You are the wind beneath my wings!

Acknowledgements

I would like to thank the following people, without whom this project would have remained but just a dream:

a) The examiners, for allowing me the opportunity to present you with this thesis.
b) ATNS, for allowing me the freedom to pursue morale within the company without fear or favour. Specifically, the following individuals:
    a. Dr Sandile Malinga, ATNS COO, for your support and sanction.
    b. Mr Sibusiso Nkabinde, FAOR MATS, for your kind feedback and assistance in checking the MoMaD items and your patience.
    c. Mr KG Molefi, FAOR APP Pool Manager, for your belief in me and your incredible logistical support.
    d. My colleagues and fellow ATNS ATS staff, for sharing your experiences, taking the time to complete the survey, and the patience you've shown in waiting for the results. I truly hope that this project will be able to make at least some small difference for some of you.
c) Dr Ian Joubert, Dr Jaco van der Westhuizen, Mr Darrel Blake and Dr Johan Engelbrecht, for the time and effort spent in your expert MoMaD items inputs.
d) Hennie Grobler, for your incredible statistical patience and speedy replies.
e) Dr Colene Hind, for flying with me – in the car and in the air.
f) Prof Sanchen Henning, without whom I never would've embarked on this journey. Your guidance and incredible *feel* for this research has made all the difference, for which I shall be forever thankful.
g) Pa Johann en Ma Irma, vir Pa se sagte oor en deernisvolle raad en Ma se *Meditereense spread* wat my elke keer weer moed gee om aan te gaan.
h) Pa Tinus en Ma Daleen, vir julle leiding toe ek jonk was wat my in 'n kritiese denkwyse geskoei het. Vir julle ondersteuning en geduld, en konstante beskikbaarheid wanneerookal dit dol raak. Vir julle liefde.
i) Kayleigh, Milla en Tina, vir die inkoop in my projek met *julle* tyd. Ek is lief vir julle!
j) Aan my lief, my anker, my sielsgenoot en my hero: A. Jou liefde, meelewing, geduld, koffie, humor en laataand halwe flieks het my hierdeur gekry. Nou is my tyd jou en die girls s'n.
k) The Lord God Almighty, who directs life and determines all. Selah!

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List of Abbreviations

ACC ..... ACCOUNTABILITY

AGFI ..... ADJUSTED GOODNESS OF FIT INDEX

ANSP ..... AIR NAVIGATION SERVICE PROVIDER

ATFCM ..... AIR TRAFFIC FLOW AND CAPACITY MANAGEMENT

ATNS ..... AIR TRAFFIC AND NAVIGATIONAL SERVICES (STATE OWNED COMPANY) LIMITED

ATC ..... AIR TRAFFIC CONTROL

ATCO ..... AIR TRAFFIC CONTROL OFFICER / AIR TRAFFIC CONTROLLER

ATM ..... AIR TRAFFIC MANAGEMENT

B2B ..... BOTTOM TWO BOX SCORE

BF ..... BREAK FACILITIES

CANSO ..... THE CIVIL AIR NAVIGATION SERVICE ORGANISATION

CC ..... COMMUNICATION CLIMATE

CFI ..... COMPARATIVE FIT INDEX

CM ..... COMMUNICATION MANAGEMENT

CMIN ..... CHI-SQUARE STATISTICS

CNS ..... COMMUNICATION, NAVIGATION AND SURVEILLANCE

CSQ ..... COMMUNICATION SATISFACTION QUESTIONNAIRE

DM ..... DIVERSITY MANAGEMENT

EFA ..... EXPLORATORY FACTOR ANALYSIS

ESMMD ..... EXPLORATORY SEQUENTIAL MIXED METHODS DESIGN

EUROCONTROL ..... EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION

FAA ..... FEDERAL AVIATION ADMINISTRATION

GEMS ..... GENERIC ERROR-MODELLING SYSTEM

GFI ..... GOODNESS OF FIT INDEX

IATA ..... INTERNATIONAL AIRLINE TRANSPORT ASSOCIATION

ICAO ..... INTERNATIONAL CIVIL AVIATION AUTHORITY

IFATCA ..... INTERNATIONAL FEDERATION OF AIR TRAFFIC CONTROL ASSOCIATIONS

IFI ..... INCREMENTAL FIT INDEX

IT ..... INTERNAL TRUST

ITM ..... INTERNAL TRUST MEASURE

IXS ..... INDEX SCORE

LEBQ ..... REVISED SIX-FACTOR LEADER EMPOWERING BEHAVIOUR QUESTIONNAIRE

LFT ..... LEADER-FOLLOWER TRADE

LI ..... LEADERSHIP INTERACTION

LMX ..... LEADER-MEMBER EXCHANGE

MIM ..... MULTI-ITEM MEASURE

MLR ..... MULTIPLE LINEAR REGRESSION

MOMAD ..... MEASURE OF MORALE AND DRIVERS

MT ..... MUTUAL TRUST

NASA ..... NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NFI ..... BENTLER-BONNET NORMED FIT INDEX

OIC ..... OFFICER IN CHARGE

PM ..... POOL MANAGER

PS ..... PARTICIPATIVE SAFETY

PT ..... PROPENSITY TO TRUST

RE ..... RESPECTFUL ENGAGEMENT

REM ..... RESPECTFUL ENGAGEMENT MEASURE

RMSEA ..... ROOT MEAN SQUARE ERROR OF APPROXIMATION

RMSR ..... ROOT MEAN SQUARE RESIDUAL

SC ..... SUPERVISORY COMMUNICATION

SDC ..... SKILL DEVELOPMENT AND COACHING

SDS ..... SEMANTIC DIFFERENTIAL SCALE

SI ..... STAFF INCENTIVE

SIM ..... SINGLE-ITEM MEASURE

SL ..... STAFFING LEVEL

SPSS ..... STATISTICAL PACKAGE FOR SOCIAL SCIENCES

SRMR ..... STANDARDISED ROOT MEAN SQUARE RESIDUAL

T2B ..... TOP TWO BOX SCORE

TC ..... TEAM COHESION

TCI ..... TEAM CLIMATE INVENTORY

TLI ..... TUCKER LEWIS INDEX

TO ..... TASK ORIENTATION

TS ..... TECHNICAL SUPPORT

UNISA ..... UNIVERSITY OF SOUTH AFRICA

VDL ..... VERTICAL DYAD LINKAGE

WHAS ..... WORKPLACE HEALTH AND SAFETY

Chapter 1: Background and orientation

"You cannot solve a problem from the same consciousness that created it.
You must learn to see the world anew."

- Albert Einstein
(Waddock & Rasche, 2012:295)

1.1 Introduction

The word 'safety' is a ubiquitous term used on a daily basis in many different environments. According to the Merriam-Webster Dictionary (2014), safety is defined as "*the condition of being safe from undergoing or causing hurt, injury or loss*". There are few industries that operate in such a safety-critical environment as that of aviation.

This statement rings particularly true for air traffic controllers (ATCOs), for whom even a momentary lapse in safe operation can have disastrous consequences and at busy airports, may jeopardise the lives of literally hundreds of flight crew and passenger lives at any given point in time. In 2013 alone, some 3.1 billion passengers were carried on 33 million scheduled commercial flights worldwide, and this is forecast to increase to 6.4 billion by 2030 (ICAO, 2014). Africa's scheduled commercial traffic grew by 7.2% in 2013, surpassed only by the Middle East and the Asia-Pacific region (ICAO, 2014).

Worldwide, Air Navigation Service Provider (ANSP) management are constantly searching for ways to reduce the occurrence of safety events and accidents, whilst endeavouring to accommodate a rapidly increasing volume of aircraft movements using ever more efficient methods (CANSO, 2011). It is colloquially estimated that between 70% and 80% of all aviation accidents can be attributed to human error (O'Hare, Wiggins Batt & Morrison, 1994; Shappell & Wiegmann, 1997, Wiegmann & Shapell, 2003). It is becoming increasingly apparent that the human factor and consideration of human performance variability are crucial to maintaining and improving safety standards (Danaher, 1980; Shappell & Wiegmann, 1997; Reason, 2000a; Shorrock & Kirwan 2002; Bushnell, 2007; Kontogiannis & Malakis, 2009; Dekker & Woods, 2010; Berry, 2010; Munene, 2016).

According to Reason (1990), human error can be apportioned into active and latent errors:

a) Active errors are errors linked to direct actions of workers at the sharp end of the operational continuum, the effects of which (referred to as active failures) ordinarily manifest almost immediately.
b) Latent errors are the results of latent failure conditions which are embedded within the processes and culture of a system or organisation. Detecting such conditions is substantially more difficult, as they may remain hidden for extended periods of time – even after the error has occurred it is often not apparent what the systemic failures were, or it is easier to simply ascribe it to active error.

Whilst active error is a simpler concept to identify and mitigate due to its explicit nature which infers that it is visibly detectable, latent error is an abstract notion requiring much organisational introspection and interrogation to recognise and even more so to prevent. Latent failure conditions are present in every system and require several actions or conditions to align before causing a failure. As a result, when such failures do occur they are even harder to fathom or dissect due to the complex nature of the causal attributes.

Low morale, or "*having less than ideal motivation*", is identified as one of several possible latent conditions for human error (Reason, 1990: 206) and as the literature review conducted for this study revealed, has been under-researched in an aviation context. The term "human error" is now considered by many to be dated in the modern discourse, and *human performance variability* is preferred (Shorrock, 2019) even though the two concepts are inextricably linked and we cannot discard one for the other (EUROCONTROL, 2013; Smith, 2015). Although the term morale has several colloquial and academic definitions, it remains a vague, elusive and ambiguous concept that is often imprecisely delineated and employed (Johnson & Bledsoe, 1973; Smith, 1971; Smith, 1976; Weakliem & Frenkel, 2006; Hardy, 2010).

The identification and mitigation of low morale as a possible approach to assist in constraining latent error in safety-critical environments, specifically aviation, is the focus of this study. Safety in aviation is non-negotiable, and thus any effort to enhance it in a structured and scientifically sound manner should be considered a worthwhile

pursuit. This introductory chapter provides a synopsis of the research background, justification, aim, process and limitations, as well as an abbreviated enumeration of applicable literature and a description of relevant ethical considerations.

1.2 Background and context

Air Traffic Control (ATC) has evolved over the years from one person in a tower waving flags at aircraft to an abundance of ANSPs located in most countries around the world. Modern ANSPs cooperate globally to provide the age-old service of getting aircraft safely from point A to point B by each combining several ATC centres, manifold ATC sectors and numerous different types of ATCOs with multifarious ATC technologies in one immense synergistic endeavour.

1.2.1 Clarification: industry- and research-specific terms and concepts

Like many other highly specialised and technical industries such as engineering, medicine or the law, there are a plethora of technical terms and industry-specific jargon in aviation that muddies the waters of understanding for persons from alternate industries. Whilst clarifying every term is not feasible nor required, there are a few important ATC-specific concepts that require elucidation. Additionally, this section explains how several academic terminologies are contextually utilised within this research.

Air Traffic Control Officer (ATCO)

Air traffic controllers, or ATCOs as they are formally known (also referred to as controllers or ATCs), are a unique set of individuals who are responsible for the safe, orderly and expeditious flow of air traffic through the world's airspaces. They are typically based at airports or off-base control centres globally and monitor the movement (speed, altitude and direction) of aircraft using either visual means, radar monitoring equipment, or procedural separation methods to communicate separation instructions to pilots, ensuring safe passage through congested skies. ATCOs are ordinarily employed by ANSPs as part of their Air Traffic Management (ATM) offering.

Air Traffic Management (ATM)

The term Air Traffic Management (ATM) comprises of all the systems that enable an aircraft to take off from an aerodrome, transit an expanse of airspace and land at its destination aerodrome safely. This term includes, but is not limited to, air traffic control – it describes aeronautical engineering personnel, meteorological forecasters and modellers, the physical air navigational systems that display information to ATCOs, airspace management personnel and their tools as well as Air Traffic Flow and Capacity Management (ATFCM).

Air Navigation Service Provider (ANSP)

ANSPs are state-controlled or private entities that provide air navigation services on behalf of a company, region or country (EUROCONTROL, 2018). ANSPs may provide services ranging from Air Traffic Management (ATM) to communication, navigation and surveillance systems (CNS), meteorological services, search and rescue functions and aeronautical information management services. Most of the world's ANSPs are members of the Civil Air Navigation Services Organisation (CANSO), which is based in the Netherlands.

Air Traffic and Navigational Services Company S.O.C. Ltd (ATNS)

Air Traffic and Navigational Services Company S.O.C Ltd (ATNS) is the largest ANSP in South Africa and provides ATM services to 10% of the world's airspace (ATNS, 2018). It is a parastatal organisation which is headquartered in Johannesburg and is the sole ATM service provider in all upper airspaces above South Africa, halfway across the Atlantic and Indian Oceans and all the way to Antarctica. ATNS provides aerodrome control services at 21 international and regional airports throughout South Africa. This includes OR Tambo, King Shaka, Cape Town, Port Elizabeth, Upington, Lanseria, Kruger Mpumalanga, Polokwane and St Helena International Airports, as well as at smaller regional airports such as Bloemfontein, Mafikeng, Pilanesberg, Pietermaritzburg, Kimberley, George, East London, Wonderboom, Grand Central, Rand and Bisho. ATNS resides under the South African Department of Transport, is a member of CANSO, and is bound by internationally agreed aeronautical best practices perpetuated by the International Civil Aviation Organisation (ICAO).

Pools, Centres and Stations

The operational department within ATNS (referred to as Air Traffic Services), is divided into large air traffic control centres such as OR Tambo and Cape Town and smaller stations such as George or Wonderboom. Within the larger centres, there are groups of controllers responsible for different types of airspace, namely:

a) Tower controllers, who are responsible for the airspace immediately surrounding the applicable airport, as well as the ground operations of aircraft wishing to depart or arrive.
b) Approach controllers, who manoeuvre aircraft in and out of airports using speed, directional and altitude instructions in a larger portion of airspace usually situated on top of the tower controller's airspace. At smaller stations, the tower and approach functions are often performed by the same ATCO.
c) Area controllers, who are in charge of the cruise part of commercial flights, employing vast swaths of airspace to implement sequencing instructions from approach controllers for inbound aircraft into various airports, as well as passing traffic information to lower flying aircraft in outlying areas and monitoring flights in the oceanic portions of their journeys.

Smaller stations customarily consist of one team of either tower ATCOs or cross-qualified tower and approach ATCOs, with an Officer in Charge (OIC) responsible for the entire team. Larger stations have teams of tower and approach ATCOs known as pools, with a Pool Manager (PM) in charge of each pool. OR Tambo and Cape Town International airports additionally have area pools, with their respective PMs. Stations are also grouped into geographical pools, each with a PM. Thus, within ATNS, teams of ATCOs are referred to as pools and company branches as centres or stations (contingent on size). Pools are geographical as well intra-station at larger stations.

Safety event

When an action by a pilot or ATCO results in the minimum separation standard specified for the particular section of airspace being infringed, the resulting loss of separation is termed as a safety event. Whilst the severity of the safety event can vary from minor to near catastrophic, the outcome is never a collision. When the

safety event is controller induced, whether by error or violation, the ATCO is generally subjected to counselling and remedial action, as well as suspension in severe cases. A thorough investigation of the event contributing factors is conducted, and safety recommendations made from elements that are considered pertinent. ATNS subscribes to a just culture principle and therefore opposes punitive measures for ATCO errors. Company responses to violations, if determined by said investigation, are governed by the ATNS disciplinary code.

1.2.2 Clarification: research-specific use of terms and concepts

Follower

The Oxford Dictionary (1995) defines the term *follower* as *"a person who moves behind someone or something".* The term *follower* as employed in this research refers to the various pools of ATCOs at operational level within the assorted ATNS centres and stations within South Africa.

Leader

The Oxford Dictionary (1995) defines the term *leader as "the person who leads or commands a group, organisation or country."* The term *leader* referred to in this research consists of PMs and OICs (hereafter referred to as PMs) at lower operational managerial level at the various ATNS stations and centres within South Africa, each heading a pool of ATCOs.

Follower driver of morale

The Oxford Dictionary (1995) defines the term *driver* as *"a factor that causes a particular phenomenon to happen or develop"*. In this research, the drivers of morale were approached from a follower perspective to imply the organisational and workplace factors that perpetuate either high or low morale as perceived by followers.

1.3 Research rationale

In ATNS's internal quarterly safety publication, it is noted as part of a finding in a recent safety event that "*senior level management within the operations department to take note of matters raised under morale*" (ATNS, 2017: 14). Additionally, a recent survey conducted at the company by a consulting firm returned very negative results and high

entropy scores throughout the company (Mandate Molefi Human Resource Consulting, 2017), with the average company-wide air traffic services entropy score calculated as 23%. Derived by scientists from the second law of thermodynamics, *entropy* is a term used in organisational psychology as a measure of disorder (Handscombe & Patterson, 2004).

Recently, research was conducted within ATNS on followership (Joubert, 2014) and safety culture (Reid, 2017). Joubert (2014) recommended that future research be conducted to address the motivational levels of followers, whilst Reid (2017) determined morale amongst ATNS ATCOs to be at less than the desired level and implored ATNS to target improved morale amongst ATCO staff members, as ATCO morale could have an impact on the safety performance of the company as a whole. An audit conducted by PriceWaterhouseCoopers (2017), in an effort by the company to address the identified problem of low morale and high entropy, emphasised that the first step towards recuperation is to align leadership at all levels to the improvement journey. By involving followers in the process of defining, measuring and improving morale, the rationale is to assist ATNS in mitigating these internally and externally identified challenges.

1.4 Thesis statement

The thesis statement is a central assertion controlling the direction and content of a research report and postulates a supposition that the researcher will defend (Lester & Lester, 2015). The essential argument of this research is:

> *Morale is a component of performance variability. If a context-specific definition of morale, as well as the context-specific drivers of morale can be ascertained, a model can be described that would allow ATC pool managers to measure levels of morale in their pools and understand the level of influence that specific individual drivers have on ATCO morale.*

1.5 Problem statement, purpose statement and research questions

Characterising the research problem and meticulously explaining its precise nature are two of the most essential steps in any research project (Du Plooy-Cilliers, Davis & Bezuidenhout, 2014). Since the main aim of any research is to find solutions to

problems, the research problem, purpose statement and research questions are the foundations of the research process (Leedy & Ormrod, 2014).

1.5.1 Problem statement

Low morale is classified as a latent condition for human error (Reason, 1990), and human error contributes to between 70% and 80% of all aviation accidents (O'Hare et al., 1994; Shappell & Wiegmann, 1997, Wiegmann & Shapell, 2003). Based on recent corporate surveys as well as independent research studies, ATNS in South Africa reflected low staff morale within its ATCO pools (ATNS, 2017; Mandate Molefi Human Resource Consulting, 2017; Coetzee, 2017; Reid, 2017; Coetzee & Henning, 2019). Previous research and existing theories relating to staff morale in a safety-critical context are limited. Specifically, a model with a theoretical reference to followership, that identifies and describes the key drivers of staff morale in an air traffic control centre as well as their impact on overall morale does not exist. The empirical measurement of morale is important to effectively manage morale in a safety-critical environment.

Safety is the most important driver of operations at ATNS and ANSPs world-wide, and the control of performance variability is crucial to maintaining and improving safety standards (Danaher, 1980; Shappell & Wiegmann, 1997; Reason, 2000a; Shorrock & Kirwan 2002; Bushnell, 2007; Kontogiannis & Malakis, 2009; Dekker & Woods, 2010; Berry, 2010; Munene, 2016). As a latent condition for human error, the definition and measurement of morale will enable its elevation, assisting in the control of performance variability as part of a systems approach to safety in safety-critical environments.

From the problem statement it can be ascertained that the identified research problem is answerable and feasible, with a scope that is clearly defined (Du Plooy-Cilliers, Davis & Bezuidenhout 2014). Additionally, as the literature review indicates, the problem is relevant and of significant theoretical value as the literature surrounding morale management in an aviation (and specifically air traffic control) context is limited.

1.6 Philosophical foundations

To position philosophy within the design of a mixed methods study, Creswell and Plano Clark (2018) suggest Crotty's (1998) conceptualisation of the four levels for developing a research study (adapted and depicted in Figure 1) as a workable option for mixed method research.

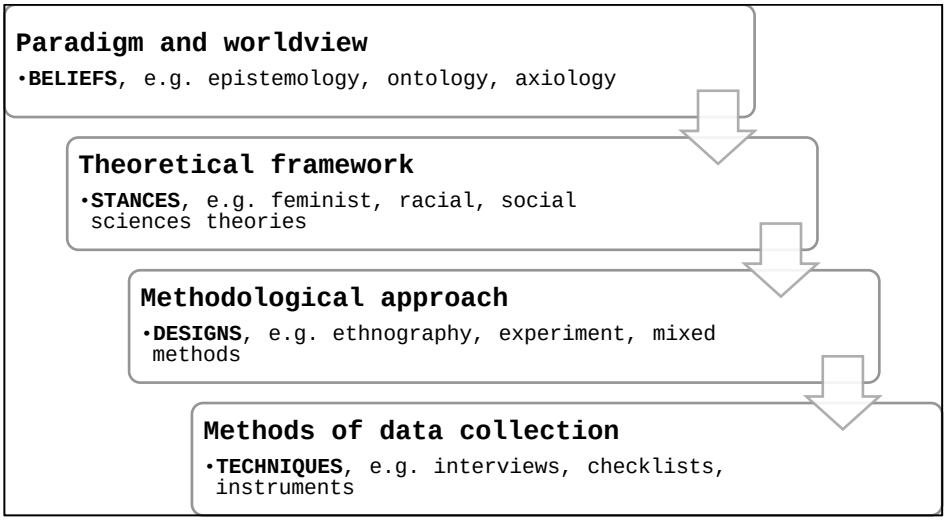

Figure 1: Four levels for developing a research study (adapted from Crotty, 1998)

As illustrated in Figure 1, Crotty (1998) contended that there are philosophical assumptions at the broadest level of designing a study, such as *ontology* that describes the nature of the reality, *epistemology* that describes the relationship between the researcher and that being researched and *axiology* that describes the role of values in the research process. Crotty (1998) continued by suggesting that these philosophical assumptions then inform the use of a theoretical stance that the researcher might use, such as social science or emancipatory theory which, according to Creswell and Plano Clark (2018), is best suited to mixed methods research and provides a framework guiding the nature of questions asked and answered in such a study.

The theoretical stance, in turn, informs the methodology to be used in the research design (Crotty, 1998), providing a strategy or plan of action for the research (Creswell & Plano Clark, 2018). Finally, Crotty (1998) contended that the methodology incorporates the methods, which Creswell and Plano Clark (2018) described as the processes and approaches utilised to accumulate, analyse and comprehend research data.

1.6.1 Research paradigm and worldview

The term *paradigm* was conceived by Kuhn (1977) and describes a collection of philosophies that determine what should be studied, how it should be studied, and how the resulting outcomes should be interpreted (Bryman, 2012). It can be formally defined as a "*basic belief system based on ontological, epistemological and methodological assumptions*" (Guba & Lincoln, 1994: 107). Additionally, axiology is also considered to be an integral notion relating to a paradigm (Guba & Lincoln, 2005). These concepts are intricately interwoven, and their relationship is illustrated in Figure 2:

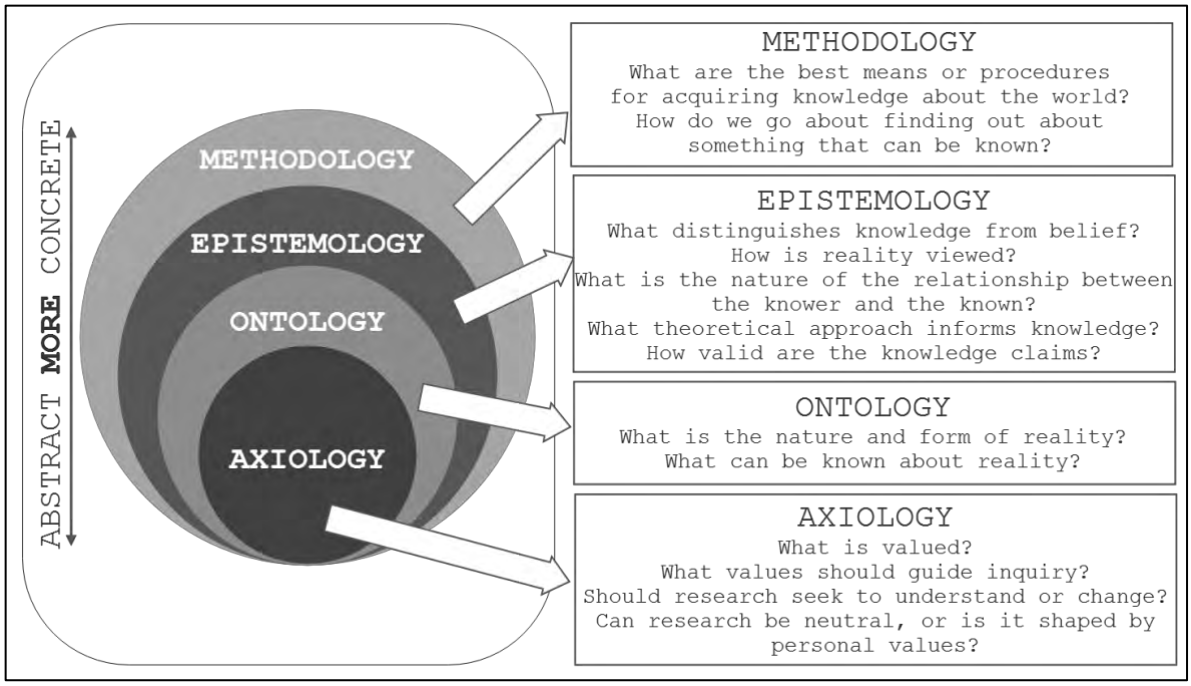

Figure 2: The research paradigm or worldview as philosophy (constructed from Guba & Lincoln, 1994; Guba & Lincoln, 2005; Creswell & Poth, 2018; Mack, 2010; Creamer, 2018; Morgan, 2007)

At the most abstract level, at the very bedrock of inquest, decisions need to be made about what is valued and which values should guide inquiry. Additionally, the role of the researcher should be decided in terms of the required level of impartiality (Morgan, 2007). These decisions are made at an axiological level and determine the axiological position of any research endeavour (Creswell & Plano Clark, 2018). Next, the nature and form of reality should be considered, and whether such realities are singular, multi-faceted or both (Creswell & Plano Clark, 2018). These considerations reside at an ontological level.

Epistemological decisions involve the nature of the relationship between the researcher and that which is being researched (Creswell & Plano Clark, 2018), the distinction of knowledge from mere belief (Mack, 2010), the way in which reality is viewed (Creswell & Poth, 2018) and the theoretical approach that informs knowledge (Creamer, 2018). At the broadest level, methodological considerations describe the strategies and procedures utilised to generate and justify knowledge (Creamer, 2018).

Whilst the concept of a paradigm is mostly used in the natural sciences, the terms *research tradition* or *worldview* are preferred in social sciences research (Du Plooy-Cilliers, 2014; Creswell & Plano Clark, 2018). Ascertaining and specifying the worldview of a study is vitally important, as it determines the knowledge that is to be sought, the questions that need to be asked to obtain it, and how to go about obtaining it (Du Plooy-Cilliers, 2014; Creswell & Poth, 2018). Creswell and Plano Clark (2018) mentioned four worldviews, namely postpositivism, constructivism, a transformative worldview and pragmatism, that they considered to be the most suitable for informing mixed method research and noted that they could be combined or used individually, because they are not "*watertight compartments*" (Crotty, 1998: 9).

Postpositivism embraces a deterministic philosophy, in which it is believed that effects or outcomes are most probably determined by causes (Creswell, 2014). Often associated with quantitative methodology, postpositivists make knowledge claims based on cause-and-effect thinking, by narrowing down and focusing on select variables and how they interrelate, by detailed analysis of observation and measurements of variables and by the testing and continuous refinement of theories (Creswell & Plano Clark, 2018).

Constructivism aims for a broad understanding of phenomena, shaped from individual perspectives or "from the bottom up" (Creswell & Plano Clark, 2018). Moulded by social interaction with individuals and their subjective views, this worldview is often associated with qualitative "storytelling" methodologies that probes for a deeper understanding of complex situations (Denzin, 2012).

Transformative worldviews are focused on the pursuit of human rights and strive for social justice, placing specific emphasis on the marginalised fringes of society such as women, people of various ethnicities and races, lesser-abled individuals and those with specific economic disadvantages (Mertens, 2009). Researchers with a transformative worldview work with society to change their situation for the better and reduce marginalisation (Creswell & Plano Clark, 2018).

Pragmatism is most frequently utilised for mixed method research, as the central focus is on the question asked, rather than the methodologies employed (Creswell & Plano Clark, 2018). The word *pragmatism* is descendant from the Greek word 'πραγμα' (pragma), denoting action (Pansiri, 2005). In philosophical terms it is a collection of concepts that have been proclaimed throughout history, with perhaps the first assertion arising from Peirce (1905: 494):

> *"The word pragmatism was invented to express a certain maxim of logic…The maxim is intended to furnish a method for the analysis of concepts…The method prescribed in the maxim is to trace out in the imagination the conceivable practical consequences – that is, the consequences for the deliberate, self-controlled conduct – of the affirmation or denial of the concept."*

Research paradigms had, up to that point, largely focussed on "*reporting and registering past experiences*" (Dewey, 1931: 33). Pragmatism, on the other hand, has a very different emphasis which Dewey observed as (1931: 32–33):

> *"Pragmatism…does not insist upon antecedent phenomena, but upon consequent phenomena; not upon the precedents, but upon the possibilities of action. And this change in point of view is almost revolutionary in its consequences…when we take the point of view of pragmatism we see that the general ideas have a very different role to play than that of reporting and registering past experiences. They are the bases for organising future observations and experiences."*

Later writings by Murphy (1990), Cherryholmes (1992) and Morgan (2007) echoed Dewey's sentiments, documenting that a pragmatic worldview emphasises the outcomes and consequences of the research, as well as the use of multiple methods to solve real-world problems. Pragmatism focuses on making a difference, appreciating both objective and subjective knowledge (Creswell & Plano Clark, 2018) and on *"connecting abstract issues on an epistemological level to the methodological level"* (Shannon-Baker, 2016: 325). The formal link between pragmatism and mixed

methods research was made by Tashakkori and Teddlie (2003), who argued that with a pragmatic worldview:

a) A single study is able to utilise both qualitative and quantitative methods.
b) Both the philosophical worldview and method that underlies a study should be of lesser significance than the research question.
c) Researchers should not have to choose between postpositivism and constructivism – pragmatism offers a significant and more suitable alternative for mixed method research.
d) Methodological preferences should be directed by a functional and realistic research philosophy.

This research is firmly rooted within a pragmatic worldview, prioritising the application of multiple methods to solve a real-world problem and embracing the considerable extent of adaptability, pliability and practicality that pragmatism affords. Embracing the metatheoretical belief of pragmatism implies distinctive philosophical assumptions concerning the ontological, epistemological and axiological positions of the research. Philosophical assumptions guide the researcher's inquiry by offering suitable philosophical and theoretical validation for the way in which objects and people are seen, observed and interpreted (Greene, 2006).

1.6.2 Axiological position

The axiological position of a study outlines the approach taken to consider the role of values during the research process (Creswell & Poth, 2018). The axiological dimension of the pragmatic worldview compels the researcher to prioritise the linking of the research to practice and be action focused (Creamer, 2018). Pragmatically inclined researchers may include multiple stances, such as for instance including both biased and unbiased perspectives to create what they consider to be a more holistic research outcome (Creswell & Plano Clark, 2018).

In line with this approach to values, this research ascertained rich opinion-based data as a first step, before becoming more unbiased and clinical during the third phase. Additionally, this research aimed to produce practically useful information that can be used to change the organisational situation for the better. As such, it is not merely observing the situation, but changing it.

1.6.3 Ontological position

The ontological position of a study describes the nature of its reality and its characteristics (Creswell & Poth, 2018). According to Creamer (2018), the ontological position of pragmatists can be described as:

a) They tend to place the emphasis on what works, shunning assumptions about the character of truth and reality.
b) They consider truth and knowledge to be perpetually uncertain, tentative and malleable as time goes by.
c) They defy several conventional dichotomies, such as objectivity and subjectivity.
d) They consider knowledge to be context-specific.
e) They regard emotions and opinions as equally valid when compared to the physical world.

The essence of the study is to consider its knowledge as context-specific, and continuously fluctuating. It places great emphasis on emotions and opinions and directs its inquiry accordingly.

1.6.4 Epistemological position

The epistemological position of research considers what is regarded as knowledge, how knowledge assertions are substantiated and what the relationship is between the researcher and the researched subject(s) (Creswell & Poth, 2018). For pragmatists, the quality of knowledge is determined by its usefulness, practicality or transferability (Creamer, 2018; Creswell & Plano Clark, 2018). Knowledge is acquired via iterations of impartial scrutiny and subjective interpretation (Plano Clark & Ivankova, 2016).

Thus, it embraces and avails the entire spectrum of epistemological positions from positivism on the one end to that of interpretivism on the other end, enabling the employment of whichever position is appropriate for the creation of practically useful knowledge during the applicable stage of the research. Each phase of this research has aimed to produce knowledge that is both practical and useful, with an initial orientation towards the interpretivist side of the scale and progressing towards a positivistic approach in phase three.

1.6.5 Methodological position

The methodological position of research determines the process in which data is gathered (Creswell & Plano Clark, 2018). It is essentially the culmination of all other positions, as it is essentially determined by the golden thread that runs through from the selected axiological position (Creamer, 2018). Pragmatists combine methodologies, by using both the post-positivistic method of deductive reasoning and the constructivist method of inductive reasoning (Creswell & Plano Clark, 2018) to varying extents. Known as abductive reasoning, this movement between inductive and deductive reasoning allows the selection of methods are that are appropriate for the setting (Morgan, 2007).

This research utilised a mixed methods approach to knowledge creation, utilising both qualitative and quantitative methodologies as required by the situation. It commenced by utilising a qualitative approach to obtain the definition and drivers of morale through focus group discussions with followers. Subsequently, a quantitative instrument was constructed from the obtained qualitative data for quantitative survey administration, which determined the levels of morale, the levels of each driver and their relationships with levels of morale.

1.7 Purpose statement

A purpose statement is a short, specific and declarative statement that summarises the topic, aspirations and intention of a research project (Hofstee, 2011). It should provide direction and motivation for the research, explaining to the reader what to expect from the rest of the document.

The purpose of this exploratory sequential mixed method study was to develop a model that delivers the definition and drivers of morale in an ATC environment and enables the measurement and management of air traffic controller (ATCO) team morale as follows:

<u>Phase one: Qualitative</u>

The first phase of the study employed qualitative methods to probe the themes and constructs that describe morale in an ATCO environment. It provided a working definition of the term *morale*, as well as the drivers of morale in an ATC context.

Phase two: Quantitative

From this initial exploration, the second phase of the study applied the qualitative findings of phase one to develop and operationalise a quantitative instrument for the measurement of morale and its drivers, amongst ATCOs within ATNS.

1.8 Research question

Research questions are used to frame in precise terms exactly what the research study aims to elucidate (Hofstee, 2011). The research question for this study was:

How can a model for ATCO team morale in a safety-critical air traffic control environment be best described?

1.9 Research objectives

Research objectives clearly state what a research project aims to achieve (Hofstee, 2011). Defining morale in an ATNS ATCO pool context and determining its drivers facilitates the measurement of morale levels. It has been demonstrated that in an ATNS context, leader over-estimation of follower attributional perceptions results in lower morale (Coetzee, 2017). This research produced a practically applicable model enabling pool managers elevate levels of ATCO morale by defining ATCO morale and determine its context specific drivers. It consisted of three phases, with qualitative data collected in phase one informing the collection of quantitative data in phase two, which yields a regression model in phase three. The following objectives were set:

1.9.1 Fundamental research objective

The fundamental research objective of the study was to provide a model for ATCO morale by defining morale and determining its context specific drivers.

1.9.2 Theoretical objectives

The theoretical objectives of the study were to:

TO1: Provide an overview of existing literature in the fields of performance variability, followership, organisational culture and climate and morale management.

TO2: Illuminate the gap in the literature relating to morale.

TO3: Construct a preliminary conceptual framework based on the literature review.

1.9.3 Empirical objectives

The empirical objectives of the study were to:

EO1: Explore the meaning of morale as perceived by ATCOs within an ATNS ATC pool environment.

EO2: Determine the most applicable drivers of morale within a safety-critical ATC environment.

EO3: Measure the levels of morale within each ATC centre in ATNS.

EO4: Identify the impact of each driver on ATCO morale levels.

EO5: Construct a final follower-centric model for the measurement and management of morale in a safety-critical ATC environment.

Defining and determining levels of morale, as well as identifying the context specific drivers of ATCO morale enables PMs to address any areas of concern. This enables PMs to elevate the levels of morale within their pools.

1.10 Significance of the study

The definition of morale and its measurement is a topic that, to date, has largely evaded the organisational body of knowledge (Hardy, Alcock & Malpass, 2015), specifically in an aviation context. Morale is receiving an ever-increasing amount of attention within the aviation industry (Lawson, 2013; Joubert, 2014; Coetzee, 2017; Reid, 2017; Coetzee & Henning, 2019), and the South African context is no exception. Providing a method for defining morale and determining its drivers in an organisationally specific context are research outputs that provide a valuable contribution to the body of knowledge in the field of leadership and organisational behaviour.

1.11 Positioning in the literature and preliminary conceptual framework

The aim of reviewing literature is to elucidate the need for proposed research in the context of the existing body of knowledge in a particular field or fields (Leedy & Ormrod, 2014). A thorough review of the literature informs the entire research process, as it provides the necessary perspective to enable the formulation of the research problem, purpose, objectives, hypotheses and questions (Leedy & Ormrod, 2014). According to Denscombe (2012), there are generally four ways in which a literature review can examine the available literature in order to provide a rationale for proposed research by:

a) Studying the current body of knowledge surrounding a particular topic, to build on it and use the findings from previously completed studies to expand our knowledge base.
b) Identifying a gap in the current body of knowledge surrounding a particular topic and finding new areas of research that address neglected areas in a particular field.
c) Adopting a critical stance to current research surrounding a particular topic, identifying shortcomings and inadequacies, and suggesting an alternative approach that may potentially present an enhanced understanding of the topic.
d) Confronting a problem and applying insight from the existing body of knowledge to a specific problem for which a solution is essential.

This research has applied existing insights from the fields of performance variability, followership and organisational culture and climate, by using a systems theory approach to confront the problem of a distinct gap in the body of knowledge surrounding morale in safety-critical environments. This section provides an abbreviated review of the available literature surrounding these applicable theories, and is structured as follows:

Table 1: Literature review structure

REVIEWED BODY OF KNOWLEDGE	AIM OF REVIEW
PERFORMANCE VARIABILITY **FOLLOWERSHIP** **ORGANISATIONAL CULTURE AND CLIMATE**	Provide a history and overview of the theory to confront the research problem by applying insight from existing body of knowledge.
MORALE	Identify a gap in the existing body of knowledge, which this research aimed to fill.

As illustrated in Table 1, literature on followership, organisational culture and climate and performance variability was scrutinised to elucidate a unique gap in the literature surrounding morale. The theoretical paradigm of systems theory can be regarded as the lens through which the relationships between the various concepts are examined to discover the necessary gap.

1.11.1 Performance variability

The study of human error rose to prominence in the mid 1970s, when a series of widely publicised tragedies occurred internationally, among them the Tenerife runway collision in 1977 (FAA, 2018), the Three Mile Island disaster (World Nuclear Organisation, 2012) in 1979, the Challenger (NASA, 2018) and Chernobyl (World Nuclear Organisation, 2016) catastrophes in 1986 as well as the King's Cross underground station fire (London Fire and Emergency Planning Authority, 2018) in 1987 (Reason, 1990). As human beings we are intrinsically wired to make mistakes despite our best efforts – it is in our nature (Shappell & Wiegmann, 1997). Human error can be defined as an action that results in consequences that were unintended or undesired by an applicable set of safety standards, or causes a system to operate outside of stipulated and acceptable limits (Senders & Moray, 1991).

It is colloquially estimated that between 70% and 80% of all aviation accidents can be attributed to human error (O'Hare, Wiggins Batt & Morrison, 1994; Shappell & Wiegmann, 1997, Wiegmann & Shapell, 2003). Munene (2016) noted that when one considers the prevalence of human error in aviation accidents on the African continent in particular, it is critical that we begin to unravel the factors contributing to the region's calamities, enabling us to address the problem appropriately. The term "human error" has recently been largely replaced in academic discourse by *human performance variability*, which is in line with the modern Safety-II positive psychology perspective (Shorrock, 2019). Even though the research of Reason (1990) and Rasmussen et al (1981) referred to the term "human error", this research utilised *performance variability* to encompass both and avoid confusion. The two concepts are inextricably linked, and a Safety-II perspective cannot discard the idea of human error (Shorrock, 2019; Smith, 2015; EUROCONTROL, 2013). It is simply the perspective that has changed, as the rest of this review reveals.

Role of performance variability in study

Reason (1990) classified human error into two categories, namely active error and latent conditions for error. Low morale, or "*having less than ideal motivation*", was identified as one of several possible latent conditions for performance variability (Reason, 1990: 206). Despite the shift away from human error to human performance variability, the role of latent error has remained acknowledged (Saward & Stanton, 2017). This study contributed to the identification and measurement of low morale as a latent condition for performance variability, and thereby created a platform for its mitigation by enabling the elevation of morale.

1.11.2 Followership

Even though more than 20 years have passed since the seminal work of Kelley (1992) thrust followership into the organisational consciousness, there is still not one universally accepted definition of the term. In a recent literature review conducted by Crossman and Crossman (2011), only five of the 30 reviewed articles ventured a concrete definition. Kelley (1992: 146-147) defined followership as:

> *"People who are effective in the follower role have the vision to see both the forest and the trees, the social capacity to work well with others, the strength of character to flourish without heroic status, the moral and psychological balance to pursue personal and corporate goals at no cost to others, and, above all, the desire to participate in a team effort for the accomplishment of some greater common purpose."*

A more recent attempt at a definition (Carsten & Lapierre, 2014: 14) was:

> *"Followership can be defined as the behaviours one engages in while interacting with leaders in an effort to meet organisational objectives."*

Perhaps a reason why a categorical definition has been so elusive is that such a definition depends on the perspective from which it is characterised (Crossman & Crossman, 2011). By purely studying the two definitions presented above, one could ascertain that the first is presented from a followership perspective, and the second with leadership as the departure point. The two concepts are so intertwined that it is almost impossible to consider the one without the other – in fact, several followership scholars have contended that successful leaders and followers share numerous of the same characteristics (Hollander & Webb, 1955; Kelley, 1988; Lundin & Lancaster, 1990; Bennis,1996; Baker, 2006, Malakyan, 2014; Morris, 2014).

Logically, leadership cannot exist without followers. Chaleff (2008) likened the relationship to a tango dance - where even though there is a leading participant it requires the effort, cooperation and perfect choreography of both dancers to make the performance successful. Kelley (1988) and Horsfall (2001) contended that every individual shifts between leader and follower roles fluidly during their career (or even on any given day), as there are very few people that are not a subordinate in some way or another despite mainly fulfilling a leadership role.

Neglect in research

When comparing followership to the field of leadership there is notably less scholarly literature available on the former (Baker, 2006; Crossman & Crossman, 2011). Just a simple Google Scholar search tells the story – over 3 900 000 results are obtained when searching for the term "*leadership"*, versus a mere 23 600 for "*followership"*.

There are various arguments debating why it is an under-researched topic, but academic consensus seems to be that it is because of the negative connotation that the word followership conveys (Baker, 2006; Goodwin, 2012; Singh & Bodhanya, 2013; Carsten & Lapierre, 2014; Riggio, 2014; Uhl-Bien, Riggio, Lowe & Carsten, 2014). Additionally, Agho (2009) contended that both managers and management academics tend to assume that people instinctively know how to follow and overlook the potential benefits of teaching individuals how to follow effectively.

Role of followership in study

Leaders are often revered for organisational success, but also blamed for its failure – it is easier to simply ascribe failure to one entity than to try and investigate the myriad of complex organisational nuances that often contribute to such failure (Meindl, Ehrlich & Dukerich, 1985). As we move further into the 21st century knowledge era, it is becoming increasingly important to consider the role of followers in the organisational context, as in this rapidly changing era of increasing competitiveness and a daily struggle for existence it needs to be a collaborative effort to ensure organisational survival (Uhl-Bien & Pillay, 2007).

This study has addressed the organisational challenge of low morale by viewing it through the lens of followership. It has thus unravelled some of the complex and nuanced causal factors instead of simply ascribing it to leadership success or failure.

1.11.3 Organisational culture and climate

The terms *organisational culture* and *organisational climate* are often used synonymously, both in scholarly and popular discourse (Hofstede, 1998; Sempane, Rieger & Roodt, 2002). There are, however, several notable scholars that contended them to be separate concepts (Schein, 1984; Desatnick, 1986; Hofstede, 1998; Schneider, 1990). Organisational culture was defined by Schein (1984: 3) as follows:

> *"Organisational culture is the pattern of basic assumptions that a given group has invented, discovered or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."*

Culture is often referred to as the *personality* of the organisation (Desatnick, 1986; Schneider, 1990; Balkaran, 1995; Van der Post, de Coning & Van der Merwe-Smit, 1997), as well as the company's soul, rationale and base (Gutknecht & Miller, 1990). It is a concealed, but unifying power that provides sense and bearing (Green, 1989), and creates a common understanding amongst members regarding the nature of the organisation and its accepted behaviours (Van der Post et al., 1997).

According to Schein (1984), researchers need to probe the fundamental assumptions that form the base of an organisation in order to fully comprehend its culture, and behaviour is considered to be the materialisation of culture. Organisational culture is something that evolves over a long period of time and is deeply woven into the very fabric of the establishment, which makes it extremely challenging and time-consuming to change (Sempane et al., 2002).

Organisational climate can to some extent be viewed as the realisation of organisational culture (Sempane et al., 2002). It can be defined as (Litwin & Stringer, 1968: 1):

> *"…a set of measurable properties of the work environment, perceived directly or indirectly by the people who live and work in this environment and assumed to influence their motivation and behavior."*

Historically, the concept of climate entered the academic domain before culture and links the individual to organisational level (Hofstee, 1998). Culture and climate are symbiotic and reciprocal in character (Sempane et al., 2002), with organisational

climate providing a summary of how members perceive an organisation (Desatnick, 1986).

Role of organisational culture and climate in study

There are numerous studies investigating the link between motivation or job satisfaction and corporate culture (Litwin & Stringer, 1968; Sempane et al., 2002; Lok & Crawford, 2004; Galdikiene, Asikainen, Rostila, Green, Balciunas & Suominen, 2016; Roos & Van Eeden, 2008). As noted under the section on morale, there is an abundance of carelessness in the use of the term morale within academic discourse – it is often used synonymously with motivation and job satisfaction. While this has negative implications for those attempting to use such synonyms to empirically test morale, the sheer amount of research and findings on this apparent link implies that there is discernibly some form of connection present. Morale is influenced by many organisational factors, embedded in organisational culture (Jones & James, 1979) and propelled by organisational climate (Turnipseed 1988; Wallace, Hunt & Richards, 1999; Sempane et al., 2002; Grobler & Jansen van Rensburg, 2018). Any attempted changes to levels of morale will have to be proliferated through a change in climate, which will translate to a change of culture in the long term.

1.11.4 Morale

Even though published literature and research on morale dates back almost a century, the pervasive theme evident from an examination of the body of knowledge is the lament regarding the under-developed state of morale as a concept (Hardy, 2010). Hightower remonstrated that "*an almost complete lack of understanding of the nature of morale retards research in the field"* (Hightower, 1944: 411). Hershey (1985: 7) admonished the field more than 40 years later: *"What group of scholars allows its members to disagree on a definition? The first step in organizing a body of knowledge is to have a well-defined nomenclature. The consequences of not doing so is wonderfully illustrated by the confusion that exists in the studies of morale."*

Another 25 years elapsed before Hardy (2010: 41) concluded, after an extensive literature review of 146 articles in the field, that "*Overall morale is poorly defined and the definitions used tend to be plucked from the air rather than synthesised from any particular empirical foundation*" and that "*There is considerable scope, therefore, for*

improving the ground on which morale research is founded". It is thus evident that, without a widely accepted academic definition of morale, any study into the concept needs to commence by defining it (even if solely in a contextual fashion).

Gap in the literature: definition and measurement in aviation context

Despite the inaccuracy in its definition, morale has been extensively studied and documented throughout the years in the military, as well as in fields of medicine and education (Hardy, 2010). The field of medicine has specifically seen much research completed into the link between practitioner morale and patient safety (Beyea, 2004; Day, Minichiello & Madison, 2006; Rimmer, 2017). Aviation has, despite the larger safety risks inherent to the field due to the sheer number of lives at risk in every situation, been slow to interrogate the concept. The author was unable to locate a single study completed in either an air traffic control or commercial airline environment providing a definition and measure for morale amongst ATCOs or pilots.

There is thus a distinct silence in the aviation literature surrounding the definition and measurement of morale, despite its relevance to safety having been asserted by both performance variability academics (Reason, 1990; Shappell & Wiegmann, 1997) and research in the medical industry.

Role of morale in study

This research has provided the first model in the South African aviation industry for contextually defining and measuring morale in a safety-critical air traffic control environment.

From this section it is now clear that a gap exists in the literature surrounding morale in safety-critical environments, and that the body of knowledge regarding performance variability, followership and organisational climate and culture adequately informs the angle from which the research problem is approached.

1.11.5 Preliminary conceptual framework

A conceptual framework explains the fundamental ideas to be studied and their relationships in either visual or narrative format (Miles, Huberman & Saldaña, 2014). It seeks to identify the underlying presumed relationships between key constructs or

factors to be to be researched, the justification of which originates from both the researcher's prior exploration or tentative theories and accepted theoretical and empirical work found in literature (Ravitch & Riggan, 2017). Figure 3 depicts the preliminary conceptual framework that this research corroborates and refines:

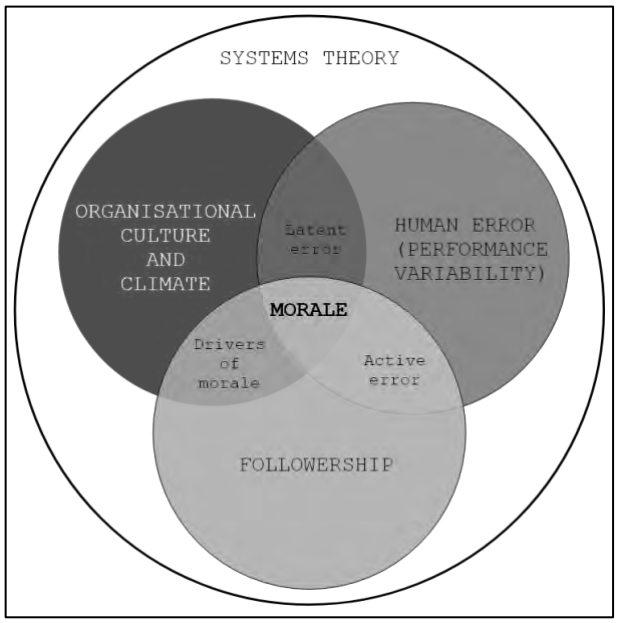

Figure 3: Preliminary conceptual framework **(author's own)**

The constructs illustrated in Figure 3 represent a preliminary interpretation regarding how the concepts reviewed in this section amalgamate, and how the chosen theoretical paradigm served as an overarching lens through which they were observed and implemented.

1.12 Methodological approach

According to Burke Johnson, Onwuegbuzie and Turner (2007), mixed methods research offers a powerful third research methodological choice in research, whilst recognising the importance of both qualitative and quantitative research and consequently often provides the most complete, balanced, revealing and functional research results. In a pragmatic worldview, methods are preferred by what is deemed applicable for the particular setting (Creamer, 2018).

This research employed a mixed methods approach, in line with the pragmatic worldview in which it is grounded. There are three basic types of mixed methods designs (Creswell & Plano Clark, 2018):

a) Convergent: The researcher collects and analyses separate qualitative and quantitative datasets and then merges the two databases to compare or combine results.
b) Explanatory Sequential: The researcher collects quantitative data first, and then proceeds to collect qualitative data which helps to explain the qualitative results.
c) Exploratory Sequential: Qualitative data is collected first, and the results then utilised for the development for an instrument to collect quantitative data with.

An exploratory sequential mixed methods design was utilised by this research. Qualitative data were collected in phase one to inform the collection of quantitative data in phase two, which yielded a regression model in phase three. The steps in this process are illustrated in Figure 4:

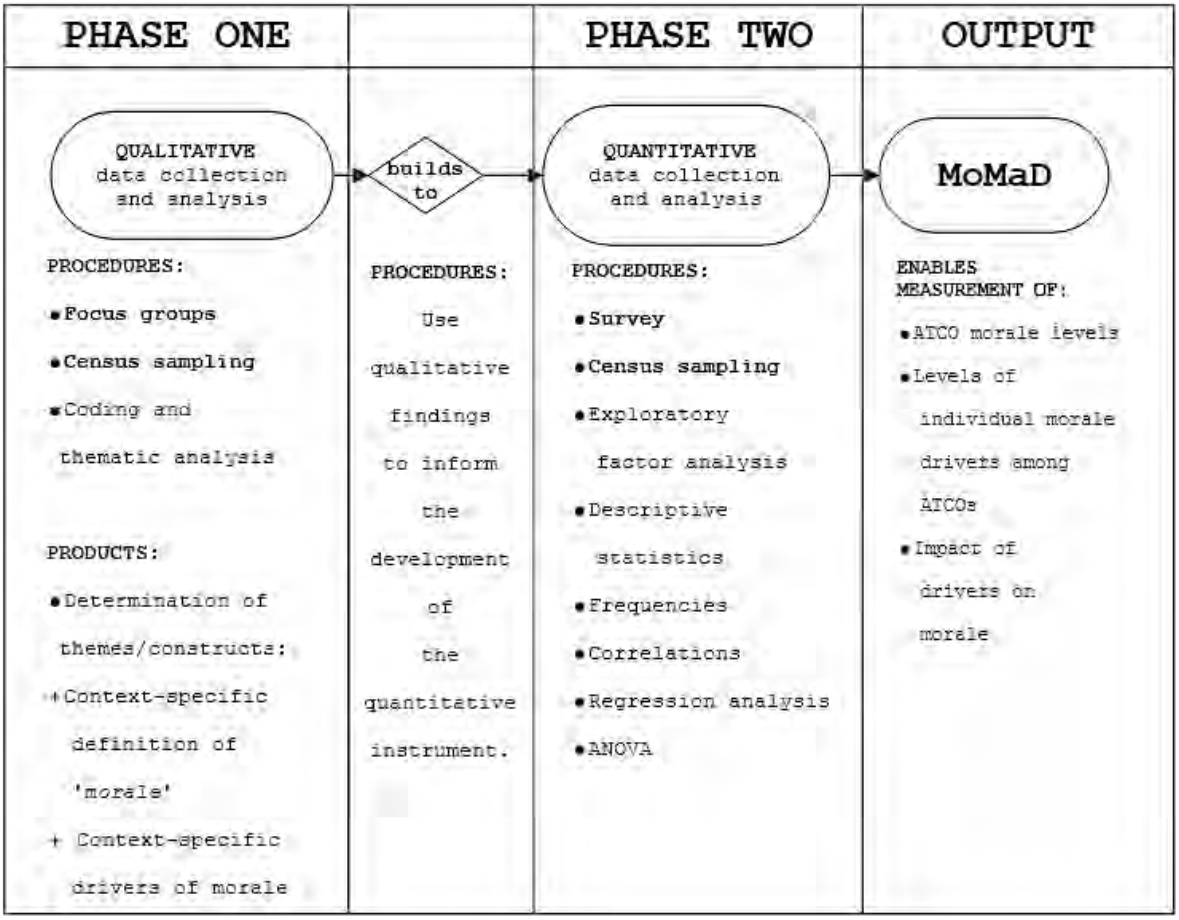

Figure 4: Exploratory sequential mixed method approach (adapted from Creswell & Plano Clark, 2018) as applied in the research

As evident from Figure 4, confronting the research problem using an exploratory sequential mixed method approach informed the process of answering the research question and enabled the achievement of the research objectives.

1.12.1 Methods of data collection

Decisions surrounding research methodology involve both philosophical assumptions as well as distinct methods or procedures (Creswell, 2014). Every study should explicitly detail the methods and procedures to be used during the research process (Leedy & Ormrod, 2014).

Population and sample frame

The researched population comprised of ATC followers in all of the 21 operational ATC units within ATNS, implying a population 570 ATCOs. This research employed a census approach, indicating that the entire population was researched and no sampling performed. A census approach to research is always preferable to sampling, as the entire population is researched and possible bias in selection is eliminated.

Data collection instruments

The instruments used in the various phases of this research were:

Qualitative instrument

Semi-structured focus group interviews were conducted to define morale and determine its context-specific drivers. A discussion guide with open-ended questions was constructed as a data collection instrument to understand opinions on morale and to determine context-specific drivers.

Quantitative instrument

A closed-ended, 5-point Likert-type scaled questionnaire was developed using the concepts obtained during the qualitative phase, and employed to measure levels of both morale and its drivers in amongst ATCOs ATNS.

1.12.2 Data produced

The instruments used in each phase of this research yielded the following data:

Qualitative data

a) A context-specific working definition of the term *morale*.

b) The context-specific drivers of ATCO morale in a safety-critical air traffic control environment.

Quantitative data

a) The measured level of ATCO morale (as defined in phase one) amongst ATCOs within ATNS.
b) The measured level of each morale driver amongst ATCOs within ATNS.

1.12.3 Validity, reliability and trustworthiness

In research there should be an elevated level of trust in the findings of the researcher, as well as an amount of certainty that should it be repeated by another researcher the outcome will be similar (Du Plooy-Cilliers et al., 2014). Quantitative studies use the terms *validity* and *reliability* to refer to this trust, whilst qualitative studies refer to *trustworthiness*, which is comprised of credibility, dependability, transferability, confirmability (Lincoln & Guba, 1985) and authenticity (Guba & Lincoln, 1994). The quantitative and qualitative phases of this study will now be discussed in terms of these elements.

Trustworthiness of qualitative data

The trustworthiness of this research was ensured as follows:

Credibility

This refers to the accuracy with which the researcher interprets the data provided by the participants (Kroonin, 2014) as well as the credentials and background of the researcher (Guba & Lincoln, 1994) to enable such accuracy. This study increased its credibility by recording all focus group interviews and confirming the agreed definitions of both morale and its drivers with participants prior to concluding the focus groups.

Trained, neutral and fully briefed research assistants were used to collect qualitative data, assisting in eliminating researcher bias from the qualitative interactions. Additionally, an external auditor was consulted to review the methods and instruments of the study prior to implementation, to ensure that they produce the correct data. The credentials of the researcher are as follows:

1. As a highly qualified air traffic control instructor at the researched company, the researcher is a senior member of the researched environment.
2. The researcher has previously conducted research in the researched environment (Coetzee & Henning, 2019) and is well acquainted with the nuances of data collection and analysis in such a highly technical milieu.

Dependability

The quality of the integration process between the data collection method, analysis and findings is referred to as the dependability of the research (Lincoln & Guba, 1985). This study ensured the dependability of the definition of morale and its drivers produced in the qualitative section by utilising regression modelling to rigorously interrogate these concepts.

Transferability

The degree to which methods, analysis and results can be applied beyond a specific research project is referred to as transferability (Lincoln & Guba, 1985). The intent of this research was to create a model for the definition and measurement of morale in safety-critical environments. As such, it is vitally important that the transferability of the research is guaranteed. This was done by ensuring that the focus group process was meticulously detailed, and conditions for its successful completion accurately recorded.

Confirmability

A high confirmability requires the researcher to completely describe the entire research process, to enable others to fully examine the research design and results (Lincoln & Guba, 1985). This research carefully detailed each step in the research process.

Authenticity

Authenticity refers to the manner in which the researcher fairly and accurately portrays the various lived realities of the researched population (Guba & Lincoln, 1994). According to Guba and Lincoln (1994), authenticity can be increased by audio recording and verbatim transcription of qualitative interactions, as well as prolonged engagement with the researched population.

As a member of the researched population, the researcher faces the same day-to-day lived experiences as ATCOs in the researched environment. This provided the benefit of prolonged engagement with the researched population to the situation, increasing authenticity. Additionally, all qualitative interactions were recorded and meticulously transcribed.

Validity and reliability of quantitative data

The validity and reliability of quantitative research are ensured by elements such as large sample sizes, random sampling and reliable research tools (Du-Plooy-Cilliers et al., 2014).

Validity

The validity of a study comprises both the validity of the research instruments and of the research methods (Leedy & Ormrod, 2014):

a) Instrument validity

   Instrument validity refers to the degree to which any form of deficiency in the measurement instrument can lead to errors in the measurement of a certain phenomenon (Leedy & Ormrod, 2014). To enhance instrument validity in this research, the quantitative research instrument was submitted for audit to a panel of experts, prior to being submitted to a pilot study. These two processes enabled the researcher to gauge whether the data obtained from the instrument was correct, whether the respondents could easily understand all the questions as well as the flow of the questionnaire, and whether there were any questions liable to misinterpretation. Instrument validity requirements were completed prior to instrument implementation in the research.

b) Method validity

   Method validity refers to the accuracy, credibility and relevance of the research project as a whole (Leedy & Ormrod, 2014). It is classified into internal validity, which describes whether the research methods and design will adequately answer the research question, and external validity, which focusses on the ability of the research to be generalised to a larger part of the researched population (Du Plooy-Cilliers et al., 2014).

To enhance internal validity in the quantitative section of the research, an external auditor was consulted to review the methods and instrument after development and prior to implementation. External validity was ensured by the representativeness of the sample, which is 100% of the population.

Reliability

The reliability of a study is the consistency with which the measurement instrument yields dependable and consistent results when there is no change to the measured entity (Leedy & Ormrod, 2014). There are several ways to improve the reliability of a measurement instrument (Leedy & Ormrod, 2014):

a) The instrument should always be administered in a consistent fashion. In this research, this was ensured by the researcher personally administering standardised instructions and directions for completing the survey to all participants.
b) Research assistants should be well trained to enable the obtainment of similar results for every single individual or situation measured. The quantitative phase of this research employed no research assistants for data collection, ensuring that the researcher alone could consistently administer the instrument.

When using Likert-type scales it is critical to calculate and interpret Cronbach's α, which determines the internal consistency and reliability of any scale or subscale (Pallant, 2013). The Cronbach's α value for the instrument in this research was calculated to measure and ensure reliability.

1.12.4 Data analysis

This research used qualitative data obtained from focus group interviews to develop and administer a quantitative instrument to ATCOs, producing quantitative data informing the research findings. It analysed the produced data as follows:

Qualitative analysis

The qualitative data collection phase of the research comprised of the researcher attending the scheduled pool meetings of each researched pool within ATNS, with a special (final) agenda point indicated (and agreed with the pool and PM) as the research focus group discussions. All ATCOs were invited to the meeting and

sensitised to the importance of attending. PMs were requested to leave the meeting before commencement of the focus group discussions, and a semi-structured interview discussion guide elicited the pool's agreed definition of morale, as well as their agreed morale drivers. Data obtained from each pool were collated, and an overarching definition of morale obtained by means of semantic similarity frequency coding. All obtained morale drivers were collated and narrowed down to the most commonly occurring themes.

Quantitative analysis

The quantitative data collection phase of this research comprised of the electronic administration of the survey instrument to every ATCO within ATNS. Data produced were analysed by adhering to the following steps:

Preparation for data analysis

a) Access to SPSS software was obtained to enable data analysis.
b) A code book was created, and data coded accordingly.
c) The database was designed and captured.
d) Data were cleaned by checking for errors and assessing missing values.

Preliminary data analysis

Descriptive statistics were used to describe the variation in the data and to determine if there were categories that needed to be collapsed, also if the variables meet the assumptions for the statistical techniques to be used. This step is critical for alerting the researcher to data errors, and modifying variables for further analysis (Creamer, 2018).

Exploration of the relationship between variables (bivariate and multivariate)

The identified morale drivers were analysed using a correlation analysis, to determine the strength of the associations between them. An exploratory factor analysis and regression analysis followed, to determine the constructs that cluster together, enabling the validation of concepts into constructs and the conception of a model. A hypothesis for each driver (from D_1 to D_k) was tested as follows:

D_1

$H_{D1(0)}$ = D_1 does not have a significant influence on morale.

$H_{D1(1)}$ = D_1 has a significant influence on morale.

D_2

$H_{D2(0)}$ = D_2 does not have a significant influence on morale.

$H_{D2(1)}$ = D_2 has a significant influence on morale.

D_3

$H_{D3(0)}$ = D_3 does not have a significant influence on morale.

$H_{D3(1)}$ = D_3 has a significant influence on morale.

D_k

$H_{Dk(0)}$ = D_k does not have a significant influence on morale.

$H_{Dk(1)}$ = D_1 has a significant influence on morale.

The dependent variable is described as morale and the identified key morale drivers are the independent variables. The relationships were collated into a preliminary factor structure as illustrated in Figure 5, which served to test the conceptual framework:

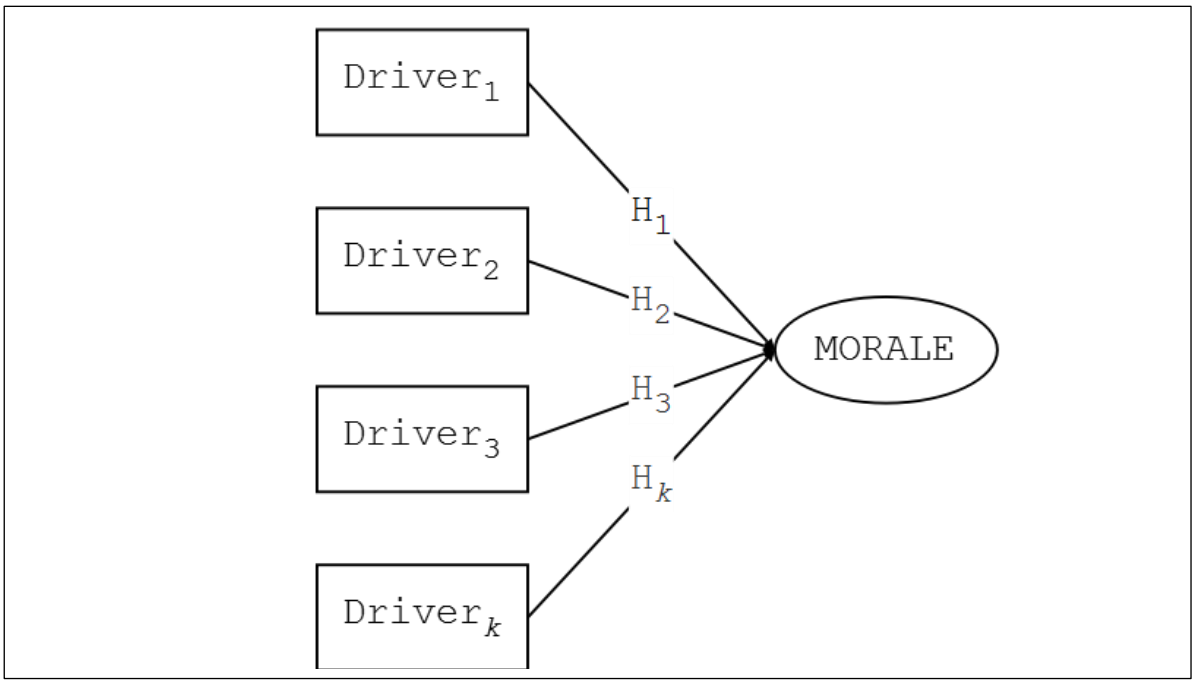

Figure 5: Preliminary factor structure (author's own)

Table 2 serves as a synopsis of the research framework and design, consisting of the worldview, theoretical paradigm, methodological approach and data collection methods:

Table 2: Research framework and design overview

RESEARCH APPROACH	
RESEARCH WORLDVIEW	Pragmatic
THEORETICAL PARADIGM	Systems theory
RESEARCH DESIGN	Exploratory sequential mixed method design
RESEARCH STRATEGY	
TARGET POPULATION	ATCOs within ATNS
POPULATION SIZE	570
SAMPLING METHOD	Census approach (no sampling)
DATA COLLECTION METHODS	Qualitative method to inform quantitative research instrument
DATA COLLECTION INSTRUMENTS	Semi-structured focus group interviews, survey questionnaire
VALIDITY, RELIABILITY AND TRUSTWORTHINESS	Panel of experts, external auditor, pilot study
DATA ANALYSIS TECHNIQUES	Coding and thematic analysis, frequency and variation, correlation analysis, exploratory factor analysis,

It is evident from Table 2 that the research approach and strategy enabled the answering of the research questions and achievement of the research objectives in a structured and effective way.

1.13 Research paradigm

This research subscribed to a pragmatic research paradigm, which utilised abductive reasoning to conduct focus groups and survey research in a mixed method manner.

1.14 Scope, assumptions and delimitations

Every research project has limitations and makes certain assumptions, as it is impractical (and frankly impossible) to encompass every aspect concerning the research in a research project (Hofstee, 2011).

1.14.1 Scope

Research was conducted in ATNS operational centres within South Africa. It included every ATCO in every ATC centre.

1.14.2 Assumptions

This research made the following assumptions:

a) A high level of intelligence, skill and language proficiency amongst respondents, owing to the professional capacity in which ATCOs operate and the inherent requirements for obtaining the job (Dean, Russell & Farmer, 2002).
b) Familiarity with terms such as centre, pool and safety events, as they form part of the day-to-day language used in this environment.
c) The provision by the researcher to each respondent of a thorough background to the study, as well as an in-depth explanation of the requirements and conditions for participation.
d) Open and honest answers from respondents, without fear of victimisation or reprisal. This was achieved by ensuring and communicating participant anonymity and removing PMs from focus group discussions.

1.14.3 Delimitations

Research was only conducted among operational ATNS ATCOs. This was in line with the followership perspective of the research, as leader opinions regarding morale and its drivers were not included in the study.

1.15 Ethical considerations

Whenever human beings or any other creatures with the ability or potential to think and feel, or experience any distress (emotional, physical, psychological or other) are the subject of investigation, researchers are compelled to closely examine the ethical implications of their actions and omissions (Leedy & Ormrod, 2014). To ensure this, the researcher:

a) Defended participants from all forms of harm, including but not limited to emotional, physical and psychological harm.
b) Did not infringe on participants' right to self-respect and human dignity.
c) Ensured that all participation in the research was voluntary and informed, and consent from all participants was obtained to use such participation in the research findings.

d) Ensured that the participants' rights to privacy were respected at all times, and that the identities of participants will never be disclosed under any circumstances.
e) Maintained complete and outright honesty at all times by providing all facts without distortion or misrepresentation, reporting all and any flaws, limitations and conflicting evidence regardless of its outcome, and diminishing researcher bias as much as possible.
f) Obtained ethical clearance from the University of South Africa (UNISA) before the commencement of data collection.
g) Secured permission for the study from ATNS.
h) Communicated the research results to all participants after the conclusion of the study.
i) Communicated the research results to ATNS management at both pool level and senior executive level after the conclusion of the study.

Additionally, when a researcher forms part of the researched environment, or is intimately involved in the researched situation, particular care should be taken to remove as many opportunities for bias as possible (Saunders et al., 2015). The present research ensured this by taking the following steps:

a) Maintaining complete and outright honesty at all times by providing all facts without distortion or misrepresentation, and reporting all and any flaws, limitations and conflicting evidence.
b) Utilising trained, neutral and fully briefed research assistants for all focus group data collection.
c) Declaring the possible conflict of interest inherent in the researcher being an employee of the researched company at every juncture of the research, and being consistently aware of possible bias resulting from this reality.
d) Ensuring inter-rater reliability by comparing research assistant focus group notes to researcher findings to check for discrepancies.

1.16 Synthesis

"Don't find fault. Find a remedy."

- Henry Ford

(Maxwell, 2006:97)

This research has made a constructive contribution to the topic of leadership and organisational behaviour by using an exploratory-sequential mixed methods approach to create a model for defining and measuring the concept of morale in a safety-critical environment. Grounded in a pragmatic worldview, it utilised the theoretical framework of systems theory to address the gap identified in the body of knowledge surrounding the concept of morale, specifically in a South African aviation context.

Knowledge gained from the fields of performance variability, followership and organisational culture and climate informed the answering of the research question, which was:

How can a model for ATCO team morale in a safety-critical air traffic control environment be best described?

Qualitative focus group data collection informed the development of a quantitative survey questionnaire, which in turn was operationalised to collect quantitative data informing the development of the model by using correlation analysis, exploratory factor analysis and regression analysis.

Performance variability is a nuanced and complex matter. As the well-known proverb about how to eat an elephant suggests, deconstructing its components and addressing them individually is surely one way of trying to solve such a complex problem. If the definition and measurement of morale as just one tiny component of human performance variability can aid in its elevation, and thereby assist in avoiding just one accident, it surely must be considered a worthwhile pursuit.

This chapter provided an explanation of the research background, justification, aim, process and limitations, as well as an abbreviated enumeration of applicable literature and a description of relevant ethical considerations, limitations and delimitations. The next chapter will elucidate the philosophical foundations that direct inquiry and will declare the theoretical paradigm that permeated the research process.

Chapter 2: Systems theory as a theoretical paradigm

"Science is what you know, philosophy is what you don't know."

- Russell (1912: 7)

2.1 Introduction

Research, in whichever form, invariably possesses a philosophical foundation which shapes the conduct of inquiry and the entire process of the research (Creswell & Plano Clark, 2018). Being aware of the assumptions that are made about gaining knowledge during the research process informs the choice of theories that guide the entire research process (Creswell & Poth, 2018). Whilst the worldview and various positions of a study can be predominantly implied and not specifically detailed, Creswell and Plano Clark (2011) argued that empirical research should always include a perspicuous breakdown of the paradigm(s) that are utilised, and positions assumed.

Theory enables a focussed and deeper understanding of a phenomenon (Du Plooy-Cilliers et al., 2014). Theories allow for the conversion of information into knowledge and form the academic underpinning of every discipline (Littlejohn & Foss, 2008).

The previous chapter provided background to this study, as well as a high-level summation of the research justification, aim, process and limitations. It also as provided an abbreviated literature review and an explanation of pertinent ethical considerations. This chapter explains the philosophical foundations that direct inquiry and declare the theoretical paradigm that amalgamates the entire research process.

2.2 Theoretical paradigm

Theory may be defined as a structured set of suppositions, concepts, principles and associations that are used to explain a phenomenon or facet of the human experience (Leedy & Ormrod, 2014; Littlejohn & Foss, 2008). According to Dubin (1978), the requirement for theories arise from the human need for creating order and coherence out of indiscriminate occurrences.

2.2.1 The purpose of theory

The purpose of theory is to assist us in condensing and storing knowledge, as well as in enabling us to place our discoveries relating to the nature of reality into declarations (Shoemaker, Tankard & Lasorsa, 2004). Social sciences theories are generated and substantiated with the main purpose of discovering and explaining general patterns of behaviour (Shoemaker et al., 2004), after which such theories can be utilised by academics to conduct research in a particular field.

Theory is the foundation in which a research study is established and forms the conceptual and theoretical framework within which data is gathered, unravelled and comprehended (Du Plooy-Cilliers, 2014). This research utilised selected concepts from the vast field of systems theory to establish a theoretical framework and provide the so-called lens through which the research interpreted the literature.

2.2.2 Introduction to systems theory as a theoretical paradigm

A system is a whole which consists of two or more parts that can individually (but not independently) have an effect on the performance or properties of the whole (Ackoff, 1994). A system can be defined as "*a set of interacting or interdependent entities, real or abstract, forming an integrated whole*", "*a collection of parts which interact with each other to function as a whole*", or "*a set of regularly interacting and interrelating group of activities*" (Sheridan, 2010: 24). A system has mutually dependent and interrelated parts (sub-systems) which when combined can create something unique to the system (Luhman & Cunliffe, 2013). In short, a system is a whole that cannot be divided into parts or sub-groups that operate independently of each other (Ackoff, 1994).

The idea of a system emphasises any component or interrelation where a change in one part leads to changes in all parts (Hanson, 1995). Systems can be man-made or natural with its parts existing at any structural level such as molecules, organisms, organisations, nations, planets or galaxies (Sheridan, 2010).

Figure 6 presents the typical levels that systems are modelled at in social science research:

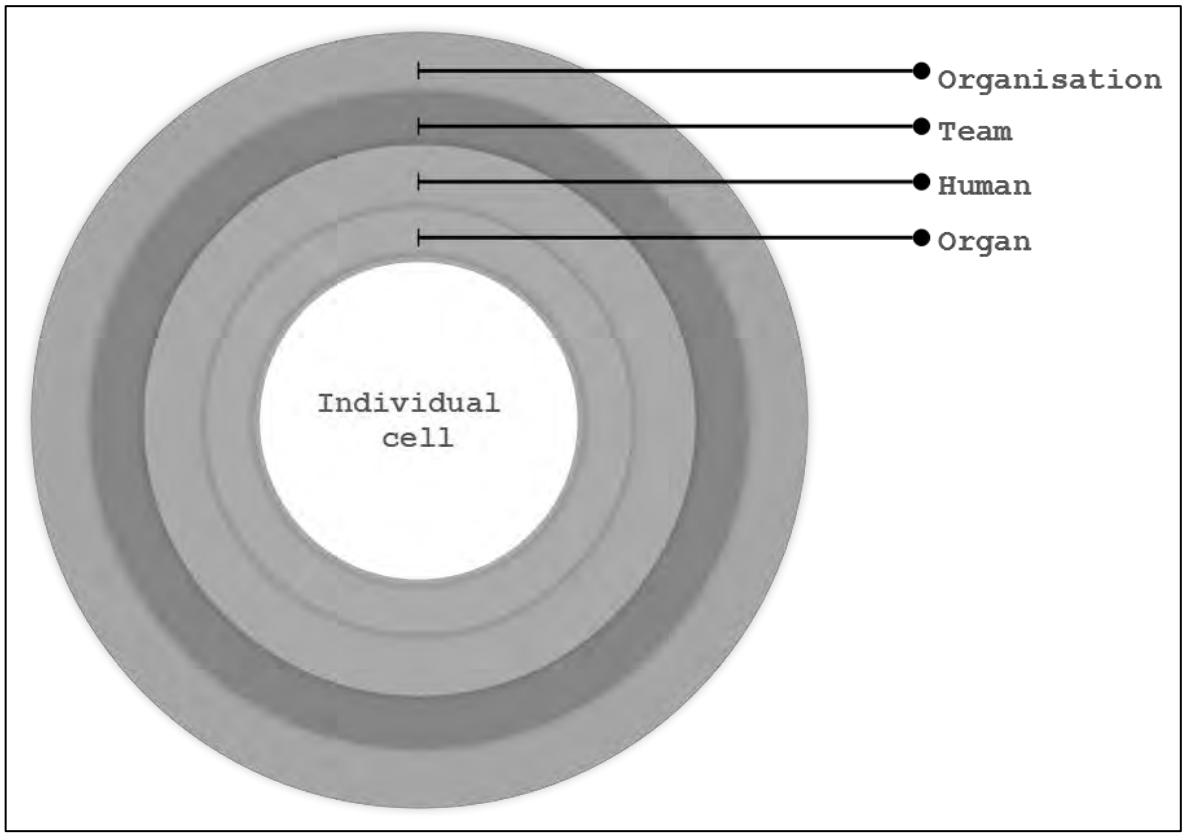

Figure 6: Levels at which systems are typically bounded and modelled (adapted from Sheridan, 2010)

The basic premise of a system is that all parts, whether it be at individual, team or organisational level of analysis, are interrelated and that any action or inaction will reverberate through the entire system, often with unintended and sometimes diametrically opposite consequences to what was intended (Hanson, 1995). There are elements of chance, choice and certainty in every single aspect of our lives (Gharajedaghi, 2011).

Systems thinking can be seen as an inherently hopeful theory as it describes dynamic and ever-changing interactions between components and not closed, deterministic systems that cannot adapt or change (Henning & Cilliers, 2012). Today's organisational problems are complex and interconnected, with no single individual possibly able to have all the answers (Wheatley, 2006). It has been demonstrated that systems theory can provide a fresh perspective on how

organisations deal with the ever-increasing complexity that the modern world presents (Schneider, Wickert & Marti, 2017).

Historical overview

Systems theory originated in the 1940s and revolves around the notion that all things are connected, and nothing can exist in isolation (Hanson, 1995). It evaluates the interaction, relationships and arrangements between the respective elements of a system, rather than the individual properties of its parts. Systems theory as a concept facilitates a more thorough understanding of complex organisational problems and increases the likelihood of an appropriate response (Kast & Rosenzweig, 1972). It is a way of seeing things that were previously overlooked or bypassed by examining the complex interrelationships between them (Von Bertalanffy, 1972). From a systems thinking perspective, the relationship between objects and events needs to be understood to effectively describe any mental processes, ideas, communication and patterns, and not merely the objects or events themselves (Bateson, 1979).

Senge (2006) likened the understanding of systems theory to the notion that climate change is such a global notion, that there is nothing that an individual can do to reduce it. Senge (2006) continued to say that this is the essence of systems thinking – that we can either act in ways that reinforce the current operation of the system or think and act in ways that lead to a different direction collectively. The applicable systems theory concepts informing the theoretical framework of this study were:

1. Nonsummativity: the notion that the whole is greater than the sum of its parts.
2. Agency and the impossibility of blame: the search for pattern instead of cause.
3. Feedback: the study of a system's ability to reintroduce output as input.

Systems thinking was applied in a safety context to further embed systems theory into the practical safety-critical environment of this research.

2.2.3 Applicable systems theory concepts

Concepts are ideas (which may be abstract) that are developed to explain an event or phenomenon enough to enable the movement from a specific observation to an idea or principle that applies beyond a single occurrence (Hanson, 1995). The development of concepts allows for a common space for the discussion of various

subjects, rendering the outcomes of such discussions or insights gained from them transferable across instances (Hanson, 1995). Research revolves around the development, testing and refining of concepts, attaining the central goal of conceptualisation by moving from concepts to measurement, data collection, analysis and back to the refinement of concepts (Hanson, 1995). Systems theory contains a substantial expanse of concepts, but for the purpose of this study the concepts of nonsummativity, agency and the impossibility of blame and feedback were significant and consequently described.

Nonsummativity

The notion that the whole is greater than the sum of its parts is referred to as nonsummativity (Hanson, 1995). This is synonymous with the concept of synergy. In systems theory, the universe is understood as an infinite hierarchical set of systems, with each system comprised of more systems located at lower levels (Henning, 2015). It directs attention to the emergent relational wholes, searching for patterns that exist between individuals instead of within them, requiring continuous alignment of what is observed or experienced with how it fits into the totality (Hanson, 1995).

Systematic attributes are destroyed when the whole is dissected into its parts and cannot be fully recovered when the system is put back together (Capra, 1987). According to Gharajedaghi (2011) it is easier to predict the behaviour of the parts by studying the whole than it is to understand the whole by studying the parts. This study utilised the human-in-team system as its unit of analysis, with subsystems within this system established as the cognitive, emotive, perceptual and socio-cultural systems.

Within the context of this research, nonsummativity could be applied to any of the multitude of systems that individual ATCOs operate in daily, for instance:

a) the pool system, implying complex inter-relations between ATCO team mates on an intra-pool level, and between other teams on an inter-pool level,
b) the company system, where various company departments interact with ATCOs during their day-to-day job-related activities,
c) the ATCO-pilot system, consisting of the standardised and ad-hoc communication and interactions between ATCOs in charge of a piece of airspace and the flight deck crew of aircraft traversing such airspace,

d) the ATCO-technical staff system, where ATCOs and technicians are in direct or embedded communication regarding technical equipment serviceability and functionality,
e) the ATCO-equipment system, containing the multitude of technical equipment that enables an ATCO to do his or her job, the understanding of its operation and the knowledge of its functionality,
f) or the ATCO-airport operator (e.g. Airports Company of South Africa or ACSA) system, implying the multi-level interactions between ATCOs and airport personnel at various levels of operational expertise.

Each of these systems demands unique and dynamic ATCO interactions and contributions, often simultaneously. ATCOs are highly skilled at multi-tasking and accomplishing simultaneous actions and interactions in a complex system environment. Removing them from these environments for inspection or trying to break down the complexity by dissecting it into individual parts or actors will not render the same results as the full system; indeed, nor will reconstructing the situation as its dynamic nature means that the entire situation is constantly changing and would therefore be diminished.

Agency and the impossibility of blame

According to the Oxford Dictionary (1995), blame is to "*feel or declare that (someone or something) is responsible for a fault or wrong*". Blame involves two notions, namely being able to allocate cause in the form of responsibility and being able to separate cause from effect (Hanson, 1995).

Blame is incompatible with a systems theory approach, as it violates the principle of nonsummativity, therefore rendering it theoretically incompatible (Hanson, 1995). The apportionment of blame entails the separation of parts by isolation to determine the causal factor, followed by the attribution of responsibility to the isolated fragment, implying both a separation of parts from the whole and finite causality of which neither is compatible with a systems theory approach (Hanson, 1995).

Agency is "*the condition of activity rather than passivity…the experience of doing things, making things happen, exerting power, being a subject of events or controlling things*" (Hewson, 2010: 2). Agency is inherent to the notion of blame, as in order to

apportion blame, someone or something would logically need to be able to act and exert both power and control (Hanson, 1995). According to Hewson (2010) there are three main types of agency, namely individual agency (a person acting for themselves), proxy agency (one agent acting on behalf of another) and collective agency (when individuals collaborate in acting).

Hanson (1995) contended that search for blame often leads to the opposite of what was intended and exacerbates the problem already experienced; and as such proposed that a systems approach to problem solving (where there is a search for pattern instead of cause, an investigation into process instead of product and an examination of events rather than outcomes) as a far superior method of problem-solving.

In the context of this research, the notion of blame has long been discarded as ATNS subscribes to a just culture policy. When an ANSP subscribes to such a policy, safety events are investigated with the goal of strengthening and improving the system by solving any procedural deficiencies and learning from any mistakes. This research subscribed to the systems theory approach of the impossibility of blame by not simply ascribing blame for performance variability to morale, but rather viewing the elevation of morale as a small reinforcement of system barriers against performance variability.

Feedback in open systems

The process of feedback is endemic to all systems and involves the ability of the system to make indications, which causes it to steer itself (Hanson, 1995). According to Chen & Stroup (1993) feedback is the process that mediates between the goal and system behaviour. Feedback infers the notion of continuous and interactive instead of linear causality (Hanson, 1995).

A system can be open (where high levels of information flows from the system to the surrounding environment) or closed (where the system boundaries are not easily crossed), but it can never be fully open or closed (Sheridan, 2010). The degree of openness or closure determines the ability of the system to cope with change.

Feedback in an open system is illustrated in Figure 7:

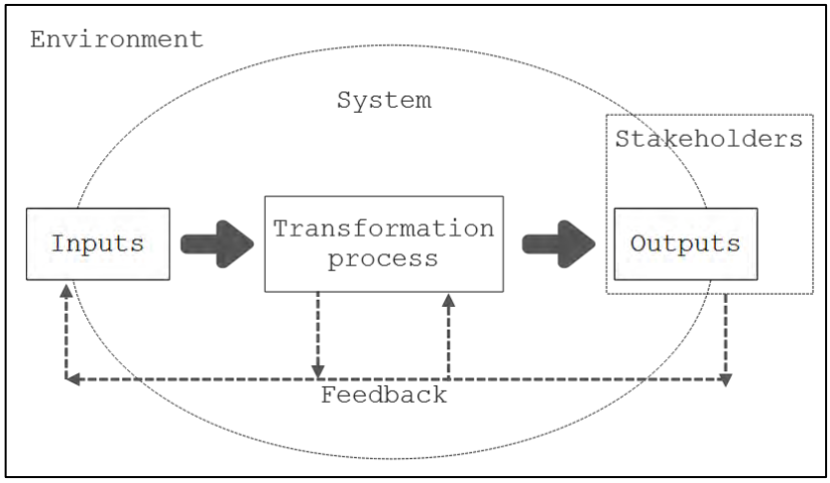

Figure 7: An open system (Luhman & Cunliffe, 2013)

Figure 7 illustrates an open system that takes input from its environment and transforms it by means of its internal processes, structure and procedures to output for its stakeholders. Feedback is then redirected back into the system to enable the improvement of all processes (Luhman & Cunliffe, 2013). According to Gharajedaghi (2011) one can understand a complex system by watching how it behaves, learning its history, directing one's thoughts to dynamic rather than static analysis, searching for the reason why the system behaves the way it does and asking not only "What is wrong?", but rather "How did we get there?"

Positive and negative feedback loops

Feedback loops exist to regulate a system to maintain a healthy balance of internal and external factors (Henning, 2015). Positive feedback refers to a feedback process where change is involved, and negative feedback where there is no change (Hanson, 1995). Importantly, the determination of the type of feedback relies solely on whether there is change involved, and not on the type of inputs or outputs that are involved.

This can be illustrated by the example of trainee ATCOs and their instructor. The instructor may train each trainee on a daily basis to enable them to eventually achieve a skill-level where they are able to work alone without supervision. The instructor may notice that a certain trainee responds well to praise, whereas another responds better to criticism. To enable both to reach their goal of working solo, one trainee is given constant positive reinforcement (praise), whilst the other is given

more negative reinforcement (criticism). The end goal is the same – they both go solo (are certified to work without supervision). This entails a change, as they go from being raw trainees with limited skills to highly skilled ATCOs able to work alone through the instructor's guidance.

Thus, both of these examples entail positive feedback, regardless of the nature of the inputs (criticism which is negative or praise which is positive). Both positive and negative feedback loops can be constructive or destructive, depending on the needs of the system (Henning, 2015).

Feedback adds structure to the basic principle that everything is related to everything in a systems environment and expounds patterns of change and non-change, thus affording a language for examining ongoing processes in systems (Hanson, 1995). A potential system trap is termed *eroding goals*, which implies that the drift to low system performance is a gradual process where the eroding performance happens slowly enough that everyone simply gets used to lower and lower performance, resulting in a negative reinforcing loop (Meadows, 2008). To counteract this, the system should either keep standards resolute, regardless of performance, or adjust goals based on the best performances of the past instead of the worst (Meadows, 2008).

By delivering a model that can provide information for the elevation of morale as many times as it is administered, this research assists the ATCO pool system to continually change the level of morale for the better. This can be achieved by addressing problematic drivers of morale, allowing time for it to take effect and receiving feedback by re-administering the model to restart the process.

Explosive instability

A state of explosive instability implies system behaviour that, driven by positive feedback loops, amplifies feedback to always move into a self-reinforcing cycle (Henning, 2009). Unless limited by some form of negative feedback, the process becomes explosive and progresses into a 'runaway' state, implying that positive feedback escalates small changes in unpredictable ways. Colloquially known as the 'butterfly effect', based on the assertion that a butterfly that flaps its wings in Beijing today can cause a storm in New York next month (Haines, 1989), explosive instability

is impossible to predict in terms of its long-term effects as a system in this state is operating with no control and total freedom (Henning, 2009).

In multifaceted systems such as aviation, explosive instability presents a threat to safe system operation in environments that are inherently unpredictable due to their complexity (EUROCONTROL, 2014). This research has provided a model for ATCO morale in safety-critical environments, facilitating the early identification of low morale to prevent the appearance of self-reinforcing low morale feedback loops.

2.2.4 Systems theory in a safety critical environment

> *"The term 'systems thinking' can mean different things to different people. Systems thinking is a diagnostic tool. In this sense, systems thinking is a disciplined approach for examining problems more completely and accurately before acting. It allows us to ask better questions before jumping to conclusions."*
>
> - Goodman (2018:1)

Despite the time, effort and money that go into the design of safer systems in safety-critical industries worldwide, disastrous, large-scale accidents keep occurring (Rasmussen, 1997). Complex socio-technical safety systems such as aviation, that include various levels of interaction from the legislators through the planners and managers right down to the system operators, are ever-stretched by the fast pace of technological change, extreme competition in the environment, changing regulatory practices, public pressure (Rasmussen, 1997) and recently, an unprecedented shutdown in operations due to the Covid-19 health crisis from which both the airline and air traffic control environments will take decades to fully recover (IATA, 2020; IFATCA, 2020).

In such environments where there is little leeway to get the quest for safer systems wrong, both in the economic (precious resources wasted on inadequate interventions) and consequential sense (deaths as a result of inadequate interventions), the need for focused and dependable intervention is obvious. Rasmussen's (1997) argument that complexity such as that found in aviation requires a system-oriented approach based on functional abstraction rather than structural decomposition is now largely accepted practice in the aviation industry, with the advent of Hollnagel's (2009) Safety-II (see page 59) approach cementing it into

common practice. It is necessary to engage in systems thinking to get to the real root of the problem by looking at the parts as well as the entire system – only then will we be able to come up with real, lasting solutions (Rutherford, 2018).

In aviation (as with other similar industries), the term ‘complex system’ is often used when describing systems:

1. that involve high volumes of very dynamic interacting elements that move and change along with constantly changing circumstances,
2. in which the cause and effect relationship is not linear, and small changes in one part of the system may produce disproportionally large effects in another part,
3. with socially constructed and often untraceable effects resulting from multiple causes,
4. that have a substantial history and have evolved irreversibly with the environment over time,
5. that, while appearing ordered and controllable in hindsight, are increasingly unordered and challenging as time goes by (Snowden & Boone, 2007).

It is therefore difficult or impossible to objectively break down complex systems into manageable parts, to confidently predict how they will function or to detail every minute aspect of what should be done to manage them successfully (EUROCONTROL, 2014). Meadows (2008:1) argues that *“as our world continues to change rapidly, and become more complex, systems thinking will help us manage, adapt and see the wide range of choices we have before us. It is a way of thinking that gives us the freedom to identify root causes of problems and see new opportunities.”*

Something that would usually be described as complex, such as for instance an aircraft engine, is actually very ordered and can with specialist knowledge be both broken down into meaningful components and reliably predicted in terms of performance. An aircraft engine is therefore not so much a complex as a complicated system. This is an important distinction, because safety has historically been approached by treating organisations like complicated, deterministic machines instead of complex, purposeful socio-technical systems by:

1. assuming predetermined and collective goals,

2. trying to analyse individual components separately,
3. searching for and identifying ‘root causes’ of events,
4. thinking linearly and acting in the short term,
5. judging performance against subjective, inflexible standards,
6. managing by numbers or consequential data, or
7. trying to affect change at component level (EUROCONTROL, 2014).

The European Organisation for the Safety of Air Navigation (EUROCONTROL) recommends that to improve system performance (both in a safety and productivity sense) implies acting on the system instead of managing people, by using a system focus and integrating the practices of Safety-II into the air traffic control safety management system (SMS) through systems theory (EUROCONTROL, 2014). It suggests and integrates ten system thinking principles into daily practice to try and narrow the chasm between ‘work-as-imagined’ and ‘work-as-done’ (see *Work-As-Imagined versus Work-As-Done* on page 59) in the operational world, as illustrated in Figure 8:

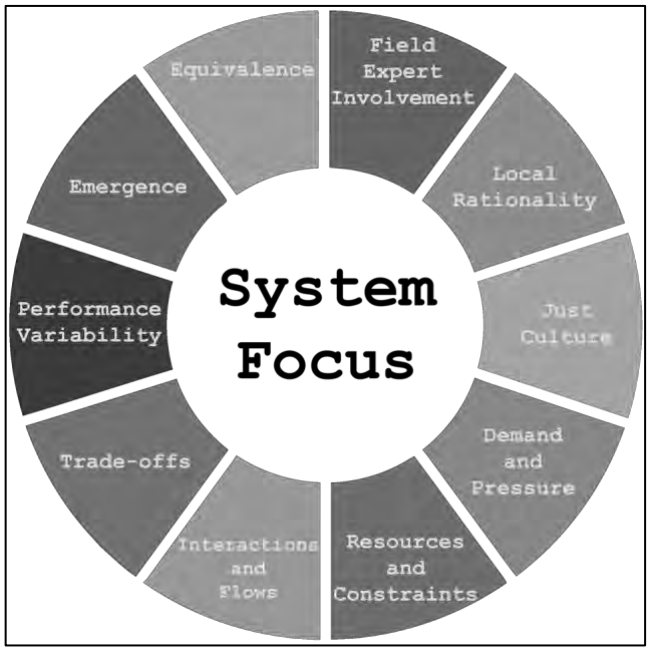

Figure 8: Ten systems thinking principles towards improving system performance in safety-critical environments (EUROCONTROL, 2014)

EUROCONTROL’s (2014) ten system thinking principles, as illustrated in Figure 8, were distilled into the five principles applicable to this research and individually described below:

Field expert involvement

In order to try and understand system behaviour, one has to recognise, include and involve the people that make the system function the way that it does in every aspect of system improvement. This could imply incident or accident investigation, system design or training – basically any effort to improve the way the system functions. The front line operators are experts at making the system work, and their input is invaluable in ensuring that system improvement actions have the desired results. People need to be recognised as partners in system improvement, and not simply objects of study or targets for interventions.

Enabling interaction between the different layers of the organisation and field experts, providing effective ways for field experts to voice concerns or suggestions and involving field experts as co-investigators, co-researchers, co-designers, co-decisionmakers and co-learners are all ways in which field expert involvement can be increased and effectively utilised. This research approached the morale problem from the perspective of followers, implying field expert involvement in the entire process to enable a lasting change in morale levels.

Local rationality

The idea that work needs to be understood from the perspective of those actually doing the work is known as local rationality. Front line workers do the best they can in any circumstance, given their goals, the situation, resources, available information, focus of attention and overall understanding of the situation. As this situation changes, even after the occurrence of a set event or incident, hindsight may not be able to faithfully reproduce and reveal the exact confluence of all these effects that at the specific time in the past produced such an event or incident. It is challenging to see the bigger picture without an intimate understanding of the inner system workings involved.

When attempting to understand how and why things happen as they do an inside perspective is required. This can be achieved by means of careful reconstruction of events and contexts, with as much input from field experts as possible. Listening to field expert stories of lived experience and trying to obtain an understanding of their point of view, as well as seeking multiple perspectives can assist in understanding

why things happen or happened as they do in complex systems. In this research the principal of local rationality was applied to fully comprehend the climatic and cultural situation within the researched environment, obtain valuable input and buy-in from field experts and give the change in morale the best chance of succeeding in the long term.

Performance variability

In complex systems, conditions and preconditions for system performance are often opaque and fluctuating, resulting in a situation where the work that needs to be done cannot be precisely specified in either procedures or policy. This results in workers at various levels having to make continuous imprecise adjustments to get the job done. Performance variability should be regarded a normal part of any system and is both deliberate and necessary. Without it, a system will lose its flexibility and become incapable of adjusting to changes in its environment. Attempting to curb performance variability by introducing new procedures or stricter rules is a slippery slope, may not be sustainable in the long term as well as obscure several of the options available in dealing with said variability effectively.

An understanding of performance variability requires a deeper knowledge of the entire system, which can only be obtained by looking at what normally goes right instead of what has gone wrong. Whilst uncontrolled performance variability can lead to system drift to an unwanted state, accepting that a certain amount of performance variability is an inevitable part of a flexible system is the first step to managing it successfully. This research presents a small contribution to the overall control of performance variability in the form of a model for the measurement and management of morale in safety-critical ATC environments in an effort to assist in strengthening system barriers against failure.

Emergence

Traditionally, the widely accepted approach to safety management was one of linear cause and effect, where a system can be decomposed into its parts to trace the root cause of a problem or incident, before rearranging the parts and putting it back together as an improved whole. In complex, socio-technical systems however, system outcomes have become increasingly emergent in that they cannot be simply

deduced from a traditional linear, resultant problem-solving approach. Woods, Dekker, Cook, Johannesen and Sarter (2010:38) explain emergence as follows: *"Emergence means that simple entities, because of their interaction, cross adaptation and cumulative change, can produce far more complex behaviors as a collective and produce effects across scale."* Emergence can be defined as the performance of a system, which tends to incur changes as the arrangement of its individual elements are changed (Vautier, Dechy, De Brunélis, Hernandez, Launay & Alarcon, 2018).

Considering the system as a whole, complex system success or failure is increasingly appreciated to be emergent rather than resultant. This research approached the safety problem from the perspective of the system's ability to succeed under varying conditions so that the number of intended and acceptable outcomes (in other words, everyday activities) is as high as possible (EUROCONTROL, 2013) instead of the more causal position of a simple linear approach. As systems and the changes to systems become progressively complex, it is necessary to become and remain alert to both their positive and negative emergent properties.

Equivalence

The principle of equivalence asserts that the sources of system success and failure are identical – ordinary, day to day work. When a small percentage of the work done in a system results in failure, the reaction tends to be to look for causes or to find out who or what failed or malfunctioned. The massively overwhelming percentage of work that gets done successfully tends to go by unnoticed, with no scrutiny or attention given as to why it resulted in success. This bimodal way of thinking, where success and failure are seen at opposites ends of the functionality spectrum, has served mankind well in the past as it tends to work well in mechanical systems.

In complex, socio-technical systems however, a more proactive approach of treating success and failure as equivalent in origin by balancing safety effort priorities more in favour of observing system behaviour and conditions in the context of ordinary work is required. It takes time for system behaviour to reveal itself, which makes the observation and understanding of ordinary work even more vital in complex systems where performance can change instantaneously or drift gradually into detrimental

territory. Whether or not there are actual component failures, performance variability can spread and interact in non-linear, emergent and unpredictable ways, resulting in system drift that can be hard to recognise unless there is attention being paid to ordinary work.

By continually monitoring system capability, performance and normal operation, system effectiveness can be increased by improving the system's ability to anticipate, respond and learn – its resilience, in effect. Safety can be improved by increasing the number of 'things that go right', to the overall benefit of the system. In aviation, accidents and disasters, whilst easy to identify, are infinitely complex to dissect and decipher, difficult to change and difficult to manage so as to prevent recurrence. Conversely, the normal, everyday performance that makes the system work is often overlooked as a source of safety.

Yet everyday tasks, due to their very nature, are generally uncomplicated and easily understood which makes them easy to change, manage and replicate (EUROCONTROL, 2013). Morale is part of the everyday lived reality of ATCOs. This research will present a model for its measurement and management by placing an emphasis on the everyday lived reality of field experts.

In an organisation, there is nothing that functions in isolation, as everything works in connected and interrelated ways that interrelate to form a complex system. In complex socio-technical systems such as aviation, this becomes even more applicable. Systems theory provides a suitable lens through which such systems can be regarded, and through which a model for morale in a safety-critical ATC environment can be best described.

2.3 Synthesis

This chapter revealed the philosophical foundations that directed inquiry in this research and asserted the theoretical paradigm connecting the complete research process. In the next chapter literature pertaining to performance variability, followership, and organisational climate and culture is independently probed, and the relevance to morale theory explained. An interrelated perspective is provided for the consideration of morale theory, which is then systematically scrutinised to identify, clarify and validate the gap in literature addressed by this research.

Chapter 3: Literature review

"Know from whence you came. If you know whence you came, there are absolutely no limitations to where you can go."

- Baldwin (1968: 96)

3.1 Introduction

Research cannot exist in a vacuum. By reviewing the literature, it is established what is already known, what is not known, and what needs to be known. This assists in establishing the foundation and seminal works surrounding the chosen research topic and scrutinise the current direction in topical research to ascertain any defects, omissions or new perspectives requiring further examination (Leedy & Ormrod, 2014).

The previous chapter elucidated the philosophical foundation in which the research is grounded and described the theoretical paradigm applicable to this research. In this chapter, each of the bodies of literature surrounding performance variability, followership, and organisational climate and culture is independently interrogated, and the relationship with morale theory explained. From these interrogations an interrelated perspective is provided for the consideration of morale theory, which is then comprehensively disseminated to identify, clarify and validate the gap in literature addressed by this research.

3.2 Structure of review

The purpose of this research was to add to the body of knowledge surrounding morale theory. To accomplish this in a manner which adds value to the researched company, pertinent additional theories were reviewed, providing a unique and relevant angle from which morale theory was interrogated to locate a gap in existing knowledge. Firstly, the research was contextualised and the role of performance variability in an aviation environment illuminated as a base for inquiry. Followership as the angle of inquiry was elucidated, whereafter the concepts of organisational culture and climate were non-critically reviewed as vehicles for morale manipulation, providing the final link which enabled the critical review of morale theory from a uniquely combined perspective. To assist in answering the Research question for this study, ("*How can a*

model for ATCO team morale in a safety-critical air traffic control environment be best described?") the theoretical objectives for this research were to:

TO1: Provide an overview of existing literature in the fields of performance variability, followership, organisational culture and climate and morale management.

TO2: Illuminate the gap in the literature relating to morale.

TO3: Construct a preliminary conceptual framework based on the literature review.

3.3 Aviation: a brief history pertaining to the need for ATC

Air traffic control (ATC) is a service provided by air traffic controllers (ATCOs) from a facility on the ground to aircraft (both on the ground and airborne), providing separation from both from each other and from other objects such as vehicles or terrain. An ATC service also has the purpose of expediting and maintaining an orderly flow of air traffic (ICAO, 2016a). The need for an ATC service arose from the historical growth of the aviation industry, which progressed beyond the point of being able to provide its own separation by virtue of both its rapid expansion in numbers, as well as the advent of instrument flight into non-visual conditions.

Whilst the history of aviation extends for more than 2000 years, with the Chinese flying kites as early as several hundred years BC (Needham, 1965), powered, controlled, sustained heavier-than-air aviation is widely acknowledged to have begun with the Wright brothers in 1903 when they successfully flew the Wright Flyer at Kitty Hawk in North Carolina for 59 seconds. The first World War brought a flurry of activity to the heavier-than-air industry, with both the Allied Forces and the Germans making great headway in constantly finding new and improved ways of ruling the skies. Notable advances during this period were the fixing of machine guns to fighters by the French and the pioneering of all-metal aircraft by the Germans (Angelucci, 2001).

It was however in the period between world wars that aviation truly blossomed, and civilian aviation as a form of transport was born (Grant, 2017). The first recorded mid-air collision between aircraft occurred in Milan, Italy in 1910. As the skies became ever more crowded, the need arose to solve the problem of a steadily increasing number of mid-air collisions (Grant, 2017). When Jimmy Doolittle developed instrument flight

in 1929, which would eventually allow pilots to fly by reference to the instruments inside their aircraft only (not requiring visual cues outside the aircraft to stay upright and on course), the need arose to find some way of being alerted to other aircraft in the vicinity. And thus, air traffic control was born.

3.3.1 The evolution of air traffic control

Croydon Airport in London is considered the birthplace of ATC as it was the first airport to feature an ATC tower, erected by the U.K. Air Ministry in 1920 to assist in creating a safe and orderly flow of traffic from and to the airport (Historic Croydon Airport Trust, 2019). Initially conceived as a service to physically alert pilots to the surface conditions of the runway, the wind direction and weather conditions via visual flag signalling from the control tower, it quickly evolved into the issuing of instructions on a radio frequency by a person in the tower to aircraft both in the air and on the ground with the purpose of keeping them safely separated.

The steady increase in air traffic numbers through the years necessitated the involvement of more and more actual people in this process, as the workload for individual controllers became too much to bear. Whilst the nature of the service (getting aircraft safely from point A to point B) has remained the same throughout the years, the complexity has increased dramatically as aircraft became more technologically advanced and capable of reaching greater altitude and distances, and thus required a greater sectorisation of the ATC service.

ATC evolved from one person in a tower waving flags at aircraft to an abundance of Air Navigation Service Providers (ANSPs) located in most countries around the world. Modern ANSPs cooperate globally to provide the age-old service of getting aircraft safely from point A to point B by each combining several ATC centres, manifold ATC sectors and numerous different types of ATCOs with multifarious ATC technologies in one immense synergistic endeavour.

Whilst the various ANSPs globally have numerous different approaches to providing their service, they are all driven by the same overarching goal: safety. Safety, as one of the strategic objectives of ICAO, is not an optional endeavour for member states. ICAO's coordinated safety activities provide measurable, practical and achievable measures to improve safety in all sectors of the air transport system (ICAO, 2019).

3.3.2 Safety in air traffic control

ATM has three primary goals, namely the facilitation of safe, orderly and expeditious air traffic flow (ICAO, 2016b). As an integral component of ATC, safety is prime amongst these three objectives, and always overrides orderliness and expeditiousness in any given situation (ICAO, 2018). Within the aviation environment, ICAO defines safety as "*the state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level*" (ICAO, 2018:2-1).

Aviation safety has progressed over the years from a purely technical approach, which blamed aircraft deficiencies for all mishaps, to a total system approach that recognises the complexity of the aviation system and all its role players (ICAO, 2018). This evolution is illustrated in Figure 9:

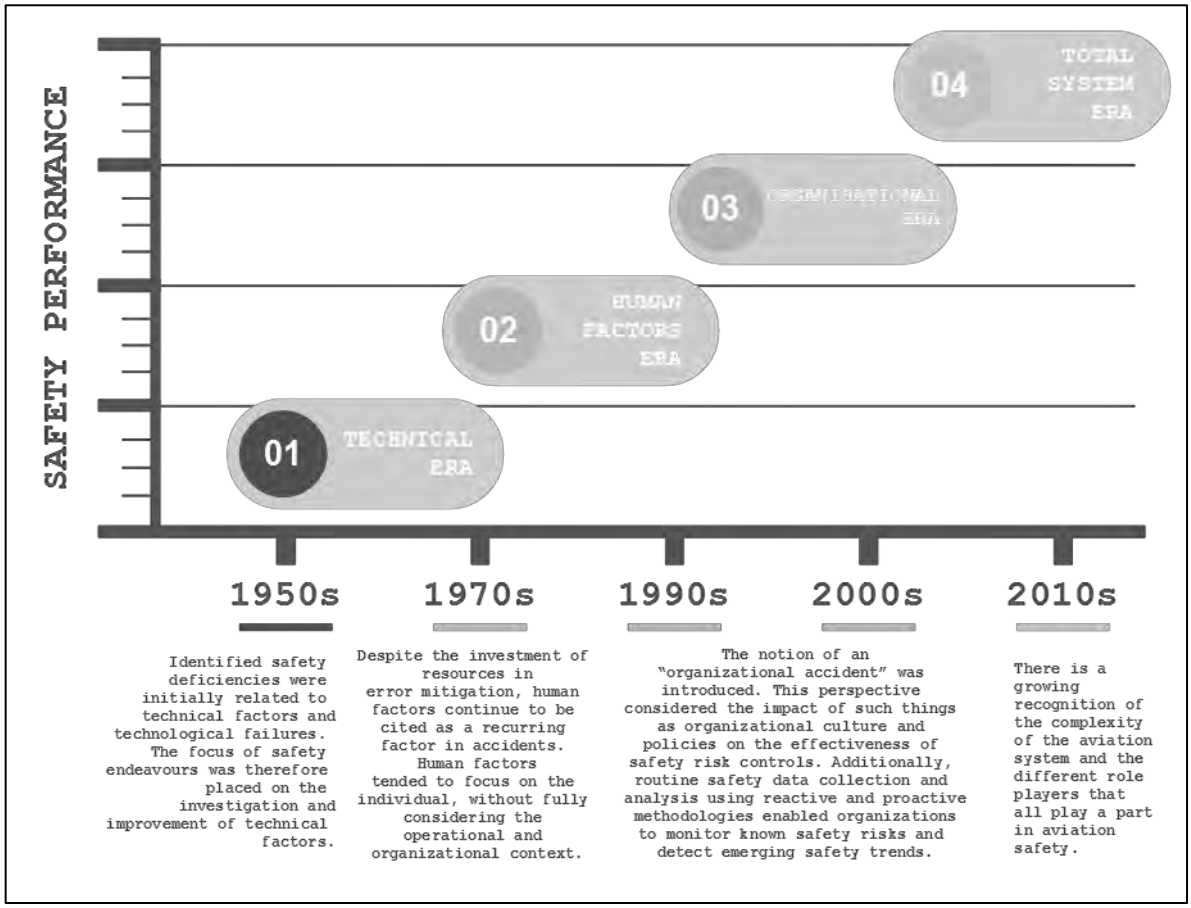

Figure 9: The evolution of the aviation industry's approach to safety (adapted from ICAO, 2018)

Aviation safety is a dynamic concept, with new hazards and risks constantly emerging and requiring mitigation (ICAO, 2018). ICAO (2018) believed that as long

as risks and hazards were identified and kept under a suitable amount of control, even a system as open and dynamic as aviation could be considered as a relatively safe environment. In recent times there has been a shift in safety thinking away from the traditional cause-and-effect view, better known as the Safety-I perspective (which dissects the things that go wrong in complex systems for causes to try and prevent them from reoccurring in future), to a more pro-active approach, known as Safety-II, where developments and events are continuously anticipated and the focus is on ensuring that as many things that go right as possible are regularly replicated (EUROCONTROL, 2013).

Safety-I

To the average person, the term ‘safety’ implies the absence of undesirable consequences such as accidents. In the past, the starting point for any safety intervention has been the presence of adverse outcomes such as accidents or identified risks (EUROCONTROL, 2013). The cause-and-effect approach to safety, commonly referred to as the Safety-I approach, has been very successful over the years, providing short-term solutions to the problem of explaining adverse outcomes (EUROCONTROL, 2013). Massive databases of accident data, compiled from mandatory accident reports required by aviation regulatory bodies after an incident or accident, are scourged by researchers to try and find and address the causes (EUROCONTROL, 2013). This results in an incredible amount of information about why and how things go wrong, and how to prevent this from happening.

A Safety-I perspective implies that systems are decomposable, where the fact that complex systems like aircraft and airports are built means that they can be taken apart into meaningful components for scrutiny by simply reversing the process. It furthermore extends this view to complex soft systems like organisations and tasks or events. Secondly it implies that system functionality is bimodal, with its components only ever operating in one of two modes – functional or malfunctioning (failing). Whilst this manner of reasoning is sufficient when it comes to technological systems and their components, it is not valid for either socio-technical systems (such as aviation) or human and organisational systems (EUROCONTROL, 2013; Shorrock, 2013), as safety is regarded as a characteristic of the system and not its components (Cook, 1998).

Work-As-Imagined versus Work-As-Done

The concepts of Work-As-Imagined and Work-As-Done describe the (often substantial) differences between the ideal way of prescribing how a task should be completed (Work-As-Imagined) by font-line operational staff and the way in which the complex, changeable and interconnected nature of the task forces them to adapt and deviate from such prescription in order to actually get the task done (Work-As-Done). As EUROCONTROL (2013:15) asserts:

> *"Today's work environments require that we look at Work-As-Done rather than Work-As-Imagined, hence at systems that are real rather than ideal. When such systems perform reliably, it is because people are flexible and adaptive, rather than because the systems are perfectly thought out and designed. Humans are therefore no longer a liability and performance variability is not a threat. On the contrary, the variability of everyday performance is necessary for the system to function, and is the source of successes as well as of failures. Because successes and failures both depend on performance variability, failures cannot be prevented by eliminating it; in other words, safety cannot be managed by imposing constraints on normal work."*

In an increasingly complex world, where work is becoming increasingly intractable, the way safety is considered needs to start mimicking Work-As-Done instead of relying on Work-As-Imagined (EUROCONTROL, 2013; Hollnagel, 2017; Shorrock, 2019).

Safety-II

Safety-II is a complimentary way of approaching safety management in complex socio-technical systems and organisations that was first introduced by Hollnagel (2009). Following the tragic accident at Milan Linate airport in 2001, where 118 people were killed when two airliners collided in thick fog after the airport had continued operations despite severely degraded conditions; and the infamous Überlingen mid-air collision in July 2002, where 71 people (mostly children) lost their lives when two commercial jets collided over Lake Constance in Germany, the EUROCONTROL Experimental Centre hosted a workshop in Brétigny (France) to review the final accident report and consider whether the old, tried and tested, safety philosophies such as Reason's (1990) Swiss Cheese Model were still appropriate given the growing complexity of aviation systems (Reason, Hollnagel & Parles, 2006). It was concluded that the Swiss Cheese Model has had a significant influence

on both the understanding of accidents and their prevention, and continues to have indisputable value as a heuristic explanatory device (Reason, Hollnagel & Parles, 2006). Hollnagel (2009) then went on to assert that instead of treating system failures that result in accidents as unique, individual events, they should be viewed as routine expressions of human performance variability. EUROCONTROL (2013:17) ventured:

> *"With the exception of major disasters, it is a safe bet that something that goes wrong will have gone right many times before – and will go right many times again in the future. Understanding how acceptable outcomes occur is the necessary basis for understanding how unacceptable outcomes happen. In other words, when something goes wrong, we should begin by understanding how it (otherwise) usually goes right, instead of searching for specific causes that only explain the failure."*

This forms the basis of Safety-II, an approach which accepts that systems cannot be decomposed into meaningful components, system functions are not bimodal, both positive and negative outcomes emerge from human performance variability; and while some undesirable outcomes can still be ascribed to failures or malfunctions, others are best understood in the context of performance variability (Hollnagel, 2009). In contrast to the Safety-I principle of bimodality, Safety-II asserts that performance modifications are pervasive in socio-technical systems, resulting in performance that is always variable to some extent (EUROCONTROL, 2013). It argues that such variabilities should not be treated negatively (as 'performance deviations', 'violations' or 'non-compliance'), but rather that they are indispensable contributions to human work, without which nothing other than the most elementary of tasks would be possible (Shorrock, 2013; EUROCONTROL, 2013).

According to EUROCONTROL (2013), Safety-II is "*the system's ability to succeed under varying conditions, so that the number of intended and acceptable outcomes (in other words, everyday activities) is as high as possible*." It must be emphasised that Safety-II is not intended to replace Safety-I as the one and only way that we are supposed to think about safety (EUROCONTROL 2013; Hollnagel, 2014; EUROCONTROL, 2014;). They are complimentary, and safety management should not be based solely on one or the other (EUROCONTROL, 2013; Hollnagel, 2014). What people do in their everyday work environment is a combination of Safety-I and Safety-II, in a balance that is determined by factors such as the culture of the organisation, the type of work, the amount of socio-technical interaction and many

more factors (Hollnagel, 2009). An overview of the differences and similarities of Safety-I and Safety-II is provided in Table 3, drawing attention to the consequences of basing safety management solely on one or the other:

Table 3: Comparison between Safety-I and Safety-II (Hollnagel, 2014:147)

	SAFETY-I	SAFETY-II
DEFINITION OF SAFETY	As few things as possible go wrong.	As many things as possible go right.
SAFETY MANAGEMENT PRINCIPLE	Reactive, respond when something happens, or is categorised as an unacceptable risk.	Proactive, continuously trying to anticipate developments and events.
ATTITUDE TO THE HUMAN FACTOR	Humans are predominantly seen as a liability or hazard.	Humans are seen as a resource necessary for system flexibility and resilience.
EXPLANATIONS OF ACCIDENTS	Accidents are caused by failures and malfunctions. The purpose of an investigation is to identify the causes and contributory factors.	Things basically happen in the same way, regardless of the outcome. The purpose of an investigation is to understand how things usually go right as a basis for explaining how things occasionally go wrong.
ROLE OF PERFORMANCE VARIABILITY	Harmful, should be prevented as far as possible.	Inevitable, but also useful. Should be monitored and managed.

In line with the move towards a total systems era of safety management, Safety-II emphasises phenomena such as emergence (see page 51), adaptation and trust (Shorrock, 2015). Safety should be examined in the context of the total system, and not as individual and insular parts, events or outcomes (EUROCONTROL, 2014).

Safety-II does not only focus on the successes of a system or positive outcomes, but instead concentrates on the whole distribution of safety performance which includes ‘normal performance’ – the things that are routinely done every day without either positive or negative outcomes (Shorrock, 2014). This is in line with the systems thinking concept of equivalence (see page 52). In shifting the focus from what goes wrong it mostly negates the systems trap of eroding goals (Meadows, 2008).

This is illustrated in Figure 10:

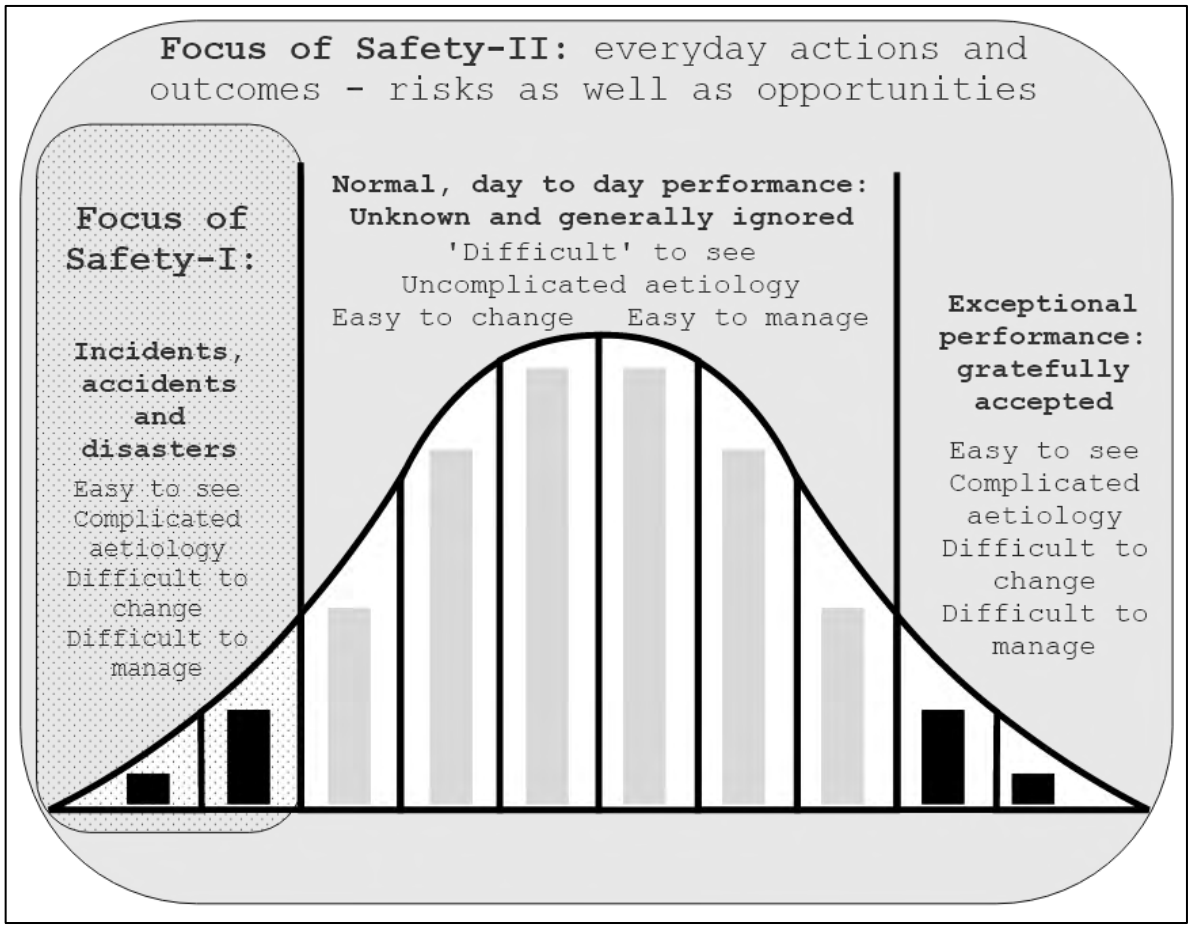

Figure 10: The focus of Safety-I and Safety-II (adapted from EUROCONTROL, 2013; Hollnagel, 2014)

Accidents and disasters, whilst easy to identify, are infinitely complex to dissect and decipher, difficult to change and difficult to manage so as to prevent recurrence. Conversely, the normal, everyday performance that makes the system work is often overlooked as a source of safety. Yet everyday tasks, due to their very nature, are generally uncomplicated and easily understood which make them easy to change, manage and replicate (EUROCONTROL, 2013). Socio-technical systems include humans, and humans will never be perfect. Thus, any system with a human element requires a systems approach to safety, where emergent phenomena originating from the aggregate complexity of the entire aviation system is taken into consideration when trying to manage safety.

A useful way of illustrating the impact and interaction of different system components on the human being is the SHELL model, introduced into the aviation arena by Hawkins (1987) and illustrated in Figure 11:

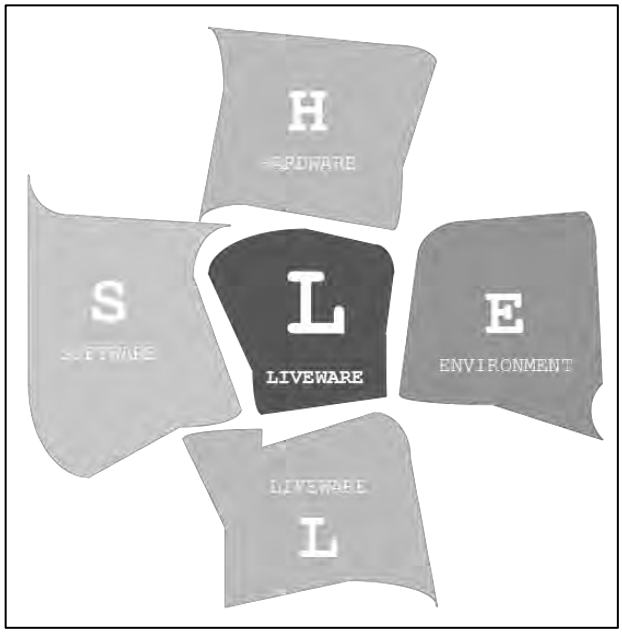

Figure 11: SHELL model of system interaction (adapted from ICAO, 2018)

The SHELL model, though dated, is still included in ICAO's newest edition of its Safety Management Manual (ICAO, 2018) due to its continued specific applicability in the aviation sector. It illustrates the relationship between the human being at the centre of the model and workplace components such as procedures, training and support (software), machines and equipment (hardware), the working environment (environment) and other humans (liveware). The critical focus of the model (depicted in its centre) is humans at the front line of operations, which also represents the least predictable dimension that is most susceptible to internal (such as fatigue, morale and hunger) and external (such as temperature, light and ergonomics) influences (ICAO, 2018).

Despite that fact that humans are notably adaptable, they do not have the ability to be standardised or controlled to the same extent as the other dimensions in the model and are subject to considerable variations in performance (ICAO, 2018). As such, the jagged edges of each block in the model represent the imperfect coupling that exists whenever humans are part of the safety equation (ICAO, 2018). With the human at the centre of the SHELL model, there is logically always room for error

regardless of the interface that is being interacted with. It is, however, the way in which we examine and manage such error that is evolving.

If safety management systems are to evolve in order to enable continued safe operation in an ever more complex industry, it is necessary to move away from cause and effect models and embrace the paradigm shift of understanding today's world and the systems that are being worked in:

> *"The new paradigm also means that the priorities of safety management must change. Instead of limiting investigations and learning to incidents, a SMS should allocate some resources to the look at the events that go right and try to learn from them. Instead of learning from events based on their severity, the SMS should try to learn from events based on their frequency. And instead of analysing single severe events in depth, a SMS should explore the regularity of the many frequent events in breadth, to understand the patterns in system performance. A good way to start would be to reduce the dependency on 'human error' as a near-universal cause of incidents and instead understand the necessity of performance variability."*

(EUROCONTROL, 2013:26)

3.3.3 Human Performance Variability

"To Err is Human."

- Pope (1711: 30)

As long as human beings remain part of the aviation equation, the interaction between complex systems (mechanical, electronic and organisational) and their human designers and operatives will remain a source of impending disaster, simply because of the undisputed fact that humans make mistakes. Safety-driven industries such as aviation spend significant resources on the study of why humans make mistakes, and how to prevent such mistakes from reoccurring.

The study of human error has its roots in cognitive psychology and spans vast fields such as human factors, reliability engineering and safety management. This review does not aim to examine the nuances of human error theory, but merely skims its surface to enable thorough consideration of the human contribution to complex system disasters in the form of latent error – a term implying a type of human error which may result in adverse consequences being dormant within a system for long periods of time, only to be discovered after they combine with other factors to breach system defences and produce disaster (Reason, 1990).

The Oxford Dictionary (1995) defines the word error as *"the state or condition of being wrong in conduct or judgement"* and goes on to define the term human error as *"the making of an error as an inevitable or natural result of being human"*. A working definition was provided by Reason (1990) as *"a generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve its intended outcome, and when these failures cannot be attributed to the intervention of some chance agency"*.

Historical context

Whilst the study of error itself originated in the late nineteenth century with the works of Sully (1881) and Freud (1901), contemporary error theory began by focusing on the settings in which errors are committed. Norman (1988) differentiated between *slips (or lapses)* and *mistakes*, which he classified as two error types inherent to the cognitive and motor aspects of error. Slips or lapses are unintended failures of execution. Mistakes transpire when a human's cognitive activity leads to outcomes or results which are divergent from what they intended. Reason (1990) contended that mistakes are effectively planning failures, whilst slips and lapses are execution failures.

Rasmussen and colleagues (1981) categorised three levels of human performance:

Skill-based level, where human performance is determined by stored patterns of pre-programmed instructions, intrinsic to automated and highly integrated patterns of behaviour, for which no or very little conscious attention or control is required. It rolls along without a person's conscious attention, and the person will be unable to describe the information on which controls and actions are based.

Rule-based level, which is applicable to tackling familiar problems and tasks, for which solutions and actions are governed by stored rules, mostly created by previous successful experience or procedural regulation. This level of performance is based on explicit know-how, and the information and rules used to govern and perform actions will be easily reportable.

Knowledge-based level, which emerges during unfamiliar situations, when a person is faced with an environment for which they lack know-how or rules for

control from experience. In this case, the control of performance moves to a higher conceptual level of functional reasoning and performance is goal-controlled and knowledge-based: the person selects the appropriate course of action or appropriate solution from an analysis of the environment and an explicit determination of the goal, after carefully weighing up what is known about the solution or action's possible effect on the problem against possible outcomes.

Reason (1990) expanded on Norman's (1988) and Rasmussen and colleagues' (1981) work by developing the generic error-modelling system (GEMS), which argues that the simple slips/mistakes distinction is not sufficient to describe all types of human error and that error is more comprehensively described in three categories, namely skill-based slips or lapses, rule-based mistakes and knowledge-based mistakes. Figure 12 illustrates the GEMS failure modes at each human performance level, which clearly shows the integration and expansion of Norman (1988) and Rasmussen and colleagues' (1981) work by Reason (1990).

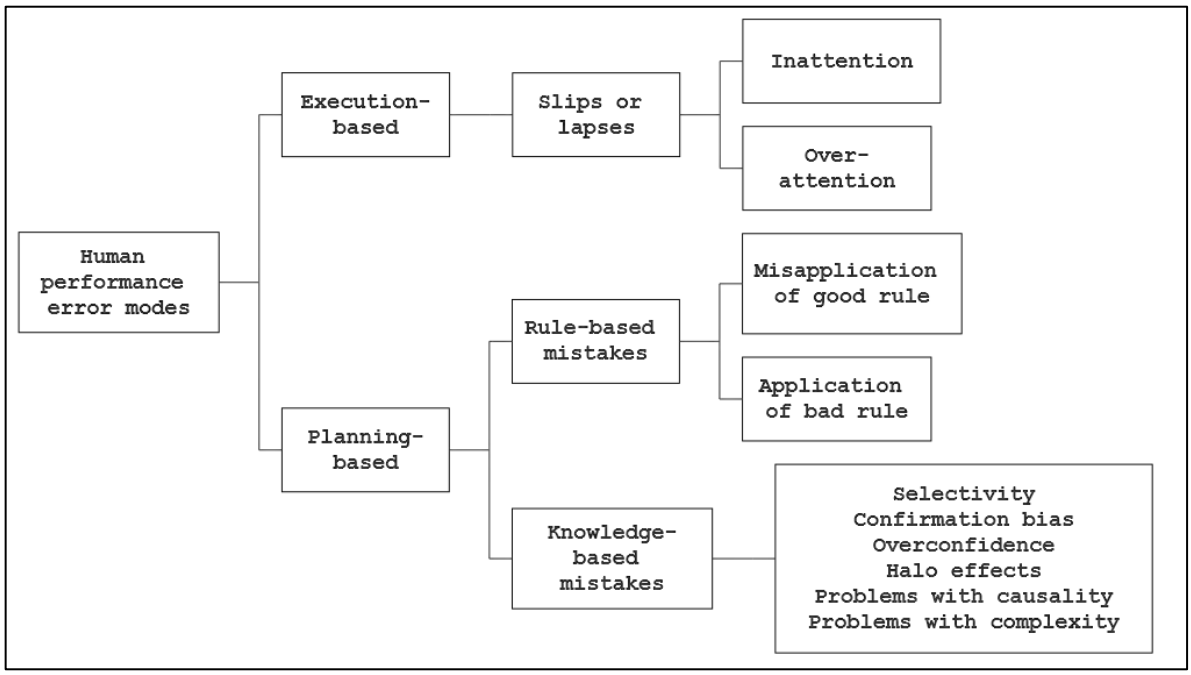

Figure 12: Failure modes at each of the human performance levels (Reason, 1990)

Within the GEMS framework, errors at the skill-based levels are attributed mainly to monitoring failures, mostly as a result of inattention or over-attention. At rule- and knowledge-based level, errors are associated with problem solving: if a problem is encountered, it is first established whether the local indications have been encountered before. If a pattern is recognised, a previously successful rule-based

solution is applied. It is only if no suitable rule-based solution is identified that the problem solver will move on to the relatively laborious procedure of making inferences from knowledge-based mental models of the problem space to enable the formulation of possibly suitable solutions (Reason, 1990).

Lastly, Reason (1990) distinguished between errors and violations. While errors are defined with regard to individual cognitive processes, violations acknowledge the fact that rules and operating procedures govern behaviour within the social context of any organisation. Violations are thus described as deliberate (yet not necessarily iniquitous) deviation from rules or procedures created to ensure what is deemed to be the safe operation of a potentially hazardous system (Reason, 1990).

Reason's taxonomy of accident causation

When human error combines with complex systems to produce disaster, it is often near impossible to isolate the exact cause of calamity due to the sheer volume of factors that contribute (Dekker & Woods, 2010). The late 1970s and early 1980s brought with them a spate of disasters including the Tenerife runway collision (FAA, 2018), the Three Mile Island disaster (World Nuclear Organisation, 2012), the Challenger (NASA, 2018) and Chernobyl (World Nuclear Organisation, 2016) catastrophes and the King's Cross underground station fire (London Fire and Emergency Planning Authority, 2018).

Once the investigations into these disasters were completed, it became clear that whilst the disasters happened mostly because of errors at the "sharp end" of the system (the pilots in Tenerife and Cape Canaveral, the nuclear operators in Pennsylvania and Chernobyl and the person who dropped the lit match onto an escalator underneath London), they were shaped by local workplace conditions and upstream organisational factors (Reason, Hollnagel & Parles, 2006). It became apparent that one could not simply consider human error in isolation from these contextual systemic issues.

In considering the complex human contribution to systems disasters, Reason (1990) distinguished two kinds of error, namely active and latent error. Whilst active error occurs at the sharp end of a complex system, such as when pilots or ATCOs make mistakes whilst on active duty, latent errors can lie dormant within the system for long

periods, only becoming apparent when they combine with other factors to breach system defences and produce disaster.

Likened to *'resident pathogens'* within the human body (Reason, 1990), latent errors were not a new concept. Rasmussen and colleagues (1981) mentioned situational factors and performance shaping factors which influence error probability, and Perrow (1984) stressed the importance of defences-in-depth which create complexity, tight-coupling and opacity in a system which decreases the possibility that one single failure will be able to cause catastrophe.

Reason (1990) argued that all complex productive systems, such as the ones in which catastrophe had occurred above, have healthy elements of production which can be affected by human error. This is presented in Figure 13, where the production elements of lop level decision makers, line management, preconditions, productive activities and system defences are depicted as a series of five planes situated in a chain.

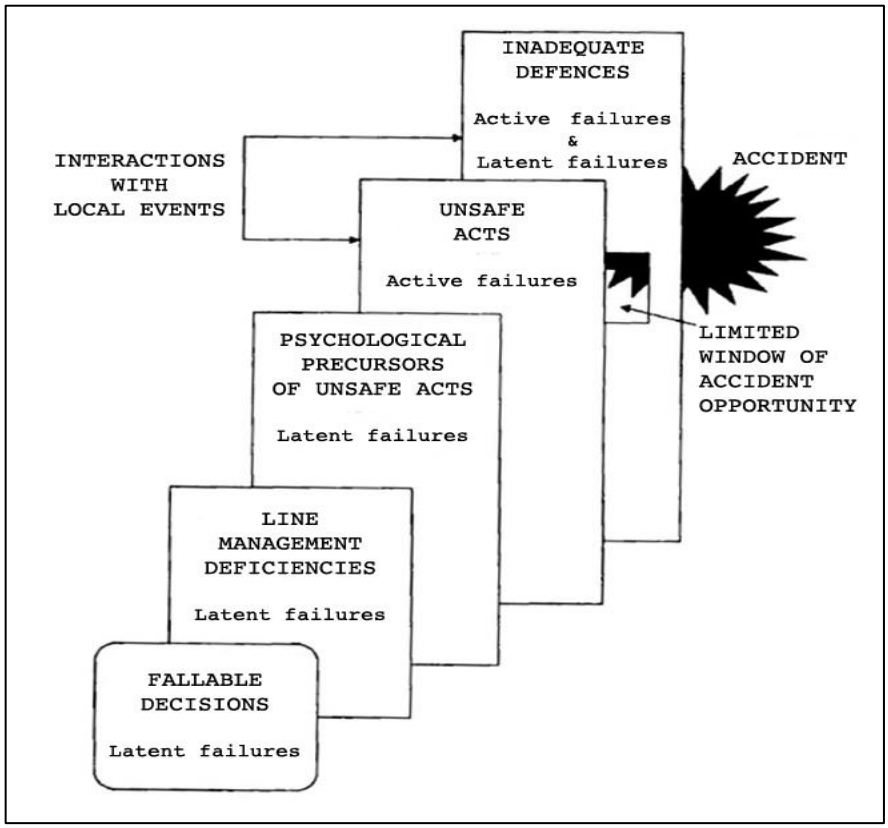

Figure 13: Failure opportunities of logical production elements in a complex productive system (Reason, 1990)

Reason's (1990) taxonomy of accident causation (colloquially known in aviation circles as the *Swiss Cheese Model*) described the trajectory that an accident

opportunity follows through a system as it breaches defences and heads for disaster. The first version of the model (known as Mark I), contrived from the logical elements of production in complex productive systems (Figure 13), showed the dynamics of accident causation that arise from interactions between latent failures and a variety of local triggering events (Reason et al., 2006) – essentially how these elements of production could logically fail (Reason 1990). Figure 14 illustrates Reason's (1990) first iteration (Mark I) of the taxonomy of accident causation.

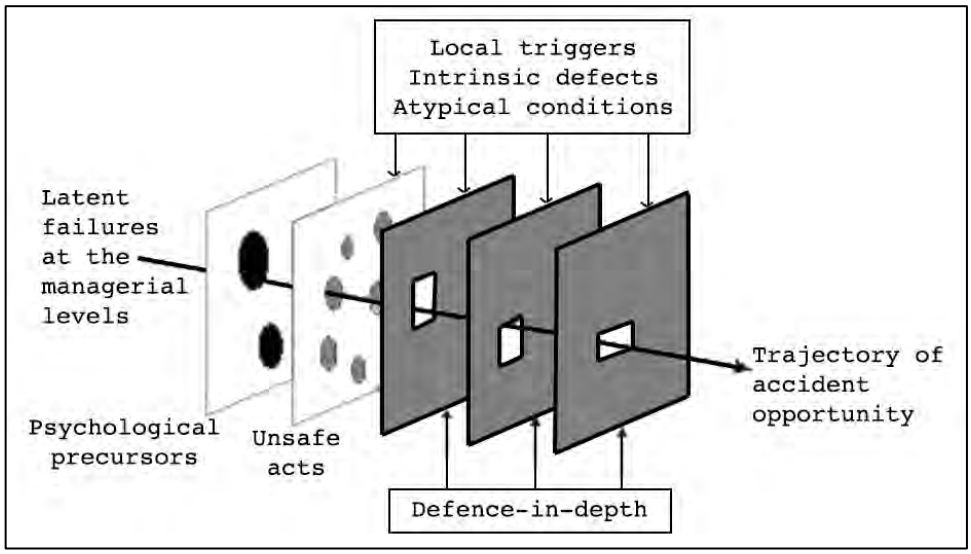

Figure 14: Reason's (1990) taxonomy of accident causation (Mark I)

The Mark I model was developed and enhanced by considering two kinds of causal dependencies, namely the ways in which latent organisational failures increase both the likelihood and severity of operator error and how procedural violations by specific individuals exert comparable knock-on effects over a much shorter period of time (Reason, 1995). Figure 15 depicts the Mark II model of accident causation:

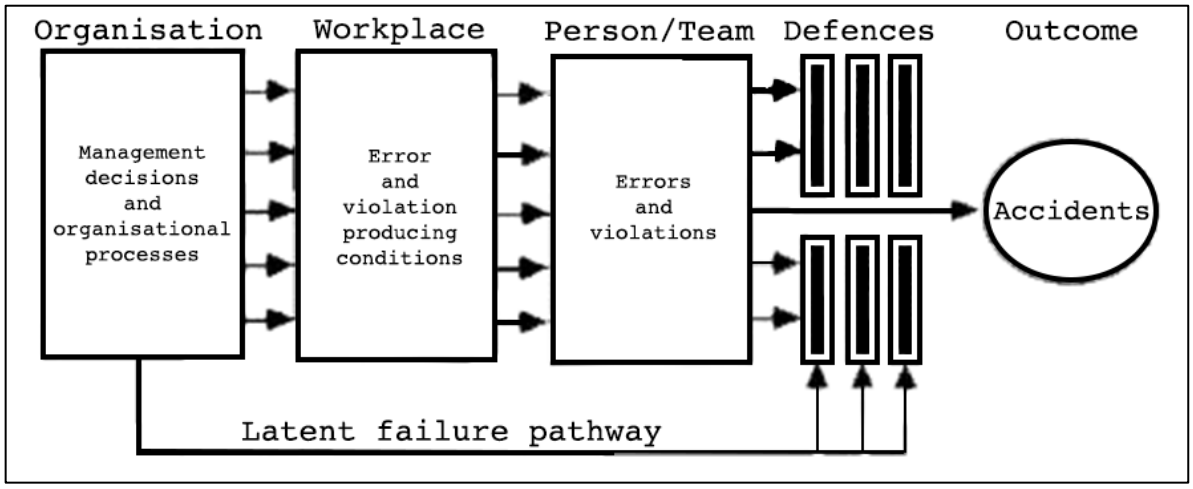

Figure 15: Reason's (1995) taxonomy of accident causation (Mark II)

Figure 15 illustrates Reason's (1995) depiction of the accident sequence, which starts with the negative results of organisational processes such as communication, planning or maintenance. These negative results create *latent failures*, which are diffused along various organisational conduits to the workplace, where they create the local conditions that foster the perpetrating of unsafe acts such as errors and violations. Local conditions can be things such as high workloads, time pressure, fatigue, deficient equipment, low morale, and conflicting norms.

Unsafe acts are termed *active failures* and are committed by the people at the immediate human-system interface, or sharp end, with their adverse effects usually almost immediately visible. Latent failures occur within the upper tiers of the system and are shaped by people who are often distant in time and space from the hazards at the sharp end of the system. Whilst many of these unsafe acts are committed, only very few of them will penetrate enough system defences to result in disaster. System defences can be deficient in places due to both active and latent failure. When these deficiencies line up and an ill-timed active failure penetrates the created opening, an accident occurs.

Fundamental to the present research, Reason (1995) identified low morale as one of several possible latent failure conditions, created by organisational processes, which could promote the commission of errors and violations in the workplace. Latent failures, by their very nature, are much more pervasive, opaque and difficult to diagnose and rectify than active failures. Similarly, identifying and rectifying but one latent failure within a system is no guarantee of system safety.

Latent failures erode system defences against active failure (Reason, 1995). What identifying and rectifying one latent failure within a system may therefore do is ensure that there is slightly less erosion to system defences, thereby decreasing the likelihood of such eroded sections lining up to allow an accident opportunity trajectory to pass through. More recently, it has been argued that accident prevention strategies aimed at strengthening system barriers (which implies decreasing erosion) instead of trying to eliminate accident causes are more efficient (Reason et al., 2006). Human error is simply a symptom of discord deeper inside the system (Dekker, 2002).

Reason's taxonomy underwent a few more iterations, with the final version illustrated in in Figure 16 and premised on the argument that every model of accident causation must have at least three basic elements: hazards, losses and defences (Reason et al., 2006). Whilst the planes are now no longer labelled, there is a welcome explanation of how the holes, gaps or weaknesses in them occur.

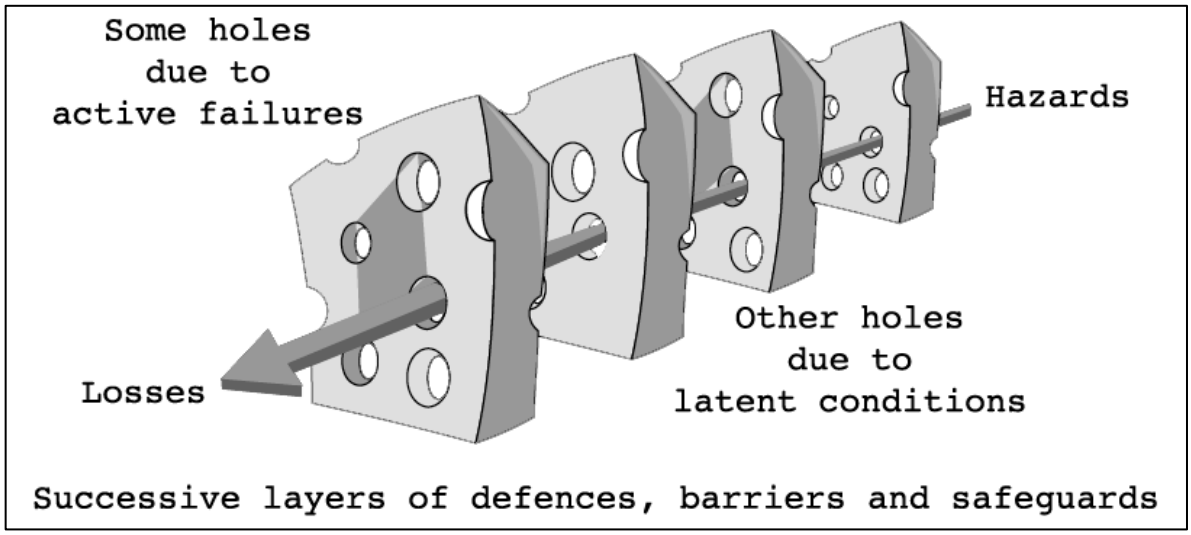

Figure 16: Reason's (1997) taxonomy of accident causation (Swiss Cheese Model)

Importantly, latent failures or latent errors are now referred to as latent *conditions*, as it is argued that a condition is not a cause in itself, but rather a necessary circumstance for a causal factor to combine with others and have an impact (Reason, 1997). Despite modern theory having moved beyond the thinking that an accident is caused by a series of deficiencies to the realisation that accidents can also occur from normal behaviours or events (Dekker, 2003), the Swiss Cheese Model has irrefutable significance as a heuristic explanatory mechanism which has had considerable influence on the understanding, analysis and prevention of accidents in many high reliability environments (Reason et al., 2006; ICAO, 2018).

The model has been rated as one of two error taxonomies which, in the dimensions of completeness and acceptability, are best suited to aviation-related command and control environments (Scarborough, Bailey & Pounds, 2005). It has been supported by findings of large studies into accident data such as the study into 523 military aircraft accidents by Li and Harris (2006), the African study by Munene (2016) into 55 scheduled aircraft accidents on the continent and the study by Erjavac, Iammartino and Fossaceca (2018) into 479 non-scheduled aircraft accidents.

In healthcare, Reason's (1990) work has been included in quality management manuals, such as by Ross (2014), which are used for tuition. Finally, Reason's (1997) Swiss Cheese Model is presently adopted as a fundamental safety management aspect by ICAO in the latest version of its Safety Management Manual (ICAO, 2018) which is applicable to all ICAO states including South Africa.

Westrum and Adamski's human envelope model

Building on the work of Reason (1990, 1995, 1997), Westrum and Adamski (1999) proposed a model which in essence postulated the causal link between human error and organisational culture. Firstly, the Swiss Cheese model was re-imagined, and represented as a "human envelope" surrounding a social technical system, as illustrated in Figure 17:

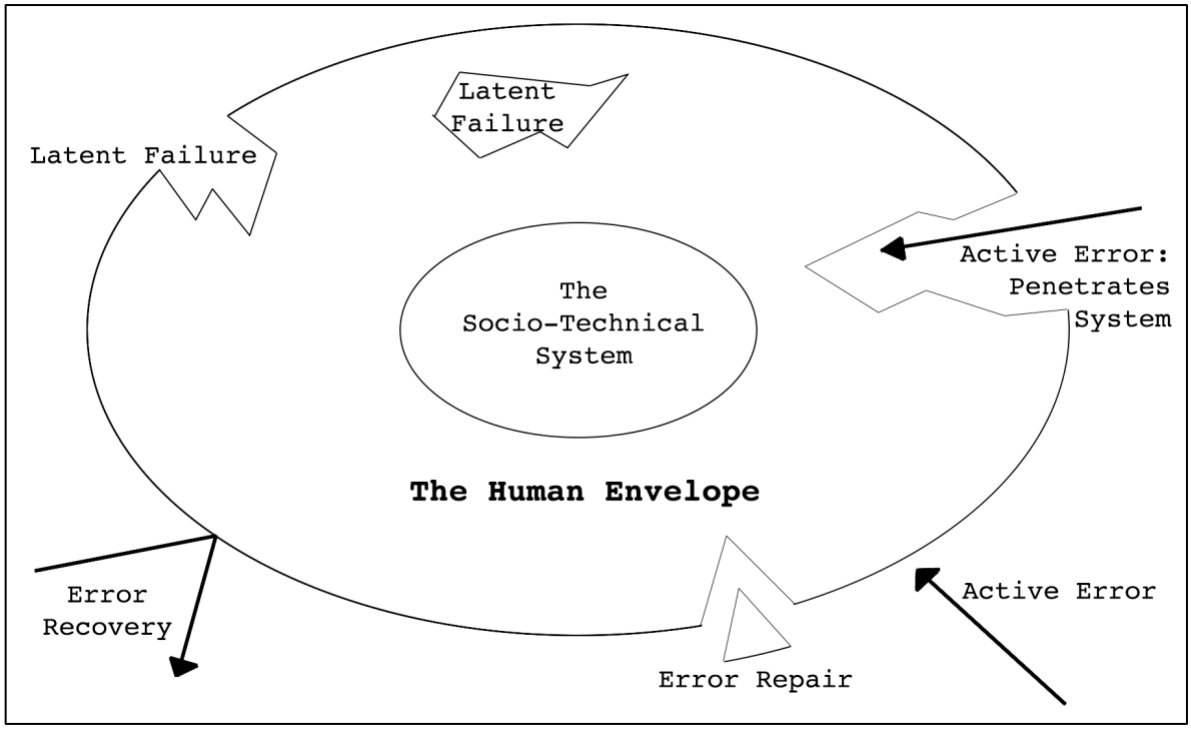

Figure 17: Active and latent failures in the human envelope (Westrum & Adamski, 1999)

Built on Westrum's (1993) earlier work on organisational culture, which identified communication and the flow of information as the critical feature of a safety-focused organisational culture and defined three types of cultures for information flow, namely the pathological, the bureaucratic and the generative culture, Westrum and Adamski (1999) postulated that each type of culture has a different effect on the human envelope, with more or fewer latent failures allowing active errors to penetrate the system (Figure 18).

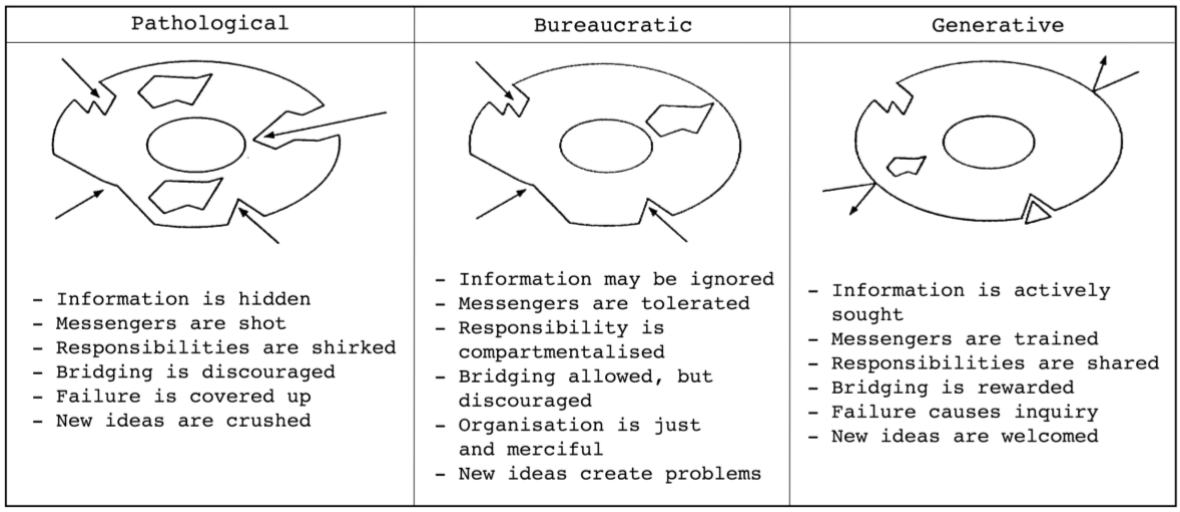

Figure 18: How organisational cultures treat information and its effect on the human envelope (Westrum & Adamski, 1999)

Each specified culture corresponds with certain typical organisational behaviours (Westrum & Adamski, 1999):

The pathological organisation typically elects to handle incongruities by means of suppression or encapsulation by silencing or ostracising the person who dares to spot a problem. This does not remove the problem, but instead serves to constantly generate latent pathogens which may remain mostly undetected due to a fear of possible punishment for detectors. This is an inherently dangerous and negative culture that should theoretically never exist in safety-driven industries such as aviation.

The bureaucratic organisation tends to be accomplished at routine or predictable difficulties, and whilst mostly not actively creating pathogens are woefully inadequate at recognising and eliminating them. Problems are often understated or only immediately pressing matters dealt with, whilst underlying causes remain unscathed. Thus, when presented with a non-routine problem or serious emergency, bureaucratic organisations are unable to adapt their responses to what the situation requires.

The generative organisation encourages constant communication and self-configuration, with a culture of incessant conscious inquiry and a high degree of integrity ensuring that even problems that are not immediately apparent get rooted out and solved. The responsiveness and depth of the human envelope ensure that

even if a latent pathogen is occasionally generated, the problem is likely to be promptly identified and rectified. Such a positive, procreant culture should be one that every safety-driven organisation strives towards.

The work of Westrum and Adamski (1999) corroborates this research by clearly illustrating that corporate culture (which from section 3.5 by inference includes *esprit*) has a direct effect on latent failures within a system's defences as described by Reason (1990).

Safety-II and the problem with the term "Human Error"

> *"The alleviation of human error, whether design or intrinsically human, continues to be the most important problem facing aerospace safety."*
>
> - Bushnell, 2007: 202

In modern society, any unwanted outcome is quickly and easily ascribed to the catch-all term 'human error'. A quick perusal of almost any news articles surrounding modern major accidents will confirm this. The academic and practical intention of human error literature has always been that human error is normal and to be expected, and that safety systems should be designed with this in mind – to avoid, reduce and mitigate error (Shorrock, 2013).

The term has however been misappropriated in the colloquial safety and justice contexts to refer to a deviation from normal procedures, rules, regulations and laws (Shorrock, 2013). Post-accident attribution of a root cause in complex systems is fundamentally wrong, in that it seeks to satisfy a social or cultural need to blame specific, localised forces or events for adverse outcomes instead of truly trying to understand the complex and technical nature of a complex systems failure (Cook, 1998).

Shorrock (2013) provided compelling reasons why the term 'human error' should be (and mostly has been) abandoned:

1. 'Human error' is mostly a post hoc judgement that can be hard to define before it happens.

2. ‘Human error’ requires a standard for correct performance, which in complex systems like ATC are hard to establish as there are many ways of obtaining the same result.
3. ‘Human error’ points to individuals in a complex system. Instead, system behaviour is propelled by both the system objectives and composition, with individuals within the system providing the flexibility to make the system work.
4. ‘Human error’ stigmatises actions that could have been heroic if the circumstances were slightly altered. “The line between ‘heroic action’ and ‘human error’ often depends only on the end result” (Shorrock, 2013:34).
5. ‘Human error’ is an inevitable by-product in the pursuit of successful performance in the inconsistent world of complex systems. The necessary ability for humans to adapt to and compensate for changing environments, resulting in infinitely flexible systems comes at a cost.

‘Human performance variability’, a term proffered by Hollnagel (2009) that has been widely acknowledged as preferable in safety science (Shorrock, 2013; EUROCONTROL, 2013; Shorrock, 2014; EUROCONTROL, 2014; Dekker, 2016; Saward & Stanton, 2017), is more than simply a replacement term for ‘human error’, but a new way of thinking that acknowledges the reality of how socio-technical systems actually work (Shorrock, 2013; Smith, 2015). This shift from causal linear thinking to a more systems-oriented approach to safety represents a profound watershed moment for the present research.

Kuhn’s (1996) notion of a paradigm shift, when a person’s beliefs and perspectives are changed, is perhaps somewhat applicable here, even though the idea of human error is not discarded entirely. Burgess (1973) believed that it is sometimes impossible for a writer to remain the same over a long period of time, and that the growth and maturation that accompanies lengthy projects requires a certain amount of change. At the start of this research project, human error alone was studied as the link to safety. Performance variability only became apparent as the research progressed towards the data collection phase. This research has retained the useful aspects of human error, whilst simultaneously shifting away from the causal inference of the very term, avoiding what Shorrock (2007:962) terms “*throwing the*

baby out with the bath water". It refers to human performance variability instead and embraces the systems approach to safety that this change in paradigm implies.

3.3.4 How human performance variability directs this research

Human performance variability can never be fully eliminated, and any system that seeks to do so will certainly lose the safety war (Reason, 1990). Performance variability is both normal and necessary (see page 51), and in essence presents the very reason why humans are required to do certain tasks – people are able to make efficiency-thoroughness trade-offs resulting in system flexibility that would be impossible for machines to replicate (Shorrock, 2013).

Because complex systems are heavily and generally successfully defended against failure, with multiple layers of defence created and moulded by the high cost of failure, catastrophe requires multiple failures to "line up" (Cook, 1998). It is argued that accident prevention strategies aimed at strengthening system barriers (which implies reducing barrier erosion) instead of eliminating accident causes are more efficient (Reason et al., 2006). Complex systems inherently contain multiple latent conditions for failure at any given point in time, and complete eradication is neither practical nor possible due to factors such as economic cost and the difficulty of identifying these conditions prior to an accident occurring (Cook, 1998). Latent conditions for failure erode system defences against active failure (Reason, 1995).

Reason (1995) identified low morale as one of several possible latent failure conditions, created by organisational processes, that could promote the commission of errors and violations in the workplace. Improving levels of morale will therefore logically assist, together with the many other interrelated factors in complex systems, in removing at least one latent failure condition from the system, thereby strengthening system barriers and assisting in preventing opportunities for active errors to penetrate such barriers and result in disaster. Despite the shift away from human error to human performance variability, the role of latent error remains acknowledged – "Errors or erroneous actions, that can result in a latent condition impacting safety, are a normal by-product of human performance variability induced by the socio-technical environment. Thus, a systems approach to error research is

essential in seeking out interventions prompting successful recovery from latent error" (Saward & Stanton, 2017:104).

Morale, however, is not a single-dimensional concept that one can simply isolate from the organisational context to enable elevation (Cattell & Stice, 1960; Williams & Lane, 1975; Scott & Rowland, 1970; Scott, 1967; Worthy, 1950; Peterson, Park & Sweeney, 2008; Hardy, 2010; Ngambi, 2011; Ibeziako, Chabikuli & Olorunju, 2013). Morale is influenced by many organisational factors, embedded in organisational culture (Jones & James, 1979) and propelled by organisational climate (Turnipseed 1988; Wallace, Hunt & Richards, 1999; Sempane et al., 2002; Grobler & Jansen van Rensburg, 2018).

The role of followership

Hofstede, Neuijen, Ohayv and Sanders (1990) empirically demonstrated that shared perceptions of daily practices are the very foundations of an organisation's culture. This research has approached the long-term change in organisational culture (by means of climate manipulation) from a followership perspective by attempting to unravel the nuances of corporate climate and its underlying group assumptions and perceptions through a search for the drivers of morale. It has been demonstrated that in an air traffic control environment, leader over-estimation of follower attributional perceptions results in lower morale (Coetzee, 2017).

Schein (1984) argued that culture is embedded in groups and that it is crucial to investigate the underlying assumptions of group members to truly understand a group's culture. In an organisational context, groups consist of followers. In an ANSP context, followers exist of the field experts on the front line doing the job – ATCOs. In line with a systems theory approach to safety, this research approached the morale problem from the perspective of followers and Field expert involvement in the entire process (see *Field expert involvement* on page 50). By doing so this research enables a lasting change in morale levels.

The role of organisational climate and culture

Deliberate adjustment to workforce morale would involve attempting to manipulate the organisational climate, which would in turn influence organisational culture in the long term to cement such a change in the corporate complexion (Schneider, Brief &

Guzzo, 1996). Any form of organisational change (such as a concerted effort to change morale) requires a change in climate to precede a change in culture, as culture is not directly manipulable (Schneider et al., 1996; Schneider, Ehrhart & Macey, 2013). Culture can only be changed by altering the tangible everyday policies, practices, procedures and routines that comprise the climate, in the hope of eventually changing the beliefs and values that guide employee action (culture) by sustained climatic intervention (Schneider et al., 1996; Schneider et al., 2013).

How would one know what fragments of a climate, when manipulated, would result in the required cultural change? Surely in order to eventually alter a culture through sustained climatic intervention, one needs to understand the very nature of such a culture and isolate the segments that require adjustment. In this way the relevant elements can be identified and manipulated, to ensure that the correct cultural changes are cemented in the long term. In this research the drivers of morale were the components that were identified for manipulation.

Assimilation

It is argued by this research that if one ascertains the drivers of morale from a follower perspective, climatic interventions aimed at addressing important and deficient elements can propel a change in organisational culture, cementing a change in morale that will assist strengthening system defences against human performance variability. This argument is now systematically substantiated from literature.

3.4 Followership

"Who is not fascinated by the dance between leaders and followers, who depend on each other surely as animals and air?"

- Bennis (2008: xxii)

Followers, if they are considered at all, are often deemed as the faceless, interchangeable and dispensable flocks that require leadership in order to guide their very existence. Limited thought has traditionally gone into the notion of follower roles or influences, and humanity has collectively spent copious amounts of time and energy in the quest to isolate the ever-elusive qualities of the perfect leader. Self-help leadership advice floods our social media timelines and advertisements for

'revolutionary' leadership conferences are ubiquitous. Yet now, more than ever, global leadership is being criticised as failing dismally in providing adequate direction for the masses in both an organisational and political context (Doffman, 2019; BusinessTech, 2019; Bridges, 2019; Picheta, 2019; Austen, 2019; New England Journal of Medicine, 2020).

Followers are rising up in ever-increasing numbers against weak, absent or toxic leadership and making their voices heard. Collective follower activism[1] is toppling regimes, revealing and punishing corrupt organisational practices[2] and determining market directions[3]. The global rise in populism reveals that followers are waking up to the power of the collective and the importance of their roles in shaping the future (Lewis, Barr, Clarke, Voce, Levett & Gutiérrez, 2019; InvestorDaily, 2019, Lewis, 2019; Grzymala-Busse, Kuo, Fukuyama & McFaul, 2020).

Scholarly discourse is eventually starting to appreciate the importance of followers in the leader-follower relationship and providing it with the long overdue attention that it deserves (Riggio, Chaleff & Lipman-Blumen, 2008). More than ninety years after its initial appearance in scholarly discourse, followership is now regarded as an important evolving concept (Uhl-Bien & Pillay, 2007; Bass & Bass, 2008; Riggio, Chaleff & Lipman-Blumen, 2008), as it provides the required impetus for leaders to realise their organisational vision (Carsten, Harms & Uhl-Bien, 2014).

3.4.1 Definition

According to the Merriam-Webster Dictionary (2014), followership is defined as "*the capacity or willingness to follow a leader*." As a social paradigm that is fundamentally indispensable to the leadership process, it can be considered as either a position within a hierarchical organisation, a set of skills utilised to supplement leadership or the behaviours that subordinates engage in whilst collaborating with their leaders to

[1] The Arab Spring in Egypt and yellow vest protests in France are examples.
[2] Events such as South African service delivery protests and the rise of community-funded organisations (for example The Organisation Undoing Tax Abuse or OUTA) forcing much introspection and hierarchical changes within the ruling African National Congress (ANC).
[3] For example a global citizen outcry against plastic waste leading to paper straws now being served in most restaurants.

attain organisational goals (Uhl-Bien, Riggio, Lowe & Carsten, 2014; Uhl-Bien & Carsten, 2017).

Whilst a widely accepted academic definition remains elusive, there seems to be some consensus that organisational success or failure depends largely on the crucially important roles that followers play in both their individual and collective, as well as relational daily roles (Kelley, 1988; Baker, 2007; Koonce, 2016, Uhl-Bien & Carsten, 2017). Crossman and Crossman (2011: 484) after conducting an extensive review of over 30 authors writing exclusively on followership (whilst only five of these authors ventured a definition), defined followership as "*…a relational role in which followers have the ability to influence leaders and contribute to the improvement and attainment of group and organisational objectives. It is primarily a hierarchically upwards influence*."

3.4.2 Historical context

> *"There is a conception of leadership gaining ground to-day very different from our old notion…It is a conception very far removed from the leader-follower relation. With that conception you had to be either a leader or a leaner. To-day our thinking is tending less and less to be confined within the boundaries of those two alternatives. There is the idea of a reciprocal leadership. There is also the idea of a partnership of following, of following the invisible leader – the common purpose. The relation of the rest of the group to the leader is not a passive one."*
>
> - Follett (1927: 122)

Followership theory can be traced back to the works of Follett (1927), one of the original scholars to acknowledge the existence of the field of followership, as well as the importance of collective leader and follower goal-setting. Over the years there have been several important scholars who attempted to refine the concept, notably Hollander and Webb (1955) who were the first to propose that leaders and followers were not simply two separate concepts on opposite sides of the leadership equation. Rather, it was advocated that leaders and followers in fact share many of the same qualities and that a person can sometimes switch between being a leader and a follower several times during an average working day (Hollander & Webb, 1955).

Litzinger and Shaefer (1982) argued that some mastery of followership is required as a precondition for leadership, but that it is not the only condition to be able to lead

and that followership deserves a more substantial space in the academic consciousness surrounding topical issues worth researching. Meindl, Ehrlich and Dukerich's (1985) seminal work noted as a finding that a certain amount of romance and mystery surrounding the concept of leadership is a critically important cog in the wheel that sustains followership and makes followers responsive to the requirements and aspirations of an organisation.

Mintzberg (1985), whilst pioneering the classification of various forms of organisational politics, acknowledged the significance of followers by arguing for the value of politics in providing strong followers with the conduits to catapult them beyond weak leadership. Vanderslice (1988) declared that traditional leader-follower hierarchical roles are not necessarily essential for accomplishing leadership functions in successful organisations.

Followership as more than just the reverse of leadership

It wasn't until the work of Kelley (1988) however, that followership truly came to the fore as a topic of inquiry in itself. Kelley (1988) argued that effective followers were ambitious, independent, intelligent and passionate, and (as illustrated in Figure 19) categorised them according to a two-dimensional scale of independent, critical thinking versus level of energy.

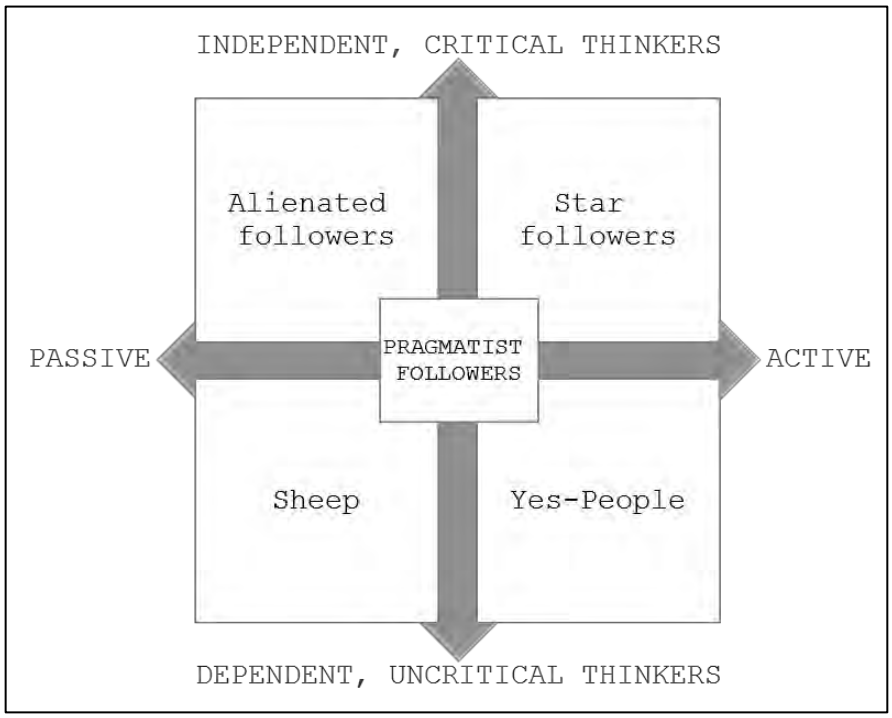

Figure 19: **Kelley's (1988) followership dimensions a**nd styles

Kelley (1988) furthermore separated followers into sheep, alienated followers, yes-people, star followers and pragmatist followers. Sheep are passive followers with limited critical thinking abilities and a high dependency on leadership, thus tending to be very draining on a leader as they require constant supervision and external motivation to fulfil even their basic assigned tasks. Alienated followers are passive with high critical thinking abilities, who are equally draining and damaging in that they are constantly questioning the leader's decisions and ability, with a very negative and abrasive attitude that they tend to try and spread to the rest of the group.

Yes-people have limited critical thinking skills and are highly dependent and active followers who are committed to the leader and organisational goals, will not question any leadership actions or decisions and will defend their leader against criticism or opposition. They will not, however, easily make their own decisions nor think for themselves.

Pragmatic followers are balanced individuals who prefer to stay in the background and will not support unique or contentious ideas until the majority of the group does. They are not pioneers, but will get the job done with minimum fuss or fight. Kelley's (1988) ideal follower is called a star follower, who has highly developed critical skills, is very independent and is actively involved in the group dynamics of the team. Such a follower is extremely valuable, in that whilst not passively accepting any instruction from the leader without interrogating it first, can be relied on to get the job done.

Scholars debated the expediency and validity of Kelley's (1988) work for over a decade, notably Lundin and Lancaster (1990) who remarked that organisational belief systems that value followership as highly as leadership will be the common thread that runs through successful companies in the future. Meindl (1995) added that followers and not leaders define leadership itself and Vecchio (1997) argued that when speaking about effective leadership we are actually referring to effective followership.

Kelley's (1988) work is widely acknowledged along with Chaleff's (1995) article on courageous followers as the initial spark that lit the smouldering followership fire. Chaleff (1995) defined five dimensions of courageous followership, stating that a dynamic model for followership is required to support and balance dynamic

leadership. In his model, courageous followers are willing to assume responsibility, serve, challenge, participate in transformation and take moral action.

The new century added tinder to this fire as organisations started to realise that beating the leadership drum relentlessly without acknowledging the crucial role that followers play in the success or failure of any leader is, although a tried and tested method, not producing the calibre of leaders that the ever-changing society of the new millennium requires. As a result, scholarly literature started interrogating the concept of followership in earnest. Lipman-Blumen (2005) found that followers who are merely passive devotees of a leader leave themselves vulnerable to being preyed upon by toxic leaders who court their followers with grand illusions and noble visions, all the while exploiting them for own gain. Still, the fire only smouldered.

Redefining followership: towards obtaining critical mass

In 2006, a pioneering breakaway at the annual Kravis-de Roulet Leadership Conference, titled *Redefining Followership* took place in Claremont, California, and followership fire finally erupted into a blazing inferno. The conference was a catalyst for a host of prominent academics to finally confront the followership challenge with renewed vigour, most notably Shamir (2007), Kellerman (2008) and Chaleff (2008).

Shamir (2007) analysed the different perspectives on the roles of followers in the leader-follower exchange. He classified followers as recipients of leadership, moderators of leadership impact, substitutes for leadership, constructors of leadership and finally as leaders themselves in a shared leadership environment. He concluded by questioning the practicality of the distinction between leaders and followers.

Kellerman (2008) investigated the level of engagement of followers in the leadership process, and categorised them into five levels of engagement:

Isolates, who are completely detached, care little for their leadership or organisational goals and do not know much about either or respond to them in any way.

Bystanders, who observe but deliberately choose to not get involved in group dynamics nor participate in group efforts.

Participants, who are engaged followers who invest resources to have a bearing on the group's direction, either in support or against their leader and his or her efforts.

Activists, who have strong opinions regarding their leader which may be positive or negative, and as such are heavily invested in working hard for their common goal or undermining it.

Die-hards, who are defined by their perseverance and willingness to die for their cause, whether it be devotion to a leader or a readiness to remove him or her from power by whichever means required.

Chaleff (2008) built on his earlier work by defining two dimensions of effective follower behaviour: the courage to *support* and the courage to *challenge* the leader's behaviour and policies. He went on to define four types of followers that typify these behaviours, namely resources, individualists, implementers and partners, of which partners are the most desirable type of follower who has the courage to both support and challenge their leader constructively (Chaleff, 2008).

Baker (2007), after compiling the most comprehensive review of followership literature to date (Baker, 2006), concluded that followers are fundamental components in organisations and that because of the fact that the leader-follower relationship is such a crucial factor in determining organisational success, much further study of this relational nature is required. Despite Agho's (2009) rumination that followership theory is perhaps receiving less attention than its leadership counterpart because society tends to take for granted that people intuitively know how to follow without having to be taught any followership skills, scholarly work surrounding followership indubitably bourgeoned at this point. Agho (2009), from a study of more than 300 senior corporate executives, found honesty to be the one characteristic commonly required in both roles.

Leading from the bottom up

Carsten, Uhl-Bien, West, Patera and McGregor (2010) completed a qualitative study into the social constructions of followership, which found that whilst some followers construct their identity around deference, obedience and being passive conformists,

others accentuate the importance of actively challenging, constructively criticising and questioning leadership. They therefore argued for an expanded view of leadership where it is based on more than just a traditional *leading down* approach, and that it was perhaps time to start looking into the concept of *leading up*, by leading from a subordinate role (Carsten et al., 2010).

DeRue and Ashford (2010) built on the literature surrounding followership identity construction by arguing for fluid, co-created, reciprocal and organisationally enforced leadership and followership identities, which individuals claim or grant to each other whilst creating their relationship and which changes with the situation over time. Carsten, Uhl-Bien, West, Patera and McGregor (2010) took this concept a step further by arguing for an expanded view of leadership that caters for a bottom-up approach rather than the traditional top-down notion, implying that followers can lead from subordinate roles, a view which was endorsed by Dinh, Lord, Gardner Meuser Liden and Hu (2014).

Greyvenstyn and Cilliers (2012) reiterated the call for a bottom-up approach to leadership by recommending that leadership takes note of how it is experienced and perceived by followers, and constantly strives to repair and optimise their mutual relationship by entering into continuous discourse to enhance collective understanding. Singh and Bodhanya (2013) provided a uniquely South African perspective on followership in contemporary organisations by viewing followership through a systems-thinking framework to uncover it as the outcome of an intricate collection of interactions between the individual, the organisation and the environment with follower constructions of their leaders being one of the primary individual factors.

Carsten and colleagues (2014) concluded that contemporary companies require active and engaged followers who labour with their leaders toward the fundamental success of the organisation and argued for an expanded view of followership as an inclusive role that ultimately propels the success of leadership. This was not a new view, but one that had been expressed decades before by Follett (1949), who emphasised the importance of the relationship between leader and follower and argued that it was this relationship that was essential to team success, and not simply the ability of a leader to dominate followers.

Leader-Follower Trade approach

The expanded view of followership was finally embraced by Malakyan (2014), who introduced the Leader-Follower Trade (LFT) approach, in which leaders and followers are regarded as separate, but interchangeable in that people often switch between the roles on a daily basis, thereby formalising the earlier theorising of Hollander and Webb (1955), Kelley (1988) and Horsfall (2001). The LFT approach is similar to the Leader-Member Exchange (LMX) leadership theory and is defined as follows: "*Leadership-followership processes occur in relationships and leading-following functions are exchangeable behaviours in human relationships. Thus, leaders and followers trade their functions from leader to follower and from follower to leader in order to develop their intrapersonal perspectives, foster interpersonal relationships, and maximise mutual effectiveness*" (Malakyan, 2014: 11).

According to the LFT approach, the attitude of a leader and follower toward each other is regarded as the governing foundation for effective leadership and followership (Malakyan, 2014). Several academics echoed this approach, notably Morris (2014) who conducted qualitative research on follower perceptions of followership. One of her respondents likened the act of followership to a linear formation of migrating birds: they're well organised and all heading in the same direction with a leader at the front, but constantly giving each other turns at the front to save collective energy and optimise the collective effort (Morris, 2014).

Riggio (2014) implored academics to invest more energy into research on the co-production of leadership, as leadership is a concept that is created by both leaders and followers as both follow a common purpose. This is particularly relevant in a safety-critical environment, as there should be a shared and common purpose: safety. An environment where only the leader beats the safety drum is bound to be less successful than one where safety is lived by all followers and simply steered by leadership.

Conceptual definition

Uhl-Bien and colleagues (2014) finally presented a clear conceptual definition and delineated two conceptual frameworks guiding direction for future research. They defined followership theory as "*the study of the nature and impact of followers and*

following in the leadership process" (Uhl-Bien et al., 2014: 96) and conceived a role-based (reversing the lens) and constructionist (leadership process) framework for followership theory. The role-based approach illustrates how follower characteristics can have a bearing on immediate corollaries such as leader and follower behaviours, as well as outlying outcomes such leadership processes and organisational performance (Uhl-Bien et al., 2014).

3.4.3 Follower-centric leadership theories

The advent of follower-centric leadership theories was perhaps when Meindl (1995) penned arguably his most important contribution to leadership, in which he described leadership as a social construction and emergent concept in which followers construct their experiences in terms of leadership concepts (Uhl-Bien & Pillay, 2007), implying that leadership is defined by followers (Meindl, 1995). Several follower-centric leadership theories emerged, of which LMX and Safety Leadership are pertinent to this research.

Leader-Member Exchange (LMX)

Leader-Member Exchange (LMX) is a follower-centric leadership theory that describes the quality of the relationship between a leader and a subordinate (Graen & Uhl-Bien, 1995). LMX theory is regarded as one of the more noteworthy and valuable approaches to studying the associations between leadership approaches and corollaries, and unlike traditional leadership theories uses the dyadic relationship between leader and member as its unit of analysis (Gerstner & Day, 1997). LMX theory was developed from Vertical Dyad Linkage (VDL) theory (Dansereau, Graen & Haga, 1975) by Graen (1976) and extended by Graen and Uhl-Bien (1995), and classifies leadership into three domains, namely the leader, the follower and the relationship.

Whilst recognising the significance of all three domains, the principal impact of LMX has been to transfer the emphasis from the leadership domain to the relationship domain (Howell & Shamir, 2005). Bass and Bass (2008: 1213) define LMX as the "*interaction of a leader with an individual member of the group or the average member of the group in contrast to the interaction of a leader with a group of members*". LMX postulates that the outcomes at individual, group and organisational

level of analysis is determined by the quality of the relationship that develops between leader and follower (Gerstner & Day, 1997).

Where traditional leadership approaches focused on leadership traits and behaviours (Mintzberg, 1973; Stogdill, 1948), LMX provides a feasible alternate method of reasoning (Bass & Bass, 2008; Uhl-Bien et al., 2014). Gerstner and Day (1997) observed that more research into the complexities of leader-member LMX perception agreement is required, and that interventions focused on improving agreement between leader and follower perceptions of LMX should be developed and tested.

Hofmann and Morgeson (1999) found the nature of leader-member relationships to be an important mediator of safety performance. By determining the drivers of morale from a follower perspective, and presenting any problematic areas to management for improvement, this research aims to strengthen the leader-member relationship.

Safety leadership

Safety-critical environments present numerous intricate challenges for leaders (Griffin & Talati, 2014). Much research has gone into the human factors and organisational strategies that enhance worker understanding, proficiency and enthusiasm for safety in the workplace (Reason, 1998), as well as into whether the allocation of resources to safety correlates to measurable organisational safety performance improvement (Christian, Bradley, Wallace & Burke, 2009; Griffin & Talati, 2014).

Even though leadership seems to be a component of most organisational safety strategies, specific inquiry into the role of leadership in safety is less abundant when compared to the role of leadership in other organisational areas such as strategy or finance (Hofmann & MorRgeson, 1999), and as such safety leadership in its own right is an emerging field. Clarke (2013) proposed a theoretical model for safety leadership, suggesting that an active transactional leadership style is crucial to ensuring compliance with procedures and regulations, whilst a transformational leadership style encourages employee safety participation.

Griffin and Talati (2014) integrated existing safety leadership research into a framework, as illustrated in Figure 20:

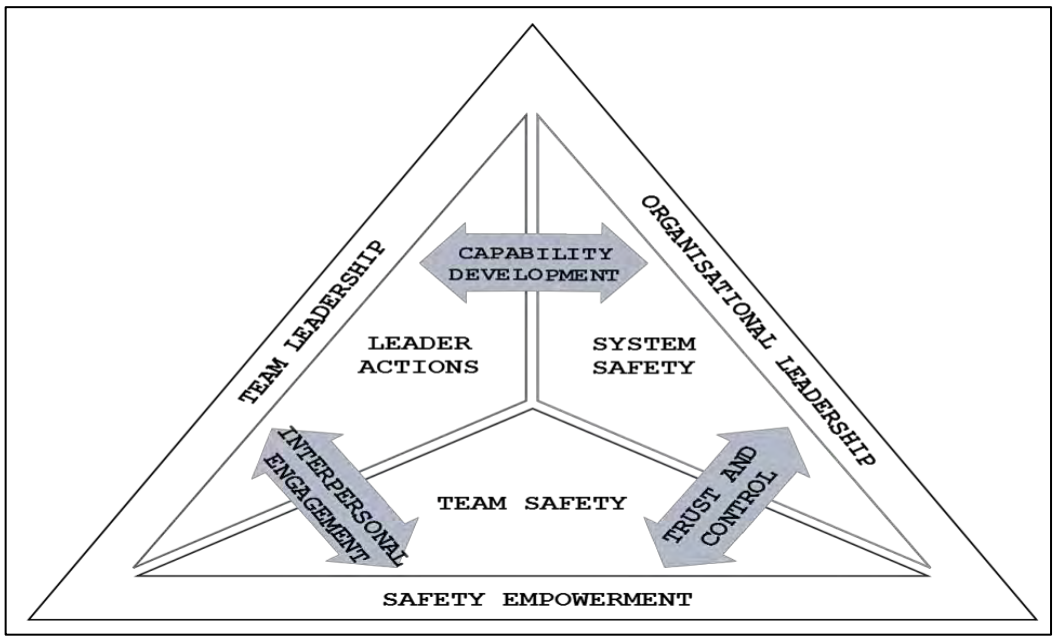

Figure 20: Safety leadership process (Adapted from Griffin & Talati, 2014)

As Figure 20 presents, safety leadership is considered to be the pivotal link between the safety of the team and of the organisational system (Griffin & Talati, 2014). According to Griffin & Talati (2014), safety leadership consists of two paths: team leadership and organisational system leadership, which enables system safety empowerment.

The finer details of the entire framework are beyond the scope of this research, but from inspection of Figure 20 it is once again abundantly clear that, as with LMX, high quality interpersonal engagement between the leader and the team (bi-directional, as indicated in Figure 20) is crucial for increased safety performance and a safe working environment (Griffin & Talati, 2014; Clarke, 2013). Additionally, Wu, Chen and Li (2008) demonstrated that safety leadership and safety climate are two important predictors of safety performance, which explains its relevance to this research.

3.4.4 Notions in followership literature substantiating this research

Greyvenstein and Cilliers (2012) recommends that leadership should take note of how they are perceived by followers, and should work towards comprehending,

transforming and enhancing their relationship with followers. Foti (2017) provided dynamic viewpoints on implicit leadership and followership theories and observed that work done in the field points to the fact that follower perceptions are critical to the leadership process. Feldman (2018), after completing an archival review on preferred methods for theory building in followership research, recommended mixed method research into follower experiences of leader behaviour in a South African setting where leader-follower dynamics is critical as a presently imperative inquiry.

Followership is founded on the importance of leader-follower relationships. LMX theory also recognises this importance (Uhl-Bien et al., 2014), but despite being a follower-centric leadership theory, still views the relationship from the top down – from a leader's perspective. Safety leadership once again emphasises the importance of this relationship from a leader's perspective by documenting the importance of interpersonal engagement between leader actions and team safety (Griffin & Talati, 2014; Hofmann & Morgeson, 1999). As Kouzes and Posner (2007: 24) so elegantly pronounced:

> *"…leadership is a relationship. Leadership is a relationship between those who aspire to lead and those who choose to follow. It's the quality of this relationship that matters most when we're engaged in getting extraordinary things done … A relationship characterized by mutual respect and confidence will overcome the greatest adversities and leave a legacy of significance."*

And as Coetzee (2016: 848) lamented from over 35 years in the leadership trenches:

> *"Knowing about leadership, being appointed into the lofty position, and enjoying all the incumbent benefits and power, do not comprise the essential set of criteria. Moreover, I believe that modern, intelligent and essentially self-directed people have become sceptical about conventional leadership theories and such leaders. Modern people are no more led. They will join, co-operate and collaborate with convincing direction and logic, presented by individuals who are authentic in purpose, endeavour, and inspiring effect by virtue of credibility. And they will participate spontaneously, only where common courtesy and basic human decency are evident."*

It is clear that the time has come to assiduously view the crucial leadership relationship from the bottom up. This research did so by utilising a systems theory perspective to employ followership and the reviewed follower-centric leadership theories to provide a bottom up angle from which to confront the gap in morale literature. The context-specific drivers of morale were determined from a follower

perspective (by Field expert involvement – see page 50), ensuring that any attempt at manipulation of morale is cemented within the very people it concerns – the followers.

3.5 Organisational culture and climate

> *"Why is culture so important to a business? Here is a simple way to frame it. The stronger the culture, the less corporate process a company needs. When the culture is strong, you can trust everyone to do the right thing."*
>
> - Chesky (2014)

Culture is the very essence of what defines our differences as human beings as we live scattered across the globe. In times past, the Inuit differed from the Incas, who differed from the Laplanders, who differed from the Maoris. Even in modern times, the culture in rural Scotland is very different from the culture anywhere in Somalia. Human beings thus possess an innate understanding of the word *culture*, as there are very few people on earth who are not defined by it in some way or another. When humans decide to relocate and leave behind their place of birth, it may take a very long time for them to fully adjust to the culture of their new home. Depending on the strength of their cultural beliefs and the strength of the culture in their new home country or town, new may never fully replace old and they may find it exceedingly difficult to integrate.

In an organisational context, the word culture was first used by Jaques (1951: 251), who defined it as "*the customary and traditional way of thinking and of doing things, which is shared to a greater or lesser degree by all members and which new members must learn, and at least partially accept, in order to be accepted into the service of the firm…"* Flamholtz and Randle (2011) suggested that organisational culture can be considered as the *personality* of the organisation – the values, beliefs and norms which dictate the conduct of its members. Similar to national or traditional culture, organisational culture is deeply ingrained and difficult to change (Sempane et al., 2002).

Organisational climate can be defined as "*the shared perceptions, feelings and attitudes that organisational members have about the fundamental elements of the organisation. Which reflect the established norms, values and attitudes of the organisation's culture and influences individual behaviour positively or negatively*"

(Castro & Martins, 2010: 2). It can be considered as the organisational *mood* – it is affected by the characteristics of and events within an organisation (Turnipseed, 1988).

Whereas culture (just like personality) becomes stable and resistant to change over time, climate (just like mood) is directly affected by several volatile factors such as structure, standards, rewards, atmosphere and management policies (Turnipseed, 1988) and may change readily. These climatic changes may either support or obstruct effectiveness within a stable culture, and over time even move the culture in a certain direction if it persists for long enough (Turnipseed, 1988).

3.5.1 Historical context

Organisational climate predates the existence of organisational culture in the literature. Taguiri, Litwin and Barnes (1968) compiled several contemporary articles into a ground-breaking book exploring the concept of organisational culture. For roughly a decade, organisational culture researchers struggled to delineate levels of analysis for the concept (Schneider et al., 2013), before Jones and James (1979) developed six dimensions of climate:

1. Leadership facilitation and support;
2. Workgroup co-operation, friendliness and warmth;
3. Conflict and ambiguity;
4. Professional and organisational *esprit*;
5. Job challenge, importance and variety; and
6. Mutual trust.

Hellriegel and Slocum (1974) contended that perceptions are important drivers of organisational climate, whilst several studies indicated that climate is closely related to job satisfaction (Friedlander & Margulies, 1969; Schneider, 1973; Pritchard & Karasick, 1973; Litwin & Stringer, 1968).

Before research into organisational climate could fully develop and mature, Pettigrew (1979) introduced the concept of culture to organisational scholars. He posited that organisational culture should be regarded as a family of concepts which include symbol, ideology, language, ritual, belief and myth (Pettigrew, 1979). This largely

derailed research into organisational climate for a while, as organisational culture dominated scholarly discourse throughout the 1980s (Schneider et al., 2013).

Hofstede (1980) conceived culture as a phenomenon that reveals itself in an organisation as a result of such an organisation's position in society as a whole. After extensive research in more than 66 countries with more than 88 000 respondents, he contended that there are four autonomous components of national culture, within which organisational culture is embedded (Hofstede, 1980):

1. individualism;
2. uncertainty avoidance;
3. power distance; and
4. masculinity.

Schein (1984) argued that it is crucial to investigate the (typically unconscious) underlying assumptions of group members that determine how they feel, think and perceive if one is to truly understand a group's culture. Furthermore, he argued that a culture cannot exist without a group that owns it, as culture is embedded in groups, necessitating the founding group to always be precisely defined (Schein, 1984). Hofstede, Neuijen, Ohayv and Sanders (1990) went on to empirically demonstrate that shared perceptions of daily practices are the very foundations of an organisation's culture.

The 1990s produced renewed interest into organisational climate as a construct, and consensus on its level of analysis as a group phenomenon rather than at individual level (Schneider et al., 2013). Hofstede (1998) delineated several focal differences between organisational climate and culture:

1. Climate stems from sociology and culture from anthropology;
2. Climate is more closely aligned to individual motivation and behaviour than culture, as culture exists exclusively at an organisational level; and
3. Climate can be seen as a sub-set of culture, implying that a shift in climate will eventually affect culture.

Importantly, alongside Hofstede (1980; 1998), several studies indicated that a prolonged climatic condition can influence and even change organisational culture

(Turnipseed 1988; Wallace, Hunt & Richards, 1999; Sempane et al., 2002). Several recent studies investigated the relationship between climate, culture, leadership style, organisational commitment, employee motivation, morale and job satisfaction (Lok & Crawford, 2004; Roos & Van Eeden, 2008; Castro & Martins, 2010; Galdikiene et al., 2016; Hignett et al., 2018), and found them to have significant influence on each other. Moos (1988) asserted that climates that are cohesive, accepting, independence-oriented and provide employees with challenging tasks, with considerate leaders in less bureaucratic environments tending to produce higher morale. It is therefore apparent that climate and culture shape and influence morale.

3.5.2 Safety culture

The concept of safety culture emerged as the world was recovering from the shock of the catastrophic explosion that occurred at the Chernobyl nuclear power station on 25 April 1986. Investigators blamed the accident on a poor safety culture that existed at the plant in the years preceding the accident (OECD Nuclear Agency, 1987). Accident investigators in various industries were becoming increasingly conscious of the role of cultural factors in crafting disaster (Reason, 1998).

Pidgeon (1991:135) conceives safety culture as *"the constructed system of meanings through which a given people or group understands the hazards of the world"*. Neal, Griffin & Hart (2000: 100) argues that *"safety climate is a specific form of organisational climate, which describes individual perceptions of the value of safety in the work environment"* and demonstrate that motivation directly influences compliance with safety procedures and participation in established safety culture practices.

Safety culture is a sub-component of organisational culture, except when safety is the dominant characteristic of an organisation (Cooper, 2000), in which case the two are inextricably coupled. Safety culture does not operate in a vacuum, but rather in partnership with other non-safety related operational processes or organisational systems as they directly and indirectly affect each other (Cooper, 2000). By this logic, in a safety-dominated organisation such as ATNS, the distinction between organisational and safety culture and climate should be virtually negligible.

Reason (2000b) argues that the official Oxford Dictionary (1995) definition of safety itself as *"freedom from danger and risks"* is unsatisfactory, due to the fact that neither an individual nor an organisation can ever be completely free of danger. Conversely, he argues, striving towards complete elimination of risk or 'target zero' can significantly harm efforts at setting and attaining realistic safety goals. He defines safety as "*the ability of individuals or organisations to deal with risks and hazards so as to avoid damage or losses and yet still achieve their goals"* (Reason, 2000b:5). The safety war cannot be won in a decisive victory according to Reason (2000b), as it is an ongoing battle that never ceases nor relents. Coetzee (2013) demonstrated that constant organisational renewal is fundamental to ensuring the effectiveness of a safety management system in directing an aviation safety culture.

High reliability organisations accept that aiming to completely eliminate risk is neither feasible nor helpful, and that entropy overcomes every system given enough time (Reason, 2000b). They anticipate the worst and equip themselves to be prepared for if and when it occurs. Safety culture is intrinsic to this process, as culture transcends individual psychology. Whilst individuals can neglect to be consistently fearful of disaster, a well-developed safety culture can compensate for this individual imperfection by providing constant reminders and processes that create pervasive and intelligent organisational wariness (Reason, 2000b).

3.5.3 Notions in literature substantiating this research

It is evident from this review that the concepts of climate, culture and job satisfaction are closely related in academic discourse. In the field of nursing, where safety is also of primary concern, both climate and culture have been shown to be associated with work morale (Galdikiene et al., 2016). Thus, from literature it can be argued that:

1. if professional and organisational *esprit* is a component of organisational climate (Jones & James, 1979); and
2. if prolonged climatic conditions can influence corporate culture (Turnipseed 1988; Wallace, Hunt & Richards, 1999; Schneider, Brief & Guzzo, 1996; Sempane et al., 2002; Schneider, Ehrhart & Macey, 2013; Grobler & Jansen van Rensburg, 2018); and

3. if corporate culture (and by extension climate) can influence organisational performance, as has been widely demonstrated (Van der Post, De Coning & Van der Merwe-Smit, 1997; Hofstede, 1998; Schneider et al., 2013; Grobler & Grobler, 2015); by inference
4. *esprit* has at least some influence on corporate performance.

In an environment where performance is largely defined in terms of safety, it is therefore arguable from literature that *esprit* (job satisfaction, motivation, morale – see section 3.6.2 on the overlapping use of these terms), through corporate climate and culture, has some effect on corporate safety performance. A recent narrative review of safety culture literature, Matsie (2019) indeed confirms that safety culture has a direct influence on safety performance.

Any form or organisational change (such as a concerted effort to change morale) requires a change in climate to precede a change in culture, as culture is not directly manipulable (Schneider et al., 1996; Schneider et al., 2013). Culture can only be changed by altering the tangible everyday policies, practices, procedures and routines that comprise the climate, in the hope of eventually changing the beliefs and values that guide employee action (culture) by sustained climatic intervention (Schneider et al., 1996; Schneider et al., 2013).

This research reveals the context specific drivers of morale, which can be individually manipulated to produce a change in morale. Such a change will however not be successful without propelling it via climatic intervention to embed it within the corporate culture.

Organisational climate and culture, in this specific order, act as the vehicles through which any lasting change in morale can be achieved. Using the systems theory approach to safety, the principle of Local rationality (see page 50) is applied to fully comprehend the climatic and cultural situation, obtain valuable input and buy-in from field experts and give the change in morale the best chance of succeeding in the long term.

3.6 Morale

"The best morale exists when you never hear the word mentioned. When you hear a lot of talk about it, it's usually lousy."

- Dwight D. Eisenhower
(Garner, 2012: 50)

Morale is a French word which is used because there is no single English word which adequately implies all of the elements of which it is constituted (Shillington, 2011). Traditionally used mostly in a military context, the term is now pervasive in organisational literature due to the perceived link between morale and performance (Bewley, 1999; Weakliem & Frenkel, 2006).

The goal of this review is to list notable definitions to guide this research's context-specific definition forming, and to determine both dimensions of morale and the drivers of morale from literature. Morale is locality-dependent (Lawley, 1985; Smith, 1976), therefore it has to be locally defined and constructed to enable testing.

3.6.1 Definition

The Oxford Dictionary (1995) defines the word morale as "*the confidence, enthusiasm, and discipline of a person or a group at a particular time*". In an organisational context there has been a notable carelessness in the use of the term (Smith, 1971; Hardy, 2010), as both a lack of empirical observation on which to ground a definition and a confusion between the feeling, state or sensation of morale and its antecedents and consequences presents conceptual clarification difficulties (Hardy, 2010).

When words or terms are commonly used to describe a particular phenomenon, both the authors and their audience may make certain assumptions regarding a common understanding (Hansen, 2006). It is not unusual to find entire articles that do not even include a specific definition for a word or term that it pertains to (Hansen, 2006). Indeed, articles such as White (2014) which mention morale only in the title of the article are commonplace in the literature.

The term 'morale' is a term that has long been considered as common vernacular in aviation, and yet a definitive, generalisable definition remained elusive until Hardy

(2010) provided one as a result of a comprehensive review of 146 articles on the topic:

> *"Morale is a mental state which can be distinguished from other phenomena. It is influenced by stimuli which impact the individual's affective state and sense of the future either directly or through moderation by others. It affects performance although not in all cases and is believed to be an important factor for individuals and in organisations."*

Whilst generalisable definitions are useful for implementation across disciplines, they come at the expense of accuracy in specific situations (Hardy, 2010). Context-bound definitions are easier to work with and provide more accurate measurement systems at the expense of being transferrable across contexts (Hardy, 2010). There are several context-specific definitions scattered throughout literature:

> *"…a general attitude of workers based upon their faith in fairness of employer's policies and behaviour, adequacy of immediate leadership, a sense of participation in the organization and an overall belief that the organization is worth working for."*

(Pestonjee & Singh, 1977: 86)

> *"…the degree of freedom from restraint in action towards a goal."*

(Stogdill, 1959: 213)

> *"…a confident and forward-looking state of mind relevant to a shared and vital purpose."*

(Smith, 1976: 87)

> *"…positive attitudes towards the prescribed activities of the group."*

(Weakliem & Frenkel, 2006: 345)

> *"Morale can be described as a mental state composed of three main ingredients:*
>
> *Confidence and Pride in Self.*
>
> *Confidence and Pride in Leaders.*
>
> *Confidence and Pride in the Team."*

(Shillington, 2011: 96)

> *"…the extent to which staff feel good about their jobs and work environment such that they experience a sense of belonging and are motivated to expend the effort to pursue workplace goals."*
>
> (Minor, Wells, Lambert & Keller, 2014: 1311)

> *"…an emotional state which integrates an individual's feelings about their personal worth, their future expectations and their relations with colleagues."*
>
> (Hardy, Alcock & Malpass, 2015: 7)

The purpose of this research was to determine a context-bound definition of morale in a safety-critical air traffic control environment, serving as a foundation for the construction of an accurate, context-bound morale measurement and management system. To enable the measurement of morale, it is important to distinguish between what it is and what it is not.

What morale is

1. Hardy (2010) demonstrated that morale is tractable to academic investigation.
2. Morale is locality dependent. It "*must be seen as a notion which changes its reality according to the exigencies of the moment, and perceptions of the actors involved*" (Lawley, 1985: 199) It is distinctly present at particular time in a particular place (Smith, 1976). Morale is a "*chameleon-like concept*" which many scholars claim to have fathomed and defined, but "*it proves itself ever elusive, persistently merging into and refusing to be seen as separate from the environment in which it lives*" (Williams & Lane, 1975: 90). It is multi-faceted, with each of its components only readily definable within the context of the operation in which it is measured (Halpin, 1966; Day, 2004).
3. Morale can be a group phenomenon (Pestonjee & Singh, 1977; Smith, 1976) or individual and group phenomenon (Peterson, Park & Sweeney, 2008; Ngambi, 2011).
4. Morale is heavily dependent on perception of immediate supervision (Pestonjee & Singh, 1977; Wofford, 1971; Baehr & Renck, 1958; Wong, 1991; Erickson, 1997; Behm, 2009; Ngambi, 2011; Ibeziako, Chabikuli & Olorunju, 2013; Coetzee, 2017; Coetzee & Henning, 2019).
5. Morale is relevant to a shared and vital purpose (Smith, 1966).

6. Morale influences productivity (Bewley, 1999; Weakliem & Frenkel, 2006) and institutional success (Ngambi, 2011).
7. Morale influences safety performance (Erickson, 1997; Topf, 1998; Itoh, Anderson & Sekhi, 2003; Beyea, 2004; Behm, 2009).
8. Morale is a concept that links organisational culture and climate to goal achievement (Smith, 1976).
9. Morale is a multi-dimensional concept (Cattell & Stice, 1960; Williams & Lane, 1975; Scott & Rowland, 1970; Scott, 1967; Worthy, 1950; Peterson, Park & Sweeney, 2008; Hardy, 2010; Ngambi, 2011; Ibeziako, Chabikuli & Olorunju, 2013).
10. Morale is a self-perpetuating concept (Worthy, 1950; Hardy, 2010; Hardy, Alcock & Malpass, 2015), which acts like a flywheel in that it resists changes to its rotational speed due to inertia.

What morale is not

1. Morale is not the same as job satisfaction (Smith, 1987; Smith, 1976; Smith, 1966; Hardy, 2010). "*Morale is dynamic and forward-looking, steadfast in the face of difficulty, whereas job-satisfaction is a more static, shallow concept*" (Smith 1966:144).
2. Morale is not the same as motivation (Hardy, 2010).
3. Morale is not the same as employee attitude (Scott, 1967).
4. Morale is not the same as happiness (Hardy, 2010).
5. Morale is not the same as work engagement (Ivey, Blanc & Mantler, 2014).
6. Morale is not single dimensional (Cattell & Stice, 1960; Worthy, 1950).

3.6.2 Conceptual confusion

Morale as a concept is plagued by a lack of collective understanding of what it is, what it is not, what its antecedents are and what its consequences are (Hardy, 2010). These problems with definition, delineation and foundations hamper measurement, as it is difficult to determine what is being measured (Hardy, 2010). Several papers such as Baird and Bradley (1978), Wofford (1971) and Ferreira and Van Antwerpen (2011) simply used an implied definition of the term, whilst failing to provide a definition of the term despite measuring it in some form or another.

In other papers such as Baird and Bradley (1978), Pestonjee and Singh (1977), Johnson and Bledsloe (1973), Worthy (1950), Abbott (2003), Behm (2009) and Ferreira and Van Antwerpen (2011), morale is used synonymously with job satisfaction. Motivation is also used indistinguishably with morale in papers such as Baehr and Renck (1958), Behm (2009) and Ibeziako, Chabikuli and Olorunju (2013).

3.6.3 Dimensions of morale

Disseminating a concept into dimensions renders it more useful for research, as it makes the link between present research and past literature more apparent (Hardy, 2010). From the literature, four dimensions of morale can be distinguished:

1. Affective component (Scott & Rowland, 1970) (Scott, 1967) (Hardy, 2010)
2. Cognitive component (Scott & Rowland, 1970) (Shillington, 2011)
3. Interpersonal component (Hardy, 2010)
4. Future/goal component (Hardy, 2010)

Furthermore, the literature has revealed that morale is a multi-faceted concept (Cattell & Stice, 1960; Williams & Lane, 1975; Scott & Rowland, 1970; Scott, 1967; Worthy, 1950; Peterson, Park & Sweeney, 2008; Hardy, 2010; Ngambi, 2011; Ibeziako, Chabikuli & Olorunju, 2013), consisting of multiple elements that make up its whole. Several elements comprising morale can be identified:

1. Group cohesion (Cattell & Stice, 1960)
2. Confidence and pride in team (Shillington, 2011)
3. Tenacity and fortitude (Cattell & Stice, 1960)
4. Leadership synergy (Cattell & Stice, 1960),
5. Confidence and pride in leadership (Shillington, 2011)
6. Adventurous striving (Cattell & Stice, 1960)
7. Personal reward (Cattell & Stice, 1960)
8. Confidence and pride in self (Shillington, 2011)

3.6.4 Drivers of morale

To enable the measurement and manipulation of a concept, one has to determine the factors that affect such a concept, underpinned by its dimensions. Several papers have highlighted assorted drivers of morale:

1. Baird and Bradley (1978): Managerial behaviour.
2. Smith (1976): Cohesive pride, leadership synergy and personal challenge.
3. Baehr and Renck (1958): Organisation and management, job satisfaction, immediate supervision, fellow employees and material rewards.
4. Worthy (1950): Decentralisation of management, sound organisation, capable leadership and working conditions. Worthy (1950: 65) added that working conditions were often misunderstood as drivers of morale: *"The role played by conditions of work is likewise often misunderstood. Good equipment, pleasant and attractive surroundings, well-maintained washrooms, and so on can never, of themselves, develop high morale. Their absence, however, can be a source of real difficulty. If employees are discontented with any phase of their relations with management, they are likely to seize upon and magnify any inconveniences arising from their physical surroundings. They can tolerate situations they know are difficult for management to correct. But where annoyances are apparently unnecessary, employees are likely to interpret the condition as evidence of management's lack of concern for them as people. It is against this attitude that employees rebel. The poor working conditions are merely evidence of the attitude and a convenient target against which to direct complaints".*
5. Decker, Dupler, Shields, Smith and Thomas (1998): Good communication, input into decisions, a problem-solving process, a manageable workload, coverage for absent employees, unity of purpose, mutual respect, empowerment (also Abbott, 2003).
6. Boyt, Lusch and Mejza (2015) divided the drivers into ones that affect the entire organisation, such as leadership, communication, trust, and public image, and drivers that influence the work group or team, such as task complexity, communication, external pressure, group size, group composition and training.
7. Day, Minichiello and Madison (2006): Organisational structures, operational issues, leadership traits, management styles, communication and staffing.

8. Peterson, Park and Sweeney (2008): Confidence in the group, enthusiasm for daily activities of group, optimism that the group will experience more success than failure, belief in the group's capabilities, resilience in face of adversity, good leadership , mutual trust and respect, loyalty, social cohesion, a common purpose, devotion to the group, sacrifice of individual needs for well-being of the group, a compelling group history, concern with honour of the group and sense of moral rightness of group.
9. Ngambi (2011): Communication, trust, developing teams, promoting team-related activities, dealing with internal and external change, succession planning and direct supervision.
10. Minor, Wells, Lambert and Keller (2014): Levels of job stress, input into decision-making, organisational fairness, perceptions of co-workers and workplace cooperation.

Comprehensive conceptualisations of three of the dimensions of morale and their respective drivers were provided by Hardy (2010). Importantly, most of the drivers listed from literature above are represented in these conceptualisations in some form or another. Hardy's (2010) conceptualisations (depicted in Figures 21-23) were therefore adopted by this research as the literature-based drivers of morale.

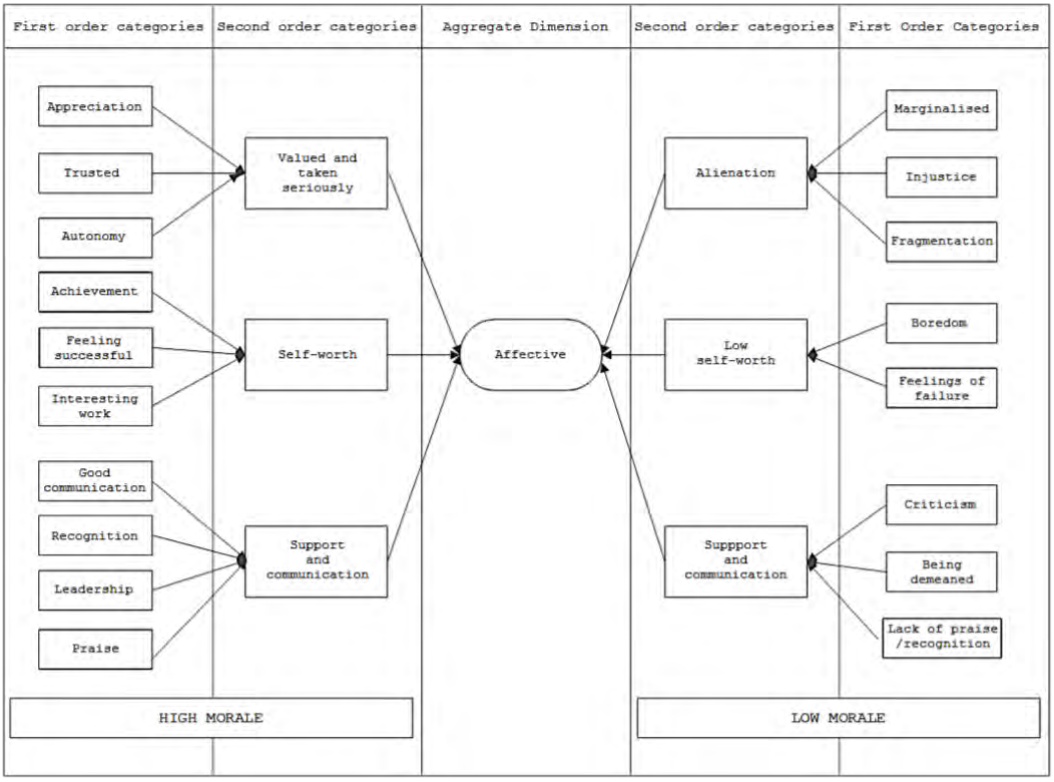

Figure 21: Structure of the affective dimension of morale (adapted from Hardy, 2010)

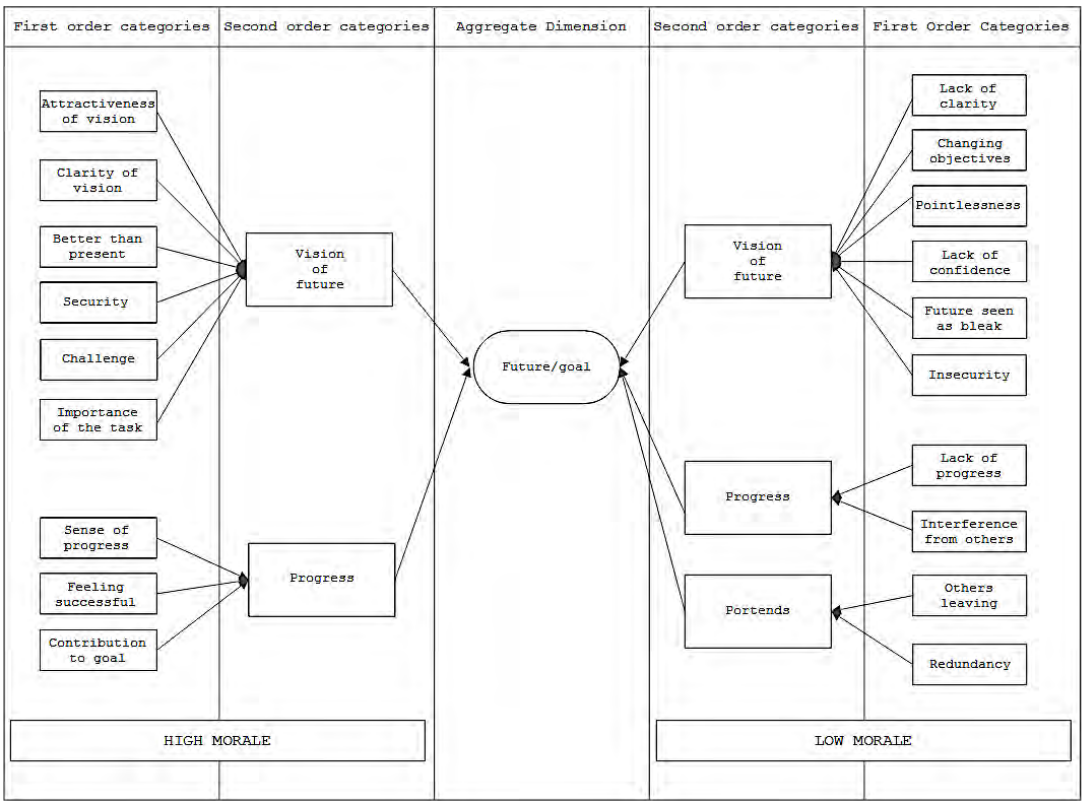

Figure 22: Structure of the future/goal dimension of morale (adapted from Hardy, 2010)

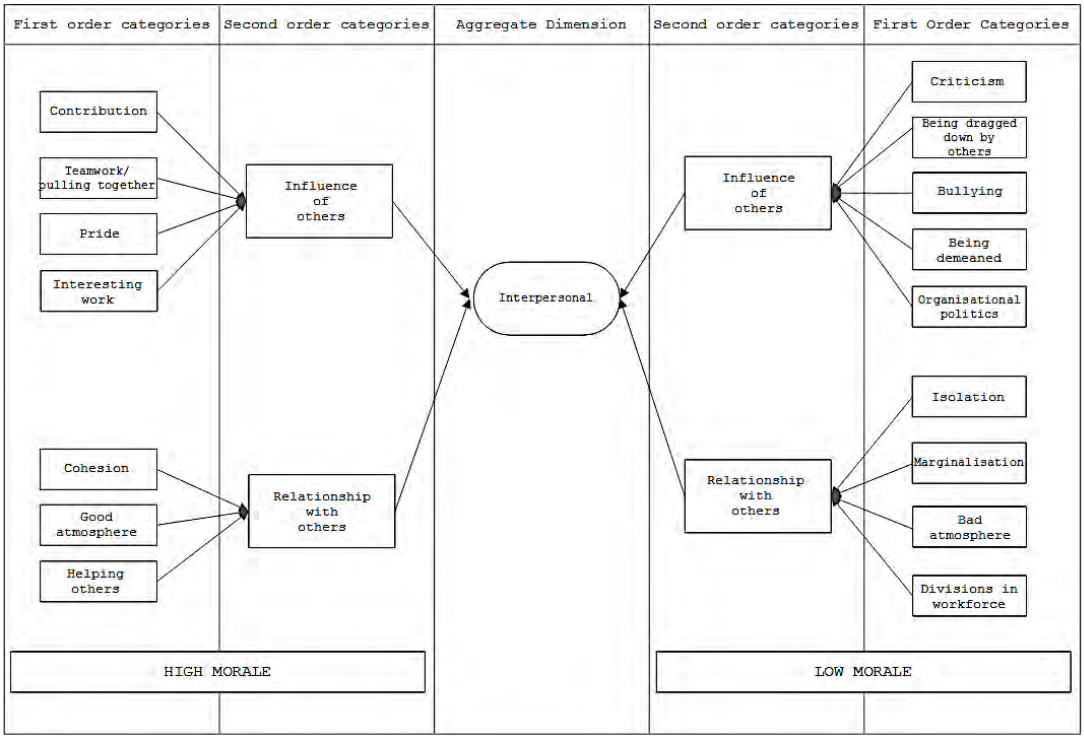

Figure 23: Structure of the interpersonal dimension of morale (adapted from Hardy, 2010)

The purpose of this research was to use literature-based drivers of morale to determine the context-specific drivers of morale in a safety-critical air traffic control

environment, which will enable the construction of an accurate, context-bound morale measurement and management system.

3.6.5 Existing measurement instruments

One of the earliest and most well-researched morale survey instruments was the Sears employee attitude (SRA) surveys, administrated to over 100 000 Sears employees by Worthy (1950). It evolved from a simple attitude survey to an organisational morale survey. Baehr and Renck (1958), in a confirmatory factor analysis study of the instrument, found immediate supervision to be of central importance to the structure of employee morale. As widely-used as the instrument was, it did not differentiate between job satisfaction and morale, nor did it provide a working definition for morale.

Smith's (1971) Staff Morale Questionnaire (SMQ) was developed to measure the morale levels of Australian school teachers. The 50-item questionnaire was based on the morale-dimensionality proposed by Cattel and Stice (1960) and measured socio-psychological factors. It was initially criticised by Williams and Lane (1975), who pointed out that it in fact measured only three of the Cattell and Stice (1960) morale elements, instead of the five that it claimed to measure. It was however pronounced as a reliable measure within the context of schools for the elements of cohesive pride, leadership synergy and personal challenge (Williams & Lane, 1975). Smith (1976) acknowledged this and stated that morale surveys were inherently pertinent to a specific place and time, as they do not lend themselves to prediction. The SMQ was used in a morale research project of 100 dissertations at the University of New England (Smith, 1987), and was subsequently reduced to a 20-item instrument. It however remains very context-specific to teacher morale.

More contemporary, and certainly much more well-defined instruments were provided by Hardy (2010), who developed a single-item measure (SIM), multi-item measure (MIM) and semantic differential scale (SDS). Frustrated with the locality-based nature of morale, Hardy (2010) created these three instruments as generalisable measures that can be used in different environments. By his own admission, this came at the expense of accuracy in specific situations (Hardy, 2010). The instruments have been validated as useful frameworks for the understanding

and manipulation of morale in a telecommunications environment, with a sample across six contact centres confirming its versatility and utility (Hardy, Alcock & Malpass, 2015).

3.6.6 Notions in morale literature substantiating this research

Hardy (2010) suggested that morale is an important organisational topic, which should be further explored through a more structured approach to its appraisal and measurement. Joubert (2014) recommended future research into the motivational levels of ATNS followers, as it may assist in facilitating a high-performance safety culture. Coetzee (2017), in a small-scale inquiry into one ATNS centre, determined morale to be low and demonstrated a relationship between levels of morale and leader attributional perception discrepancies.

In ATNS's internal quarterly safety publication, it was noted as part of a finding in a recent safety event that "*senior level management within the operations department to take note of matters raised under morale*" (ATNS, 2017: 14). Reid (2017) concluded that morale among ATNS ATCOs is low, that tenure is a reliable predictor of morale (the longer an ATCO is with ATNS, the lower his or her morale) and recommended that ATNS target improved morale among its ATCO members, as morale may have an impact on safety. Coetzee and Henning (2019) recommended a cross-sectional study into low perceived team morale as a latent safety risk in ATC centres. In ATNS's corporate plan low morale was listed as a strategic imperative, risking "adverse effect on ATNS performance" (ATNS, 2019a:29) if not addressed. As such, low morale was listed as an adverse situation that requires urgent intervention in ATNS's Strategy Performance Roadmap for 2019 to 2022 (ATNS, 2019b).

3.7 In summary: relationship of reviewed concepts to gap in morale literature

This revision elucidated the golden thread that runs through the literature surrounding the reviewed concepts to the gap in morale literature. As described in section 3.2, each concept has been reviewed to ascertain the relationships between them and illuminate their chosen area of influence on the central research premise of morale

theory. From the review, a relationship diagram illustrating the associations between reviewed concepts is presented in Figure 24:

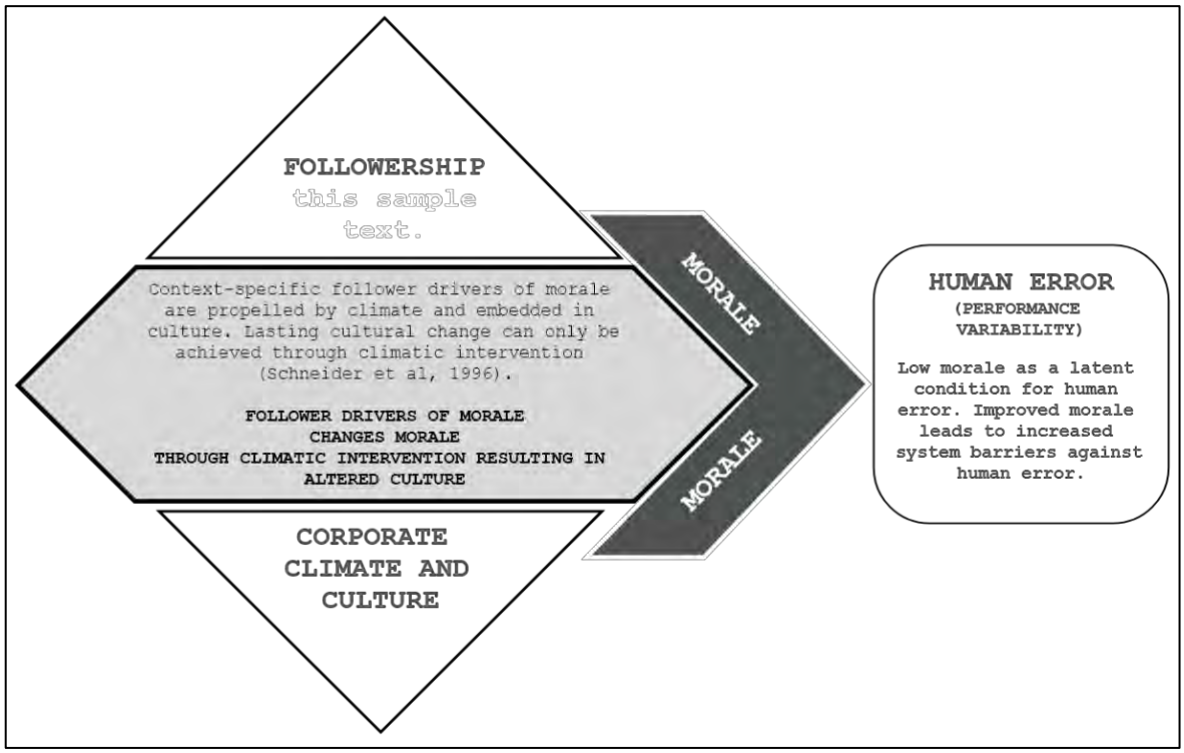

Figure 24: Relationship between reviewed concepts, and their application in this research (author's own)

As illustrated in Figure 24, the reviewed concepts interact as follows:

Human error (performance variability): Human performance variability can never be fully eliminated, and any system that seeks to do so will certainly lose the safety war (Reason, 1990). It is argued that accident prevention strategies aimed at strengthening system barriers (which implies reducing barrier erosion) instead of eliminating accident causes are more efficient (Reason et al., 2006).

Latent conditions for failure erode system defences against active failure (Reason, 1995). Reason (1995) identified low morale as one of several possible latent failure conditions, created by organisational processes, that can promote the commission of errors and violations in the workplace. Improving levels of morale will therefore logically assist in removing at least one latent failure condition from the system, thereby strengthening system barriers and assisting in preventing opportunities for active errors to penetrate such barriers and result in disaster.

Followership: This research viewed the crucial leadership relationship from the bottom up by utilising a systems theory perspective to employ followership and the reviewed follower-centric leadership theories in combination with corporate climate and culture to provide a bottom up angle from which to confront the gap in morale literature. In line with a systems theory approach to safety, the context-specific drivers of morale were determined from a follower perspective (by means of Field expert involvement – see page 50), ensuring that any attempt at manipulation of morale is cemented in the very people it concerns – the followers.

Organisational climate and culture: The concepts of climate, culture and job satisfaction are closely related in academic discourse. In the field of nursing, where safety is also of primary concern, both climate and culture have been shown to be associated with work morale (Galdikiene et al., 2016). This review argues that in an environment where performance is largely defined in terms of safety, that morale, through corporate climate and culture, has some effect on corporate safety performance.

Morale is propelled by corporate climate (Turnipseed 1988; Wallace, Hunt & Richards, 1999; Sempane et al., 2002; Grobler & Jansen van Rensburg, 2018), and embedded in corporate culture (Jones & James, 1979). Any form or organisational change (such as a concerted effort to change morale) requires a change in climate to precede a change in culture, as culture is not directly manipulable (Schneider et al., 1996, Schneider et al., 2013).

This research reveals the context specific drivers of morale, which can be individually manipulated to produce a change in morale. Such a change will however not be successful in the long-term without propelling it via climatic intervention to embed it in the corporate culture. Organisational climate and culture, in that specific order, thus act as the vehicles through which any lasting change in morale can be achieved. Using the systems theory approach to safety, the principle of Local rationality (see page 50) is applied to fully comprehend the climatic and cultural situation, obtain valuable input and buy-in from field experts and give the change in morale the best chance of succeeding in the long term.

This review has thus provided a unique, two-pronged angle from which the gap in morale literature was approached: Follower drivers of morale, propelled by climate and embedded in culture, has an effect on morale. Low morale is a latent condition for human error. Measurement of morale is thus crucial, to enable its elevation and the removal of at least one latent condition for human performance variability from a safety-critical environment.

3.8 Updated conceptual framework

The updated preliminary conceptual framework (as introduced in section 1.11.5 and illustrated in Figure 3) is now deconstructed, describing each of its separate components individually by removing them from under the lens of the chosen theoretical paradigm (as described in Chapter 2) for individual scrutiny, as illustrated in Figure 25:

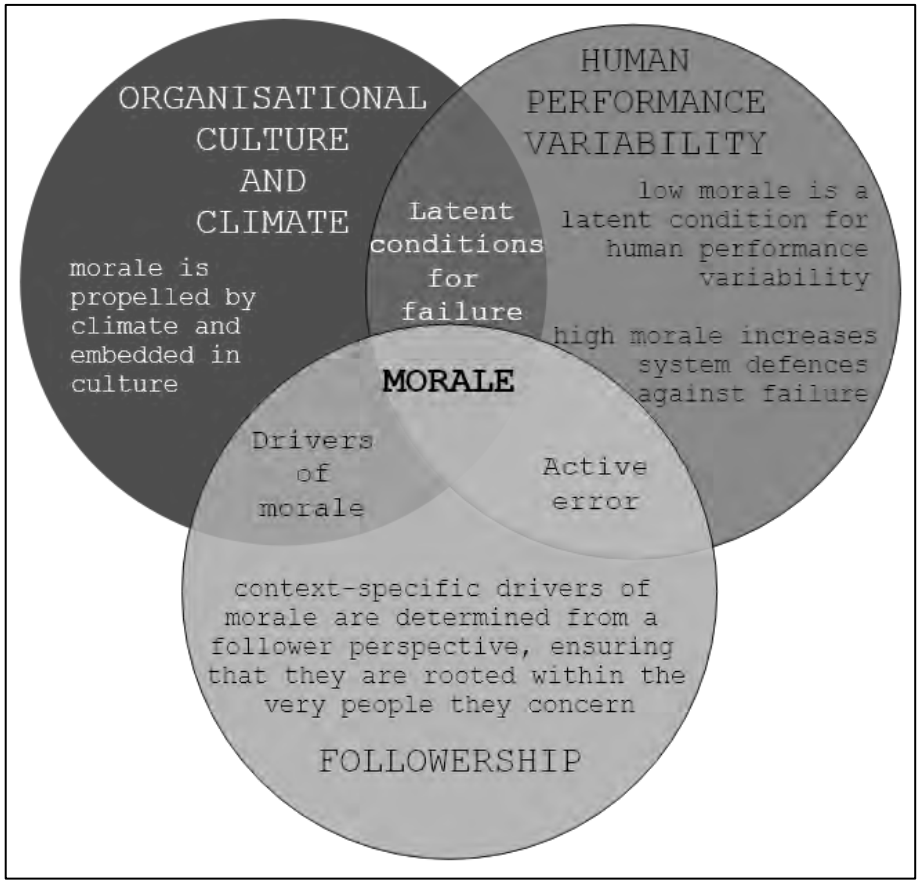

Figure 25: **Updated preliminary conceptual framework (author's own)**

This chapter has investigated each of the individual elements illustrated in Figure 25 and illuminated the relationships between them and their chosen area of influence on

the central research premise of morale theory. An updated preliminary factor structure is presented in Figure 26, based on the review of morale literature:

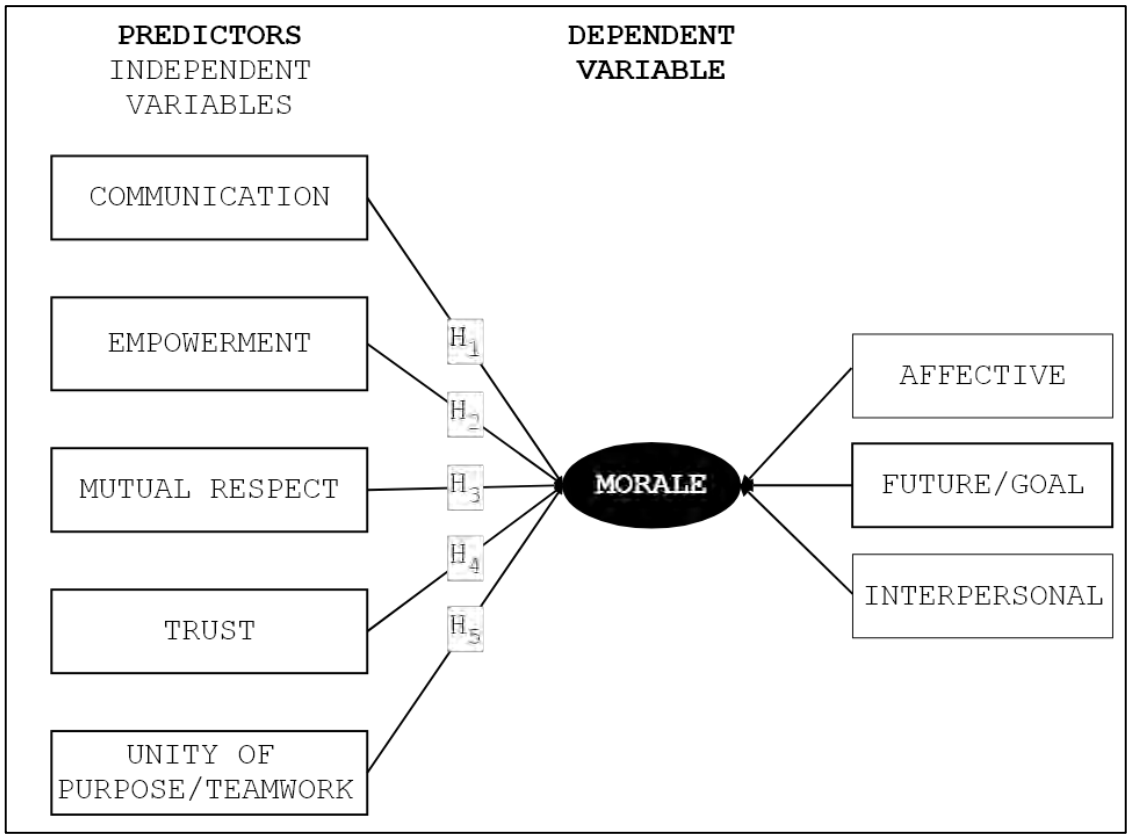

Figure 26: Updated preliminary factor structure (author's own)

Figure 26 illustrates the initial selected follower drivers of morale attained from literature, which were contextually verified and supplemented in phase one of the research, creating a final factor structure which was used in phase two. They were revealed from literature (section 3.6.4) in Table 4 as:

Table 4: Drivers of morale (from literature)

DRIVER	OXFORD DICTIONARY (2015) DEFINITION	SOURCE(S)
COMMUNICATION	The imparting of information by speaking, writing, or using some other medium (in this case two-fold: both PM and company communication with ATCOs).	Decker et al. (1998), Boyt et al. (2015), Day et al. (2006), Ngambi (2011) and Hardy (2010).
EMPOWERMENT	Authority or power given to someone to do something (in this case PMs empowering ATCOs by virtue of education or delegation).	Worthy (1950), Decker et al. (1998), Boyt et al. (2015), Ngambi (2011) and Minor et al. (2014).
MUTUAL RESPECT	A feeling of deep admiration for someone elicited by their abilities, qualities or achievements (in this case two-fold: respect for ATCO colleagues and respect for PMs).	Decker et al. (1998), Peterson et al (2008) and Hardy (2010)

DRIVER	OXFORD DICTIONARY (2015) DEFINITION	SOURCE(S)
TRUST	Firm belief in the reliability, truth or ability of someone or something (in this case trust of ATCOs in PMs).	Boyt et al (2015), Peterson et al (2008), Ngambi (2011) and Hardy (2010).
UNITY OF PURPOSE / TEAMWORK	The combined actions of a group (in this case working together as an ATCO pool).	Decker et al. (1998), Peterson et al. (2008), Hardy (2010), Ngambi (2011) and Minor et al. (2014)

The aim of the qualitative section of this research (phase one) was to refine, add and remove drivers until only the most context applicable drivers remained.

3.9 Justification for the study and contribution to the body of knowledge

The goal of research is to contribute to the body of knowledge by filling a gap or highlighting and correcting a perceived weakness in literature (Leedy & Ormrod, 2014). Gaps or weaknesses in literature may exist on a methodological, contextual and conceptual level. This research addressed the following gaps and weaknesses:

Methodological: Several studies have been completed on morale without providing a definition for the very element they interrogate (Baird & Bradley, 1978; Wofford, 1971; Ferreira & Van Antwerpen, 2011). There is also an abundance of imprecision in the application of the term 'morale' in research and it is often used interchangeably with job satisfaction (Baird & Bradley, 1978; Pestonjee & Singh, 1977; Johnson & Bledsloe, 1973; Worthy, 1950; Abbott, 2003; Behm, 2009; Ferreira & Van Antwerpen, 2011) and motivation (Baehr & Renck, 1958; Behm, 2009; Ibeziako et al., 2013), despite empirical proof that these concepts are not the same (Hardy, 2010; Smith, 1987; Smith, 1976; Smith, 1966). Whilst mostly quantitative studies on morale have been completed, Hardy (2010) completed a mixed method study on the definition and drivers of morale. His aim was to provide a generalisable framework for morale, which necessarily came at the expense of accuracy in context specific situations. Thus, there is a distinct gap for a mixed method inquiry into morale in a context-specific situation.

Contextual: The researcher was unable to locate any studies on morale nor an existing instrument for morale in a safety-critical South African air traffic control environment. Other context-specific instruments are available such as by Smith (1976)

in a teaching environment, Worthy (1950) amongst Sears employees and Harding (1941) amongst civilians in wartime. Morale is a locality dependent concept (Lawley, 1985; Smith, 1976; Williams & Lane, 1975; Halpin, 1966; Day, 2004; Hardy, 2010). This implies that instruments conceived for a particular context are not necessarily transferrable to another. Naturally, the same would also apply to the instrument created by this research, however the revealed need for a context-specific instrument outweighs this constraint. Hardy (2010) created a generalisable instrument, but at the expense of contextual accuracy. In an industry as technical and complex as aviation, this review has indicated a definite need for a context-specific instrument.

Conceptual: The measurement of morale enables its elevation. Defining a concept and determining its drivers enables measurement. The researcher was unable to identify a model or morale framework specifically applicable in the aviation industry or safety-critical environments. This research has provided a situation-determined, customisable model which can be applied to a safety-critical environment by determining the situation-specific drivers and definition of morale to enable measurement. The model measures the level of each determined driver of morale in a safety critical environment and the levels of morale itself (as contextually defined), after which the individual impact of each driver on morale can be determined. The researcher was unable to find a similar model in a safety-critical ATC environment and it has been asserted that morale is an important avenue of research in the organisational context (Hardy, 2010), specifically in a South African ATC organisational context (Joubert, 2014; Coetzee, 2017; ATNS, 2017; Reid, 2017; Coetzee & Henning, 2019).

3.10 Synthesis

In this chapter, the bodies of literature surrounding human performance variability, followership and organisational culture and climate were independently scrutinised. From these examinations an interrelated perspective was provided for the contemplation of morale theory, which was then critically appraised to isolate, elucidate and substantiate the gap in literature addressed by this research. The next chapter details the research design and methodology utilised by this research to answer the research questions and meet its empirical objectives.

Chapter 4: Research design and methodology

"Method is the arithmetic of success."

- Billings (1876: 287)

4.1 Introduction

The purpose of this study was to develop a model that delivers the definition drivers of morale and enables the measurement and management of ATCO team (pool) morale within safety-critical ATC contexts in two distinct phases. The first phase of the study provided a working definition of the term *morale* in an air traffic control (ATC) context and determined its context-specific drivers. From this initial exploration, the second phase of the study developed and operationalised a survey instrument by measuring both the morale levels amongst ATCOs and the influence of each identified driver of morale on ATCO morale within ATNS. Decisions surrounding research design and methodology involve both philosophical assumptions as well as distinct methods or procedures (Creswell, 2014). Research methodology can be defined as a premise of how inquiry should ensue, affording scrutiny of its philosophies, processes and suppositions (Schwandt, 2014). *"Methodologies explicate and define the kinds of problems that are worth investigating; what comprises a researchable problem, testable hypothesis, and so on; how to frame a problem in such a way that it can be investigated using particular designs and procedures; how to understand what constitutes a legitimate and warranted explanation; how to judge matters of generalisability; how to select or develop appropriate means of gathering data; and how to develop the logic linking problem-data generation-analysis-argument."* (Schwandt, 2014: 222).

The definition of morale and its measurement is a topic that, to date, has largely evaded the organisational body of knowledge (Hardy, Alcock & Malpass, 2015), specifically in an aviation context. Morale is receiving an ever-increasing amount of attention within the aviation industry (Lawson, 2013; Joubert, 2014; Coetzee, 2017; Reid, 2017; Coetzee & Henning, 2019), and ATNS is no exception. Providing a method for measuring morale and its drivers in an organisationally specific context are research outputs that provide a valuable contribution to the body of knowledge in the field of leadership and organisational behaviour.

The empirical objectives of this research were:

EO1: Explore the meaning of morale as perceived by ATCOs within an ATNS ATC pool environment.

EO2: Determine the most applicable drivers of morale within a safety-critical ATC environment.

EO3: Measure the levels of morale within each ATC centre in ATNS.

EO4: Identify the impact of each driver on ATCO morale levels.

EO5: Construct a final follower-centric model for the measurement and management of morale in a safety-critical ATC environment.

The previous chapter examined the individual bodies of literature surrounding human performance variability, followership and organisational culture and climate, providing an intersected approach to the identification of a gap in morale theory. This chapter provides an overview of the entire research structure, before detailing the research design and methodology utilised to answer the research questions and meet its empirical objectives.

4.2 Research overview

According to Saunders, Lewis and Thornhill (2015), the research process can be conceptualised as an onion (Figure 27), with several layers enveloping, shaping and influencing the eventual process of data collection.

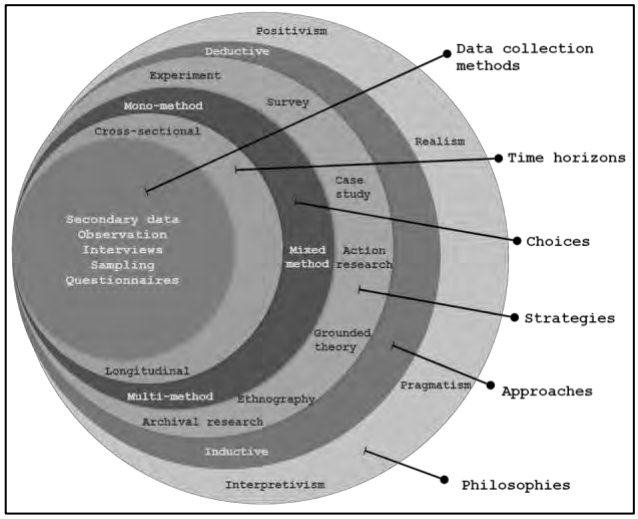

Figure 27: The research onion (Saunders et al., 2015)

As illustrated in Figure 27, the underlying research philosophy determines the research approach, which in turn guides the selection of research strategy before

shaping the research choices and time horizons, and eventually leading to certain data collection decisions. Every study should explicitly detail the choices, methods and procedures to be used during the entire research process (Leedy & Ormrod, 2014). The present research is now contextualised in terms of the entire process from philosophy through to data collection methods.

4.2.1 Philosophical stance of the researcher

Ascertaining and specifying the philosophy or worldview of a study is vitally important, as it determines the knowledge that is to be sought, the questions that need to be asked to obtain it, and how to go about obtaining it (Du Plooy-Cilliers, 2014; Creswell & Poth, 2018). Creswell and Plano Clark (2018) mentioned four worldviews, namely postpositivism, constructivism, a transformative worldview and pragmatism, which they considered to be the most suitable for informing mixed method research. These worldviews can be combined or used individually (Crotty, 1998). Pragmatism is most frequently utilised for mixed method research, as the central focus is on the question asked, rather than the methodologies employed (Creswell & Plano Clark, 2018). The research paradigm or worldview of research, as explained in Figure 2, is applied to the present research and expanded in Figure 28 to illustrate the practical implications of a pragmatic research philosophy, as well as how they apply to the present research:

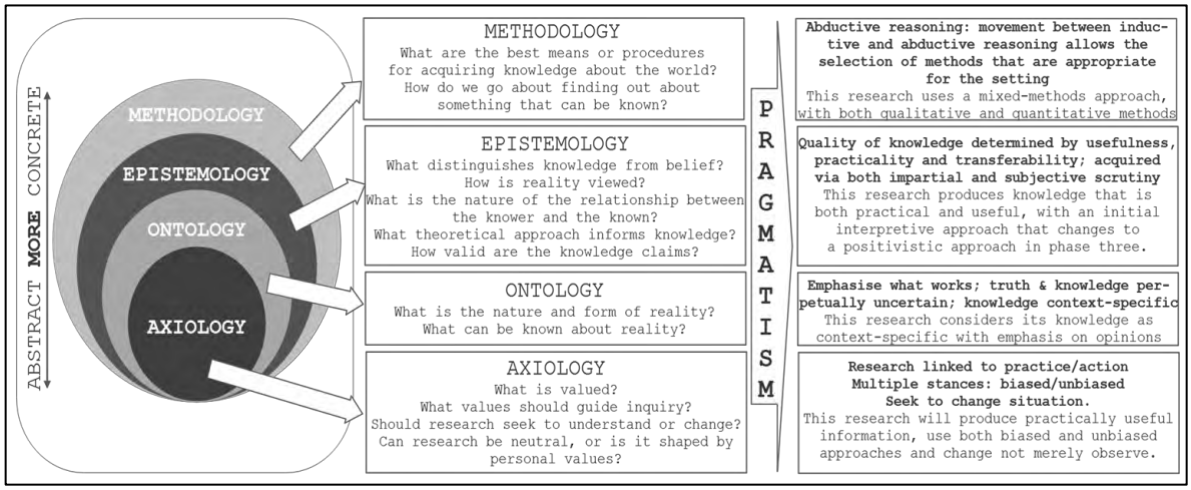

Figure 28: The research paradigm or worldview as philosophy (constructed from Guba & Lincoln, 1994; Guba & Lincoln, 2005; Creswell & Poth, 2018; Mack, 2010; Creamer, 2018; Morgan, 2007) adapted (by the author) to illustrate the practical implications of a pragmatic research philosophy.

Pragmatism, as contextualised to the present research in Figure 28, is selected from

four worldviews that are considered to be the most suitable for informing mixed method research (Creswell & Plano Clark, 2018).

4.2.2 Approach to reasoning

There are generally considered to be two contrasting approaches to reasoning that can be adopted by researchers, namely deductive and inductive reasoning (Saunders et al., 2015). Deductive reasoning implies that a conclusion is arrived at after logically considering a set of premises and deducing that the conclusion is true when all the premises are true (Ketokivi & Mantere, 2010). Deduction involves shifting from the general to the specific (Johnson et al., 2007) and can be described as theory-driven.

With inductive reasoning there is a gap in the logic argument between the observed premises and the conclusion, and as such the conclusion is judged to be supported by the observations that are made (Ketokivi & Mantere, 2010). Induction refers to a reasoning process that moves from the specific to the general (Johnson et al., 2007) and can be described as data-driven.

Pragmatists combine methodologies, by using both the post-positivistic method of deductive reasoning and the constructivist method of inductive reasoning (Creswell & Plano Clark, 2018) to varying extents. Known as abductive reasoning, this movement between inductive and deductive reasoning presents a third approach to reasoning and allows the selection of methods are that are appropriate for the setting (Morgan, 2007).

The differences between the three approaches to reasoning are summarised in Table 5:

Table 5: Deduction, induction and abduction: from reason to research (Saunders et al., 2015)

	DEDUCTION	INDUCTION	ABDUCTION
LOGIC	In a deductive inference, when the premises are true, the conclusion must also be true	In an inductive inference, known premises are used to generate untested conclusions	In an abductive inference, known premises are used to generate testable conclusions
GENERALISABILITY	Generalising from the general to the specific	Generalising from the specific to the general	Generalising from the interactions between the specific and the general
USE OF DATA	Data collection is used to evaluate propositions or hypo-theses related to an existing theory	Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework	Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection and so forth
THEORY	Theory falsification or verification	Theory generation and building	Theory generation or modification; incorporating existing theory where appropriate, to build new theory or modify existing theory

As summarised by Saunders and colleagues (2015) in Table 5, research that starts with theory and moves through a literature review phase in order to test such a theory is applying a deductive approach to reasoning. Conversely, research that commences with data collection in order to explore a phenomenon and then generates or modifies theory is following an inductive approach. Finally, research that creates or modifies theory by collecting data to explore a phenomenon and identify themes and patterns, before testing this created or modified theory by more data collection is following an abductive approach to reasoning. In line with the pragmatic philosophy followed by this research, an abductive approach to reasoning prevailed.

4.2.3 Research strategy

A research strategy can be defined as a plan which a researcher follows to answer a research question (Saunders et al., 2015). It is the methodological connection between the research philosophy and methodological choices (Denzin & Lincoln, 2011). The choice of research strategy should be guided by the research objectives and research questions, the manner in which these connect with the research philosophy and purpose and approach, as well as by the sources of data, extent of existing knowledge on the topic and the amount of time and resources at the researcher's disposal (Saunders et al., 2015). Saunders and colleagues (2015)

identified eight research strategies most suited to business research, namely experiments, surveys, archival and documentary research, case studies, ethnography, action research, Grounded Theory research and narrative inquiry.

Survey research gives a numeric generalisation of trends amongst a group of subjects by generalising the results of a specific sample of such a group (Fowler, 2009). Action research is an emergent and iterative research strategy that aims to develop practically implementable solutions to organisational problems by involving the participants in becoming part of the solution that creates a lasting effect long after the research is complete (Saunders et al, 2015).

A note on action research

This research does not purport to have practiced the complete cyclic action research method. Action research is an explicit participatory and self-reflecting research method that creates knowledge based on enquiries conducted in specific and often practical contexts such as education and healthcare (Koshy, Koshy & Waterman, 2011). It involves a spiral of self-reflective cycles in which there is a planning of change, an act of observing the process and consequences of the change, a reflection on the processes and consequences of the change, and then a re-planning that restarts the process (Kemmis, McTaggart & Nixon, 2014). In this research, it is the *spirit* of action research that resonates with the chosen worldview and is thus embraced. Reason and Bradbury (2001) purport the primary objective of action research to be the production of practically useful knowledge that is beneficial to people in the everyday context of their lives. "*For me it is really a quest for life, to understand life and to create what I call living knowledge - knowledge which is valid for the people with whom I work and for myself*" (Marja Liisa Swantz, in Reason and Bradbury, 2001:1). It is in this light that the focus group sessions were completed.

Saunders and colleagues (2012) argued that research strategies should not be treated as mutually exclusive, and that a mixed methods research design could combine or sequentially utilise several different strategies. This research utilised action (with a caveat as indicated above) and survey research strategies to deliver the definition and measurement of ATCO team (pool) morale within ATNS through an exploratory sequential mixed method research design as follows:

Phase one: Qualitative research

The first phase of the study employed qualitative methods to provide a working definition of the term *morale* in an air traffic control (ATC) context and determine its context-specific drivers.

Phase two: Quantitative research

From this initial exploration, the second phase of the study applied the qualitative findings of phase one to develop a quantitative measurement instrument, which was subsequently operationalised by measuring both the morale levels amongst ATCOs and the influence of each identified driver of morale on ATCO morale within ATNS. The quantitative research results were used to develop a follower-centric model for employee morale in a safety-critical ATC environment.

In brief, this research utilised focus group interviews (which involved the participants in becoming part of the solution) in phase one and survey research in phase two to answer the research question and achieve the research objectives.

4.2.4 Choice of research approach

Research approaches are blueprints for research decisions that traverse every step from broad assumptions to detailed methods of data collection, analysis and interpretation (Creswell, 2014). There are three widely acknowledged research approaches, namely quantitative, qualitative and mixed method approaches. Newman and Benz (1998) contended that quantitative and qualitative research should not be considered as inelastic, discrete and opposite genres, but instead as different ends on a continuum.

Quantitative research is an approach for *"testing objective theories by examining the relationship among variables"* (Creswell, 2014:4). Variables can generally be tested by means of specific instruments that yield numerical data for statistical analysis. Researchers that practice quantitative inquiry generally have a positivistic research philosophy and use deductive reasoning to reach conclusions based on objective analysis of data that are carefully controlled for bias and alternative explanations and easily generalisable and replicable (Creswell, 2014).

Qualitative research is an approach that provides an in-depth exploration and deeper understanding of the meaning that individuals or groups ascribe to a specific societal or individual problem (Creswell, 2014). Qualitative researchers follow an inductive approach in moving from specific particulars to general themes by means of interpreting data collected iteratively with emerging instruments in the participant(s)' setting (Creswell, 2014). There is a distinct focus on accurately depicting situational complexity.

According to Burke Johnson, Onwuegbuzie and Turner (2007), mixed methods research offers a powerful third methodological choice in research, whilst recognising the importance of both qualitative and quantitative research. Mixed method research is an approach to inquiry involving the collection of both quantitative and qualitative data either sequentially or concurrently, before integrating the data in analysis to provide a deeper understanding of results (Creswell, 2014). Consequently, it often provides the most complete, balanced, revealing and functional research results (Burke Johnson et al., 2007).

In a pragmatic worldview, methods are preferred by what is deemed applicable for the particular setting (Creamer, 2018). The present research employs a mixed methods approach, in line with the pragmatic worldview in which it is grounded.

4.2.5 Time horizon

The time horizon suitable to a particular research project is determined by the research question (Saunders et al., 2015). Research can be conducted either as a once-off 'snapshot' of a particular time, or as a representation of events that occur over a given period of time, with several data collection processes scattered over the time-frame. Research that collects data from participants in a single, brief period of time only sufficient for once-off participation of all participants is called a cross-sectional study. When data are collected at two or more points in time to study changes that take place over longer periods of time, it is referred to as a longitudinal study (Christensen, Burke Johnson & Turner, 2011).

This research is considered a cross-sectional study, as the data collection represents a 'snapshot' of the levels of morale drivers at a particular place in time. Even though

two sets of data were collected, they were not compared in order to determine changes in the measured variables and as such do not comprise a longitudinal study.

4.2.6 Data collection instruments

There are several types of data collection instruments that can be used to obtain data from a population of participants such as questionnaires, secondary data, observation, focus groups and interviews (Saunders et al., 2015). Questionnaires are data collection instruments that are filled out by participants to measure their opinions and perceptions and provide self-reported demographic information (Christensen et al., 2011). They may include both closed-ended and open-ended items.

Secondary data collection is when a researcher does not collect new data from scratch, but instead relies on data that were collected for another purpose or left behind on a previous project (Saunders et al., 2015). Data collection by means of observation entails the surveillance of participants in either natural or structured environments consisting of real-world environments or laboratory settings (Christensen et al., 2011).

Focus groups are used for data collection when a focus group moderator keeps a small and uniform group of participants focused on a specific research topic or issue, and are usually used when exploring ideas or obtaining in-depth information about a certain topic (Christensen et al., 2011). Lastly, interviews are used for data collection when a researcher asks an individual participant a series of questions according to set interview protocols (Christensen et al., 2011).

In line with a mixed method research approach, both qualitative and quantitative data were collected in this research. Qualitative data were collected by means of semi-structured focus group interviews, with an open-ended discussion guide. The strengths and weaknesses of focus group data collection are provided in Table 6:

Table 6: Strengths and weaknesses of focus group data collection (Christensen et al., 2011)

STRENGTHS	WEAKNESSES
Useful for exploring ideas and concepts	Sometimes expensive

Provides window into participants' internal thinking	Might be difficult to find a focus group moderator with good facilitative and rapport-building skills
Can obtain in-depth information	Reactive and investigator effects might occur if participants feel they are being watched or studied
Can examine how participants react to each other	Might be dominated by one or two participants
Allows probing	Difficult to generalise results if small, unrepresentative samples of participants are used
Most content can be tapped	Might include large amounts of extra or unnecessary information
Allows quick turnaround	Measurement validity might be low
	Usually should not be the only data collection method used in a study
	Data analysis can be time consuming because of the open-ended nature of the data

A closed-ended, 7-point Likert-type scaled questionnaire was utilised to collect quantitative data. The strengths and weaknesses of questionnaire data collection are provided in Table 7:

Table 7: Strengths and weaknesses of questionnaire data collection (Christensen et al., 2011)

STRENGTHS	**WEAKNESSES**
Good for measuring attitudes and eliciting other content rom research participants	Usually must be kept short
Inexpensive (especially mail questionnaires and group-administered questionnaires)	Reactive effects might occur (e.g. respondents might try to only show what is socially acceptable
Can provide information about participants' subjective perspectives and ways of thinking	Nonresponse to selective items
Can administer to probability samples	People filling out questionnaires might not recall important information and might lack self-awareness
Quick turnaround for group-administered questionnaires	Response rate may be low for mail and e-mail questionnaires
Perceived anonymity by respondent can be high if situation is carefully controlled	Open-ended items may reflect differences in verbal ability, obscuring the issues of interest
Moderately high measurement validity for well-constructed and validated questionnaires	Data analysis can be time consuming for open-ended items
Closed-ended items can provide exact information needed by researcher	Measures need validation
Open-ended items can provide detailed information in respondents' own words	
Ease of data analysis for closed-ended items	
Useful for exploration as well as hypotheses testing research	

In summary, this research subscribed to a pragmatic research paradigm, which utilised abductive reasoning to perform action (with a caveat as indicated on page 118) and survey research in a mixed method manner, completing a cross-sectional study

by means of focus group interviews and questionnaires. The research onion (Saunders et al., 2015), previously explained in section 4.2 and illustrated in Figure 27, can thus be contextualised to the present research as illustrated in Figure 29:

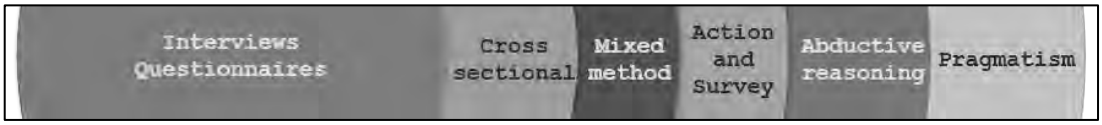

Figure 29: The research onion (Saunders et al., 2015) as contextualised to the present research

With the research overview (as summarised in Figure 29) now complete, the next section describes the research design and methodology.

4.3 Research design

According to Leedy and Ormrod (2014), research design can be defined as the plan or blueprint of a study, providing the macro structure for data collection. The ultimate goal of a robust research design is to provide credible research results (McMillan & Schumacher, 2001). There are three basic types of mixed methods designs (Creswell & Plano Clark, 2018):

a) Convergent: The researcher collects and analyses separate qualitative and quantitative datasets and then merges the two databases to compare or combine results.
b) Explanatory Sequential: The researcher collects quantitative data first, and then proceeds to collect qualitative data which helps to explain the qualitative results.
c) Exploratory Sequential: Qualitative data is collected first, and the results then utilised for the development for an instrument to collect quantitative data with.

An exploratory sequential mixed methods design (ESMMD) was utilised by this research. Qualitative data (the context-specific definition and drivers of morale) were collected in phase one to inform the development and operationalisation of a quantitative instrument yielding quantitative data (the levels of both morale and its drivers) in phase two, that informed the model development.

The steps in this process are illustrated in Figure 4 and reproduced here as Figure 30 for ease of reference:

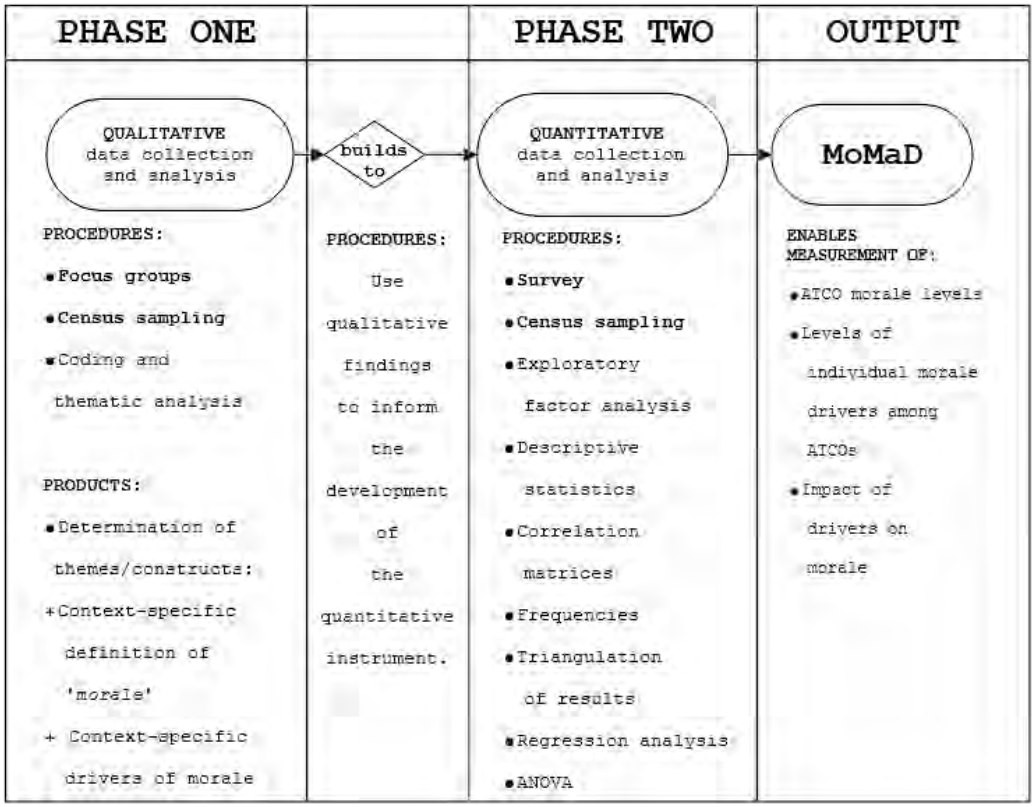

Figure 30: Exploratory sequential mixed method approach (adapted from Creswell & Plano Clark, 2018) as applied in the research

As evident from Figure 30, confronting the research problem using an exploratory sequential mixed method design informed the process of answering the research question and enabled the achievement of the research objectives

4.4 Population and sample frame

The researched population comprised of ATC followers in all of the 21 operational ATC units within ATNS, with a population of 570 individuals at the time of data collection. A census approach to sampling implies that the entire population is included. This research employed a census approach, which is always preferable to sampling, as the entire population is researched and possible bias in selection is eliminated.

4.5 Methods

The research consisted of two data collection phases, where qualitative data were gathered in phase one, and quantitative data in phase two.

4.5.1 Qualitative method

In phase one of the research, semi-structured focus group interviews were conducted to define morale and determine its context-specific drivers. This data was then used to develop a quantitative scale for the measurement of morale and its drivers in phase two.

Method of data collection and research instrument

A discussion guide with open-ended questions was constructed as a data collection instrument to understand opinions on morale and to determine context-specific drivers. The qualitative data collection phase of the research spanned five weeks and comprised of the researcher (and at least one research attendant) attending the scheduled pool meetings of each researched pool within ATNS, with a special (final) agenda point indicated (and agreed with the pool and PM) as the research focus group discussions.

All ATCOs were invited to the meeting and sensitised to the importance of attending. PMs were invited to leave the meeting before commencement of the focus group discussions, and a semi-structured interview discussion guide elicited the pool's agreed definition of morale, as well as their agreed morale drivers. The following questions were asked at 25 separate focus group sessions:

1. What is the ATCO definition of morale within ATNS? Let's discuss, unpack, and agree on a collective ATCO definition.
   (ATCOS were asked to write down their definitions of morale on a piece of paper, which was collected and stored.)
2. What are the drivers of morale within ATNS? Let's agree on the factors that influence ATCO morale within ATNS.
   (ATCOS were asked to rank the identified drivers of morale from most important to least important in terms of their effect on morale.)

The final discussion guide is attached as Appendix A.

Data

The qualitative instrument yielded context-specific working definitions of the term *morale* and themes emergent from the search for the drivers of morale.

Data analysis

Data obtained from each pool was collated, and an overarching definition of morale obtained by means of semantic similarity frequency coding. All obtained morale drivers were collated and narrowed down to the most commonly agreed themes by sorting them according to the frequency with which they were mentioned, followed by their average ranking.

Trustworthiness

In research there should be an elevated level of trust in the findings of the researcher, as well as an amount of certainty that should it be repeated by another researcher the outcome will be similar (Du Plooy-Cilliers et al., 2014). Qualitative studies use the term *trustworthiness*, comprised of credibility, dependability, transferability, confirmability (Lincoln & Guba, 1985) and authenticity (Guba & Lincoln, 1994) to refer to this trust. In essence, the trustworthiness describes the rigour and quality of the data. The trustworthiness of this research was ensured as follows:

Credibility: This refers to the accuracy with which the researcher interprets the data provided by the participants (Kroonin, 2014), as well as the credentials and background of the researcher (Guba & Lincoln, 1994) to enable such accuracy. This study increased its credibility by recording all focus group interviews and confirming the agreed definitions of both morale and its drivers with participants prior to concluding the focus groups. Trained, neutral and fully briefed research assistants were utilised to assist in collecting the qualitative data, thereby assisting in eliminating researcher bias from the qualitative interactions as far as possible. Additionally, external auditors provided feedback on the methods and instruments of the study in a research methodology colloquium prior to implementation, to ensure that they produce the correct data. The credentials of the researcher are as follows:

1. As a highly qualified air traffic control instructor at the researched company (at the time of the study) the researcher is a senior member of the researched environment.

2. The researcher has previously conducted research in the researched environment (Coetzee, 2017; Coetzee & Henning, 2019) and is well acquainted with the nuances of data collection and analysis in such a highly technical milieu.

Dependability: The quality of the integration process between the data collection method, analysis and findings is referred to as the dependability of the research (Lincoln and Guba, 1985). This study ensured the dependability of the definition of morale and its drivers produced in the qualitative section by utilising in-depth statistical analysis in the quantitative section to rigorously interrogate these concepts.

Transferability: The degree to which methods, analysis and results can be applied beyond a specific research project is referred to as transferability (Lincoln & Guba, 1985). The intent of this research is to create a model for the definition and measurement of morale in safety-critical environments. As such, it is vitally important that the transferability of the research is guaranteed. This was done by ensuring that the focus group process was meticulously detailed, and conditions for its successful completion accurately recorded.

Confirmability: A high level of confirmability requires the researcher to completely describe the entire research process, to enable others to fully examine the research design and results (Lincoln & Guba, 1985). This thesis carefully details each step in the research process.

Authenticity: Authenticity refers to the manner in which the researcher fairly and accurately portrays the various lived realities of the researched population (Guba & Lincoln, 1994). According to Guba and Lincoln (1994), authenticity can be increased by audio recording and verbatim transcription of qualitative interactions, as well as prolonged engagement with the researched population. As a member of the researched population, the researcher faced the same day-to-day lived experiences as ATCOs in the researched environment. This provided the benefit of prolonged engagement with the researched population in the situation, increasing authenticity. Additionally, all qualitative interactions were recorded and meticulously transcribed.

4.5.2 Quantitative method

Phase two of this research developed an instrument from data obtained in phase one and operationalised it by administering it to the research population, in order to determine the level morale, the level of each driver of morale and the impact of these drivers on morale amongst the researched population. The level of each driver was compared to the level of morale to determine any possible correlations and allow the creation of a factor structure.

Data collection method and research instrument

Levels of morale were tested by using Hardy's (2010) Multi-Item Measure (MIM) of morale, revised to a 5-point Likert-type scale from the original 7-point scale, as well as a single item measure (SIM) providing participants with the qualitatively obtained definition of morale and asking them to rate their morale within their pool on a 5-point Likert-type scale. A closed-ended, 5-point Likert-type scaled questionnaire was developed by determining the dimensions of each driver from literature, assimilating it with the themes emergent from phase one and generating items to measure each applicable dimension. This new combined quantitative scale, the Measure of Morale and Drivers (MoMaD), was administered to the entire ATNS ATCO population to measure the levels of each driver and the level of morale, as well as determine the impact of each driver on morale. The instrument is attached as Appendix B.

Data

The MoMaD instrument used in the quantitative phase of this research yields the following data:

a) The measured level of each morale driver amongst ATCOs within ATNS.
b) The measured level of ATCO morale (as defined in phase one) amongst ATCOs within ATNS.

Data analysis

The quantitative data collection phase of this research spanned one month and comprised of the electronic administration of the survey instrument to ATCOs within ATNS. Data produced were analysed by adhering to the following steps:

Preparation for data analysis

a) Access to Statistical Package for Social Sciences (SPSS) software was obtained to enable data analysis, as well as the SPSS AMOS module for the regression modelling.
b) A code book was created, and data coded accordingly.
c) The database was designed and captured.
d) Data were cleaned by checking for errors and assessing missing values.

Preliminary data analysis

Descriptive statistics are used to describe the variation in the data and to determine if there are categories that need to be collapsed and if the variables meet the assumptions for the statistical techniques to be used. This step is crucial for alerting the researcher to data errors, and modifying variables for further analysis (Creamer, 2018).

Data analysis

Data were analysed by means of the following statistical procedures:

a) Frequencies and descriptive statistics
b) Exploratory factor analysis
    a. Orthogonal varimax rotation
    b. Construct validation
    c. Cronbach's α score calculation
c) Construct means
d) Multivariate correlations
e) Correlation analysis
f) Ordinal logistic regression
g) ANOVA

Validity and reliability

Validity and reliability are crucial elements to enable judgement surrounding the quality of research in both the natural sciences and quantitative social sciences research and can be described as the amount of trust in the results (Saunders et al., 2015). The validity and reliability of quantitative research are ensured by elements

such as large sample sizes, random sampling and reliable research tools (Du-Plooy-Cilliers et al., 2014).

Validity: The validity of a study comprises both the validity of the research instruments and of the research methods (Leedy & Ormrod, 2014). It refers to the appropriateness of the measures used, the accuracy of the data analysis and the generalisability of the findings (Saunders et al., 2015) and consists of:

a) Instrument validity

Instrument validity refers to the degree to which any form of deficiency in the measurement instrument can lead to errors in the measurement of a certain phenomenon (Leedy & Ormrod, 2014). To enhance instrument validity in this research, the quantitative research instrument was submitted for audit to a panel of experts, prior to being submitted to a pilot study. These two processes enabled the researcher to gauge whether the data obtained from the instrument was correct, whether the respondents could easily understand all the questions as well as the flow of the questionnaire, and whether there were any questions liable to misinterpretation. Instrument validity requirements were completed prior to instrument implementation in the research.

b) Method validity

Method validity refers to the accuracy, credibility and relevance of the research project as a whole (Leedy & Ormrod, 2014). It is classified into internal validity, which describes whether the research methods and design will adequately answer the research question, and external validity, which focusses on the ability of the research to be generalised to a larger part of the researched population (Du Plooy-Cilliers et al., 2014).

To enhance internal validity in the quantitative section of the research, an external audit panel was consulted to review the methods and instrument after development and prior to implementation. External validity was ensured by the representativeness of the sample, which was 100% of the population.

Reliability: The reliability of a study is the consistency with which the measurement instrument yields dependable and consistent results when there is no change to the measured entity (Leedy & Ormrod, 2014). There are several ways to improve the reliability of a measurement instrument (Leedy & Ormrod, 2014):

a) The instrument should always be administered in a consistent fashion. In this research, it was assured by the researcher ensuring that the research assistants were well briefed in order to enable the administering of standardised instructions and directions for completing the survey to all participants.
b) Research assistants should be well trained to enable the obtainment of similar results for every single individual or situation measured. In the present research, two university professors and a Doctor of Psychology were utilised as research assistants, ensuring a more than appropriate level of training.

When using Likert-type scales as will be the case in this research, it is critical to calculate and interpret Cronbach's α, which determines the internal consistency and reliability of any scale or subscale (Pallant, 2013). The Cronbach's α value for the MoMaD instrument was calculated to measure and ensure reliability.

4.6 Assumptions

This research made the following assumptions:

a) A high level of intelligence, skill and language proficiency amongst respondents, owing to the professional capacity in which ATCOs operate and the inherent requirements for obtaining the job (Dean, Russell & Farmer, 2002).
b) Familiarity with terms such as centre, pool and safety events, as they form part of the day-to-day language used in this environment.
c) The researcher provided each respondent with a thorough background to the study, as well as an in-depth explanation of the requirements and conditions for participation.
d) Open and honest answers from respondents, without fear of victimisation or reprisal. This was achieved by ensuring and communicating participant anonymity and removing PMs from focus group discussions.

4.7 Limitations and delimitations

This study was limited to the operational centres at ATNS only, whilst maintaining repeatability for future research. The availability and cooperation of participants, as well as their eagerness to contribute was noted as another limitation. Research was only conducted among operational ATNS ATCOs. This is in line with the followership perspective of the research, as leader opinions regarding morale and its drivers were not included in the data gathering process or results. Only an electronic survey method was utilised for quantitative data collection, opening the results up to possible distortion resulting from common method variance (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

4.8 Ethical considerations

Whenever human beings or any other creatures with the ability or potential to think and feel, or experience any distress (emotional, physical, psychological or other) are the subject of investigation, researchers are compelled to closely examine the ethical implications of their actions and omissions (Leedy & Ormrod, 2014).

To ensure that all reasonable efforts were made to minimise both participant and researcher exposure to harm, the following steps were taken:

a) Participants were defended from all forms of harm, including but not limited to emotional, physical and psychological harm.
b) There was no infringement on participants' right to self-respect and human dignity.
c) All research participation was voluntary and informed, and consent from all participants were obtained to use such participation in the research findings.
d) Participants' rights to privacy were respected at all times, and no identities of participants were disclosed under any circumstances.
e) Accurate analysis of data and reporting of findings, with no altering of data or falsifying of results was a priority.
f) Findings were accurately reported, irrespective of whether they supported or contradicted expected outcomes.
g) Accepted data management practices were followed, which include the secure storage of collected data for at least the stipulated minimum time period as well

as the de-identification of sensitive information and compliance with legal regulations.

h) Researcher integrity and objectivity were consistently maintained as far as humanly possible.
i) Conflicts of interest were fully disclosed.
j) Ethical clearance was obtained from UNISA before the commencement of data collection.
k) Permission for the study was secured from ATNS and the instruments developed were submitted for approval prior to being administered to participants.
l) The research results were communicated to all participants after the conclusion of the study.

Additionally, when a researcher forms part of the researched environment, or is intimately involved in the researched situation, particular care should be taken to remove as many opportunities for bias as possible (Saunders et al., 2015). The present research ensured this by taking the following steps:

a) Maintaining complete and outright honesty at all times by providing all facts without distortion or misrepresentation, and reporting all and any flaws, limitations and conflicting evidence.
b) Utilising trained, neutral and fully briefed research assistants for data collection.
c) Declaring the possible conflict of interest inherent in the researcher being an employee of the researched company at every juncture of the research and being consistently aware of possible bias resulting from this reality.

4.9 Synthesis

The research method, together with the thesis statement, is critical to the success of a research project. Research results can only be understood, accepted, rejected or replicated by identifying and verifying the methodology behind how such results were obtained (Hofstee, 2011).

This research subscribed to a pragmatic research paradigm, utilising abductive reasoning to perform action (with a caveat as indicated on page 118) and survey research in a mixed method manner, completing a cross-sectional study by means of interviews and questionnaires

It was completed in two phases, using an exploratory sequential mixed method approach to firstly obtain the definition and themes emergent in the search for the drivers of morale qualitatively, before determining and measuring these drivers quantitatively and constructing a model to enable the measurement of the levels of both morale and its drivers amongst ATCOs in safety-critical ATC environments.

In this chapter an overview of the entire research structure was provided, before the research design and methodology utilised to answer the research questions and meet its empirical objectives were detailed. The next chapter describes the research results.

Chapter 5: Qualitative research findings

> *"I want to understand the world from your point of view. I want to know what you know in the way you know it. I want to understand the meaning of your experience, to walk in your shoes, to feel things as you feel them, to explain things as you explain them. Will you become my teacher and help me understand?"*
>
> - James P. Spradley (1979:34)

5.1 Introduction

This research was completed in two phases. Firstly, an exploratory sequential mixed method approach was used to obtain the definition and drivers of morale qualitatively. Secondly, a quantitative instrument was assembled from the qualitative results and this instrument was operationalised by measuring the levels of both morale and its drivers amongst air traffic controllers (ATCOs) within Air Traffic and Navigational Services S.O.C. Ltd (ATNS). The steps in this process are reiterated in Figure 31:

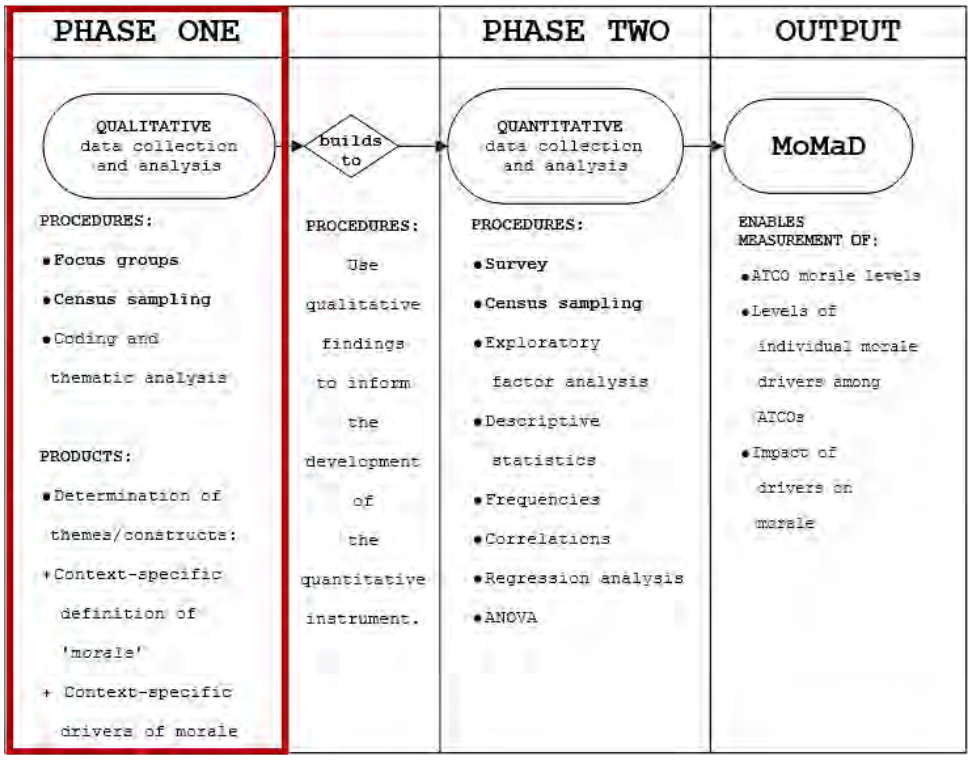

Figure 31: Exploratory sequential mixed method approach (adapted from Creswell & Plano Clark, 2018) as applied in the research, with phase one highlighted for research progress reference

The purpose of the qualitative first phase of this research, as highlighted in Figure 31, was to determine the context-specific definition and drivers of morale in a safety critical air traffic control environment by means of focus group interactions at each of the

operational stations within South Africa. The empirical objectives applicable to this phase of the research were to:

EO1: Explore the meaning of morale as perceived by ATCOs within an ATNS ATC pool environment.

EO2: Determine the most applicable drivers of morale within a safety-critical ATC environment.

The previous chapter provided an overview of the entire research structure including the research design and methodology. This chapter presents phase one of the research process: the qualitative research results obtained from the focus group interactions to meet the first and second empirical objectives.

5.2 Population and sample frame

The qualitative focus group data collection process was conducted at 17 of the 21 ATNS air traffic control stations. The researcher and at least one research assistant travelled to each of the 17 stations within a time frame of five weeks. Stations vary from very small to large, and ATCO numbers fluctuate constantly as ATCOs move abroad or retire and new ATCOs are trained. ATNS stations are located and named as listed in Table 8:

Table 8: ATNS air traffic control stations and their locations

	NAME	LOCATION	CODE
1	Bisho Airport	Bisho, Eastern Cape	FABE
2	Bram Fisher International Airport	Bloemfontein, Free State	FABL
3	Cape Town International Airport	Cape Town, Western Cape	FACT
4	East London Airport	East London, Eastern Cape	FAEL
5	George Airport	George, Western Cape	FAGG
6	Rand Airport	Germiston, Gauteng	FAGM
7	Kimberley Airport	Kimberley, Northern Cape	FAKM
8	Kruger Mpumalanga International Airport	Mbombela, Mpumalanga	FAKN
9	Lanseria International Airport	West Rand, Gauteng	FALA
10	King Shaka International Airport	Durban, Kwazulu-Natal	FALE
11	Mmabatho International Airport	Mahikeng, North West	FAMM
12	OR Tambo International Airport	Kempton Park, Gauteng	FAOR
13	Port Elizabeth International Airport	Nelson Mandela Bay, Eastern Cape	FAPE
14	Oribi Airport	Pietermaritzburg, Kwazulu-Natal	FAPM
15	Pilanesberg International Airport	Sun City, North West	FAPN
16	Polokwane International Airport	Polokwane, Limpopo	FAPP
17	Upington International Airport	Upington, Northern Cape	FAUP
18	Mthatha Airport	Mthatha, Eastern Cape	FAUT
19	Virginia Airport	Umhlanga, Kwazulu-Natal	FAVG
20	Wonderboom Airport	Pretoria, Gauteng	FAWB
21	Saint Helena International Airport	Saint Helena Island, Atlantic Ocean	FHSH

Stations with five or less ATCOs at the time of data collection (FABE, FAMM, FAUT and FHSH) were purposely omitted due to the cost involved in travelling to these locations versus the benefit of data collected from such a small portion of the overall population (FAUP was an exception, due to staff numbers changing from a total of six to only four after travel for the researcher and assistant had been arranged and paid for). FAOR is the largest station, and is divided into five pools, namely Area Central/East/West (ACCCEW), Area North/South (ACCNS), Approach Radar (APP), Air Traffic Service Officers (ATSO) and Tower (TWR). The other stations are grouped by ATNS into pools spanning two geographic regions within South Africa as listed in Table 9:

Table 9: ATNS station and pool groupings

NORTHERN REGION				
NTH1	FAOR (ACCCEW, ACCNS, APP, ATSO & TWR)			
NTH2	FABL	FAKM	FAUP	
NTH3	FALE	FAPM	FAVG	
SOUTHERN REGION				
STH1	FACT	FAGG	FHSH	
STH2	FAPE	FAEL	FABE	FAUT
STH3	FALA	FAGM	FAPN	FAMM
STH4	FAWB	FAPP	FAKN	

5.3 Method of data collection

Focus group sessions were conducted as a pre-arranged agenda item during scheduled pool meetings at each of the stations. As a standard procedure within ATNS, all ATCOs are routinely invited to pool meetings. Due to the nature of shift work, leave and off days there will never be 100% attendance as some of the staff on the day are rostered to man the relevant positions whilst others have alternative commitments on rostered off days. The roster is different for every meeting, so everyone gets a chance to attend a pool meeting at some point during a calendar year.

A census approach was adopted (at the 17 stations that were selected as described in section 5.2) and all ATCOs were invited to the sessions, resulting in a completely random group of eventual attendees. Pool managers were invited to leave the room to facilitate open and honest discussions during the focus group sessions.

In total, 25 focus group sessions were conducted at 17 stations over a period of five weeks, with attendance as enumerated in Table 10:

Table 10: Focus group session details

SESSION	STATION	ATTENDANCE	TOTAL STAFF	ASSISTANT	CODING
1-4	FACT	14	98	ASSISTANT 1	S21
5	FAGG	11	25	ASSISTANT 1 & ASSISTANT 2	S20
6	FAPE	8	35	ASSISTANT 1	S19
7	FAEL	12	24	ASSISTANT 1	S18
8-9	FAWB	11	19	ASSISTANT 2	S17
10	FAKM	6	6	ASSISTANT 2	S16
11	FABL	11	27	ASSISTANT 2	S15
12	FAKN	11	15	ASSISTANT 2	S14
13	FAPN	5	7	ASSISTANT 1	S13
14	FALE	8	40	ASSISTANT 3	S12
15	FAPM	6	6	ASSISTANT 3	S11
16	FAVG	5	6	ASSISTANT 3	S10
17	FAOR ACCCEW	9	29	ASSISTANT 1	S9
18	FAOR TWR	8	18	ASSISTANT 1	S8
19	FAOR APP	8	27	ASSISTANT 1	S7
20	FAUP	3	4	ASSISTANT 2	S6
21	FAOR ACCNS	11	32	ASSISTANT 1	S5
22	FAGM	7	19	ASSISTANT 2	S4
23	FAOR ATSO	6	79	ASSISTANT 2	S3
24	FAPP	5	7	ASSISTANT 1	S2
25	FALA	9	26	ASSISTANT 1	S1
	TOTAL	**174**	**549**		

The researcher conducted all the focus group sessions with at least one of the three research assistants in attendance as corroborating scribe. The research assistant notes provided inter-rater reliability for the qualitative data described in this section. Each session commenced with an introduction of the research team, followed by a summary of the session contents. A quick overview of the research process was provided, whereafter an assurance of confidentiality was cemented by requesting participants to sign a Respondent Informed Consent form (Appendix C:), or to leave the room if they felt uncomfortable or did not wish to participate. Researcher bias was addressed, with the role of the research assistant/s in moderating bias explained. Data were collected in three steps: firstly, asking respondents to define morale, secondly asking them to identify the drivers of morale and thirdly asking them to rank the identified drivers.

5.3.1 Step one: Definition of morale

The first section of the discussion guide presented participants with three definitions of morale from literature (see Appendix A:) and requested them to, individually or in groups of two or three, write down their own context-specific definition of morale on a sheet of paper. Figure 32 shows a few random examples:

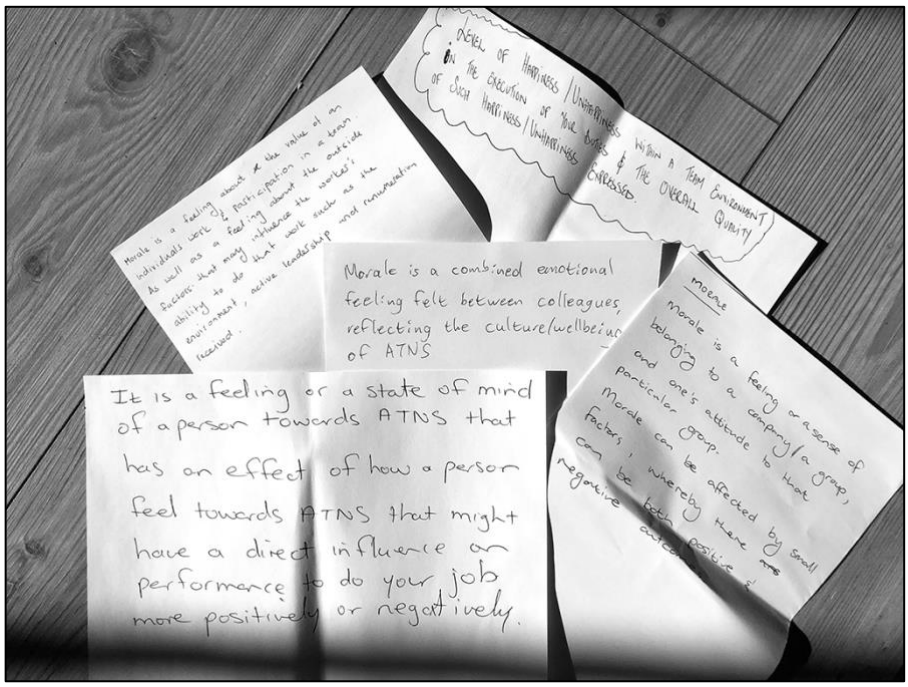

Figure 32: Examples of focus group responses to the request for a definition of morale **(author's** own)

These sheets were collected and stored for analysis as described in section 5.5.1.

5.3.2 Step two and three: Drivers of morale

The second phase of each focus group session provided participants with a definition of the word 'driver', then required participants to identify the drivers of morale within their ATCO team, irrespective of whether such drivers were deemed to be present or absent. Drivers were named and discussed, and once consensus was achieved as to the fact that the named driver was in fact a driver of morale, the researcher wrote it down on a piece of paper and placed it in the centre of the focus group where it was visible to everyone.

Once the group was satisfied that all drivers of morale were represented on the various pieces of paper, they were asked to work together, discuss and rank the

drivers from most to least important in terms of their effect on morale within the team. They had to do this by placing the driver with the perceived largest effect on morale within the team at the top, and the driver with the perceived smallest effect on morale within the team at the bottom. Examples of completed ranking exercises after the second phase of the focus group are illustrated in Figure 33:

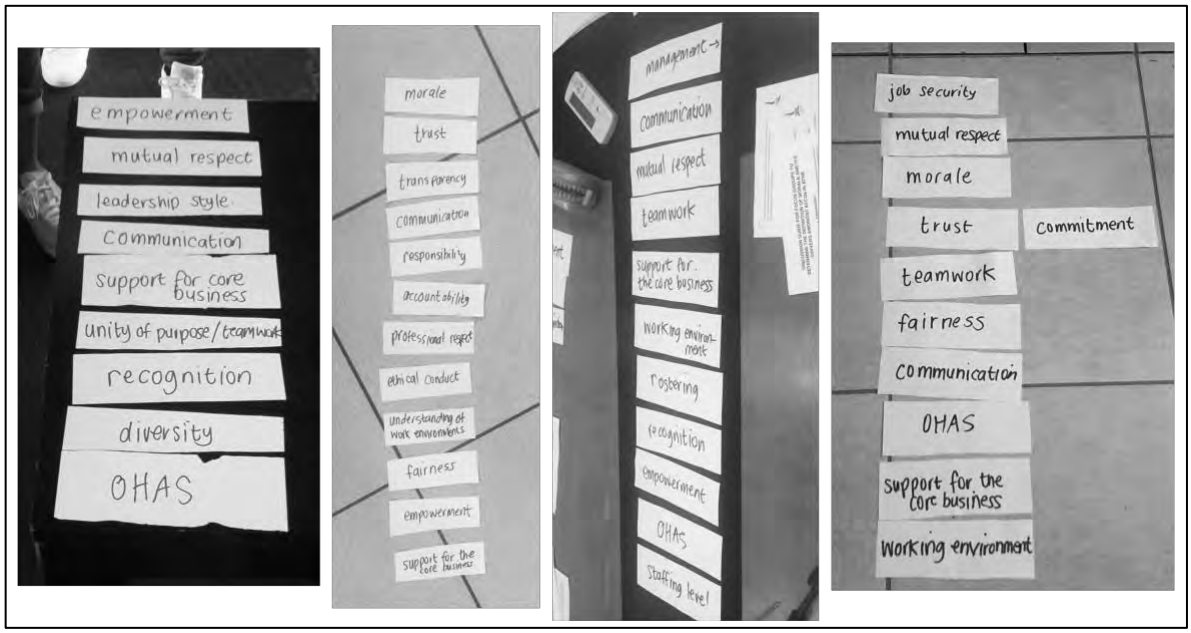

Figure 33: Examples of drivers of morale as identified and ranked by focus group sessions **(author's own)**

Once completed, the pieces of paper were numbered and stored for analysis as described in section 5.5.1.

5.3.3 Influence of direct supervision on morale

Once the second and third steps of the focus group session were complete, participants were asked to think of a direct supervisor, regardless of location within the company. Participants were then asked to indicate the level of influence of direct supervision on morale by verbalising either 'High', 'Medium' or 'Low' as an answer. Responses were recorded for transcription and analysis as indicated in section 5.5.5.

5.3.4 Morale as a person

Lastly, respondents at a few of the sessions (time permitting) were asked to complete an abstract personification exercise of describing 'Morale' as a person that walked

through the door (appearance, mood, attitude, hobbies and more). They were asked to describe the person and explain why they attributed certain characteristics. Selected examples of the descriptions are illustrated in Figure 34, and the responses were transcribed and collated for analysis in adding richness to the data:

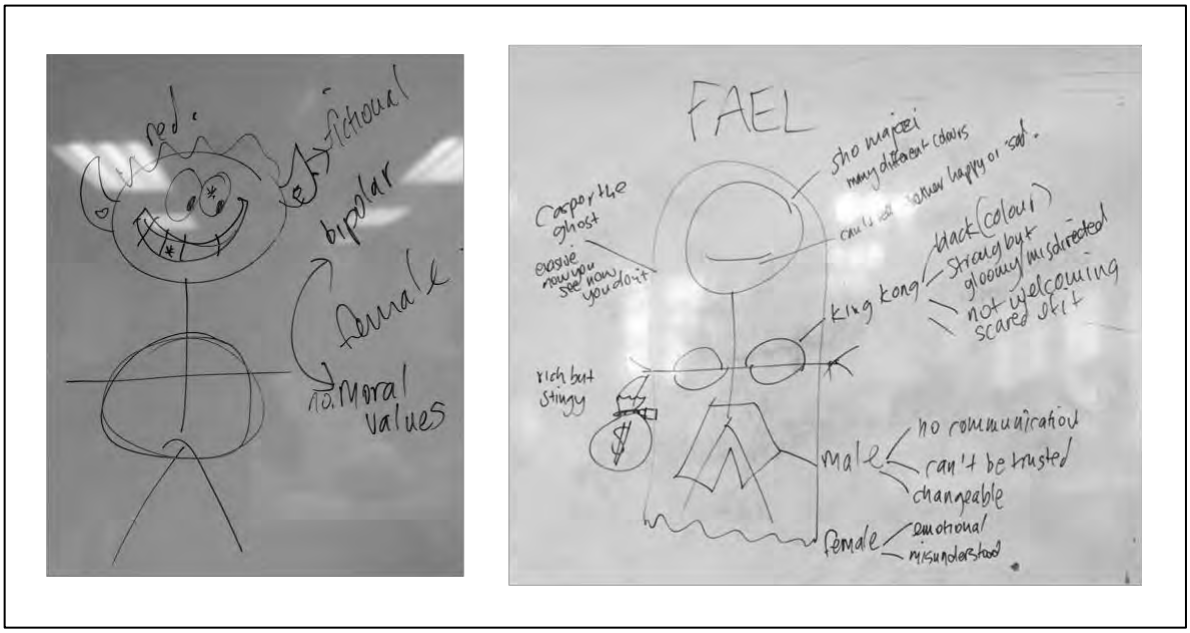

Figure 34: Examples of the personification **exercise: Morale as a person' (author's own)**

5.4 Method of data analysis

The focus group session (as detailed in section 5.3) recordings were transcribed and analysed to explore the definition and drivers of morale, as well as ascertain the perceived influence of direct supervision on morale.

5.4.1 Definition of morale

One hundred and twenty-two unique definitions were received (as described in section 5.3.1) and collated by means of transcription and content analysis using an online text analyser (Webtools, 2018). From the collation of individual definitions, the transcribed text was analysed and ordered according to their frequency of occurrence (excluding prepositions and conjunctions), whereafter the top occurrences were combined to assemble a definition of morale amongst ATCOs at ATNS.

5.4.2 Drivers of morale

Forty unique drivers of morale were obtained from transcriptions of the focus group sessions as described in section 5.3.2 and arranged in order of the number of times they occurred. In the event of the same number of occurrences, the average ranking of the driver across all focus group sessions was utilised to distinguish order.

5.4.3 Influence of direct supervision on morale

One hundred and thirty-eight verbal responses (as detailed in section 5.3.3) were extracted from transcriptions of individual focus group sessions, of which seven indicated that they were unsure or undecided. At seven of the focus group sessions (sessions 1-5 and 8-9) that took place at three stations (FACT, FAGG and FAWB) the section on direct supervision of morale was omitted due to time or logistical constraints. Averages for each response ('Low', 'Medium', 'High' or undecided) were obtained by dividing the number of responses for each answer by the overall number of responses.

5.5 Phase one: Qualitative data collection and analysis

This section describes the results of data analysis as detailed in section 5.4, commencing with the definition of morale, moving through the drivers of morale and influence of direct supervision on morale and concluding with an analysis of descriptions of morale as a person.

5.5.1 Definition of morale

ATCO definitions of morale (collected as described in section 5.3.1 and analysed as described in section 5.4.1) provided text breakdown statistics as listed in Table 11:

Table 11: Text statistics for morale definitions

CHARACTERS	WORDS	UNIQUE WORDS	SENTENCES	SPACES	PUNCTUATIONS
16306	2701	1002	196	2560	291

Participants initially found the exercise of physically writing down what they believed morale to be surprisingly challenging. Frequent exclamations stating various versions of "*Wow, this is hard!*" were common. One FACT ATCO beautifully described morale as *"…it's like love, this is something that…you can't touch it. You*

can feel it. You can't describe it. But you know, it's the…it's just…you know!", which captures the very essence of the struggle to put a concrete definition on paper. Notable examples of received definitions are listed in Table 12:

Table 12: Notable verbatim ATCO definitions of morale

DEFINITION	SOURCE
"A feeling of working for a company that encourages a respectful environment (respect of our time and careers in aviation) were employees are appreciated, and fosters a sense of belonging fueled by teamwork. A feeling of appreciation in a respectful environment."	FACT
"A sense of wellbeing in your environment – job, satisfaction, trust, motivation and how the people around you influence how you feel about where you are…your environment. It's an emotional thing."	FAGG
"The joy of being at work. As a group, the feeling of belonging and wanting to be there. The feeling of being supported by your work colleagues and the company. Adequate support systems for the job. Pride in the job."	FACT
"Level of happiness, satisfaction of work environment and job satisfaction, influenced by events and environment at work, as well as co-workers and experiences."	FALE
"I would define it as being a state of mind where an ATC willingly partakes in all the necessary actions required during their shift, because they have a positive belief and trust in the abilities of all their colleagues and that all interactions will be with a common goal and vision in mind."	FAOR ACCCEW
"Motivation to come to work happy and satisfied, that all your basic needs are taken care of and work environment is a place you would like to be to work to the best of your ability."	FAOR TWR
"A sense of fairness or unfairness within the company. A sense of demotivation or motivation based on the attitude of the employees in the workplace. The type of energy shared amongst the employees. The enthusiasm or lack therefore from the employees and management. Teamwork or lack thereof."	FAEL
"The feeling one feels toward an organisation or system that influence your willingness to participate in events and things."	FAOR ACCNS
"Morale is the conditions of work environment which contribute to an employee's will and motivation to strive and be generally content with the work factor of their lives."	FAOR ATSO
"A feeling or a sense of belonging to a company or a group, and one's attitude to that particular group. It can be affected by small factors, whereby there can be positive and negative outcomes."	FAPP
"Attitude or feeling that makes one or you look forward to be part of your workplace – positive or negative depending on how staff is being treated or valued within the organization."	FAPP

After text analysis as described in section 5.4.1, the top word occurrence frequencies are listed in Table 13:

Table 13: Ranked word occurrence frequencies (f)

RANK	f	WORD	RANK	f	WORD
1	71	feeling/feel/feels	**11**	14	towards
2	58	environment	**11**	14	working
3	52	work	**13**	14	workplace
4	49	employees	**14**	13	within
5	36	organisation/company/ATNS	**15**	12	job

RANK	*f*	WORD	RANK	*f*	WORD
6	31	individual/you/one/employee/person	**15**	12	way
7	23	motivation	**17**	11	positive
8	20	team/people/staff/colleagues	**18**	11	sense
9	17	attitude	**19**	10	good
10	16	state	**20**	8	based

The analysed collated definitions were visually assimilated into a word cloud using Zygomatic's (2020) free online word cloud generator and is illustrated in Figure 35:

Figure 35: Visual representation of most used words in morale definition collated text (Zygomatic, 2020)

The ranked word occurrences were rearranged and grammatically ordered to produce the following ATNS context-specific ATCO definition of morale:

> *"Morale is the feeling, sense or state of individuals and teams within the workplace or working environment indicating their attitude towards the organisation and motivation for the job."*

This definition (as quantitatively confirmed in section 7.8) satisfies the first empirical research objective:

EO1: Explore the meaning of morale as perceived by ATCOs within an ATNS ATC pool environment.

5.5.2 Drivers of morale: themes emergent from focus group interactions

Data collected from focus group sessions as described in section 5.3.2 and analysed as described in section 5.4.2 revealed 40 mutually exclusive themes that describe the drivers of morale in a safety-critical air traffic control environment. Robust group discussion took place during every focus group session to ensure that the meaning implied by each driver corresponds with what the ATCO intended to express. The drivers listed at each station, as well as the elements that shape each driver are contained in Appendix H: Drivers of morale as identified at ATNS stations. The themes that emerged from the focus group interactions, along with the occurrence frequency (*f*) of each theme and the average ranking (see section 5.4.2) are listed in Table 14:

Table 14: Ranked drivers of morale from focus groups

RANK	DRIVER	*f*	AVERAGE RANKING	RANK	DRIVER	*f*	AVERAGE RANKING
1	**COMMUNICATION**	**22**	**3.25**	21	BUREAUCRACY	4	12.00
2	**MUTUAL RESPECT**	**21**	**3.69**	22	COMMITMENT	3	11.13
3	**TEAMWORK**	**20**	**5.19**	23	WELLNESS	3	11.31
4	**WORKING ENVIRONMENT**	**15**	**8.44**	24	CAREER DEVELOPMENT	3	11.63
5	**SUPPORT FOR THE CORE BUSINESS**	**14**	**7.50**	25	RESPONSIBILITY	3	11.75
6	**OCCUPATIONAL HEALTH AND SAFETY**	**13**	**8.94**	26	PROCUREMENT	3	12.00
7	**TRUST**	**12**	**7.44**	26	PASSION	3	12.00
8	**REWARD AND RECOGNITION**	**10**	**10.19**	26	PERFORMANCE MANAGEMENT	3	12.00
9	**EMPOWERMENT**	**9**	**8.88**	26	INCENTIVE	3	12.00
10	**FAIRNESS**	**9**	**10.13**	26	COLLEAGUES	3	12.00
11	LEADERSHIP	8	9.94	31	JOB SECURITY	2	11.31
12	STAFFING	8	10.00	32	ATTITUDE	2	11.38
13	PLANNING	6	11.50	33	DISCIPLINE	2	11.63
14	JOB SATISFACTION	5	9.94	33	EMPATHY	2	11.63
15	ROSTER	5	11.06	35	CONSISTENCY	2	11.75
16	DIVERSITY	5	11.13	36	TOLERANCE	2	11.81
17	MANAGEMENT	5	11.31	37	PROCEDURES	2	11.88
18	MORALE	4	10.81	38	SHIFT WORK	2	11.94
19	ACCOUNTABILITY	4	11.50	39	LOCATION	2	12.00
20	TRANSPARENCY	4	11.69	39	ENERGY	2	12.00

Due to the impractical nature of ascertaining the impact of 40 drivers on morale, the list was narrowed down to the top 10, namely communication, mutual respect, teamwork, working environment, support for the core business, occupational health and safety (OHAS), trust, reward and recognition, empowerment and fairness. It has

to be stressed again that these themes emerged from conversations that emphasised the fact that morale can be influenced both up and down by the presence or absence of drivers. Thus the process was a positive one throughout, with ATCOs identifying both problem areas, as well as areas where a driver is causing elevated morale levels.

Theme one: Communication (*f* = 22)

The Oxford Dictionary (1995) defines communication as "the imparting or exchanging of information by speaking, writing, or using some other medium". In 22 of the 25 focus group sessions, communication was named as a driver of morale, and in 10 of the sessions was ranked within the top three drivers. It was often one of the first things that were mentioned, and (even though it was emphasised that drivers that are both absent and present should be mentioned) sadly, mostly in the context of absence. As an S6 ATCO stated, *"It's a complete communication issue overall, because no one ever knows what's happening when or where*". This was considered to be particularly problematic, given that 'open and effective communication' is a core ATNS value (ATNS, 2019:7). As an S7 ATCO stated: "*It's surprising because the communication is actually one of our company core values...but it's actually right up there on our issues of concern*".

In the examples and explanations provided for how communication can be considered as a driver of morale, several elements emerged that shape and form the basis for communication within the ATNS pool environment. These elements are illustrated in Figure 36, and each of them plays some sort of role when it comes to the influence of communication on morale:

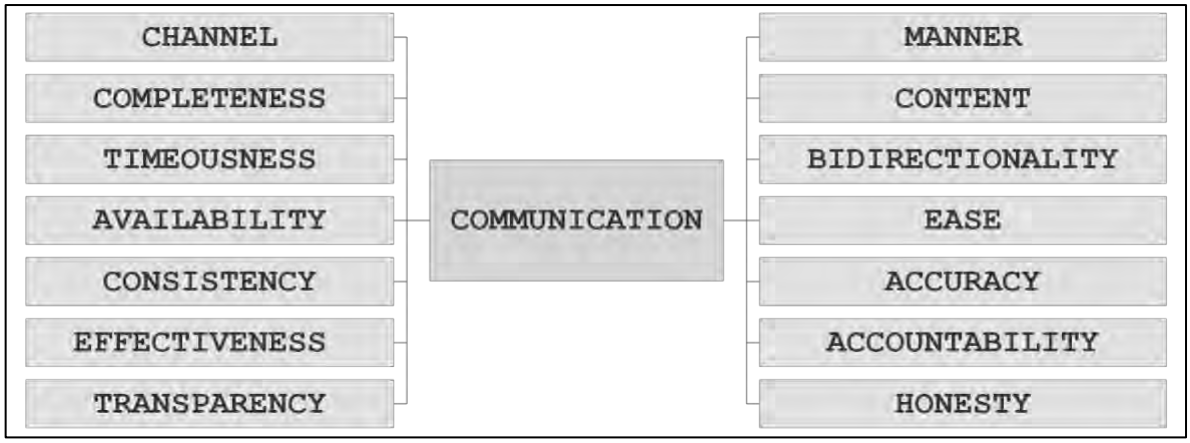

Figure 36: Elements that shape the theme of communication **(author's own)**

The channel of communication was described to be problematic at some of the bigger ATCO stations (FAOR, FACT and FALE), as the company mostly communicates via email, and ATCOs have limited access to their emails for various reasons (lack of computer access and slow internet being the most common). This also manifested as a lack of bidirectionality in communication, in that it mostly (if at all) flows downwards, but seldom upwards. Another issue raised was the use of social media for company communication, an example provided by an S3 pool member: "*We get a lot of stuff on WhatsApp and if you're not on the group, uhm you don't get the information - you have to rely on a friend to forward you the information or if you don't have a smartphone, because it does happen.*" Completeness of communication describes receiving all of the information required to do one's job effectively. As an S5 pool member stated, *"… it's difficult to do your job properly and maintain a high or a good morale when you're not given the information you need to actually do that.*"

Timeousness and consistency were described as having an influence on morale as "*I'm sure if we had something like timelines maybe it could improve morale. How many times have all of these sorts of like sessions have we always seen that communication has always been the biggest thing, because we never know what their plan is. We never know if we're heading in one direction or another. 'No, no don't worry it is in the mix.' Of when? Of what? Is it a 5-year plan?*" by an S8 ATCO. At S13, another ATCO lamented the lack of availability of communication and communication content as *"...like if things are not communicated to me or I don't know what's going on then I feel left out.*" Effectiveness of communication was agreed to be a driver of morale, in that the company often feels that it communicates, but that such communication fails to effectively penetrate to all levels of the organisation, particularly to operational level.

Transparency and honesty as elements of communication were also of concern: "*Speaking of honesty because I think with that we'll call someone, and they don't tell you the truth of what's happening. They just want to tell you something that will pacify you for that time*" (S14), "*False promises, whereas transparency is just 'listen it's gonna take three years, that's just the way it is*' " (S11), *"I wrote that under transparency because I feel like if everything was freely available for us to access*

we wouldn't need to go through that one channel of one person, you know something as simple as a cc in something or posting it up on the portal so that you can access it there. You know like as an example with the example of the licenses if they were to put updates, a list, or even that that tower list - if they had an updated seniority list up on portal then I don't think so many people would be so frustrated about when are they going on course. Like just let the information be freely available to everyone without having to go via someone to get it." (S19) and "*People are more accepting of bad situations like less inclined to do negative about the situation, when it's explained to you. If the explanation makes sense, there's very few of us that will actually have a problem with it*" (S10). At S19 the manner of communication as a driver of morale was illustrated with the following example: "*The structure of it, so if you keep on telling somebody bad news the whole time, and you don't implement reinforcement of good news or some kind of hope it could start dragging morale down*."

A final element in terms of communication as a driver of morale was identified as accountability, which featured strongly at several focus sessions. ATCOs felt that there was not enough accountability within ATNS in terms of ensuring open and effective communication, which they verbalised as follows: "*There's no accountability...there's no follow up...there's no...I feel like there should be more time frames that what he said that would help a lot if I know.*" (S19), "*I don't know if other people feel like that there's a lack of follow through in our work. Like we have a lot of these and it's not just, like you even spoke about it with the surveys complete this but then you never get feedback. People kind of lose momentum on the new changes because they don't see the, they don't see the end result of the outcome so there isn't a follow through.*" (S2), "*Another thing with ATNS management they sit and deliberately put themselves in a position where the employees will push them into a corner and they do not understand that had I communicated that listen, this is what's going on, no one would have been pestering me about when will we get the money because then everyone is there picture, like we know this is what's going on so there's no need to pester management about your issues*" (S16), *"But I don't think everyone is held accountable in this company, I think it's just for us only."* (S2) and *"...there are always surveys…They are always questionnaires, there are always everything but never implementation on what comes out of it.*" (S19).

Theme two: Mutual respect (*f* = 21)

The Merriam-Webster dictionary (2014) defines the word 'mutual' as "*directed by each toward the other or others*", while respect is defined as "*due regard for the feelings, wishes or rights of others*". Mutual respect therefore implies the bi-directional or omni-directional presence of a regard for each other's feelings, wishes or rights between two or more people. Mutual respect was named as a driver of morale in 21 of the 25 focus group interactions, and ranked in a top three position in terms of importance in 11 of these interactions. There was a general feeling that mutual respect is something that drives morale strongly in a strongly team-driven environment such as ATNS, which was succinctly summarised by an S9 ATCO as "…*everyone is battling and that comes in also with mutual respect. Everybody's got their own things man. We're just all trying here trying to do our best we can.*"

The elements that emerged as the basis for mutual respect as a driver of morale within the ATNS pool environment are illustrated in Figure 37:

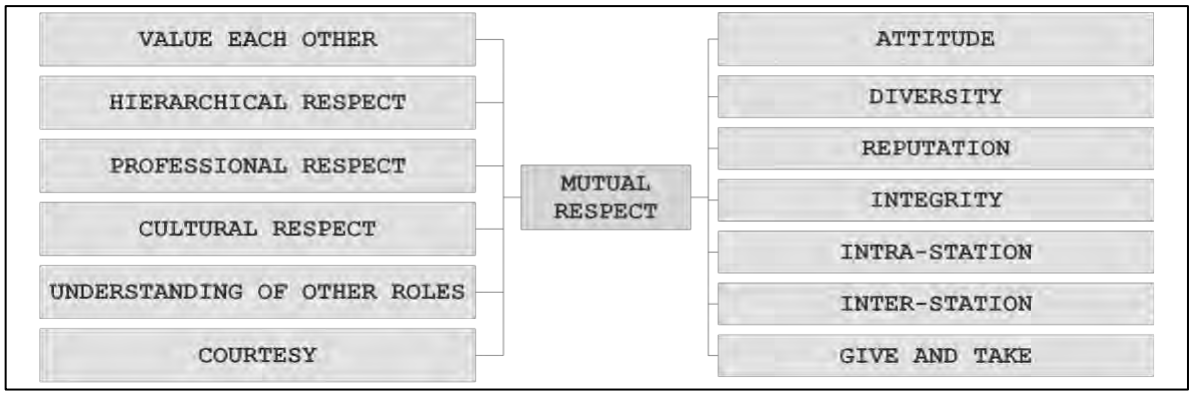

Figure 37: Elements that shape the theme of mutual respect (author**'s own)**

In some stations, valuing each other was identified as a base for mutual respect, as one S2 ATCO mentioned after moving from another station: "*I've been here for like three weeks but what I've just noticed is there just so much that makes you want to look forward to come to work because of the way people are in this tower. There is so much of respect amongst each other.*" In the air traffic control context, hierarchy is still deeply ingrained in most operations because of either the present military context or military history of the environment, as most air traffic control services either originate from a military background or are still military-operated. Just like on the flight deck, there are certain ranks, hierarchies and tenure milestones that indicate a person's qualification level and experience. As such, hierarchical respect forms a big

part of the team culture and the mutual respect dimension within such a team. For instance, as one S7 ATCO stated: "*when we started when you were [starting] in the system [as an ATSO]…you [automatically] had respect for the controllers and what they were doing, [because they out-ranked you]*". Similarly, professional respect is a vital component of mutual respect in a close-knit team environment, because "*you may respect someone [as a person], but not get along work-wise*" (S1).

Cultural respect and diversity were identified as important elements of mutual respect, because of ATNS's very diverse make-up. Because of the technical nature of the job, ATCOs at most stations felt that understanding of each other's roles, both between stations as well as between ATCOs and management, plays a major part in mutual respect as a driver of morale, which ties in with inter-station and intra-station respect. As an S10 ATCO lamented: *"I think different departments lack appreciation for their role or the input that they have because I think they are very good at appreciation of their role, but do they have appreciation of the other roles?"* An S5 ATCO added *"And I really think it's not about, you know how much traffic we work, it's about understanding the dynamic of why we do the things we do, you know, and when you can understand that dynamic, then you can make a better decision."*

Courtesy as an element of mutual respect implies a general attitude of tolerance and understanding, or as an S3 ATSO stated: *"I feel like at the end of the day, everyone who walks in through the glass door is a human being and would like to be treated as such."* Attitude, reputation, integrity and a "give and take" attitude all contribute towards mutual respect's influence on morale in various ways: *"I think in our pool we lack respect for each other, there isn't much there."* (S21), *"…in the end, we're in the core business. We don't feel like they are like taking care of us. We feel like it's actually the other way around, we need to be chasing after them."* (S21), *"…if sometimes you feel disrespected, regardless of who it is - a colleague, is it from management point of view, is it from ATNS generally, maybe that's individual, like how they feel respected or disrespected - but it does affect the morale of the person."* (S19) and *"It plays a role because you can feel respected or disrespected based on how the organisation manages, you know, the whole leadership style of ATNS as an organisation."* (S18).

At most stations it was acknowledged that the "mutual" part in mutual respect is what drives morale, and that respect needs to be bi-directional to be effective. It was acknowledged that a company-wide effort to be more understanding of each other's challenges would go a long way towards lifting morale: "…*different challenges, different skill sets, different skill levels, different abilities. So it's just a case of remembering that whatever respect we want, we should be willing to give…"* (S5). The challenge facing any such effort, is a widely declared silo mentality that exists throughout the company. According to BusinessDictionary.com (2020), silo mentality is "*a mindset present in some companies when departments or sectors not wish to share information with others in the same company. This type of mentality will reduce the efficiency of the overall operation, reduce morale and may contribute to the demise of a productive company culture.*" Notable mentions regarding the silo mentality prevalent throughout ATNS are listed in Table 15:

Table 15: Silo mentality: verbatim quotes

QUOTE	SOURCE
"ATNS feels like many different companies, because there is ATA, there is HR, there is head office…"	S4
"I think also that things that happen in head office and how air traffic services…we're treated differently in a sense of we have to do things right all the time, whereas head office people could just not answer their phones the whole week. But with us we're expected to work in a different standard than them so like it should be consistent within the whole company because everyone is expected to work."	S14
"I mean if I fill in an S&T form incorrectly, you know the main job here is to control traffic. I don't work with S&T forms. Uhm, if I complete that form incorrectly and then someone starts saying you should know how to complete this like it's they know better from their side. It's their daily, daily job even me on my daily job I know better than them but I won't scream at someone who doesn't know how to do this job, instead I'd rather teach them."	S1
"When you have corporate people trying to, you know, to manage air traffic control, air navigation service provision, and they don't understand what they are doing, because they've never worked in the trenches or whatever. It's not that we want ATCs to be managers - we've seen what that can do. But, you know, you've got this huge abyss between us and them and it just…it seems like it's getting bigger and bigger."	S5
"There's a disconnect between us and this is for how long now, between us and head office (let me refer to them as head office), wanting to manage us like, people that work Monday to Friday, 9 to 5…and the disconnect there is the lack of understanding from them is that…that we're are not (and I say this with the utmost of respect) we are not office workers, working from 9 to 5 Monday to Friday - there's people in here 365 days a year 24/7, rain or shine, Christmas, New Year's. And there's the disconnect - they don't seem to not understand the reality."	S7
"I feel like there are two separate worlds within one organisation."	S19
"…because I feel like the company sometimes it's way divided you know, it's like since you're from Joburg, Joburg is another company."	S2
"…you feel like 'maybe I work for a different company'."	S17

AN S4 ATCO observantly noted that "…*the opposite of silos would be teamwork*", suggesting that teamwork could be an antidote to the problems affecting mutual respect's influence on morale.

Theme three: Teamwork (*f* = 20)

Teamwork is defined as "*the combined actions of a group*" (Oxford Dictionary, 2015). Although most organisations have some form of teamwork present in their day-to-day operations, it is an absolutely inescapable part of being an air traffic controller as very few airspaces in the world are not shared between several controllers at any given point in time. As an example, an aircraft would speak to a total of nine individual controllers on its journey from the parking bay at OR Tambo International Airport in Johannesburg to the parking bay at Cape Town International Airport, spread across two towers and two radar halls in two separate buildings. Some of them sit next to each other and some are in different cities, but they all liaise and work together as one team to get the flight safely from point A to point B.

During the focus group interactions, teamwork emerged as a theme during 20 of the 25 sessions and was ranked within the top three drivers of morale on five occasions. As one S8 ATCO explained, *"No one is working in their own little bubble, you know? Everyone is making a conscious effort to keep a collective eye on each other just to make sure we are looking after each other."* The elements that shape the theme of teamwork as it affects morale in an ATNS ATCO context are illustrated in Figure 38:

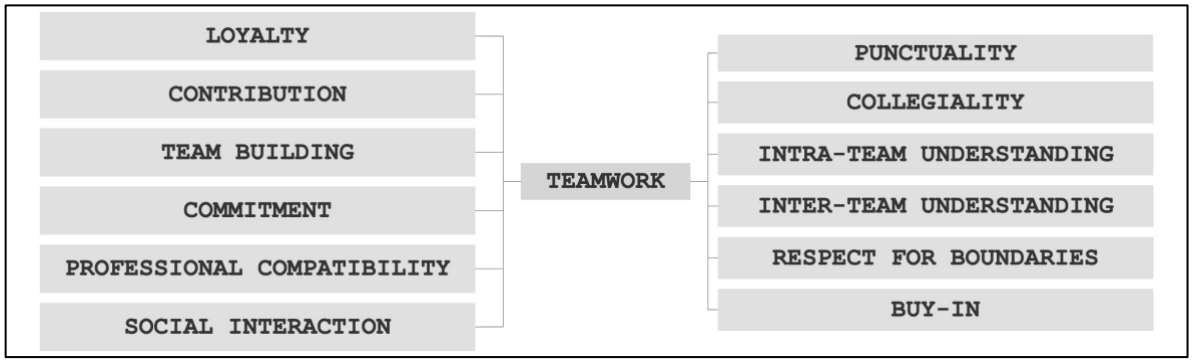

Figure 38: Elements that shape the theme of teamwork **(author's own)**

Loyalty and contribution go hand in hand as a base for teamwork, for instance "*some people sort of like betraying the team by taking extra sick days when you know they're not sick*…" (S21), "*let's say we have one person that joins that isn't now pulling their weight in the team, then the team and the morale falls apart* …" (S2), *"Uhm, if*

everyone is willing to participate, say for instance being present in one's team, affecting one another in the tower, say I'm working on position and it's busy - helping you to spot traffic outside, then we can motivate each other. It increases your morale." (S11) or *"I think this would also relate to teamwork, by sort of having each other's backs. I don't think we have each other's backs. I mean, sometimes you need your colleague to do something for you operational and they don't feel the need to because they don't want to and they don't have to."* (S3).

Teambuilding, social interaction and collegiality are burning issues amongst ATCOs, cropping up in conversations regarding teamwork as a driver of morale in 14 of the 25 focus group sessions. The overall feeling was that team building, social interaction and collegiality are crucial components of successful teamwork, but that the idea of what teambuilding should entail is misconstrued by ATNS management.

Historically, formal teambuilding events were scheduled through third-party team building events companies, and ATCOs were sent to various different venues for a day to do anything from archery and target shooting to obstacle courses and organised team sports such as soccer. These event days were subsequently withdrawn due to the substantial financial burden they posed, and the lack of tangible results. *"There was a time in the company where uhm we put an emphasis on like team building activities, whether it was actually like team building, or just like going out for year-end functions, social, basically building that trust and building that confidence and you know, encouraging teamwork. And when that was taken away, you could literally see it, it was very tangible that your team was kind of breaking down."* (S11) *"And another thing that they've taken off was the team building, trips and activities. I think that increased the morale of the staff members."* (S17)

ATCOs unanimously agreed that these third-party organised event days were a waste of everyone's time as well as the company's financial resources, and that the same and even better results could be achieved by simple things that do not involve third party contractors or excessive monetary expenditures. Examples given were: "*I would like to just say that the way ATNS did team building in the past is not the way team building should be done. Well, it was a total checkbox exercise. Because real team building is not done in this kind of way, but outside this area - even if it's a braai in the parking lot or something. We're not fancy people! Just a braai and a case of*

beers and there!" (S5), "*Even just bowling, jah, bowling's a great idea, right? Jah or netball or whatever. Create a game day. Like we could get board games and just chill.*" (S3) and "*I don't know what the term is, but like either camaraderie like in terms of team building and like social, you know gatherings of the employees.*..." (S19).

Inter- and intra-team understanding could also be enhanced by such informal efforts, as an S8 ATCO explained: "*The whole goal [of teambuilding] is just spending time together. I mean I think it's so important throughout, to just speak to each other in an informal manner. Informal chats. I don't want a sit down in a meeting for every time we need to figure out why the tower is unhappy with approach. Or an over-budget archery session. It's pointless."*

Commitment as an element that shapes teamwork was explained as: "*Some people are committed to what they're doing here. Some people are not committed sometimes it's just a stop gap. And I think that then plays on teamwork, because you do get people that come in with a lack of commitment and that can be shown in arriving late for work. Uh or they might not be pulling their weight*." (S2)

Professional compatibility is an element that shapes teamwork uniquely in an ATC environment. In an average corporate setting, you may have trouble getting along with someone on a work level, but it may not influence your actual work directly. As an ATCO, you are reliant on another ATCO to make life as easy as possible by positioning traffic optimally before handing it to you. You constantly receive partially pre-completed work, the nature of which determines how much is left to do before it fits in with your working style and you can hand it to the next sector.

If somebody's working style is not compatible with your own, you could end up working much harder when rostered with that person than you would with someone whose style is more compatible to yours. "*So not everybody is, is going to agree with the way that other people do things. Obviously you have to work within rules….that's why I use the word compatibility because I will be more compatible working with person X as I will working with person Y or whatever. So, I think when you, when you see who your team is, and I'm not trying to make it a nasty like looking down on people, like whatever, but I think there is such a thing as a professional sort of compatibility with people*." (S5)

Punctuality and respect for boundaries round out the list of elements that shape teamwork in an ATC environment, as "…*you're relying on your team member to show up on time*…" (S21) and "*everyone knows more or less, where they stand with each other, and there's a certain line everyone knows with each other.*" (S6) Finally buy-in in relation to teamwork was described as "*I think what's nice here for us and our morale from a team members perspective that there's a sense of belonging for each person. So there's that sense of buying into the greater good, but then also that what we do is pleasurable to some degree when it's us doing the job. And the only time that it's not, it's that outside impact from like let's say head office or above us that's a handbrake on the whole, the wheels turning, and I think that's the difference with us…"* (S10). Good teamwork is considered to be vitally important, and can actually ameliorate many other ills, as an S6 ATCO explained: "*teamwork…it fills in a lot of gaps."*

Theme four: Working environment (*f* = 15)

ATCOs at 15 out of the 25 focus group sessions stressed that environment in which they spend their working days has a profound impact on how they feel about going to work. The term "working environment" includes anything about the physical space in which the ATCOs perform their daily tasks, excluding technical equipment or occupational health and safety-related items, and are listed in Figure 39:

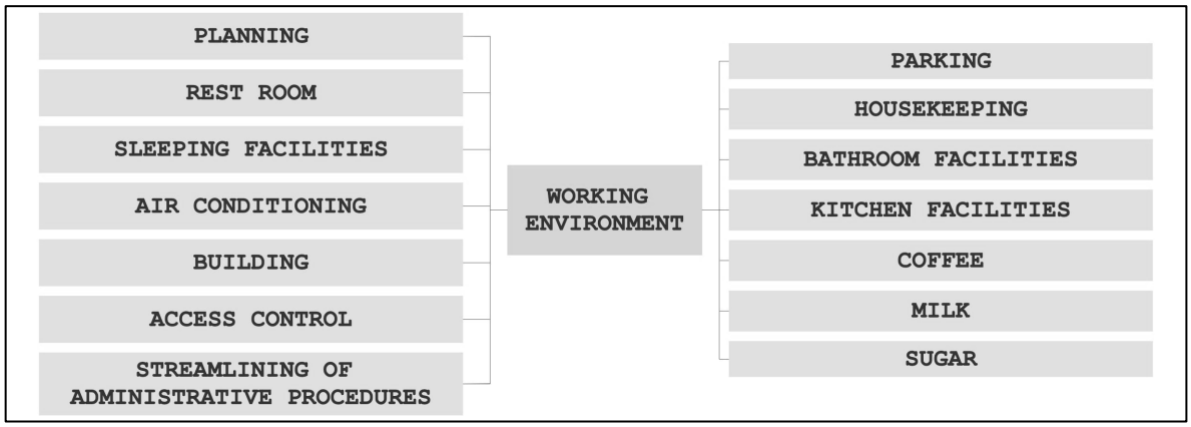

Figure 39: Elements that shape the theme of working environment **(author's own)**

As an ATCO at S10 explained, *"…your working environment has a big impact on how we feel at work and how we behave at work. Because we want things, especially in our job, like serviceable equipment. We want our working environment to be cool and clean, to be safe. So things like that, I think it does affect morale."* Whilst the

items in Figure 39 are fairly self-explanatory, and may even seem completely arbitrary, an item such as coffee was the first thing to be mentioned at several of the stations as an absolute necessity for ATCOs to be able to function optimally.

The feeling is that it is one of those things that go unnoticed when it's freely available, but has a large negative effect when it's not: *"[Coffee] it's like pilots and alcohol…it's the same thing. Yes, it's just one of the things that goes with the job."* (S15), *"Whenever we don't have coffee, the staff's morale is low."* (S17), *"I think the frustration of coming in to work and for example and maybe not having sugar and milk. It might seem small, but if you sitting on position and you want to make a cup of coffee…it gets frustrating at times."* (S1), *"We don't have grocery for the whole of January now."* (S13), "*You get to work in the morning or you're working night shift and the milk's run out.*" (S7)*, "I know it might sound dumb, but the kitchen stuff, like coffee, cutlery, and stuff. I remember when I came into ATNS we had hot chocolate, and all those nice things, and it was wonderful, I mean we had a few problems and that, but we kind of sorted it out within the office. But just knowing that that is there made you feel appreciated."* (S19) and "…*but if they know that this coffee will finish in the next two weeks, they should know that they should do that [ordering new coffee] two weeks prior instead of doing it after the coffee is finished.*" (S17)

Procurement is something that was also prominent in more than half of conversations (13 out of 25 focus group sessions), and whilst it is discussed in detail under theme five, it spans across both themes as items such as groceries run out regularly and then take a long time to be replaced ("*We use to order stuff and literally the Pick and Pay delivery guy would walk up and deliver our stuff and [with laborious procurement processes] you are doing nothing. You are not adding value to the process, it just costs more and takes longer.*" S8) or broken things in the workplace take a long time to be repaired ("*And the work environment…stuff like the temperature…the air cons and….no ventilation - it's stuffy. We are still sitting with cr*p like our kitchen…a disgusting kitchen. We have a situation of where things are sticking up - we have holes in our console which they covered with laminated cardboard and it's masked with masking tape."* - S8). As an S14 ATCO summarised: *"So it's those little things, like there's a don't care attitude towards not knowing what's going to happen [with procurement]. And that has now made me as an employee, not care."*

Whilst most work environments have some form of breaks room or cafeteria, a shift work environment that includes night shift work also generally has sleeping facilities available. At the stations where these are present, there was some frustration as to the quantity and cleanliness: "*Because now we have so many more people during the night shift, we actually need more rooms, because they're always full.*" (S3) and "*You know, like, somebody can once come to clean the beds whatever it is, you know, you know I feel nervous sleeping on those beds you know even though I bring my own sheet."* (S9)

Unnecessarily repetitive administrative procedures also add irritation, as ATCOs get remunerated for being as efficient as possible and therefore get particularly frustrated by inefficient processes around them: "…*the signing on procedures, 3000 of them just to get from the gate to working on position…could it never be like streamlined those kind of processes? Why are there two fingerprint accesses at the door…but they don't talk to each other? So then it goes to back procurement with whoever is deciding what to buy, buying the wrong stuff*." (S7)

Theme five: Support for the core business (*f* = 14)

Support for the core business includes everything in the working environment that is used to complete the tasks required to get the job done. In the case of ATCOs, this includes simple things like stationery to highly technical items such as VHF radios and radar screens. Surprisingly, this is a major area of concern for ATNS ATCOs, with lengthy discussions ensuing at 14 of the 25 focus group sessions regarding the various elements that shape support for the core business as a theme that affects morale, as illustrated in Figure 40:

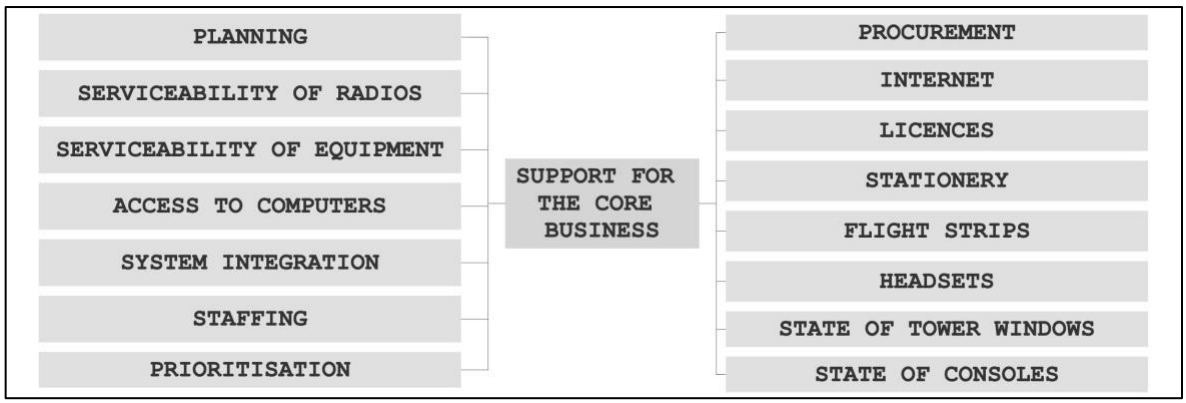

Figure 40: Elements shaping the theme of support for the core business **(author's own)**

The elements in Figure 40 are all distinctly inter-related, for instance problems with headsets, licensing and staffing comes down to problems with procurement practices and planning. Nonetheless, they all affect morale as elements that shape support for the core business in their own right.

Planning is again one of those items that are particularly important to the ATCO personality type. As an S21 ATCO explains: "*I mean, you teach me to have the foresight to prevent the situation, yet in your planning you don't do it…it often feels like everything is last minute and that affects all of us, because we've all been selected and we've all succeeded in this profession by being the type of people that like to plan things and to set things up and have them work out in the long-run. And I think it grates us a lot more than others when it doesn't happen that way from people that are supposed to be leading the way."* Planning was noted to be problematic as an integral part to most of the other themes, but particularly when it comes to career progression: "*So that uncertainty of where are you going to in your career. That's the thing and that goes a lot with planning because if they planned properly you won't be stuck somewhere for a long time…there would always be a progression and a plan, but also it affects your personal planning." (S3), "I feel like when people are transferring in from other stations, they never know where to go [when they get here]. They don't have, uh, they can't get into the gate because it wasn't planned beforehand.*" (S3), "*…it happens often that they just tell you that next week Monday you need to go on course. It happened to me. I was on leave; I had to cancel my leave, uhm. It also happened to one of the staff. She was supposed to go to the Aviation Training Academy. They gave a date, she went, when she got there, they told her it was cancelled. But nobody said anything to her.*" (S2) and "*I've been on an area course...I had to re-course because…there was no specific plan, nobody had it in black and white."* (S21)

Serviceability of radios and equipment, and the state of tower consoles and windows are very pertinent issues (f = 10), specifically I such a technical environment where the job depends on constantly serviceable equipment: *"We believe they don't want to fix anything, they believe we just want to break everything." (S15),* "*Before and first and foremost - when you sign an ATNS contract as a new employee, they pledged that they will at all times provide you with all the particular resources to ensure that*

you can adequately accomplish your duties. That's the foremost thing that they said, but you go to a station and then you lack the things like pens, headsets, the radios sometimes don't work, and then it takes time to fix them or equipment generally…" (S1), "*We're currently working on handheld backup radios. They still expect you to deliver the same level of service but with equipment that's in a downgraded state.*" (S17), "*We have a situation of where things are sticking up - we have holes in our console which they covered with laminated cardboard and it's masked with masking tape."* (S8) and "*If you sit at the actual position where you're supposed to be working from and you look up at either your final approach or your intersection, it's the three most important places that you need to look and every single one of those three windows is so badly clouded out and wet, because it's the double glazing that wasn't properly installed…so you end up physically having to stand up and have to look around those windows*." (S2)

Access to computers and the internet is an ongoing concern, and one that permeates back to the theme of communication, as a large proportion of company communication is electronic. Limited or no access to computers for 6 of the 17 researched stations (two of them at bigger stations with more people) mean that much of the company communication gets lost in the pipeline, and never reaches the intended recipients: "*We really struggle with our resources…with the internet and the computers literally someone would be using it…and then the next thing it's off. And then people come late for their shifts and they don't know what shift they're working and it just create like a whole chaos.*" (S1), "*Internet…the internet is slow and if there is a computer there's usually somebody sitting on YouTube*." (S7), "*We don't have computers, some of us don't even have yet an ATNS email address. Most of us. We don't use it, because there is no access to a computer. There's not even Wi-Fi. Why won't the company pay for Wi-Fi?*" (S8) and *"…computers - number of computers and they're slow apart from just the network that we all know through the company is slow, but they are slow to switch on.*" (S19)

The frustration with an apparent lack of overall administrative system integration (as mentioned under theme four as a lack of streamlining for administrative procedures) is summarised as follows: *"Seriously, they make us work more than we used to before automation." (S21),* "*What is it going to take for all these systems to work*

together to actually help us as opposed to frustrate us?" (S7) and "*I don't know how you'd quantify that either, but the level of technology that's being used in ATNS is not sufficient. Like we've got roster tools that don't work. We now have three people doing the roster where we used to have one. How did you automate that? Because we have a system that actually makes it harder.*" (S21)

According to ATCOs at nine out of the 25 focus group session, staffing levels affect morale in a unique way, in that it needs to be as close as possible to "just right" to have a positive effect on morale. "Staffing - either too many or too few is an issue.*"* (S21) This is because too few staff members mean that others have to pick up the slack (*"Our pool is on a staff shortage now for months - we have critically short staff numbers in our pool and it doesn't appear anything is being done to fix it. Their solution is to close down all of our sectors. And that's not a solution.*" - S21) and too many staff members cause career progression to become slow ("*Because if you are over staffed it means you'll wait much longer to go on course."* - S17). AN S1 ATCO instructor explained what he perceives to be a slippery slope: *"That gets us demotivated most of the times, because we find that we do have people in place but unfortunately, the training sometimes takes a bit longer and then once we're still in the process of training people, others leave in between. So instead of us actually covering numbers, we're actually just trying to catch up spots, which we cannot get to."* Staffing is a complex and sometimes contrarian concept, which in the case of S21 is actually so sub-optimal that it is having a strangely positive effect on morale: "…*because we're so short staffed, we have to work together as a team and we actually boost each other out by doing that*."

Prioritisation links to the silo mentality mentioned under theme two, as there is a perceived lack of understanding between departments about each other's jobs. As examples, an S14 ATCO said that *"I'll try to give you a few examples. Like what Person X was saying, there's people who do not understand what we do in ATS, and because they don't understand what we do they don't take some of the things that we do to be as important. Like for instance we don't have a tower cell[phone], we've been crying for a tower cell for some time now. So, apparently it's been bought, it's there, it's sitting, but until you understand what happens when our lines are not working you won't take it to be an essential thing for us."* and an S18 ATCO added

"But there's certain things that needs to be addressed at that time. Like I believe when you see an email you need to understand that the station can't run without this thing, I need to make sure it's done by end of business today. Like do your part and leave the rest of the people to do their part." ATCOs find the prioritisation of both procedures (*"*we've been asking for independent runways for years but it's in a queue with other things that need to be done at the planning office" - S7) and broken equipment (*"uh, there are some things that are happening, things that are broken that have been reported for years and years and no one has been doing anything about that"* - S18) to be particularly problematic.

Procurement is a genuinely burning issue, that was passionately discussed at 13 of the 25 focus group sessions. As a S.O.C., ATNS is bound by very rigid, government-regulated procurement processes. With corruption in South Africa sky-rocketing to ever higher levels on a daily basis, these regulations are becoming ever stricter. The nature of such regulations, for a S.O.C. such as ATNS that has a remarkably clean and well administrated fiscal discipline and actually follows regulations, cause procurement practices to be notoriously difficult to change. This means that procurement is indeed a very large thorn in the side of a time-critical environment such as ATC, and one without an obvious simple solution. Substantiating quotes are listed in Table 16:

Table 16: Procurement as an element shaping the theme of support for the core business: verbatim quotes

QUOTE	SOURCE
"When we start at, what should we call it, a new development, the systems upgrade, anything. There's no input from people in the field, there's – 'take it!' "	S15
"We have graphs, RSI [Risk Severity Index], we have those. We are held accountable as ATCs, but how is procurement being held accountable? You know, how we are out of coffee, how is procurement held accountable? The tender process, whatever happens? How are those people held accountable when they lack in the delivery?"	S5
"But I don't think everyone is held accountable in this company, I think it's just for us only."	S2
"...nobody that was held accountable for that. Do you understand? And for me it's not about punishing the person, that's not the whole point but how do we improve it so that it doesn't happen again, you know. What are the steps I'll take and like we have less than three miles, we have things to show like this is what we've done, this is the measure that we've put in place to try and avoid that from happening again. How is the company stopping bad procurement back practices, what are they doing?"	S7
"…the whole thing of introducing new equipment that you're now supposed to work with but uhm like no investigation was made to see if it will be compatible with the type of work you're doing, like not having double transmissions on the VCS [Voice Communication System] and stuff."	S3

QUOTE	SOURCE
"For instance most of the times they spend so much money on ads and all that, you know which is good, but again, going back to the station, we don't have paper here. We don't have you know simple paper to print. Come to think of it, how is it that they can book everything and pay for everybody and it doesn't take time, forever, but then when you, when you want to buy coffee and stuff, they tell you, you know, procurement this, procurement that?"	S1
"…along with that, uhm it comes across as a mismanagement. Well from, from down here when you get to work and then they say that then there's no toilet paper - procurement."	S3

Air traffic controllers have national Civil Aviation Authority (CAA) issued licenses which they are required to renew at set intervals by means of formal checks with an instructor. The documentation for said check then gets sent to the CAA, who issues a new licence, valid for the applicable renewal interval. An ATCO may not legally work on an ATC frequency without a valid license physically in their possession. Thus, should there be a delay between the period that a license expires and the date on which the CAA returns a valid version, such an ATCO would be confined to administrative duty, or in ATC vernacular "sitting on the couch". The South African Civil Aviation Authority (SACAA) has presently accumulated a backlog in terms of the issuing and renewal of licenses, which makes the planning and scheduling of ATCOs for renewals in time for them to be able to receive their licenses back before it expires particularly challenging. Add to that the courier process involved in getting licenses to and from stations outside of Johannesburg (where the SACAA is based), and it becomes apparent why many ATCOs country-wide spend a lot of time "on the couch", which is an enormous source of dissatisfaction.

At most stations, there are administrative staff in charge of ensuring license validity and the timing of transfers for new staff to ensure optimal training capacity, but it is proving to be very challenging: "*Yes you have access to your license, but it's in a locker in someone's office who is supposedly managing it. Yet people's ratings lapse, or medicals are almost past due, or licenses have expired. What are they doing? You get paid to do that, but you're not doing it.*" (S21), "*Yes. Also, employee trust in leadership, because there's situations develop [sic] where people's licenses are allowed to lapse, or you aren't rostered for sufficient training*." (S21) "*So obviously you know how with the ATNS part, the licenses take forever so that's the planning in ATNS. And then the license finally gets here and it's like 'oh we didn't know your license was gonna come'…it's like there's no training plans…personally I started*

realising that this thing is gonna kill my morale because as it's standing we only have one instructor or our position. And then…there's two of us training and we only work five days a week, sometimes three. So it's a matter of in a week I only probably train one day currently." (S14), "*no time frame is given if you're told that your license isn't back. How long is it going to take? No one knows. Who supposed to know? No one knows. Your license is lost. No one knows. There's no accountability...there's no follow up...I feel like there should be more time frames…that would help a lot if I know okay, I'm going to be on the couch for three months. Then I know I okay three months but if every month, I'm coming to ask and you're like 'ag no we still don't know we still don't know'…that...it kills you.*" (S19) "*So we send them and never get them back. And then we send again. We've been on the couch for over four months.*" (S17).

Simple items, such as stationery and flight strips (small strips of paper used by ATCOs to annotate flight progress with a pen), are constantly running out, and was mentioned as a source of annoyance at 13 of the 25 focus group interactions, linked closely to procurement: "*Just to add on that this is the last batch for the flight strips that we borrowed from PE. So after this there's nothing, after this we don't know what's gonna happen until we get stock from someone.*" (S1) and "*now we don't have paper for printing, we don't have pens*" (S17).

A crucial item for ATCOs at busier stations is a headset. At smaller stations, a fixed microphone is sufficient, and shared between ATCOs. At larger stations there are more people present in a controlling space (tower or radar hall) at once, making the use of microphones impractical due to ambient noise considerations. Headsets negate this constraint, as the pilot transmissions are only audible to the controller working the frequency through his or her headset. Headsets are high wear and tear items that require servicing and replacement relatively often. Sharing of headsets is not advisable in general, as bacteria could be transferred leading to ear, respiratory or other infections. In the context of the Covid-19 pandemic this becomes particularly problematic. At S1 they have been sharing headsets for a long time: *"Yes. We've been waiting for headsets for the past three years now. Uhm at the moment it's under procurement. Uhm, yes we're exchanging headsets, we're using and there is only a few people (I think two) that have got their own headsets, the rest of us are exchanging headsets every now and then. And that can also you know create an*

environment where we wait, or if one staff member is sick, the entire tower might be sick." Prioritisation is applicable in the context of headsets as well, which is reflected in this exchange at S19:

> Person X: *"And then you look at things like in head office...stuff like headsets that needs to be approved from head office. They sit there, they take a while to be approved. The procurement process is slow. But for you to get accommodation tomorrow in in a hotel for a month, that can be approved today, but for headsets it cannot be approved because there's someone sitting there and saying 'what are these people doing with headsets?'* ***It's like being a cheese factory, and you don't want to buy milk - how you gonna make cheese?****"*
>
> Person Y: *"Exactly. Yeah, I mean we're supposed to be the sharpest part of the knife, but the handle doesn't want to attach you know, yeah, definitely."*

In closing, an ATCO at S7 summarised the situation regarding the difference between responsibility and accountability in terms of support for the core business: *"You can delegate responsibility, not accountability."* And finally, an S8 ATCO extended the concept of support to the visibility of management: *"I also think support means to be seen. You only see higher management when s*** is hitting the fan."*

Theme six: Occupational health and safety (*f* = 13)

Occupational health and safety is defined by the World Health Organisation (WHO) as "*all aspects of health and safety in the workplace with a strong focus on primary prevention of hazards*". It was identified in 13 of the 25 focus group sessions as anything in the workplace that contributes to or could negatively affect employees' personal health and safety. The elements identified as shaping the theme of health and safety in the ATNS air traffic control environment are listed in Figure 41:

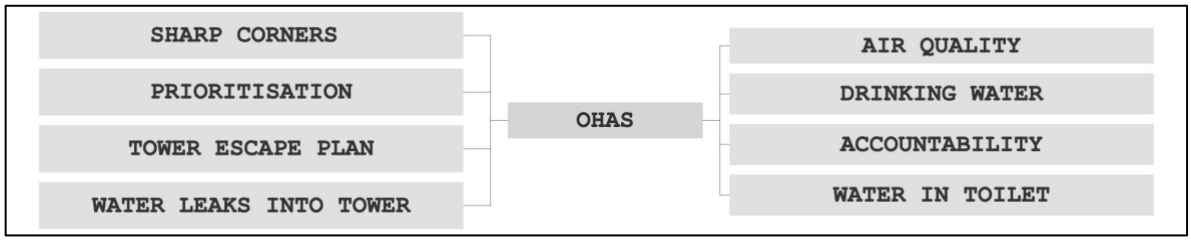

Figure 41: Elements that shape the theme of occupational health and safety **(author's own)**

At S14, there are continual issues with the serviceability of the bathroom facility, specifically "*I'm not sure whether this would affect morale, but I think it does - like resources, and I'm talking now water in the toilet, which is a problem that we have*

here." The cleanliness of the sleeping facilities is an issue for S3, S5, S7 and S9: "*You know, like, somebody can once come to clean the beds whatever it is, you know…you know I feel nervous sleeping on those beds you know, even though I bring my own sheet" and "the evening rest rooms need to be a little bit cleaner, actually 200% cleaner I think*". Similarly, the cleanliness of the bathroom facilities and safety of the environment at S8 was described as: "*Okay, I need to go to the bathroom, but actually you know what I don't want to go to the bathroom, because it is disgusting. I have to wait for home. There's corners of desks that catch your clothes and rip it.*" AN S15 ATCO noted clean drinking water as an element shaping the theme of occupational health and safety: "*Fresh, clean cold water in the controlling environment, within reachable distance from the controlling position, because if we drink water from the tap then people have a running tummy*" The situation was summarised by an S10 ATCO as: "*Your working environment has a big impact on how we feel at work and how we behave at work. Because we want things, especially in our job, like serviceable equipment. We want our working environment to be cool and clean, to be safe. So things like that, I think it does affect morale*."

Theme seven: Trust (*f* = 12)

Trust is defined in the Oxford Dictionary (2015) as the "*firm belief in the reliability, truth or ability of someone or something*". It was identified in 12 out 25 focus group interactions as a driver of morale. The elements that shape the theme of trust in an ATNS air traffic control environment are illustrated in Figure 42, and whilst this theme is much less multi-faceted, it is one that consistently moved its way to the top half of the ranking list at all stations where it was identified as a driver of morale.

Figure 42: Elements that shape the theme of trust **(author's own)**

The elements illustrated in Figure 42 require no explanation, as they are familiar to us all. There was an overarching feeling at stations where trust emerged as a theme that ATNS lacked credibility in ATCO interactions, and had mostly lost ATCO trust, but that there is much potential for this to not be a permanent situation. Substantiating ATCO quotations are listed in Table 17:

Table 17: Trust: verbatim quotes

QUOTE	SOURCE
"Now, it's every man's an island. You watch what you say, if you say the wrong thing to the wrong person, the entire station knows about it."	S15
"If we trusted them, we wouldn't have a problem with it."	S21
"They always say they want to hear what you have to say, but when it, you know, but not really. Like they make you feel like you're involved and you matter and, but it's just for them to say 'we've ticked those boxes', they feel like 'okay it's great'."	S20
"We can't really trust what they tell us anymore, it's a big problem."	S12
"Station X is not a sinking ship, the ship has already sunk. Each and every person in this building are on their own little life boat holding their yellow licence. It's just that's it, the ship has sunk and nobody cares about me and I can't look after somebody else. So I need to be about myself."	S21
"It feels like ATNS just tells you do you want you hear, but they never follow through. And it's not just equipment. It's I think everything."	S9
"Somebody said under communication they said there was a word about just being truthful, like truthful communication, because sometimes they don't want to tell you the truth because it's hard, so they'd rather tell something else just to placate, yeah."	S8
"False promises whereas transparency is just 'listen it's gonna take three years, that's just the way it is'."	S11
"Because now we've reverted to always saying 'okay, put it on paper'."	S13
"It's, it's a culture thing…but they say they're not punitive, you know?"	S2
"That thing: if you don't trust one another, then you already kind of screwed."	S6

Whilst Table 17 does not paint a pretty picture, it does seem like a cry for help, implying that an honest attempt at complete and consistent honesty, regardless of the nature of the message (whether it is good or bad news), might make a big difference to the present situation.

Theme eight: Reward and recognition (*f* = 10)

The Merriam Webster Dictionary (2014) defines the word 'reward' as "*something that is given in return for good or evil done or received or that is offered or given for some service or attainment*" and 'recognition' as "*a special notice or attention*". At 10 of the 25 focus group sessions, ATCOs expressed the view that reward and recognition is considered to be driver of morale.

The elements that shape the theme of reward and recognition as a driver of morale in an ATNS air traffic control environment are illustrated in Figure 43:

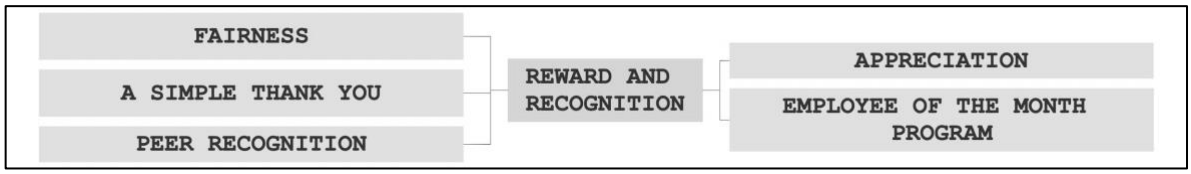

Figure 43: Elements that shape the theme of reward and recognition **(author's own)**

At the time of data collection there had been a lengthy deadlock in salary negotiations resulting in the fact that ATCOs had not had a basic increase for more than a year. Yet surprisingly, even in the middle of such financial turmoil where you would expect financial incentive to be at the top of every list, it only featured as a minor part of conversations surrounding reward and recognition. The majority (f = 7) of the 10 focus group sessions where reward and recognition emerged as a theme agreed that a simple thank you in the form of verbal or written acknowledgement of a job well done would be a great morale booster in most situations.

As an S3 ATCO explained: *"Just to add two cents on that. Uhm, you know, how when you were still young, and you would get like 100 and then you go home and your parents are so happy. Imagine your boss doing that you know, just that makes you feel like wow, I did something that is huge. Like this is a real achievement. I don't need money for this. This is good. I feel…you feel good about yourself and you're even like 'what more can I do, because I feel like I need this every week, every month?'"* AN S12 ATCO added *""So even just to mention, thank you. Jah, just to mention, sometimes that will be perfect"* and an ATCO at S3 ventured *"So, but just for you to be recognised to say, this is actually a valuable member of this team, because he's contributing x y z, that nobody else is doing."*

ATNS utilises the Balanced scorecard performance management system (Kaplan & Norton, 1992), where employees are given routine objectives for which they receive a salary and stretch objectives that determine the size of their bonus allocation in relation to the total bonus allocation declared by the company in a given financial year, if any. Even though fairness is a identified as a driver in its own right, it was specifically mentioned as an item that shapes the element of reward in terms of the fairness of the performance management system by an ATCO from S21*: "And then, was it two years ago with our BSCs, they moderated everyone in Station X down*

because you have to fit the bell curve. But bell curves don't exist in highly motivated individuals. Because…nobody minds if there's a fair call on performance management, but if you've worked really hard and now you get moderated for no reason, that's different."

Appreciation and recognition as elements that shape the theme of reward and recognition in the context of morale were summarised as *"One other big driver is the sense that bottom line staff like us are always the lowest priority or aren't priority at all. So no effective appreciation, not even speaking monetarily or economic, just appreciation. No recognition of what we do and it borders on abuse sometimes, where we're just asked to keep on keeping on because that's what needs to be done"* (S21) and *"…it sort of filters down because we haven't had a salary increase. But, not once has management actually showed any empathy to the fact that we have done our jobs exactly the way we would have done had we got an increase. How about just saying 'thank you'?"* (S7). An ATCO at S17 lamented: *"…the company is quick to recognise your mistakes, but not quick to recognise your successes."*

In summary, an S19 ATCO noted: *"ATNS as a company - their asset value is people, and they're not really investing in their assets. It's like the asset in their world is becoming finance. So they're swopping it around. And by doing that they are taking a lot of things away and giving extra things such as work and forgetting everything in between. So they take everything too much on one side and then they don't supplement with anything else."*

Theme nine: Empowerment (*f* = 9)

Empowerment is defined in the Oxford Dictionary (2015) as "*Authority or power given to someone to do something*," which in the case of this research is taken to mean PMs empowering ATCOs by virtue of education or delegation. During 9 of the 25 focus group interactions, empowerment was identified as a driver of morale, with the elements shaping it illustrated in Figure 44:

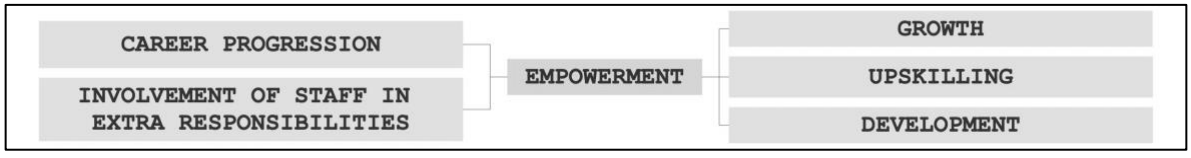

Figure 44: Elements that shape the theme of empowerment **(author's own)**

Career progression in air traffic control is a complex matter. At most organisations, the passage of enough time generally means some form of career progression for employees as long as they are putting in enough work. With ATC, no amount of hard work is going to make up for wrong selection or wrong placements, as each ATC position requires a very unique skill set, which cannot necessarily be taught. Therefore, it happens quite often that for a variety of reasons including wrong placement, wrong selection, wrong timing or sometimes even just simple bad luck, an employee gets stuck at a certain station or in a certain position that was not their end goal in terms of career progression. This is a major source of frustration: *"I feel like at some point, not even at some point but soon into one's employment they reach the ceiling. And some people feel stuck, that could be the reason why they leave the company to go and pursue something else."* (S3)

Whilst this situation is sometimes avoidable by means of better selection and placement, it often turns out to be almost semi-permanent when it does occur. In a case like this, if an employee is unfortunate enough to be stuck, as an S17 ATCO suggests: *"But if let's say logistically, right we're over staffed and they can't accommodate your course in the next X years. Empowerment would mean that they invest in you while you are here. Just something that empowers you that to do your job better at the station where you are."* AN S16 ATCO adds: *"Skilling someone is empowering someone, it's giving someone a skill".*

Involvement of staff in extra responsibilities is also seen as an element that shapes empowerment as a driver of morale: "*Because we'll come to work we do the same thing almost every day. So sometimes it's nice to, you know, to participate in other things.*" (S3) and "*…the other one is utilisation of your human resources, meaning uhm if you have somebody that's very good with something that step forward to say, 'let me help with this, let me get involved with this,' and then being side-lined.*" (S7)

Theme ten: Fairness (*f* = 9)

Fairness is defined in the Oxford Dictionary (2015) as "*impartial and just treatment or behaviour without favouritism or discrimination*". Even though fairness permeates through all of the other drivers of morale, it was identified as a stand-alone driver of morale during nine out of the 25 focus group interactions. The elements shaping

fairness as a theme driving morale in an air traffic control environment are illustrated in Figure 45:

Figure 45: Elements that shape the theme of fairness **(author's own)**

Fairness by leadership was raised as an element that shapes the theme of fairness in an air traffic control environment: "*So it's like a, it's general feeling of some people will get away with absolutely anything and other people get reprimanded." (S12), "Uhm, I feel like our pool gets punished a bit more than other pools for things that maybe other pools don't really consider*." (S3), "…*if a problem that we have at Station X was a similar problem at Station Y or at Station Z [flagship stations], the response time would be different.*" (S17), "*Yes, fairness like that, like they would not necessarily rectify anything, they would just jump straight to a disciplinary. So everyone is like...you're working with this fear, you're so scared to falter with anything, just to skip signing a memo, and it'll come back to you. Or speak up at a staff meeting because you know, if you're going to speak up you're gonna get labelled. You're going to get victimised or something!*" (S21) and "*Where some people's actions…it's…it will get treated a certain way and then someone else will do the same thing and it's something completely different.*" (S9).

In service environments such as air traffic control, where hours of duty sometimes fall outside of normal working hours, duties are generally allocated in shifts. For shifts to be allocated and so that an employee can know when they are supposed to be at work, duties are indicated on a roster. Each industry has different rules that apply in terms of how an employee may be rostered, for instance how many shifts an employee may be allocated, how far apart they may be, how long they may be and how many off days there must be. In air traffic control, the hours are often very unsociable, especially at stations providing a 24-hour service.

Whilst ATCOs generally are used to shift work, and generally prefer shift work over normal working hours, the roster itself is a big driver of morale: "*The roster plays a very big role in terms of morale, like just roster on its own. Be it, it changes or doesn't change, like the dates published. There's always issues like the way it's made, uh*

the way they shift us. It's a bit unfair sometimes to certain individuals, some get it nice, and some always get it nice and some, you know…so it plays a very big role in terms of staff morale." (S18), "…fairness, with regards to rostering and shifts is very important." (S2), "*if somebody books off sick the whole time, or if somebody is not paying the ball game in terms of the roster*." (S7) and *"…working hours affect morale. For instance, consistently getting rostered for morning shifts*..." (S21). At S18, the consistency, communication, and timeousness of the rostering process was mentioned alongside fairness as the elements surrounding rostering that affects morale in an air traffic control environment, and this was largely echoed at most focus groups (f = 5) where rostering was mentioned as an element that shapes the theme of fairness.

Lastly, fairness in career development was highlighted as a element that shapes the theme of fairness as a driver of morale: "*But fairness is a big role player…fairness in [career] progression is probably the biggest one definitely*." (S19), "*I come to Station X, we spend like seven years before I can actually be given a chance to go and do a cause that further develops me. Then you go to your Station Y, you have somebody who spends like six months then they go on course*." (S1) and "*When you're stuck here for like four years, and you see people from other stations like in Province X moving quicker than you, you know what I mean - it affects your morale as well*." (S13)

In summary, the themes emergent from focus group interviews in search of the drivers of morale in an ATNS air traffic control context are identified as Communication, Mutual respect, Teamwork, Working environment, Support for the core business, Occupational health and safety (OHAS), Trust, Reward and recognition, Empowerment and Fairness. This (confirmed by quantitative analysis in section 7.8.1) satisfies the second empirical objective of the present research qualitatively:

EO2: Determine the most applicable drivers of morale within a safety-critical ATC environment.

5.5.3 Researcher observation on inter-relatedness of themes

Whilst the purpose of this research is to ascertain the drivers of morale, the focus group interactions have revealed these drivers to be incredibly inter-related. It is predicted that it may therefore be challenging, to isolate them. As an example, communication requires teamwork and teamwork without mutual respect is arduous.

5.5.4 Researcher observation on morale as a driver of morale

Early in the focus group research process (in session 7), an ATCO made the following observation: "*As you know that in physics, everything is affected by energy. So, for example, for this light to work, it, we need to generate electricity in order for the light to work. So that's the same as morale - it's fueled by the energy for me personally. You don't have to see it. It's just how I feel within myself and the amount of energy that I'll generate towards doing my job and how effective I am and how I will produce as an individual*." At the time 'energy' didn't make it onto the list of drivers identified at the particular station.

The observation in session 7 remained with the researcher, who towards the end of the focus group sessions (just after session 20), started realising that it ties in with an unspoken theme was emerging - one that ATCOs were struggling to verbalise: morale is a driver of morale. To test this theory, the researcher decided to wait for the theme to emerge again in the next sessions and probe the ATCOs to see if they agreed with this interpretation, all the while gauging the responses to see if it was instantaneous or hesitant. Research assistants were primed to pay specific attention to the ATCO reactions when probed.

In session 21, the moment arrived when one ATCO lamented: "*One thing is inter-colleague morale, because it's a company-wide thing the salary negotiations, but if I have to sit in the restroom again and have to listen to…I won't mention our controllers' names…but if I have to listen to them moan and b*tch again (sorry for the word) about the salary negotiations, I'm going to lose it!*" The researcher responded with "…*do you guys agree, and this is like a moment for me, that morale drives morale?*" The response was confirmed by both researcher and assistant as an instantaneous and unanimous "*yes*". Session 21 subsequently went on to rank morale as the second most important driver of morale, behind job satisfaction.

Three sessions later, in session 24, the following exchange occurred:

> Person X*: "Is it possible that when something goes wrong for so long, that it becomes so accepted, that it actually becomes less of a driver at a later stage? So something that might have bothered you for a while, and in fact, it's a driver, but in a negative sense, like - it's not there. So it affects the morale. Is it the human psyche? That you get so used to that, that when the next thing comes in, either positive or negative, that that thing kind of takes a back seat? Is it possible that if the company leaves a negative thing for long enough that it'll even itself out? Because it looks like that's what they're hoping for."*
>
> Researcher: *"Tell me if I'm completely off the mark here, but that morale affects morale."*
>
> Person X: *"Absolutely!"*
>
> Researcher: *"So, the lower morale gets, the lower it goes, and the less…it's like a fly wheel."*
>
> Person X: *"Exactly, it goes lower and then it becomes our new norm. So, this was…our new norm, now we had a negative driver, so morale dropped, but for eight years that same negative driver's there, and then eventually all the new people that come in think that this is the norm, this is our morale. Then we have another negative driver and then morale drops again. If you don't fix these things, and it is happening…if you don't fix these things you're never going to pick up morale. You might be able to pick up from where morale was yesterday. But it's like a snowball -* ***it becomes very hard to stop at the bottom of the hill****."*

In the end, even taking into account the fact that morale as a driver of morale was only introduced by the researcher in the last six sessions, it was embraced in all six sessions and ranked so high on average that it narrowly missed the cut for inclusion as a driver by placing 18th out of 40 drivers in total (see Table 14).

5.5.5 Influence of direct supervision on morale

Out of 138 responses to the question as detailed in section 5.3.3, 75.4% of respondents indicated that in an air traffic control environment, direct supervision (which would be pool managers) has a high level of influence on morale.

The results are detailed in Table 18:

Table 18: Influence of direct supervision on morale

STATION	LOW		MEDIUM		HIGH		UNDECIDED		TOTAL
FABL	2	*18,2%*	2	*18,2%*	6	*54,5%*	1	*9,1%*	**11**
FACT	0	*0,0%*	0	*0,0%*	0	*0,0%*	0	*0,0%*	**0**
FAEL	2	*16,7%*	3	*25,0%*	4	*33,3%*	3	*25,0%*	**12**
FAGG	0	*0,0%*	0	*0,0%*	0	*0,0%*	0	*0,0%*	**0**
FAGM	1	*14,3%*	2	*28,6%*	4	*57,1%*	0	*0,0%*	**7**
FAKM	1	*16,7%*	0	*0,0%*	5	*83,3%*	0	*0,0%*	**6**
FAKN	0	*0,0%*	0	*0,0%*	11	*100,0%*	0	*0,0%*	**11**
FALA	0	*0,0%*	0	*0,0%*	9	*100,0%*	0	*0,0%*	**9**
FALE	0	*0,0%*	0	*0,0%*	7	*87,5%*	1	*12,5%*	**8**
FAOR ACCCEW	0	*0,0%*	1	*11,1%*	8	*88,9%*	0	*0,0%*	**9**
FAOR ACCNS	0	*0,0%*	3	*27,3%*	7	*63,6%*	1	*9,1%*	**11**
FAOR APP	1	*12,5%*	0	*0,0%*	7	*87,5%*	0	*0,0%*	**8**
FAOR ATSO	0	*0,0%*	6	*100,0%*	0	*0,0%*	0	*0,0%*	**6**
FAOR TWR	0	*0,0%*	0	*0,0%*	8	*100,0%*	0	*0,0%*	**8**
FAPE	0	*0,0%*	0	*0,0%*	8	*100,0%*	0	*0,0%*	**8**
FAPM	0	*0,0%*	0	*0,0%*	5	*83,3%*	1	*16,7%*	**6**
FAPN	0	*0,0%*	0	*0,0%*	5	*100,0%*	0	*0,0%*	**5**
FAPP	1	*20,0%*	0	*0,0%*	4	*80,0%*	0	*0,0%*	**5**
FAUP	0	*0,0%*	1	*33,3%*	2	*66,7%*	0	*0,0%*	**3**
FAVG	1	*20,0%*	0	*0,0%*	4	*80,0%*	0	*0,0%*	**5**
FAWB	0	*0,0%*	0	*0,0%*	0	*0,0%*	0	*0,0%*	**0**
	9	***6,5%***	**18**	***13,0%***	**104**	***75,4%***	**7**	***5,07%***	**138**

As shown in Table 18, a mere 6.5% of respondents indicated that they perceived immediate supervision to have a low effect on morale, 13% thought that the effect was medium, and 5.07% of respondents were undecided.

5.5.6 Morale as a person

Personification exercises were completed (as described in section 5.3.4) at nine of the focus group sessions, with notable responses summarised in Table 19:

Table 19: Morale as a person: research notes

GENDER	CHARACTERISTICS	SOURCE
FEMALE	short black hair, middle-aged, used to be pretty, reads a lot, inspires others, welcoming, willing to learn from others, gives people cookies, lacks motivation, loner	S15
FEMALE	(because females have lots of mood swings), misunderstood, King Kong (strong, favouritism, black, you're scared of it, not welcoming), "*strong, but gloomy and misdirected*", "*you can see it, it's right there, it's very big, but it can't talk*", rich but stingy, Casspir the ghost ("*because now you see it, now you don't*"), Sho Majozi (rainbow-coloured hair), strange smile ("you can't tell whether they're happy or sad")	S18

GENDER	CHARACTERISTICS	SOURCE
MALE	(“*because males don’t have issues*”), respectable, of a certain age, dressing appropriately, “*Because he's like a priest type and he's in his late fifties, and he's just got this whole suit situation going, like grey hair type of thing…he's not trying to go anywhere - he's arrived and just respectable*” healthy, content, easy-going, happy, you can talk to him about anything (like a bartender) “*so morale is not judgmental, he's very young and very respectful, always happy and yes he is that bartender who will give you a whiskey when you need one.”*	S20
MALE OR FEMALE	stand-up comedian (“*you feel good after listening to him*”), unapologetically themselves, inspiring, separate, very detached from everyone, unbothered (not happy or sad), unique character, shifty person (“*you think you know Morale, and then you don’t*”), mother (“*when the woman is happy the entire household is happy*”)	S16
FEMALE	emo, goth person, always angry	S12
FEMALE	(because females are not trustworthy), active, happy, smiling, rainbow-coloured	S9
FEMALE	(because females are the rock), confident, likes soccer (“*because soccer unites people*”), late thirties (“*mature but not old*”), sensitive, changeable	S13
MALE	early thirties (“*experienced many kilometres on the road*”), strong character, likes sports, they know their limits, very happy, glowing (“*they light up the room*”)	S6
GENDER NEUTRAL	friendly, quick to lend an ear and engage with others, approachable, “*It’s that guy that everybody goes to with their problems, right? Because you trust him, you feel they listen to you*”	S10

5.6 Synthesis

An insightful sketch of the interaction between drivers is provided by an ATCO from S5 (Person X), who in a delightful interaction during the focus group session said:

> Person X: *“Can I mention a few practical things or whatever? It started at gate when I walked through security. When I get here I first go to the bathroom, the men's bathroom. Then if I go stand there, the tiles are the same tiles as in 1991 when I started here, the bloody tiles were taken off the floor from hospital tile floors - they were back then peeling already. It still looks like that. Then I go into the kitchen and then I've been sick the day before - I’m now having to put in my sick leave, but I can't get access to a computer or whatever. I go in there and I’m pissed off already. Whenever I work with someone I walk in and then I see ‘ahh, we’re two short today’. Once again, it's the same person that booked off sick. On my shift I got somebody I know he's going to come back from the break 10 or 15 minutes late with some stupid excuse. We sit with bad weather and you know when you go on a break and you go back your morale has dropped because the storm has actually got worse since you've last worked after your break. Nothing that ATNS can do about that, but that's something that affects your morale.”*
>
> Person Y: *“Good coffee helps.”*

(Laughter)

Person X: *"Yeah, but you go into the kitchen to get the coffee that you actually walk out without coffee - no spoon, or there is no milk. It's those small little things or whatever, that drive you mad and then you get to some point where you just snap. Where you just snap - you're shouting at somebody, your colleagues or whatever, 'Why you calling me for joining into Station X?!' or whatever, you know?"*

(Laughter)

*Person X: "And you know like…because I'm actually p*ssed off and I've been to 12 computers where everybody was sitting and watching YouTube movies or something like that…at night you're running around in the corridor in your little duvet looking for a place to sleep…**all the little things add up**."*

When it comes to morale, it is indeed the little things that add up…they add up to create a big thing that gather more and more little things like a snowball as it rolls faster and faster down the hill, regardless of whether it is rolling towards the high or low side of the morale hill. Slowing down, stopping and eventually reversing the morale snowball becomes ever harder the lower down the hill it gets.

This chapter qualitatively identified the themes emergent from the search for the drivers of morale in an ATNS ATC environment as Communication, Mutual respect, Teamwork, Working environment, Support for the core business, Occupational health and safety (OHAS), Trust, Reward and recognition, Empowerment and Fairness. The next chapter will describe the process that was followed in the construction of a measuring instrument based on the qualitative data presented in this chapter.

Chapter 6: Construction of measuring instrument

"Stories give life to data and data gives authority to stories."

- Wendy Newman

(Canadian School Libraries, 2017)

6.1 Introduction

This exploratory sequential mixed method research obtained the definition and drivers of morale qualitatively, assembled a quantitative instrument from the qualitative results and operationalised this instrument by measuring the levels of both morale and its drivers amongst air traffic controllers (ATCOs) within Air Traffic and Navigational Services S.O.C. Ltd (ATNS) to construct a model for air traffic controller morale. The steps in this process are indicated Figure 46 as a visual illustration of progress:

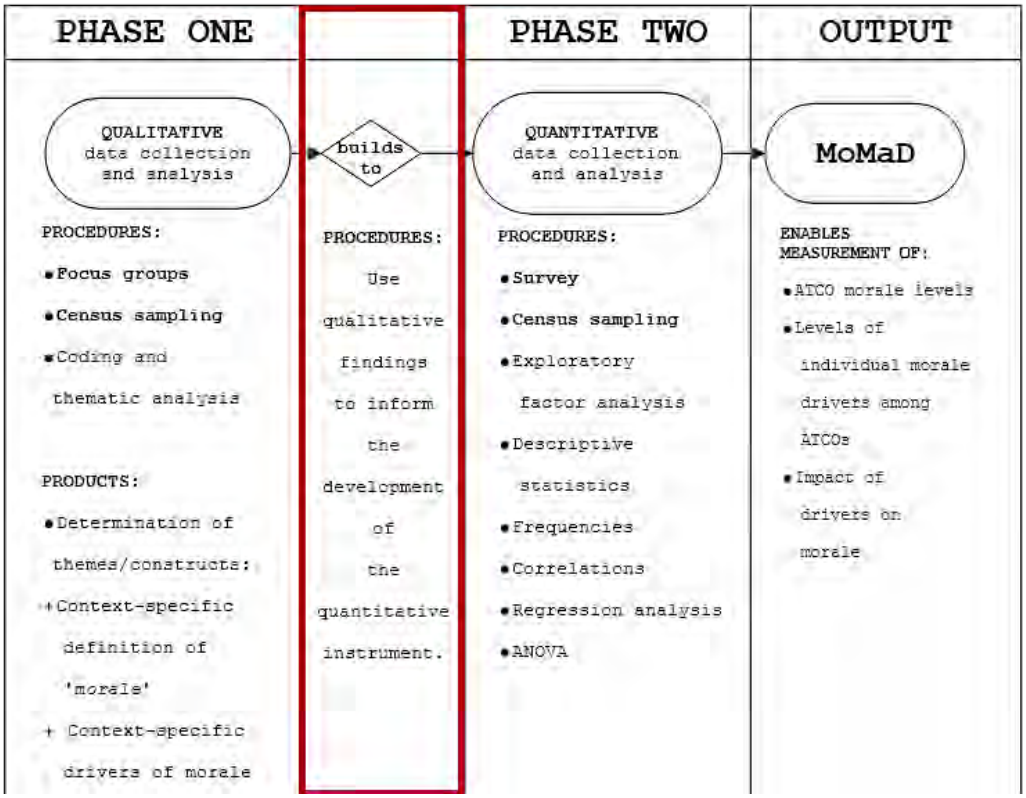

Figure 46: Exploratory sequential mixed method approach (adapted from Creswell & Plano Clark, 2018) as applied in the research, with instrument development highlighted for research progress reference

The purpose of this chapter, as highlighted in Figure 46, was to construct a measuring instrument from the data obtained from the qualitative focus group interactions. The previous chapter provided an overview of phase one of the research process where

qualitative research results were obtained from the focus group interactions to meet the first and second empirical objectives. This chapter details the process followed in in the development of a research instrument, which enabled the quantitative data collection and analysis in phase two.

6.2 Outline

The Measure of Morale and its Drivers (MoMaD) was developed by using the qualitative data obtained in phase one. The development took place by means of the following process:

1. An existing, validated scale (Hardy's (2010) Multi-Item Measure of Morale (MIM section of the MoMaD)) was identified to test the levels of morale as described in section 6.3. This section was supplemented by two perceived morale Single-Item Measure (SIM) items utilising the qualitatively determined definition of morale.
2. A new scale was constructed (the *Measure of Morale Drivers* section of the MoMaD) as detailed in section 6.5 to test the levels of each driver of morale by determining the dimensions of each driver of morale and developing items that inform each dimension. This was done by:
    a. Assimilating the dimensions (from literature) of each driver of morale with the themes emerging from the qualitative phase.
    b. Enlisting the assistance of a statistician to ensure that the dimensions of each driver was sufficiently incorporated.
    c. Collecting and implementing detailed critical feedback from five field experts on the readability and clarity of the items, as well as the apparent validity of constructs.
    d. Administering a pilot study.
    e. Completing preliminary data analysis on pilot study data, including an Exploratory Factor Analysis, and refining items accordingly.
3. To rank the overall importance of drivers as feedback to the researched company, an *Effect of Drivers on Morale in your Pool* section was included, which asked respondents to give each driver a rating on a 10-point Likert Scale (Least Important to Most Important). Additionally, a section was included at the end of each driver to ascertain problematic areas as identified by the qualitative phase for feedback (not modelling) purposes.

4. To ascertain the accuracy of the qualitatively ascertained definition of morale, respondents were given the definition and asked to confirm its accuracy in an ATNS context by selecting yes or no.

The scales in items (1) to (4) were combined (as described in section 6.9) to form the final MoMaD instrument that was administered to participants.

6.3 Multi-Item Measure of Morale (MIM)

The Multi-Item Measure (MIM) morale scale was developed by Hardy (2010) to determine levels of morale. Permission to utilise this instrument as part of the MoMaD is included as Appendix G. The scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):

1. I look forward to going to work
2. I feel in control at work
3. My job is interesting
4. I feel cheerful at work
5. I feel lots of energy at work

6.3.1 Scale reliability

Hardy's (2010) MIM has been validated as a useful measure for the understanding and manipulation of morale in a telecommunications environment, with a sample across six contact centres confirming its versatility and utility (Hardy, Alcock & Malpass, 2015). It focuses on the actual sensation of morale, on a seven-point Likert scale, reduced to 5-point for the purpose of this research. The factor loadings for each item in Hardy's (2010) MIM for morale are listed in Table 20:

Table 20: Hardy's (2010) multi-item morale measure (MIM) factor loadings

ITEM	FACTOR LOADING
I look forward to going to work	0.85
I feel in control at work	0.57
I feel lots of energy at work	0.82
I am cheerful at work	0.56
My job is interesting	0.72

This scale performed well on a confirmatory factor analysis, with $x^2 = 13.55$, $df = 9$ with the x^2 value being non-significant (p = 0.139). Chi-square (CMIN)/ df = 1.506, Root Mean Square Error of Approximation (RMSEA) = 0.052, (Bentler-Bonnett Normed Fit Index (NFI) = 0.971, Tucker Lewis Index (TLI) = 0.999, Comparative Fit Index (CFI) = 0.983 and Standardised Root Mean Square Residual (SRMR) = 0.0292. None of the items intercorrelate > 0.085 and Cronbach's α is 0.85 with a 95% lower bound of 0.83. It has been repeated on another similarly sized sample with similar results, indicating good repeatability and scale reliability (Hardy, 2010). The MIM is a generalisable scale, as detailed in section 3.6.5, which may come with the expense of accuracy in specific situations (Hardy, 2010).

6.4 Single-Item Measure of Morale (SIM)

To ensure an accurate morale level value, specifically because of the very unique nature of the ATC environment and the warning from Hardy (2010) to use the MIM scale with caution when measuring morale in very specific environments, the MIM was supplemented by a single item measure (SIM) measuring perceived morale to enable result comparison for validity purposes. The perceived morale section (items 1 and 2) provided respondents with the qualitatively determined definition of morale and asked them to use this definition to rate their morale within their pool (item 1) and within ATNS (item 2) on a 5-point Likert-type scale (extremely low, low, neither high or low, high, extremely high). Hardy (2010) found SIMs of morale to be an acceptable way to measure the concept of morale. Item 2 was included for feedback (not modelling) purposes.

6.5 Measure of morale drivers

The *Measure of Morale Drivers* section of the MoMaD was developed by assimilating the dimensions obtained from literature of each driver of morale with the themes emergent from the qualitative phase of the research. This was done to ensure that the themes emergent from the qualitative focus group sessions are aligned to literature, as this research does not purport to include the vast fields of knowledge contained under each driver as its field of expertise.

It must be stressed that the purpose of this research was not to test each driver's dimensions as separate factors, but rather as descriptors of the 10 drivers of morale. Thus, suitable dimensions of each morale driver were cherry-picked from literature to mirror the emergent qualitative themes, and not all dimensions were included. The purpose of this process was to stay as true to both literature and the qualitative findings as possible, ensuring a valid and reliable questionnaire to determine and test the ten identified drivers of morale.

6.5.1 Assimilation of qualitative themes with morale driver dimensions

The qualitatively identified themes emergent from the search for the drivers of morale in an ATNS air traffic control environment were communication, mutual respect, teamwork, working environment, support for the core business, occupational health and safety (OHAS), trust, reward and recognition, empowerment and fairness. In this section, these themes are integrated with their applicable dimensions from literature, producing the descriptors that inform the preliminary factor structure, as illustrated in Figure 47:

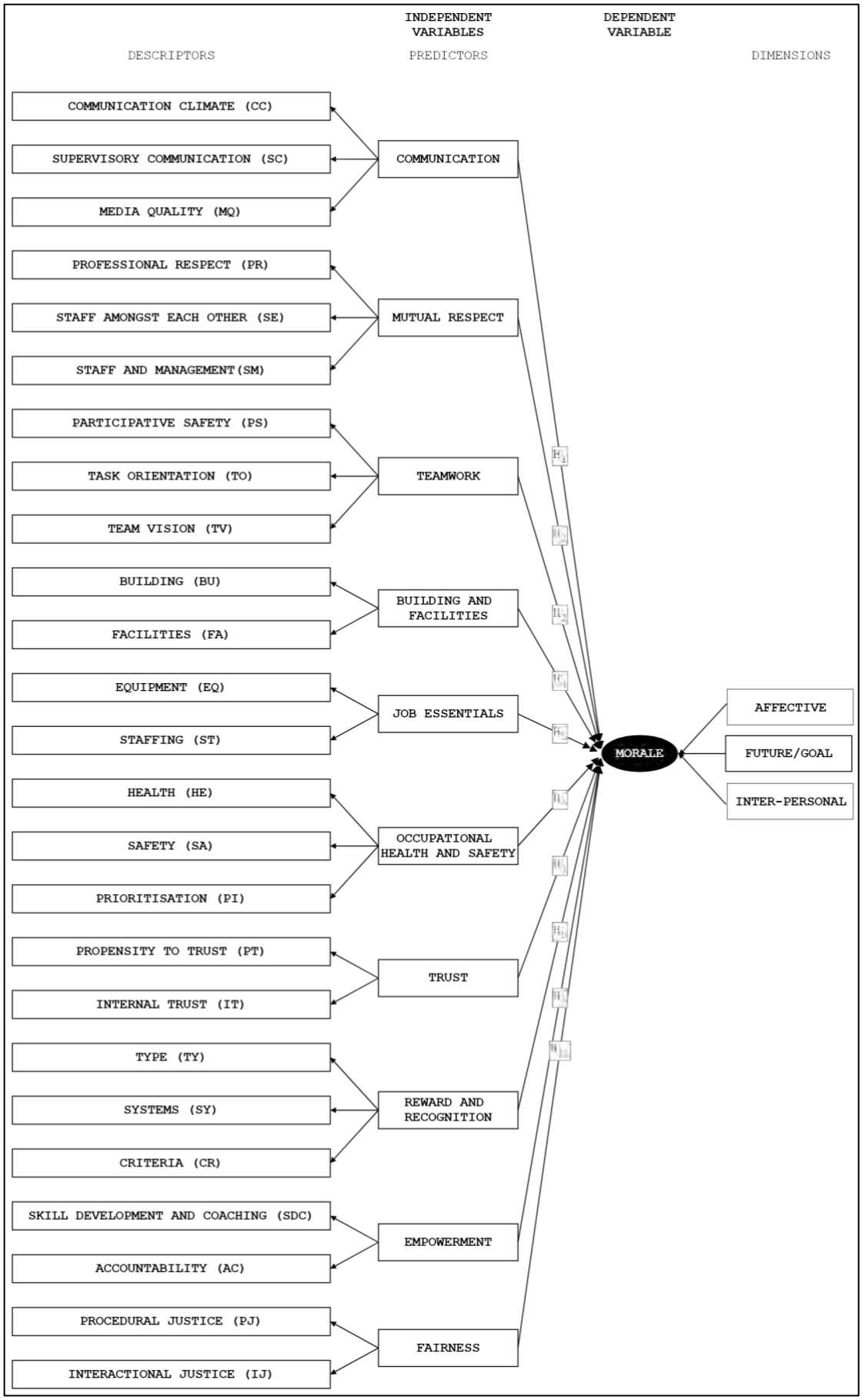

Figure 47: Interaction between descriptors and drivers of morale (author's own)

Communication:

Downs and Hazen (1977) found communication to possess eight distinct dimensions, namely satisfaction with Communication Climate (CC), with Personal Feedback, with Organisational Integration, with Media Quality (MQ), with Co-worker Communication, with Corporate Information, with Subordinate Communication and with Supervisory Communication (SC). These factors have been widely confirmed as internally reliable (Clampitt & Downs, 2004), as Downs and Hazen's Communication Satisfaction Questionnaire (CSQ), which tests these eight factors, has been the subject of many PhD dissertations and is widely used as a communication audit technique (Zwijze-Koning & De Jong, 2008).

Zwijze-Koning and De Jongh (2008) recommend that in order to warrant a fair evaluation of an organisation's communication system, the CSQ should be complemented with focus group interactions to enable the personalisation of the items to specific organisational environment. CC, MQ and SC were selected as dimensions of communication included in the MoMaD, with CC dealing with general satisfaction with the perceived effectiveness of the communication atmosphere, SC dealing with satisfaction with both upward and downward communication between employees and their direct supervisors and MQ addresses the extent to which meetings are well organised, written directives are short and clear and the degree to which the communication media is correct (Greenbaum, Clampitt & Willihnganz, 1988). Themes emergent from the focus group interactions in phase one of the research (as illustrated in Figure 36) were integrated with the dimensions of communication (Downs & Hazen, 1977) as introduced in Figure 48:

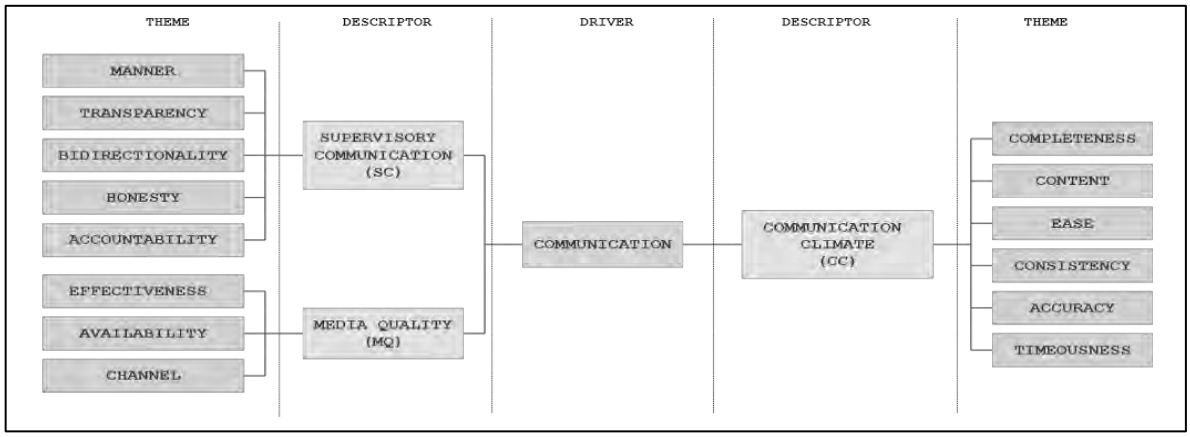

Figure 48: Themes emergent from phase one relating to communication, as assimilated with the selected dimensions of communication from **literature (author's own)**

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree), based on the assimilation illustrated in Figure 48:

i. Communication Climate (CC)
    1. New information regarding my job execution is communicated timeously.
    2. Communication between pool members is efficient.

ii. Supervisory Communication (SC)
    1. There is effective, bidirectional communication between me and my pool manager.
    2. My pool manager is held accountable for effective communication in the pool.
    3. In my pool there is a climate of honesty and transparency in communication.
    4. My pool manager understands the problems faced by pool members.

iii. Media Quality (MQ)
    1. My pool manager uses a suitable channel of communication (email, WhatsApp, meetings).
    2. My pool manager communicates important information frequently.
    3. Important information is easily available to me when I need it.

Lastly, respondents were asked to mark the relevant items (as illustrated in Figure 48) that are absent in their pool, thereby obstructing effective communication (accountability, accuracy, availability, bidirectionality, channel, completeness, consistency, content, ease, effectiveness, honesty, manner, timeousness, transparency or none of the above) for company feedback purposes.

Mutual Respect:

According to Carmeli, Dutton and Hardin (2015), respect is a foundational condition of human connections, representing confirmation of human existence and dignity. They focus on the potency of Respectful Engagement (RE) as a key form of positive interrelating, which takes place interpersonally through particular forms of interaction, and contend that conveying presence, communicating affirmation, effective listening and supportive communication contributes to higher levels of RE.

Integration of the emergent qualitative themes (as introduced in Figure 37) into the dimension of RE is illustrated in Figure 49:

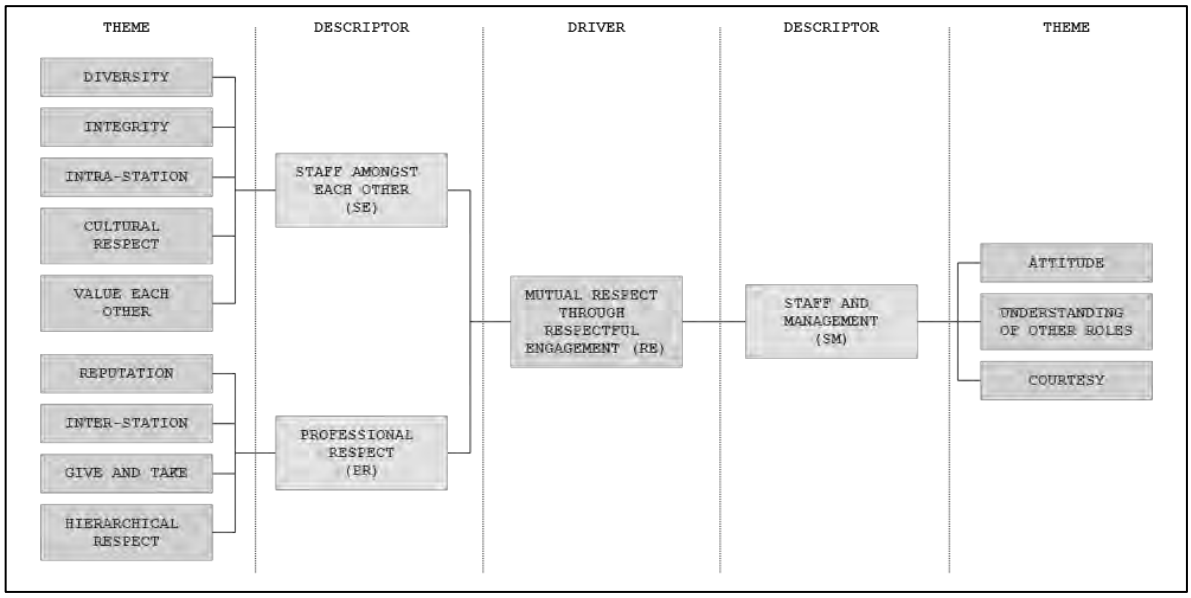

Figure 49: Themes emergent from phase one relating to mutual respect, as assimilated with the dimension of respectful engagement from literature (author's own)

In line with the emergent qualitative themes, RE is sub-divided into three categories, namely RE of staff with management (SM), of staff with each other (SE) and RE in terms of professional respect (PR) as shown in Figure 49. The proposed scale asks respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):

i. Respectful engagement of staff with management (SM)
    1. Management and pool members understand what goes into each other's work.
    2. Management and pool members appreciate each other's contribution to the organisation.
    3. Management and pool members speak to each other in a respectful manner.

ii. Respectful engagement of staff with each other (SE)
    1. Pool members have a good attitude towards the job.
    2. Pool members display cultural respect at work.
    3. My pool is sufficiently respectful of diversity and our differences.

iii. Respectful engagement on a professional level (PR)
    1. Pool members display professional respect at work.
    2. Pool members respect professional hierarchy.

3. There is sufficient *give and take* in terms of respect between our pool and other departments – we give as much respect as we demand.

Respondents were finally asked to mark the relevant items (as illustrated in Figure 49) that were absent in their pool, thereby obstructing effective mutual respect (attitude, courtesy, cultural respect, hierarchical respect, integrity, inter-team respect, intra-team respect, professional respect, reputation, respect for diversity, understanding of other roles, valueing each other or none of the above) for company feedback purposes.

Teamwork:

Anderson and West (1998) defined a team as either a permanent or semi-permanent proximal group to which individuals are allocated, identify with and interact with on a regular basis in order to perform work-related tasks. To make teamwork possible, it is necessary for individuals to interact at work, share a common goal and have enough task inter-dependence to make shared understandings and patterns of behavior necessary (Anderson & West, 1998).

Anderson and West (1998) found that four dimensions of teamwork were identified, namely Team Vision (TV), Participation Safety (PS), Task Orientation (TO) and Support for Innovation, where PS involves active involvement in group interactions where the predominant interpersonal interaction is non-threatening and supportive, TO describes a general commitment to excellence in task performance and a supportive climate open to improvement, and TV refers to a valued group outcome representing a higher order goal and motivating force at work.

Themes emergent from the focus group interactions (as introduced in Figure 38) in phase one were integrated with PS, TO and TV as illustrated in Figure 50:

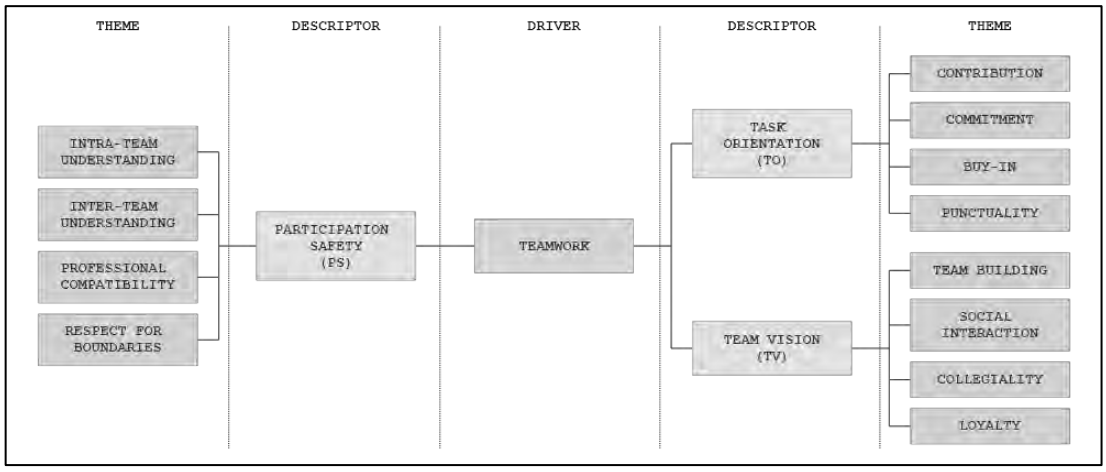

Figure 50: Themes emergent from phase one relating to teamwork, as assimilated with the selected dimensions of teamwork from literature (author's own)

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree), based on the assimilation illustrated in Figure 50:

i. Participative Safety (PS)
    1. Pool members are loyal to each other.
    2. Pool members support each other to get work done despite challenges at work.
    3. Pool members keep each other informed about work related issues.

ii. Team Vision (TV)
    1. Pool members agree over the appropriateness of pool objectives.
    2. Pool members share the same vision at work.
    3. Pool members know what the pool objectives are.

iii. Task Orientation (TO)
    1. My pool has a good reputation within ATNS.
    2. My pool is a high-performance team.
    3. My pool has clear criteria which pool members try to meet to achieve excellence as a team.

Lastly, respondents were asked to mark the relevant items (as illustrated in Figure 50) that were absent in their pool, thereby obstructing effective teamwork (buy-in, collegiality, commitment, equal contribution, inter-team understanding, intra-team

understanding, loyalty, professional compatibility, punctuality, respect for boundaries, social interaction, team building or none of the above) for company feedback purposes.

Working environment (Building and Facilities):

From the qualitative discussions during the focus group sessions in phase one of the research, working environment consistently emerged as a driver of morale. As detailed in section 5.5.2, working environment ranked as the fourth most important driver of morale in an air traffic control environment, with various elements mentioned as forming part of it that can be basically divided into either elements related to the physical building in which work needs to occur (BU) or the facilities provided inside said building enabling employees to do their job (FA). There is limited literature surrounding the physical working environment in terms of its effect on morale, but Muskita and Kazimoto (2017) found a negative relationship to exist between supervisor efforts to improve both the working environment and employee comfort levels and increased employee morale. To avoid conceptual confusion with the psychosocial working environment, which refers to factors such as working relationships and social support in the workplace, the driver was renamed to Building and Facilities, and the qualitative themes (as introduced in Figure 39) were separated into categories as illustrated in Figure 51:

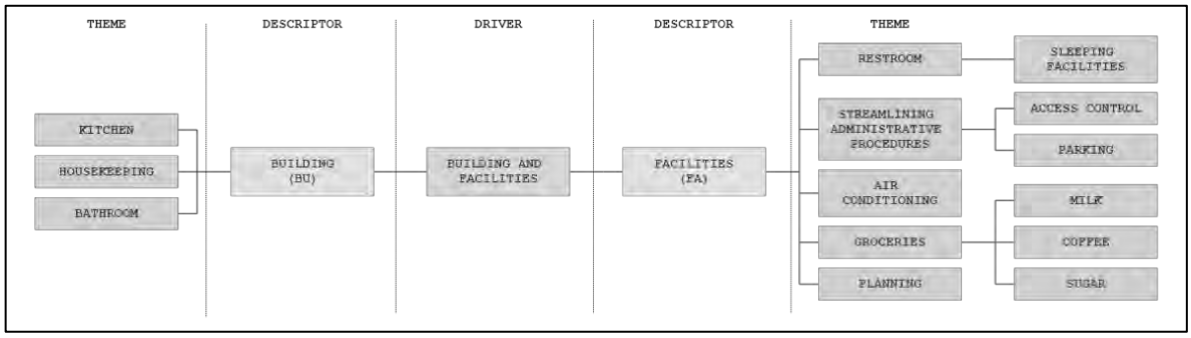

Figure 51: Themes emergent from phase one relating to the working environment, separated into two distinct, measurable categories (author's own)

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):

i. Building (BU)
    1. The physical building in which I work is adequately maintained and clean.

2. The kitchen facility is adequate, functional and clean.
3. Bathroom facilities are functional and clean.

ii. Facilities (FA)

1. The air conditioning provided on position is adequate and sanitised.
2. The resting facilities are adequate in providing the necessary rest and recovery during breaks.
3. Administrative procedures at my station (such as sign on duties and access control are sufficiently streamlined.

Because certain items (particularly coffee) were consistently raised in the focus group interactions under the theme of working environment, two last questions were included for company feedback and not for model purposes:

1. Refreshments in the kitchen (coffee, tea, milk, sugar) are adequate.
2. Overall, ATNS provides enough assistance to keep the building and facilities in an acceptable condition.

Finally, respondents were asked to mark the relevant items (as illustrated in Figure 51) that are problematic about the building and facilities in their pool (access control, air conditioning, bathroom, building, coffee, housekeeping, kitchen, parking, planning, refreshments (e.g. tea or milk), rest room facilities, sleeping facilities, streamlining of administrative procedures or none of the above) for company feedback purposes.

Support for the core business (Job Essentials):

Qualitative data obtained during the focus group sessions in phase one of the research showed that support for the core business ranked as the fifth most important driver of morale in an air traffic control environment. Two sub-themes emerged that broadly encompass the mainly cited elements, namely Equipment (EQ) and Staffing (ST).

For enhanced naming intelligibility the driver is renamed to Job Essentials, and the qualitative themes (as introduced in Figure 40) are separated into categories as illustrated in Figure 52:

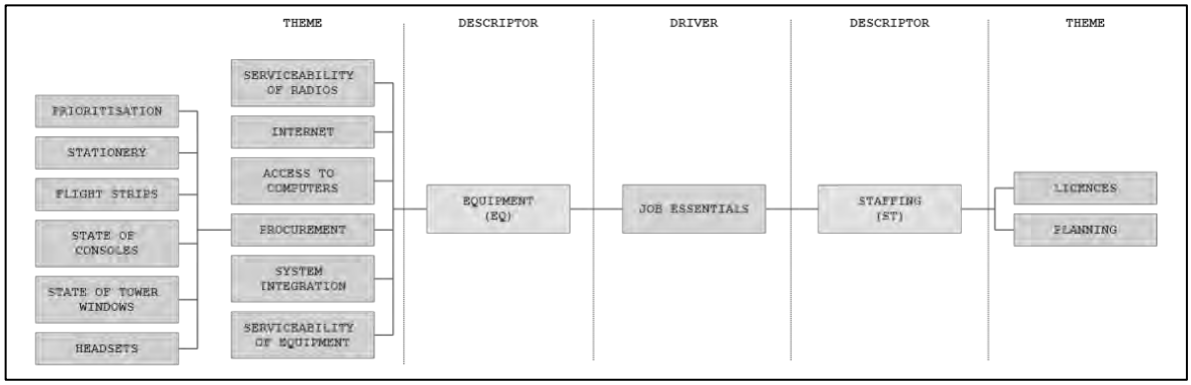

Figure 52: Themes emergent from phase one relating to job essentials, separated into two distinct, measurable categories (author's own)

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):

i. Equipment (EQ)
    1. The serviceability of core function equipment (headsets, radios) is acceptable.
    2. There is sufficient access to computers with internet access at my station for work related purposes.
    3. The systems required to do my job are integrated to ensure efficient operations.

ii. Staffing (ST)
    1. The staffing levels in my pool are acceptable.
    2. There is sufficient planning in terms of future staffing at work.
    3. The administrative process relating to CAA licencing is adequately prioritized.

In any state-owned company in South Africa, procurement is a difficult subject. Necessary controls and procedures are often over-regulated and complex for a variety of reasons. Procurement was consistently raised as an issue that affected morale, but due to its complex and sensitive nature (subsequently confirmed as a sound decision in a recommendation from one of the subject experts listed in Table 21) not included in modelling.

Two last questions were included for company feedback purposes only:

1. The procurement process adequately prioritises items that are essential to the core business function.
2. Overall, I feel ATNS provides enough timeous support through its procurement process to ensure peak core function performance.

Respondents were finally asked to mark the relevant job essential items (as illustrated in Figure 52) that are problematic in their pool (access to computers, flight strips, headsets, internet, licences, planning, prioritisation, procurement, serviceability of equipment, serviceability of radios, staffing levels, state of consoles, state of tower windows, stationery, system integration or none of the above) for company feedback purposes.

Occupational health and safety (OHAS):

The qualitative focus group sessions in phase one of the research revealed occupational health and safety to be the sixth most important driver of morale in an air traffic control environment. Three sub-themes emerged that represent the mainly cited elements (as introduced in Figure 41), namely Health (HE), Safety (SA) and Prioritisation (PI) as illustrated in Figure 53:

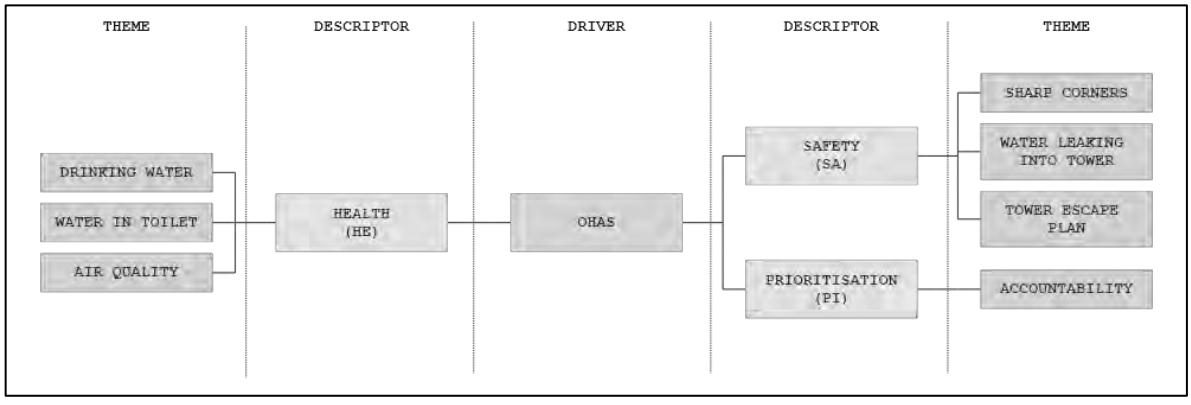

Figure 53: Themes emergent from phase one relating to occupational health and safety, separated into three distinct, measurable categories (author's own)

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):

i. Health (HE)
    1. There is clean drinking water freely available at my station.

2. The air quality at my working station is acceptable.
3. The ablution facilities are serviceable.

ii. Safety (SA)

1. I am well informed regarding the emergency escape plan.
2. There are no sharp protruding corners or objects that could significantly harm me in the workplace.
3. There are no water leaks in my station building that could pose a risk to people at work.

iii. Prioritisation (PI)

1. There is sufficient accountability for reported OHAS risks that remain unrectified after a reasonable period.
2. When OHAS risks are identified in my station, they are rectified as a matter of urgency.
3. OHAS is a priority at my station.

The majority of the stations visited during the qualitative phase had at least one OHAS challenge, with some stations having to deal with several. One last question was included for company feedback purposes only, and not for modelling:

1. Overall, ATNS provides enough support to ensure that OHAS is never compromised.

Respondents were asked to mark the relevant items (as illustrated in Figure 53) that are problematic about OHAS in their pool (accountability, air quality, drinking water, escape plan, prioritisation, sharp corners, water leaks or none of the above) for company feedback purposes.

Trust:

Trust requires uncertainty and involves both confidence in the trustee's ability to deliver and their benign intentions (Huff & Kelley, 2003). Four dimensions of trust are identified by Huff and Kelley (2003), namely Individual Propensity to Trust (PT), Internal Trust (IT), External Trust and Propensity to Distrust. PT is an individual level dimension, which considers an individual's inherent predisposition towards trusting others. Huff and Kelley (2003) argued that organisational trust has its basis in individual trust, as it is the individuals themselves that trust and not the organisation

and therefore it is important to know how likely an individual is to trust another as part of the overall trust measurement. IT refers to the climate of trust within an organisation, defined as positive expectations of individuals regarding the intent and behaviours of others in the organization based on historical behaviours, organizational roles, relationships or interdependencies. Themes emergent from phase one of the research (as introduced in Figure 42) were integrated with the dimensions of trust (Huff & Kelley, 2003) as illustrated in Figure 54:

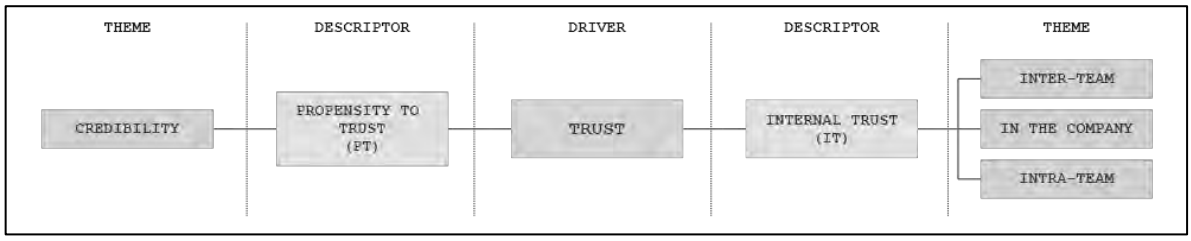

Figure 54: Themes emergent from phase one relating to trust, as assimilated with the selected dimensions of trust from literature (author's own)

The proposed instrument asked respondents to rate the following items on a 5-point Likert scale, (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree), based on the assimilation illustrated in Figure 54:

i. Propensity to trust (PT)
    1. Most people can be trusted.
    2. I believe that people usually keep their promises.
    3. When people make promises, they generally deliver on them.

ii. Internal Trust (IT)
    1. There is a very high level of trust throughout my pool.
    2. Pool members trust that management promises will be honoured at work.
    3. My pool manager in ATNS trusts pool members to make good decisions.

Lastly, respondents were asked to mark the relevant items (as illustrated in Figure 54) that are absent in their pool, thereby obstructing effective trust (credibility, inter-team trust, intra-team trust, trust in the company or none of the above) for company feedback purposes.

Reward and recognition:

There are three main dimensions of reward (Chiang, 2005), namely Reward Type (TY), Reward Systems (SY) and Reward Criteria (CR). TY refers to the nature of the

reward itself (for instance financial or non-financial), SY denotes the methods or mechanisms by which organisations determine employee reward outcomes (for instance pay increases or bonuses) and CR relates to the basis by which organisations determine and distribute rewards (for instance individual or group-based) (Chiang, 2005). Themes emergent from the focus group interactions (as introduced in Figure 43) were integrated with the dimensions of reward and recognition according to Chiang (2005) as illustrated in Figure 55:

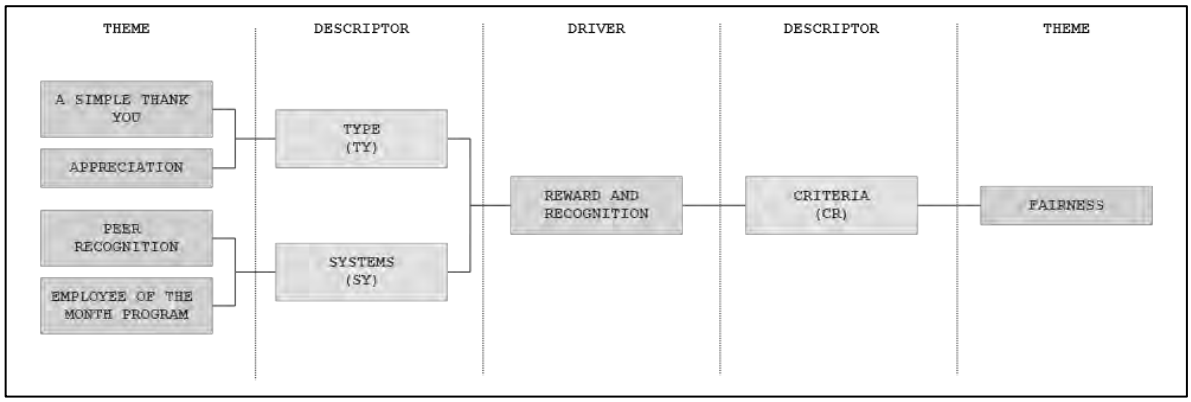

Figure 55: Themes emergent from phase one relating to reward and recognition, as assimilated with the dimensions of reward from literature (author's own)

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) as assimilated in Figure 55:

i. Reward Type (TY)
    1. My efforts at work are appreciated.
    2. I receive feedback regarding my performance at work.
    3. I receive financial compensation for above average performance.

ii. Reward Systems (SY)
    1. There is an effective rewards and recognition system in place.
    2. Good performance is rewarded at work.
    3. I am incentivized to go the extra mile at work.

iii. Reward Criteria (CR)
    1. I know what is expected of me to qualify for a reward.
    2. The rewards and recognition system is fair.
    3. I know exactly what would potentially qualify for reward and recognition.

Respondents were asked to mark the relevant items (as illustrated in Figure 55) that are absent in their pool, thereby obstructing effective reward and recognition (appreciation, being thanked, fairness of program, peer recognition or none of the above) for company feedback purposes.

Empowerment:

Konczak, Stelly and Trusty (2000) determined that empowerment possesses six dimensions: Delegation of Authority, Accountability (AC), Self-directed Decision Making, Information Sharing, Skill Development and Coaching for Innovative Performance. AC refers to a leader's emphasis on accountability for outcomes, skill development implies the amount of a manager's time spent on securing appropriate training to ensure that employees are equipped with the required skills to support empowerment efforts and coaching for innovative performance refers to leader behaviours that encourage new ideas, calculated risk taking and learning from mistakes (Konczak, Stelly & Trusty, 2000).

Two dimensions were collapsed in contextualising the instrument into a safety-critical environment: Skill Development and Coaching for Innovative Performance are collapsed into skill development and coaching (DC). Themes emergent from the focus group interactions (as introduced in Figure 44) were integrated with the dimensions of empowerment according to Konczak, Stelly and Trusty (2000) as illustrated in Figure 56:

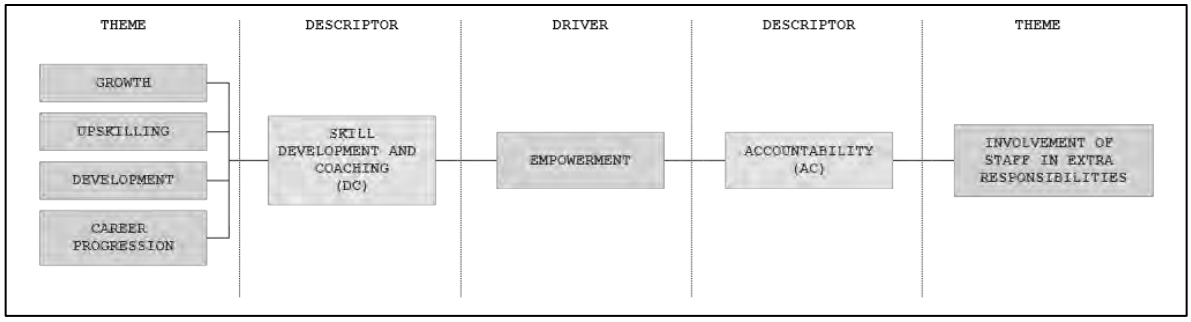

Figure 56: Themes emergent from phase one relating to empowerment, as assimilated with the selected dimensions of communication from literature (author's own)

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) as assimilated in Figure 56:

i. Skill development and coaching (DC)
    1. I have opportunities to grow and develop new skills at work.
    2. My pool manager takes positive corrective action when I make a mistake at work.
    3. My pool manager ensures that continuous learning and skill development are a priority.

ii. Accountability (ACC)
    1. There is someone who is accountable for ensuring fair career progression for me.
    2. I am held accountable for my performance at work.
    3. My pool manager holds pool members accountable to keep customers satisfied.

Respondents were asked to mark the relevant items (as illustrated in Figure 56) that are absent in their pool, thereby obstructing effective empowerment (career progression, development, growth, involvement in extra responsibilities, upskilling or none of the above) for company feedback purposes.

Fairness:

In literature, Organisational Justice is the term used to describe the role of fairness as it relates directly to the workplace (Moorman, 1991). Two dimensions of Organisational Justice are recognised (Moorman, 1991), namely Procedural Justice (PJ) and Distributive Justice, with PJ further subdivided into Formal Procedures and Interactional Justice (IJ). PJ describes the fairness of procedures used to determine the outcomes that an employee receives and IJ denotes the way in which organisational procedures are carried out, as the actions taken by managers as they enact procedures or explain decisions are vital in determining if PJ exists (Moorman, 1991; Tyler & Bies, 1990).

Themes emergent from the focus group interactions (as introduced in Figure 45) were integrated with the dimensions of fairness according to Moorman (1991) as illustrated in Figure 57:

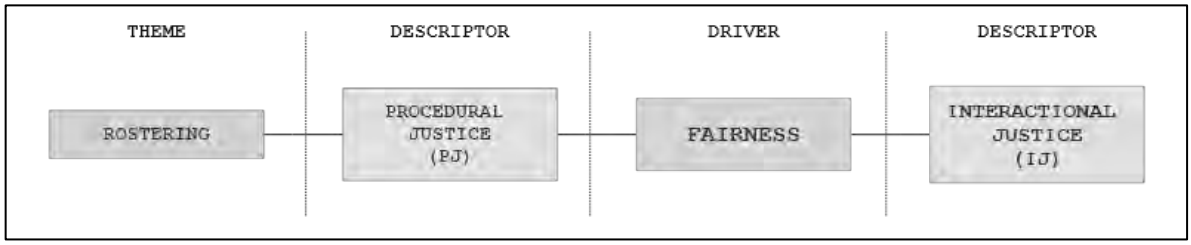

Figure 57: Themes emergent from phase one relating to fairness, as assimilated with the selected dimensions of organisational justice from literature (author's own)

The proposed scale asked respondents to rate the following items on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) as assimilated in Figure 57:

i. Procedural Justice (PJ)
    1. My pool manager collects accurate information from pool members necessary to make informed decisions.
    2. Opportunities are provided for pool members to challenge decisions made by the pool manager.
    3. Decisions are based on approved standard operating procedures.

ii. Interactional Justice (IJ)
    1. My pool manager considers my viewpoint.
    2. My pool manager makes just and fair decisions.
    3. My pool manager shows care and concern towards me as an employee.

Because rostering was the only issue specifically mentioned in the focus group interactions under the theme of fairness, a last question was included for company feedback and not for model purposes:

1. Duties on my pool's roster are consistently and fairly allocated, considering any staffing constraints.

6.6 Statistician input

The proposed scale was approved for pilot study application by a statistician after a few minor wording changes and item shifts, including changing the driver ranking

question (the second last item) to a 10-point Likert scale rating question. The final items are listed in section 6.9.

6.7 Field expert input

Saunders, Lewis and Thornhill (2015) recommend that an expert or group of experts be consulted when designing a new questionnaire, as suggestions on the questionnaire structure and the suitability and representativeness of items will assist in establishing content validity. The proposed instrument was sent to six field experts for assessment in terms of readability, flow, understandability, content and general impressions. The experts are listed in Table 21:

Table 21: List of field experts consulted in the development of MoMaD

TITLE AND NAME	JOB TITLE	QUALIFICATION(S)
DR IAN JOUBERT	SENIOR INSTRUCTOR: ATNS AVIATION TRAINING ACADEMY	MBL, DBL
DR ANDRÉ COETZEE	CEO: HENLEY AIR	B.Eng, MSc, PhD
DR JACO VAN DER WESTHUIZEN	HUMAN FACTORS SPECIALIST: ATNS	BHMSC, MBL, PhD
PROF JOHANN COETZEE	INDUSTRIAL AND AVIATION PSYCHOLOGIST	BA, BA(Hons), BA, MComm, PhD, PhD, PhD
MR DARREL BLAKE	EXECUTIVE COACHING SPECIALIST	BA(Psych.)
MR SIBUSISO NKABINDE	MANAGER AIR TRAFFIC SERVICES (FAOR): ATNS	ATCO, MBA CANDIDATE

Overall feedback was positive, with some advice provided:

1. It was pointed out that several items contained two aspects, for instance "*In my pool there is a climate of honesty and transparency in communication*" and "*My pool manager ensures that continuous learning and skill development are a priority*". These items were amended to include only one aspect.
2. Some electronic flow issues were identified on the electronic data collection method (as detailed in section 7.3), mostly to do with readability on various different devices including desktops and different brands of smart phones. The flow was amended accordingly.
3. It was suggested that more biographical information be collected and the MoMaD was amended accordingly.

6.8 Pilot study

The purpose of a pilot study is to refine the questionnaire to enable respondents to answer all questions easily and avoid data recording deficiencies (Saunders, Lewis & Thornhill, 2015). It is recommended that a pilot study should be administered to respondents who are similar to the researched population, with the minimum number of pilot responses determined by the amount of variation in the pilot population (Saunders, Lewis & Thornhill, 2015). A minimum of 10 responses is regarded as an absolute baseline, with 20 being preferable (Fink, 2013). The newly compiled MoMaD was subjected to a pilot study to determine reliability and gauge whether the constructs were emerging sufficiently from collected data.

6.8.1 Population and sample frame

The electronic MoMaD questionnaire (see section 7.3) was administered to a simple random sample of 28 ATNS employees at the ATNS head office in Bruma, Johannesburg. The sample was selected from all head office employees with previous ATCO experience who were not working as ATCOs and therefore did not form part of the research population.

6.8.2 Results

A total of 28 questionnaire links were distributed, and 21 responses received, with a response rate of 75%. There were several suggestions for extra explanation screens to be included in the online platform, which were duly added.

Pre-test reliability

The age distribution of pilot study respondents was sufficiently diverse with at least one respondent in each age category as indicated in Table 22:

Table 22: Age group distribution: Pilot study

AGE GROUP	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
18-29	1	4.8	4.8	4.8
30-39	7	33.3	33.3	38.1
40-49	8	38.1	38.1	76.2
50-59	4	19.0	19.0	95.2
60+	1	4.8	4.8	100.0
TOTAL	**21**	**100.0**	**100.0**	

Both male and female respondents were included, ensuring feedback from both genders in terms of content and readability as indicated in Table 23:

Table 23: Gender distribution: Pilot study

GENDER	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
MALE	5	23.8	23.8	23.8
FEMALE	16	76.2	76.2	100.0
TOTAL	**21**	**100.0**	**100.0**	

Responses to perceived morale rating item showed an evident distinction between morale levels at pool level and at company level (the purpose of the item for company feedback as described in section 6.3), with morale at company level being significantly lower than at pool level, as shown in Table 24 and Table 25:

Table 24: Level of morale within pool distribution: Pilot Study

MORALE	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
EXTREMELY LOW	2	9.5	9.5	9.5
LOW	11	52.4	52.4	61.9
NEITHER	5	23.8	23.8	85.7
HIGH	3	14.3	14.3	100.0
TOTAL	**21**	**100.0**	**100.0**	

Table 25: Level of morale within ATNS distribution: Pilot study

MORALE	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
EXTREMELY LOW	8	38.1	38.1	38.1
LOW	9	42.9	42.9	81.0
NEITHER	4	19.0	19.0	100.0
TOTAL	**21**	**100.0**	**100.0**	

Two respondents were able to leave the driver ranking question unanswered due to an erroneous setting in the data collection software, which was subsequently rectified, forcing respondents to answer all questions. This resulted in n=19 for driver ranking items, as shown in Table 26:

Table 26: Morale driver ranking distribution: Pilot Study

DRIVER	n	MINIMUM	MAXIMUM	MEAN	STD DEVIATION
COMMUNICATION	19	6	10	9.26	1.240
EMPOWERMENT	19	4	10	7.47	1.744
MUTUAL RESPECT	19	3	10	8.21	2.097
TRUST	19	5	10	9.21	1.357
TEAMWORK	19	4	10	7.95	1.715
REWARD AND RECOGNITION	19	4	10	8.47	1.867
BUILDING AND FACILITIES	19	1	10	6.74	2.845
JOB ESSENTIALS	19	2	10	7.63	2.362
OHAS	19	2	10	6.84	2.609
FAIRNESS	19	6	10	9.11	1.329
TOTAL	**19**				

As Table 26 indicates, Communication was ranked as the top driver of morale, and Building and Facilities as the lowest importance in terms of its effect on morale. Thus, the ranking item produced functional data in the pilot study.

Due to the same setting error in the data collection software, one respondent was able to leave the section regarding Trust as a driver of morale blank, which resulted in n=20 for the Trust driver. This setting was rectified. MoMaD factor scale and reliability statistics for the pilot study are shown in Table 27:

Table 27: Factor scale and reliability statistics: Pilot study

DRIVER	*n*	MEAN	VARIANCE	STD DEVIATION	*n* OF ITEMS	CRONBACH'S α
MORALE (MIM)	21	18.6190	13.348	3.65344	6	.667
COMMUNICATION	21	26.19	32.662	5.715	9	.837
EMPOWERMENT	21	17.05	17.248	4.153	6	.792
MUTUAL RESPECT	21	28.14	25.329	5.033	9	.790
TRUST	20	16.05	11.629	3.410	6	.658
TEAMWORK	21	30.24	43.790	6.617	9	.897
REWARD AND RECOGNITION	21	20.90	15.790	3.974	9	.648
BUILDING AND FACILITIES	21	12.33	14.633	4.589	6	.753
JOB ESSENTIALS	21	15.90	22.390	4.781	6	.749
OHAS	21	23.76	40.390	6.355	9	.847
FAIRNESS	21	18.20	24.090	4.908	6	.879
TOTAL	**19**				**81**	**.774**

Cronbach's α scores are deemed to be acceptable above 0.70 (Pallant, 2013). An overall Cronbach's α value of 0.774 indicates acceptable reliability for the instrument based on pilot study data. In terms of individual factor Cronbach's α values, the values of Morale, Trust and Reward and Recognition falls marginally below 0.70. This was noted, but due to differences in performance management criteria at ATNS head office, the omitted Trust items for one respondent and the more corporate environment when compared to the highly technical ATS environment, identified low α instrument items were retained as is after robust interrogation and discussion.

The pilot study provided a valuable opportunity to refine both the MoMaD itself, as well as test the usability of the data collection software (as detailed in section 7.3) and its presentation to respondents.

6.9 Instrument finalisation: Measure of Morale and its Drivers (MoMaD)

After items were amended according to the statistician and field expert feedback received and pilot study data analysis, the final MoMaD items for this research are documented in Table 28:

Table 28: Final MoMaD items for use in phase two data collection

ITEM	DIMENSION	DESCRIP-TOR	ITEM
B1	BIOGRAPHICAL	N/A	AGE GROUP
B2	BIOGRAPHICAL	N/A	GENDER
B3	BIOGRAPHICAL	N/A	ROLE
B4	BIOGRAPHICAL	N/A	STATION
B5	BIOGRAPHICAL	N/A	POOL
B6	BIOGRAPHICAL	N/A	EMPLOYMENT DURATION
SIM1	PERCEIVED MORALE	N/A	With the definition of morale in mind, please rate the current level of your morale in your pool
SIM2	PERCEIVED MORALE	N/A	With the definition of morale in mind, please rate the current level of your morale in ATNS
MIM1	MIM	N/A	I look forward to going to work
MIM2	MIM	N/A	I feel in control at work
MIM3	MIM	N/A	My job is interesting
MIM4	MIM	N/A	I feel cheerful at work
MIM5	MIM	N/A	I feel lots of energy at work
Q9	COMMUNICATION	CC	New information regarding my job execution is communicated timeously
Q10	COMMUNICATION	CC	Communication between pool members is efficient
Q11	COMMUNICATION	CC	In my pool there is a climate of transparency in communication.
Q12	COMMUNICATION	MQ	My pool manager uses a suitable channel of communication (email, WhatsApp, meetings)
Q13	COMMUNICATION	MQ	My pool manager communicates important information frequently
Q14	COMMUNICATION	MQ	Important information is easily available to me when I need it
Q15	COMMUNICATION	SC	My pool manager understands the problems faced by pool members
Q16	COMMUNICATION	SC	There is effective communication between me and my pool manager
Q17	COMMUNICATION	SC	My pool manager is held accountable for effective communication in the pool
Q18	EMPOWERMENT	SD	I have opportunities to develop new skills at work
Q19	EMPOWERMENT	SD	My pool manager focuses on corrective action rather than placing blame when I make a mistake
Q20	EMPOWERMENT	SD	My pool manager ensures that continuous learning is a priority
Q21	EMPOWERMENT	AC	There is someone who is accountable for ensuring fair career progression for me
Q22	EMPOWERMENT	AC	I am held accountable for my performance at work
Q23	EMPOWERMENT	AC	My pool manager holds pool members accountable to keep customers satisfied
Q24	MUTUAL RESPECT	SM	Management and pool members understand what goes into each other's work

ITEM	DIMENSION	DESCRIP-TOR	ITEM
Q25	MUTUAL RESPECT	SM	Management and pool members appreciate each other's contribution to the organisation
Q26	MUTUAL RESPECT	SM	Management and pool members speak to each other in a respectful manner
Q27	MUTUAL RESPECT	SE	Pool members have a good attitude towards the job
Q28	MUTUAL RESPECT	SE	Pool members display cultural respect at work
Q29	MUTUAL RESPECT	SE	My pool is sufficiently respectful of diversity and our differences
Q30	MUTUAL RESPECT	PR	Pool members display professional respect at work
Q31	MUTUAL RESPECT	PR	Pool members respect professional hierarchy
Q32	MUTUAL RESPECT	PR	There is sufficient *give and take* in terms of respect between our pool and other departments – we give as much respect as we demand
Q33	TRUST	PT	Most people can be trusted
Q34	TRUST	PT	I believe that people usually keep their promises
Q35	TRUST	PT	When people make promises, they generally deliver on them
Q36	TRUST	IT	There is a very high level of trust throughout my pool
Q37	TRUST	IT	Pool members trust that management promises will be honoured at work
Q38	TRUST	IT	My pool manager trusts pool members to make good decisions
Q39	TEAMWORK	PS	Pool members are loyal to each other
Q40	TEAMWORK	PS	Pool members support each other to get the work done despite challenges at work
Q41	TEAMWORK	PS	Pool members keep each other informed about work related issues
Q42	TEAMWORK	TV	Pool members agree over the appropriateness of pool objectives
Q43	TEAMWORK	TV	Pool members share the same vision at work
Q44	TEAMWORK	TV	Pool members know what the pool objectives are
Q45	TEAMWORK	TO	My pool has a good reputation within ATNS
Q46	TEAMWORK	TO	My pool is a high-performance team
Q47	TEAMWORK	TO	My pool has clear criteria which pool members try to meet to achieve excellence as a team
Q48	REWARD	TY	My efforts at work are appreciated
Q49	REWARD	TY	I receive feedback regarding my performance at work
Q50	REWARD	TY	I receive financial compensation for above average performance
Q51	REWARD	SY	There is an effective rewards and recognition system in place
Q52	REWARD	SY	Good performance is rewarded at work
Q53	REWARD	SY	I am incentivised to go the extra mile at work
Q54	REWARD	CR	I know what is expected of me to qualify for a reward
Q55	REWARD	CR	The rewards and recognition system is fair
Q56	REWARD	CR	I know exactly what would potentially qualify for reward and recognition
Q57	BUILDING	BU	The physical building in which I work is adequately maintained
Q58	BUILDING	BU	The kitchen facility is adequate
Q59	BUILDING	BU	The bathroom facilities are functional
Q60	BUILDING	FA	The air conditioning provided on position is adequate
Q61	BUILDING	FA	The resting facilities are adequate in providing the necessary rest and recovery during breaks
Q62	BUILDING	FA	Administrative procedures at my station (such as sign on duties and access control) are sufficiently streamlined

ITEM	DIMENSION	DESCRIP-TOR	ITEM
Q63	N/A	FEEDBACK	Refreshments in the kitchen (coffee, tea, milk, sugar) are adequate
Q64	N/A	FEEDBACK	Overall, ATNS provides enough assistance to keep the building and facilities in an acceptable condition
Q65	JOB ESSENTIALS	EQ	The serviceability of core function equipment (headsets, radios) is acceptable.
Q66	JOB ESSENTIALS	EQ	There is sufficient access to computers with internet access at my station for work related purposed
Q67	JOB ESSENTIALS	EQ	The systems required to do my job are integrated to ensure efficient operations
Q68	JOB ESSENTIALS	ST	The staffing levels in my pool are acceptable
Q69	JOB ESSENTIALS	ST	There is sufficient planning in terms of future staffing at work
Q70	JOB ESSENTIALS	ST	The administrative process relating to CAA licencing is adequately prioritised
Q71	N/A	FEEDBACK	The procurement process adequately prioritises items that are essential to the core business function
Q72	N/A	FEEDBACK	Overall, I feel that ATNS provides enough timeous support through its procurement process to ensure peak core function performance
Q73	OHAS	HE	There is clean drinking water freely available in my station
Q74	OHAS	HE	The air quality at my working position is acceptable
Q75	OHAS	HE	The ablution facilities are serviceable
Q76	OHAS	SA	I am well informed regarding the emergency escape plan
Q77	OHAS	SA	There are no objects that could significantly harm me in the workplace (e.g. sharp protruding corners)
Q78	OHAS	SA	There are no water leaks in my station building that could pose a risk to people at work
Q79	OHAS	PI	There is sufficient accountability for reported OHAS risks that remain unrectified after a reasonable period
Q80	OHAS	PI	When OHAS risks are identified in my station, they are rectified as a matter of urgency
Q81	OHAS	PI	OHAS is a priority at my station
Q82	FAIRNESS	PJ	My pool manager collects accurate information from pool members necessary to make informed decisions
Q83	FAIRNESS	PJ	Opportunities are provided for pool members to challenge decisions made by the pool manager
Q84	FAIRNESS	PJ	Decisions are based on approved standard operating procedures
Q85	FAIRNESS	IJ	My pool manager considers my viewpoint
Q86	FAIRNESS	IJ	My pool manager makes just and fair decisions
Q87	FAIRNESS	IJ	My pool manager shows care and concern towards me as an employee
Q88	N/A	FEEDBACK	Duties on my pool's roster is allocated in a fair manner, considering any staffing and operational constraints
Q89	N/A	FEEDBACK	Please rate the importance of the below drivers in order of their effect on morale in your pool
Q90	N/A	DEFINITION	Do you agree with the definition of morale provided below?

All items listed in Table 28 are based on a 5-point Likert-type scale (strongly disagree, disagree, neither agree or disagree, disagree, strongly disagree) apart from items 1 and 2 (extremely low, low, neither high or low, high, extremely high) and item 89 which is based on a 10-point scale (1 as least important to 10 as most important).

6.10 Synthesis

The MoMaD instrument was developed by using the qualitative data obtained in phase one. This chapter presented the process that was followed during instrument development. The next chapter presents the quantitative research results obtained from administering the MoMaD to the research population, as well as describes the development of a model for ATCO morale in a safety-critical ATC environment and presents a discussion of research results.

Chapter 7: Quantitative research results and model development

"If you focus on results, you will never change. If you focus on change, you will get results."

- Jack Dickson (DeFord, 2004:35)

7.1 Introduction

This exploratory sequential mixed method research aimed to obtain the definition and drivers of morale qualitatively, to assemble a quantitative instrument from the qualitative results and to operationalise this instrument by measuring the levels of both morale and its drivers amongst air traffic controllers (ATCOs) within Air Traffic and Navigational Services S.O.C. Ltd (ATNS). These steps were followed with the aim of constructing an air traffic controller team morale model with reference to followership.

The purpose of the quantitative second phase of this research was to measure the levels of morale and its drivers within each ATC centre within ATNS and determine the impact of each of the identified drivers on ATCO morale levels to construct a model that enables the measurement of morale and its drivers. A visual reminder of where this phase fits into the research journey is provided in Figure 58:

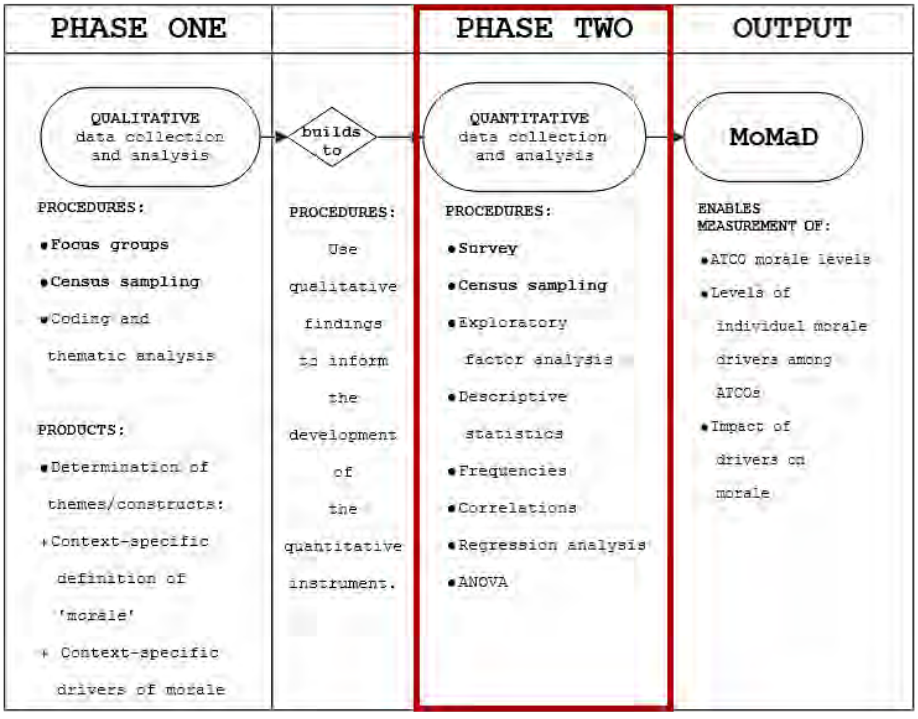

Figure 58: Exploratory sequential mixed method approach (adapted from Creswell & Plano Clark, 2018) as applied in the research, with phase two highlighted for research progress reference

Morale, with its dimensions as defined by Hardy (2010) in section 3.6.3 and contained in Hardy's (2010) multi-item measure (MIM) of morale, represents the dependent variable and the qualitatively identified drivers of morale the independent variables. The preliminary factor structure, updated after the qualitative phase, is illustrated in Figure 59:

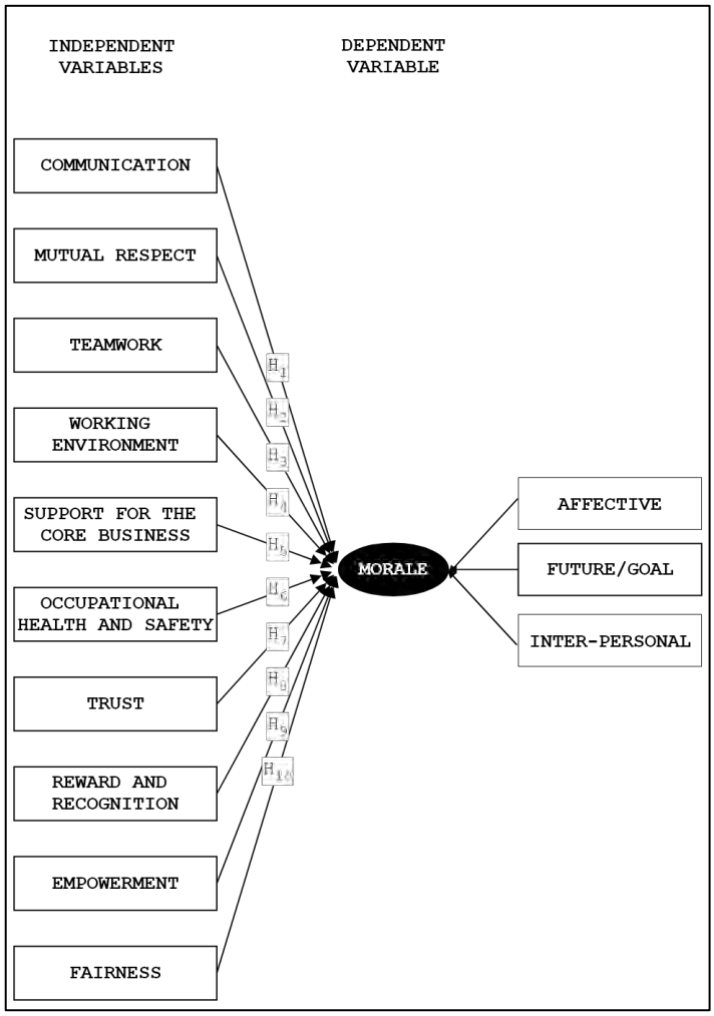

Figure 59: Updated preliminary factor structure (author's own)

The empirical objectives applicable to this phase of the research were to:

EO3: Measure the levels of morale within each ATC centre in ATNS.

EO4: Identify the impact of each driver on ATCO morale levels.

EO5: Construct a final follower-centric model for the measurement and management of morale in a safety-critical ATC environment.

The previous chapter presented the steps taken in the development of a research instrument. This chapter describes phase two of the research by presenting the

quantitative research results obtained from administering the research instrument to the researched population as well as detailing the construction of a model for morale in a safety-critical ATC environment. A discussion of research results rounds off the chapter.

7.2 Population and sample frame

The quantitative data collection process included all 21 ATNS air traffic control stations. The researched population comprised of ATC followers in all of the 21 operational ATC units within ATNS, with a population of 570 individuals at the time of data collection. ATNS stations are located and named as listed in Table 29:

Table 29: ATNS air traffic control stations, locations and staff complement

	NAME	LOCATION	CODE	POPULATION
1	Bisho Airport	Bisho, Eastern Cape	FABE	5
2	Bram Fisher International Airport	Bloemfontein, Free State	FABL	27
3	Cape Town International Airport	Cape Town, Western Cape	FACT	101
4	East London Airport	East London, Eastern Cape	FAEL	21
5	George Airport	George, Western Cape	FAGG	25
6	Rand Airport	Germiston, Gauteng	FAGM	17
7	Kimberley Airport	Kimberley, Northern Cape	FAKM	6
8	Kruger Mpumalanga International Airport	Mbombela, Mpumalanga	FAKN	16
9	Lanseria International Airport	West Rand, Gauteng	FALA	24
10	King Shaka International Airport	Durban, Kwazulu-Natal	FALE	40
11	Mmabatho International Airport	Mahikeng, North West	FAMM	3
12	OR Tambo International Airport	Kempton Park, Gauteng	FAOR	193
13	Port Elizabeth International Airport	Nelson Mandela Bay, Eastern Cape	FAPE	37
14	Oribi Airport	Pietermaritzburg, Kwazulu-Natal	FAPM	6
15	Pilanesberg International Airport	Sun City, North West	FAPN	5
16	Polokwane International Airport	Polokwane, Limpopo	FAPP	6
17	Upington International Airport	Upington, Northern Cape	FAUP	5
18	Mthatha Airport	Mthatha, Eastern Cape	FAUT	5
19	Virginia Airport	Umhlanga, Kwazulu-Natal	FAVG	7
20	Wonderboom Airport	Pretoria, Gauteng	FAWB	19
21	Saint Helena International Airport	Longwood, Saint Helena	FHSH	2
			TOTAL	**570**

A census approach to sampling implies that the entire population is researched. This research employed a census approach, which is always preferable to sampling, as the entire population is researched and possible bias in selection is eliminated.

7.3 Method of data collection

The Measure of Morale and Drivers (MoMaD) (with items detailed in Table 28), was administered to the entire ATNS ATCO population over the course of one month. An online questionnaire platform was utilised (JotForm, 2020) for survey distribution, and an HTML link sent to all respondents via email, social media and QR codes printed onto wall-mounted posters in each ATC centre.

A private social media group was created, which included contact persons from each station (who volunteered during the qualitative phase) to keep respondents informed about the data collection process, remind them to participate and distribute the research results. Data collection progress reports were constantly shared on this platform, which was a vital step in enlisting participation in an environment with less than ideal morale.

7.4 Phase two: Quantitative data

The MoMaD instrument (as developed in Chapter 6 and detailed in Table 28) used in the quantitative phase of this research yielded an electronic dataset that can be downloaded at any time in un-coded raw Microsoft Excel format for cross-referencing purposes by entering the URL https://www.jotform.com/excel/202401774950048 into any browser window. It contains the following data:

1. For research objective and modelling purposes:
    a. The measured level of ATCO pool morale (as defined in phase one) amongst ATCOs within ATNS.
    b. The measured level of each morale driver amongst ATCOs within ATNS.
    c. The perceived accuracy of the qualitatively obtained definition of morale.
2. For company feedback purposes:
    a. The perceived levels of ATCO morale within ATNS.
    b. Pool-specific feedback regarding Building and facilities, Job essentials, OHAS and Fairness.
    c. The hurdles obstructing the effectiveness of drivers by their absence in each pool, as obtained from the qualitative phase and detailed under each driver in section 6.5.1.

d. The ranked perceived effect on morale of the themes identified as drivers of morale in the qualitative phase in each pool.

Venter and Van Zyl (2017) recommend a step-wise approach to data analysis, as illustrated in Figure 60, which was adhered to in this chapter. Data was prepared for analysis, after which the reliability of scales were determined. A preliminary data analysis was completed, after which the relationships between variables were explored.

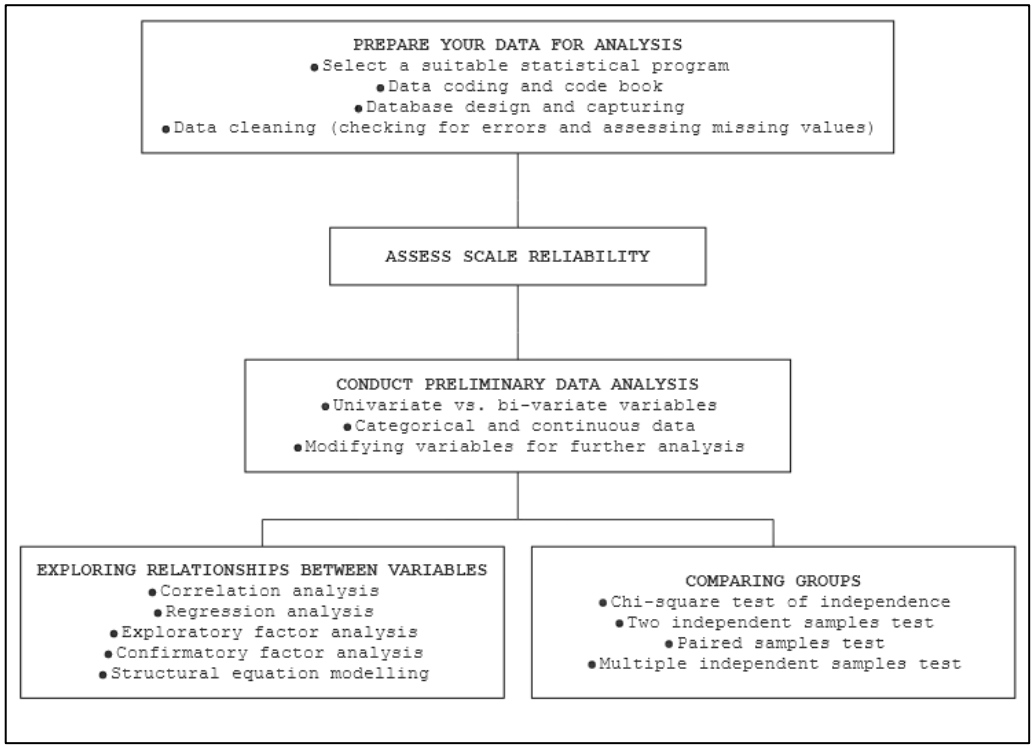

Figure 60: Roadmap to analysing data (Venter & Van Zyl, 2017)

Collected data were analysed in a step-wise manner by following the roadmap illustrated in Figure 60.

7.5 Preparation for data analysis

The assistance of a statistician with access to Statistical Package for Social Sciences (SPSS) software, as well as the SPSS AMOS module for the regression modelling, was enlisted to enable data analysis. A code book was created (attached as Appendix J) and data coded accordingly. The database was designed and captured automatically by the online platform, resulting in clean, error-free data with no missing

values as the online platform settings were sufficiently tested and adjusted during the pilot study.

7.6 Scale reliability

Internal consistency as an indication of the reliability of a scale is commonly measured by calculating and assessing the Cronbach's alpha coefficient, which indicates whether items in a scale are all measuring the same underlying construct (Venter & Van Zyl, 2017). A Cronbach alpha coefficient was calculated for various driver scales and evaluated using the guidelines suggested by George and Mallery (2018) where > .9 excellent, > .8 good, > .7 acceptable, > .6 questionable, > .5 poor, and ≤ .5 unacceptable. The overall 56-item MoMaD scale displayed a Cronbach's alpha coefficient of 0.95, indicating excellent reliability, with a 95% confidence level lower bound of 0.94.

7.7 Preliminary data analysis

The purpose of a preliminary data analysis is to gain an understanding of the data by inspecting the distribution of received responses in order to make decisions regarding the most appropriate statistics to report, whether or not any categories need to be collapsed, if the variables meet the assumptions of the statistical techniques that will be used or whether the data requires any transformation before it can be analysed (Venter & Van Zyl, 2018). Frequencies and descriptive statistics were used to describe the variation in the data and determine if the variables meet the assumptions for the statistical techniques to be used.

7.7.1 Frequencies and descriptive statistics

Descriptive statistics are used to describe the basic features of data in research (Leedy & Ormrod, 2014), providing an overview of the biographical distribution of respondents as well as perceptions, frequencies and central tendencies regarding the drivers of morale.

Biographical data

Items B1 to B6 of the MoMaD (as listed in Table 28) provided respondent biographical data. From the total population of 570 ATCOs, 256 responses were

received, representing a total response rate of 44.9%. The overall responses per station are listed in Table 30:

Table 30: Station-level response distribution

CODING	POOL	STATION	RESPONSES	POPULATION	RESPONSE RATE
S22	STH2	FABE	4	5	80.0%
S15	NTH2	FABL	15	27	55.6%
S21	STH1	FACT	41	101	40.6%
S18	STH2	FAEL	5	21	23.8%
S20	STH1	FAGG	14	25	56.0%
S4	STH3	FAGM	5	17	29.4%
S16	NTH2	FAKM	2	6	33.3%
S14	STH4	FAKN	9	16	56.3%
S1	STH3	FALA	14	24	58.3%
S12	NTH3	FALE	17	40	42.5%
S23	STH3	FAMM	2	3	66.7%
S9	NTH1	FAOR ACCCEW	15	33	45.4%
S5	NTH1	FAOR ACCNS	16	34	47.1%
S7	NTH1	FAOR APP	21	28	75.0%
S3	NTH1	FAOR ATSO	17	77	22.1%
S8	NTH1	FAOR TWR	11	21	52.4%
S19	STH2	FAPE	9	37	24.3%
S11	NTH3	FAPM	4	6	66.7%
S13	STH3	FAPN	4	5	80.0%
S2	STH4	FAPP	6	6	100.0%
S6	NTH2	FAUP	3	5	60.0%
S24	STH2	FAUT	3	5	60%
S10	NTH3	FAVG	6	7	85.7%
S17	STH4	FAWB	13	19	68.4%
S25	STH1	FHSH	0	2	0.0%
25	**7**	**TOTAL**	**256**	**570**	**44.9%**

As shown in Table 30, the best response rate was received from station S2 and the lowest response rate from station S25. Low population numbers in smaller stations necessitated the collapsing of stations into pools. The realised pool-level sample distribution is listed in Table 31:

Table 31: Realised pool-level sample distribution

NORTHERN REGION					RESPONSES	POPULATION	RESPONSE RATE
NTH1	FAOR (ACCCEW, ACCNS, APP, ATSO & TWR)				80	193	41.5%
NTH2	FABL	FAKM	FAUP		20	38	52.6%
NTH3	FALE	FAPM	FAVG		27	53	50.9%
					127	**284**	**44.7%**
SOUTHERN REGION							
STH1	FACT	FAGG	FHSH		55	128	43.0%
STH2	FAPE	FAEL	FABE	FAUT	21	68	30.9%
STH3	FALA	FAGM	FAPN	FAMM	25	49	51.0%
STH4	FAWB	FAPP	FAKN		28	41	68.3%
					129	**286**	**45.1%**
TOTAL					**256**	**570**	**44.9%**

Responses received were 50% male and 50% female, with 128 responses per gender. The vast majority of respondents were under the age of 40, as illustrated in Table 32:

Table 32: Respondent age group distribution

AGE CATEGORY	COUNT	PROBABILITY
18-29	87	0.33984
30-39	120	0.46875
40-49	40	0.15625
50-59	8	0.03125
60+	1	0.00391
TOTAL	**256**	**1.00000**

Two age category items, 50-59 and 60+ were collapsed into a new category of 50+ due to only one response having been received in the 60+ category. This resulted in a total of 9 responses received in the 50+ category. In terms of tenure, 60.5% of respondents had been employed by ATNS for 10 years or less, as shown in Table 33:

Table 33: Respondent tenure distribution

TENURE (YEARS)	COUNT	PROBABILITY
0-5	83	0.32422
6-10	72	0.28125
11-15	43	0.16797
16-20	33	0.12891
21-25	16	0.06250
26+	9	0.03516
TOTAL	**256**	**1.00000**

Table 32 and Table 33 indicates a relatively young workforce, with older ATCOs generally ending up in small, specialised pools at bigger stations such as FAOR or FACT as confirmed in Table 34:

Table 34: Frequencies for age groups per pool

AGE GROUP	NTH1	NTH2	NTH3	STH1	STH2	STH3	STH4
18-29	22 (28%)	10 (50%)	7 (26%)	15 (27%)	10 (48%)	10 (40%)	13 (46%)
30-39	39 (49%)	7 (35%)	17 (63%)	27 (49%)	7 (33%)	10 (40%)	13 (46%)
40-49	17 (21%)	3 (15%)	3 (11%)	11 (20%)	3 (14%)	2 (8%)	1 (4%)
50+	2 (2%)	0 (0%)	0 (0%)	2 (4%)	1 (5%)	3 (12%)	1 (4%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

As shown in Table 34, 72% of respondents at FAOR (NTH1) were above the age of 30, which shows a markedly older age distribution than elsewhere. STH1 contains

FACT as well as 14 responses from FAGG, but a similar trend can nevertheless be observed when compared to other pools.

Morale

Two measures of morale, a SIM and MIM, were included in the MoMaD instrument, as explained and described in sections 6.3 and 6.4.

Single-Item Measure of morale (SIM)

Perceived levels of morale were measured as items SIM1 and SIM2 of the MoMaD (as listed in Table 28) by providing respondents with the qualitatively obtained definition of morale and asking them to use this definition to rate their morale on a 5-point Likert-type scale. Item SIM1 measured the perceived level of morale at pool level and item SIM2 measured the perceived level of ATCO morale within ATNS. Overall, the perceived levels of morale within the ATCO pools displayed a reasonably symmetrical normal distribution, as Figure 61 illustrates:

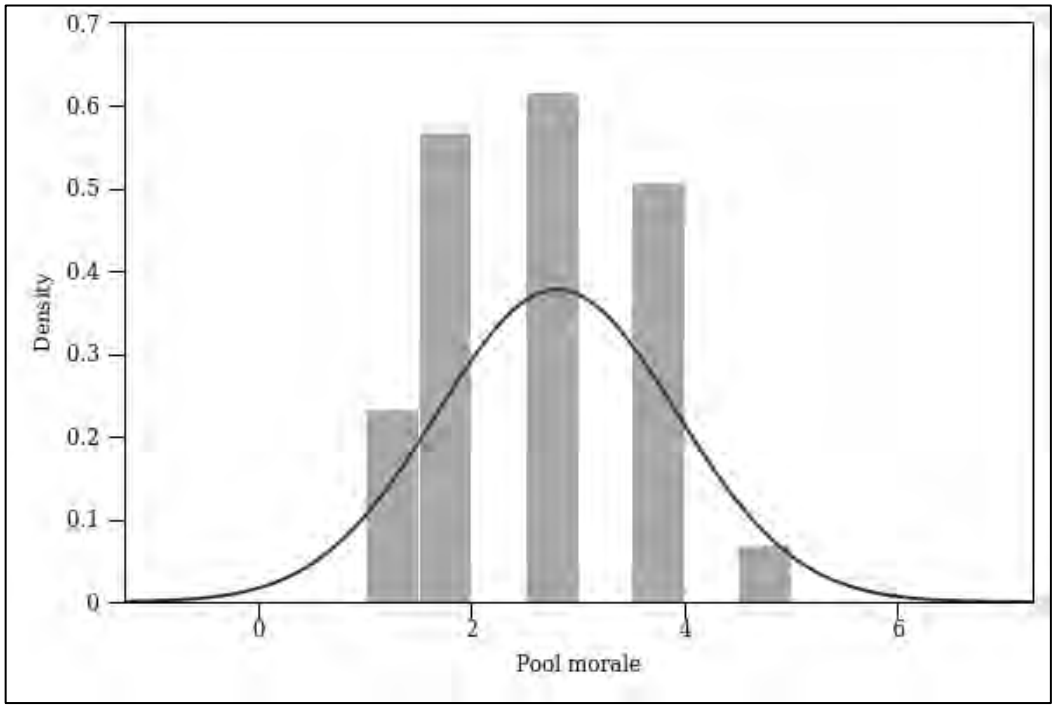

Figure 61: Distribution of perceived levels of ATCO pool morale as measured with SIM1

When the skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the kurtosis is greater than or equal to 3, the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013). Frequency distributions were

calculated at pool level, and Table 35 shows that without the STH3 and STH4 pool responses the picture would have been considerably bleaker in terms of the mean morale levels.

Table 35: Distribution of perceived pool morale by pool as measured by SIM1

POOL	*M*	*SD*	*n*	SE_M	MIN	MAX	SKEWNESS	KURTOSIS	*MDN*
NTH1	2.83	1.05	80	0.12	1.00	5.00	-0.17	-0.59	3.00
NTH2	2.75	1.07	20	0.24	1.00	4.00	-0.28	-1.12	3.00
NTH3	2.81	1.08	27	0.21	1.00	4.00	-0.38	-1.10	3.00
STH1	2.53	1.00	55	0.13	1.00	5.00	0.60	-0.18	2.00
STH2	2.52	1.17	21	0.25	1.00	4.00	0.04	-1.41	2.00
STH3	3.20	1.00	25	0.20	1.00	5.00	-0.15	-0.48	3.00
STH4	3.18	0.98	28	0.19	2.00	5.00	0.11	-1.20	3.00
OVERALL	**2.80**	**1.06**	**256**	**0.07**	**1.00**	**5.00**	**-0.03**	**-0.81**	**3.00**

Table 36 lists the distributions of perceived pool morale as measured with the SIM1 in the various pools within OR Tambo International Airport (the largest centre):

Table 36: Distribution of perceived pool morale by pool within FAOR as measured by SIM1

POOL	*M*	*SD*	*n*	SE_M	MIN	MAX	SKEWNESS	KURTOSIS	*MDN*
ACC	2.84	0.82	31	0.15	1.00	4.00	-0.44	-0.17	3.00
APP	3.00	1.14	21	0.25	1.00	5.00	0.00	-0.70	3.00
ATSO	2.65	1.41	17	0.34	1.00	5.00	-0.03	-1.46	3.00
TWR	2.73	0.90	11	0.27	1.00	4.00	-0.30	-0.53	3.00
OVERALL	**2.83**	**1.05**	**80**	**0.12**	**1.00**	**5.00**	**-0.17**	**-0.59**	**3.00**

Within Cape Town International Airport ATC centre, the distribution of perceived morale per pool as measured by the SIM1 is as follows:

Table 37: Distribution of perceived pool morale by pool within FACT as measured by SIM1

POOL	*M*	*SD*	*n*	SE_M	MIN	MAX	SKEWNESS	KURTOSIS	*MDN*
ACC	2.25	1.18	16	0.30	1.00	5.00	1.50	1.43	2.00
ATSO	2.94	0.77	16	0.19	2.00	4.00	0.10	-1.21	3.00
TWR/APP	1.89	0.60	9	0.20	1.00	3.00	-0.02	-0.01	2.00
OVERALL	**2.44**	**1.00**	**41**	**0.23**	**1.00**	**5.00**	**0.53**	**0.07**	**2.00**

The overall dataset mean for pool morale as measured with the SIM1 of morale within ATNS ATCO pools was 2.80. Top two box scores (T2B) are used to summarise the positive responses from a Likert-type scaled survey item. It combines the total number of responses returned indicating the sum of the two highest scale items (High and Extremely high), which is then presented as a percentage of the total number of responses.

Bottom two box scores (B2B) reflect the sum of the lowest scale items (Extremely low and Low). The T2B, B2B and Neutral scores (representing responses in the neutral 3-box on a 5-point Likert-type scale) are summarised in Table 38:

Table 38: Top two box, neutral and bottom two box scores for perceived pool morale (SIM1)

NORTHERN REGION					T2B	NEUTRAL	B2B
NTH1	FAOR (ACCCEW, ACCNS, APP, ATSO & TWR)				26%	40%	24%
NTH2	FABL	FAKM	FAUP		30%	30%	40%
NTH3	FALE	FAPM	FAVG		33%	30%	37%
REGION SCORES					**28.4%**	**36.2%**	**35.4%**
SOUTHERN REGION							
STH1	FACT	FAGG	FHSH		18%	24%	58%
STH2	FAPE	FAEL	FABE	FAUT	29%	19%	52%
STH3	FALA	FAGM	FAPN	FAMM	40%	36%	24%
STH4	FAWB	FAPP	FAKN		43%	25%	32%
REGION SCORES					**29.5%**	**25.5%**	**45.0%**
OVERALL SCORES					**28.9%**	**30.9%**	**40.2%**

Note. Due to rounding errors, pool total percentages may not equal 100%.

The overall ATNS-wide level of perceived pool morale ($\mathrm{M} = 2.80, n = 256$) and the overall ATNS-wide T2B score (28.9%) for perceived pool morale as measured by the SIM1 of morale indicated a low level of perceived morale within ATNS ATCO pools.

Multi-Item Measure of morale (MIM)

Morale was additionally measured by means of the Multi-Item Measure of Morale (MIM) (Hardy, 2010) as items MIM1-MIM5 of the MoMaD, as described in section 6.3. The overall distribution of MIM responses are illustrated in Figure 62:

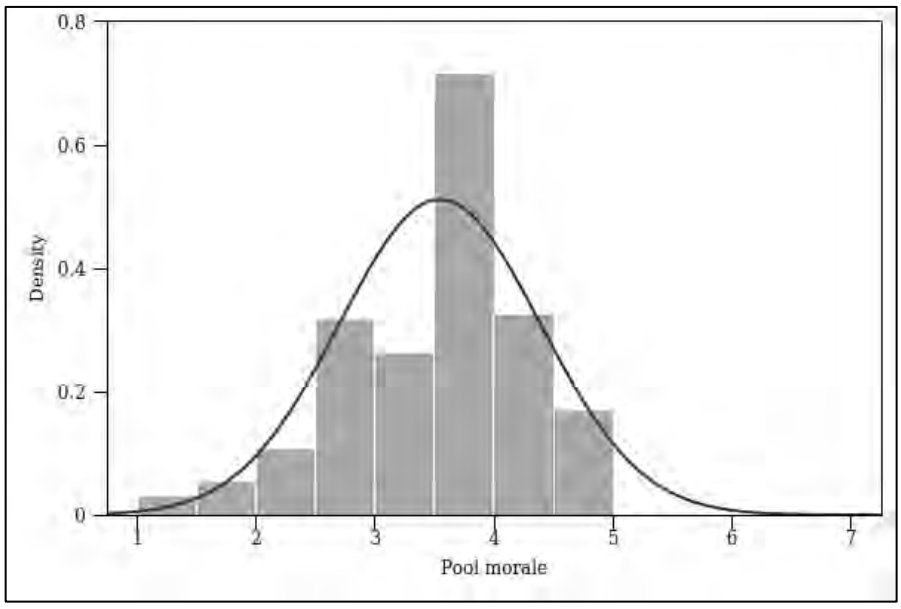

Figure 62: Distribution ATCO pool morale as measured with MIM

It was observed that the overall distribution was significantly higher than what was measured by SIM1. The overall dataset mean was calculated as 3.60, compared to 2.80 as measured by SIM1. Breaking the distributions down by pool level revealed a similarly higher trend, as illustrated in Table 39:

Table 39: Summary statistics for pool morale by pool as measured by MIM

POOL	*M*	*SD*	*n*	SE_M	MIN	MAX	SKEWNESS	KURTOSIS	*MDN*
NTH1	3.62	0.82	80	0.09	1.00	5.00	-0.78	0.85	3.80
NTH2	3.26	0.81	20	0.18	1.00	4.20	-1.09	1.05	3.30
NTH3	3.41	0.68	27	0.13	2.00	4.40	-0.48	-0.81	3.40
STH1	3.53	0.65	55	0.09	1.60	4.60	-0.62	0.07	3.60
STH2	3.31	1.02	21	0.22	1.00	5.00	-0.71	-0.33	3.60
STH3	3.89	0.77	25	0.15	2.20	5.00	-0.29	-0.66	3.80
STH4	3.83	0.65	28	0.12	2.40	5.00	-0.31	-0.30	4.00
OVERALL	**3.60**	**0.78**	**256**	**0.05**	**1.00**	**5.00**	**-0.70**	**0.56i**	**3.80**

The T2B, B2B and neutral score breakdown continued in the same vein, as illustrated in Table 40:

Table 40: Top two box, neutral and bottom two box scores for pool morale (MIM)

NORTHERN REGION					**T2B**	**NEUTRAL**	**B2B**
NTH1	FAOR (ACCCEW, ACCNS, APP, ATSO & TWR)				61%	23%	16%
NTH2	FABL	FAKM	FAUP		54%	25%	21%
NTH3	FALE	FAPM	FAVG		52%	29%	19%
REGION SCORES					**58.0%**	**24.7%**	**17.3%**
SOUTHERN REGION							
STH1	FACT	FAGG	FHSH		56%	29%	15%
STH2	FAPE	FAEL	FABE	FAUT	59%	13%	28%
STH3	FALA	FAGM	FAPN	FAMM	69%	18%	13%
STH4	FAWB	FAPP	FAKN		68%	24%	8%
REGION SCORES					**61.8%**	**23.1%**	**15.1%**
OVERALL SCORES					**59.9%**	**23.9%%**	**16.2%**

Note. Due to rounding errors, pool total percentages may not equal 100%.

Once again it was apparent that the overall morale level was significantly higher than what was measured by SIM1. The overall T2B score for morale amongst ATNS ATCOs was calculated as 59.9%, compared to 28.9% as measured by SIM1.

To understand this difference, a profile plot of individual MIM item (MIM1-MIM5, as listed in Table 28) means is presented in Figure 63:

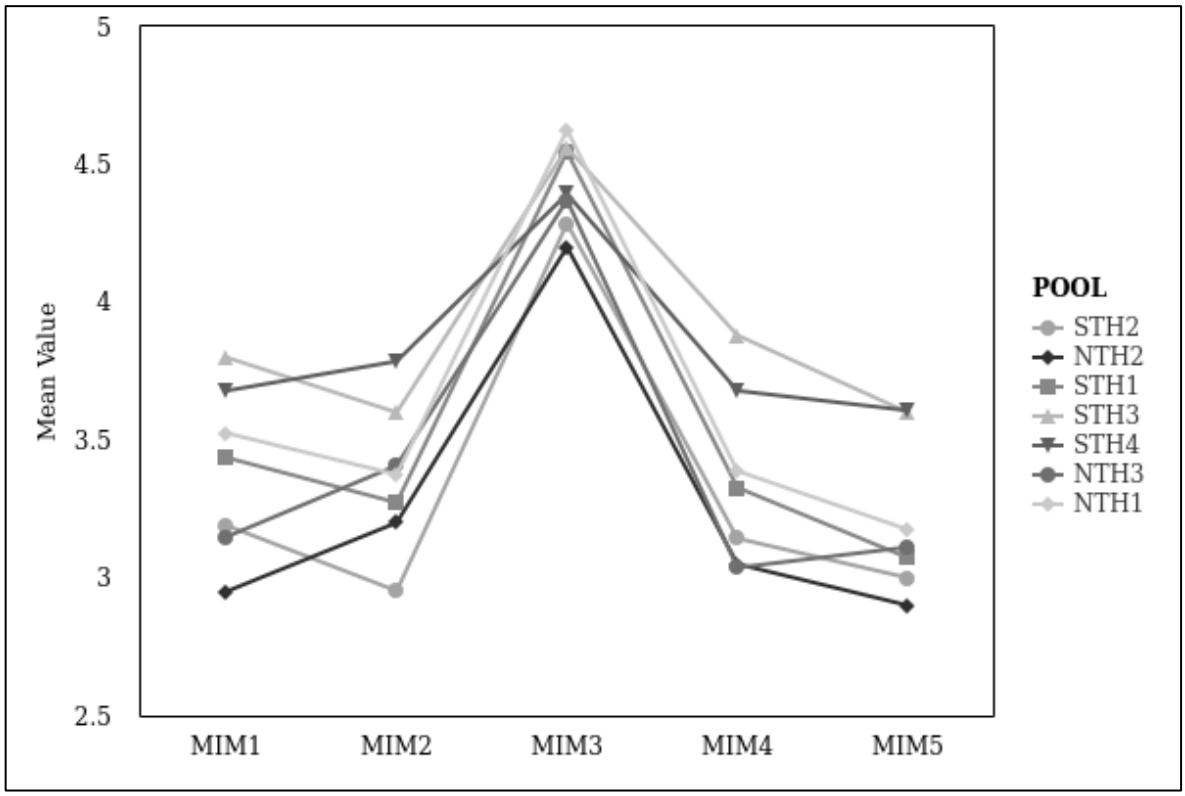

Figure 63: Profile plot of MIM item response means per pool

It is apparent from Figure 63 that item MIM3 had an unusually high mean (4.49 out of a possible 5.00), which influences the means of other items to be significantly higher. The item wording ("My job is interesting") may have something to do with this – ATCOs in general find their jobs to be extremely interesting, regardless of their morale levels. To illustrate this point, an S12 ATCO said during phase one: "*Uhm, I'm probably right or wrong, please correct me, all of those [other mentioned morale drivers] affect job satisfaction, but if I work a good sequence I don't care about all of those things - honestly, my morale is sitting up there!*". AN S5 ATCO added: "*Can I just say…the thing that keeps us coming back is the job that we do. I think like 99% of ATCs love their job and we are such a rare portion of the population, because if somebody asked me* 'what do you do?*' and I say air traffic control I say it with such pride in my voice, because I'm such a small portion of the population that does it, but I love coming to work - it's amazing! And plugging in – everything else just disappears.*"

Many other mentions of this point were made, but an S8 ATCO summed up the sentiment by saying: "*The work itself is a driver for me, because we do love what we do and if you come here and you had to do [something else] every single day you wouldn't come to work anymore*."

A Cronbach alpha coefficient was calculated for the MIM scale, consisting of items MIM1 to MIM5. The Cronbach's alpha coefficient was evaluated using the guidelines suggested by George and Mallery (2018) where > .9 excellent, > .8 good, > .7 acceptable, > .6 questionable, > .5 poor, and ≤ .5 unacceptable. The items for the MIM had a Cronbach's alpha coefficient of 0.85, indicating good reliability.

SIM as source of morale measurement for modelling purposes

The MIM provided reliable results that could have been freely used as a basis of analysis as a measure for the levels of morale within ATNS pools. From the qualitative analysis, however, it was apparent that the SIM provided a much more accurate picture of morale conditions. STH1, for instance, indicated a MIM morale mean as 3.53 out of a possible 5.00. The SIM1 mean for STH1, however, was 2.53 out of 5.00. A verbatim quote from STH1, echoing the prevailing mood for all three focus group sessions in this specific station, provides context: *"Station X is not a sinking ship, the ship has already sunk. Each and every person in this building are on their own little life boat holding their yellow licence. It's just that's it, the ship has sunk and nobody cares about me and I can't look after somebody else. So I need to be about myself."* It is thus a finding of this research that the SIM of morale, in this context-specific situation, provides a better measure of morale than Hardy's (2010) generalisable MIM of morale.

The SIM responses are thus used as a base for further analysis, providing the perceived levels of morale within ATNS pools. Hardy (2010) found SIMs of morale to be an acceptable way to measure the concept of morale.

Drivers of morale

Frequencies and distributions for the drivers of morale will be presented after the completion of the exploratory factor analysis (EFA), as it is only after this analysis that the drivers of morale will be revealed.

Company feedback information (non-modelling data)

Additional data were gathered to enable this research to provide company and pool-specific feedback to pool managers based on the focus group interactions, and not for modelling purposes. As described in 7.4, this data includes:

a. The perceived levels of ATCO morale within ATNS.
b. Pool-specific feedback regarding Building and facilities, Job essentials, OHAS and Fairness.
c. The hurdles obstructing the effectiveness of drivers by their absence in each pool, as obtained from the qualitative phase and detailed under each driver in section 6.5.1.
d. The ranked perceived effect on morale of the themes identified as drivers of morale in the qualitative phase in each pool.

Each of these items are now presented for the benefit of ATNS pool managers, enabling them to see the quantitative outcome of the qualitative process. Limited analysis and discussion are included here, as this section does not form part of the research findings, but is included purely for company-specific feedback purposes.

Perceived levels of ATCO morale within ATNS

Perceived levels of morale were measured as items SIM1 and SIM2 of the MoMaD (as listed in Table 28) by providing respondents with the qualitatively obtained definition of morale and asking them to use this definition to rate their morale on a 5-point Likert-type scale firstly in a pool context, and secondly within the larger ATNS context. Item SIM2 measured the perceived level of ATCO morale within ATNS, and the response distribution per pool is listed in Table 41:

Table 41: Distribution of perceived ATNS morale by pool as measured by SIM2

POOL	*M*	*SD*	*n*	SE_M	MIN	MAX	SKEWNESS	KURTOSIS	*MDN*
NTH1	2.39	1.07	80	0.12	1.00	5.00	0.48	-0.38	2.00
NTH2	2.75	1.25	20	0.28	1.00	5.00	-0.01	-1.21	3.00
NTH3	2.26	1.02	27	0.20	1.00	4.00	0.34	-0.95	2.00
STH1	2.11	1.03	55	0.14	1.00	5.00	0.60	-0.35	2.00
STH2	2.67	0.97	21	0.21	1.00	4.00	0.03	-1.02	3.00
STH3	2.92	1.12	25	0.22	1.00	5.00	0.53	-0.69	3.00
STH4	2.71	0.90	28	0.17	1.00	5.00	0.59	-0.03	3.00
TOTAL	2.45	1.07	256	0.07	1.00	5.00	0.50	-0.54	2.00

The T2B scores for item SIM2 complete the picture, as shown in Table 42:

Table 42: Top two box, neutral and bottom two box scores for perceived ATNS morale (SIM2)

NORTHERN REGION					T2B	NEUTRAL	B2B
NTH1	FAOR (ACCCEW, ACCNS, APP, ATSO & TWR)				15%	28%	58%
NTH2	FABL	FAKM	FAUP		35%	20%	45%
NTH3	FALE	FAPM	FAVG		15%	22%	63%
REGION SCORES					**18.1%**	**25.2%**	**56.7%**
SOUTHERN REGION							
STH1	FACT	FAGG	FHSH		9%	25%	65%
STH2	FAPE	FAEL	FABE	FAUT	24%	29%	48%
STH3	FALA	FAGM	FAPN	FAMM	28%	28%	44%
STH4	FAWB	FAPP	FAKN		18%	36%	46%
REGION SCORES					**17.1%**	**28.7%**	**54.3%**
OVERALL SCORES					**17.6%**	**26.7%**	**55.5%**

Note. Due to rounding errors, pool total percentages may not equal 100%.

When the SIM2 values for ATCO morale within ATNS context are compared to the SIM1 values for morale within pool context, the morale within an ATNS context is considerably lower, as illustrated in Figure 64:

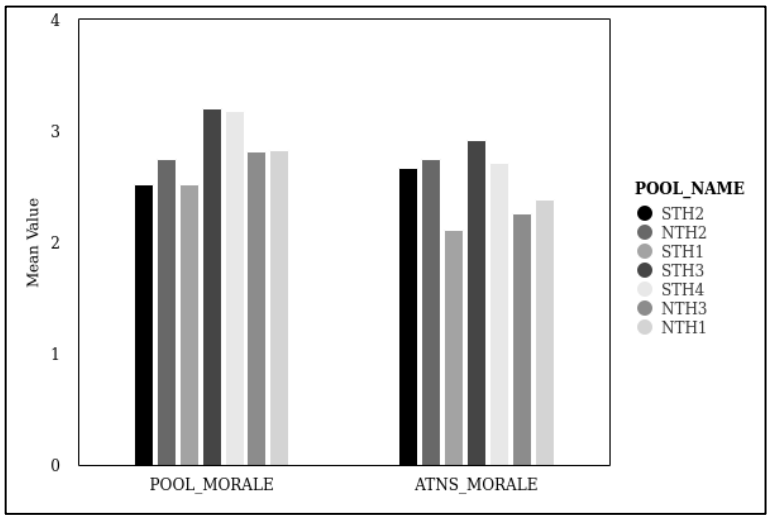

Figure 64: Pool morale vs ATNS morale mean values as measured by the SIM

This may be indicative that a proportion of the morale problem does not reside at pool level, and that further inquiry into morale with the company as level of analysis may be warranted.

Pool-specific feedback items

Specific pool-specific themes emerged during the qualitative phase that warranted standalone feedback to pool managers. Five items were included in the MoMaD for this purpose alone. Items Q63 and Q64 dealt with building and facility-related concerns, items Q71 and Q72 were included to assess specific Job essentials-

related matters and item Q88 assessed Fairness, specifically surrounding the roster allocation within pools.

At several stations, the absence of coffee (n=10) and general groceries (n=9) were noted as items that affect morale under the theme of building and facilities. An item was included as Q63: "*Refreshments in the kitchen (coffee, tea, milk, sugar) are adequate*" to enable direct and detailed feedback to pool managers regarding this identified item. Response frequencies per pool are listed in Table 43:

Table 43: Item Q63 response frequencies

POOL	*M*	*SD*	*n*	*MDN*
NTH1	2.71	1.20	80	3.00
NTH2	2.70	1.17	20	3.00
NTH3	3.33	0.88	27	4.00
STH1	3.18	1.09	55	4.00
STH2	2.33	1.15	21	2.00
STH3	1.72	1.06	25	1.00
STH4	2.07	1.25	28	2.00
TOTAL	**2.68**	**1.22**	**256**	**3.00**

Responses indicated that kitchen refreshments were problematic in general, with a mean of 2.68 out of a possible 5.0, but specifically in pool STH3 (M=1.72) and pool STH4 (M= 2.07).

The level of analysis for this research was the ATNS pool environment. A physical building often houses more than one pool, and whilst there are various maintenance and procurement issues that are under the station's control, there is some overlap in terms of ATNS as a company's responsibility when it comes to maintenance of buildings and facilities. A standalone item was therefore included for feedback to ATNS as to the perceptions of ATCOs regarding the discharge of their maintenance duties. Q64: "*Overall, ATNS provides enough assistance to keep the building and facilities in an acceptable condition*" was included for this purpose, and response frequencies are listed in Table 44:

Table 44: Item Q64 response frequencies

POOL	*M*	*SD*	*n*	*MDN*
NTH1	2.16	1.15	80	2.0
NTH2	3.00	1.08	20	3.00
NTH3	2.89	1.19	27	3.00
STH1	2.29	1.15	55	2.00
STH2	2.48	1.21	21	2.00

POOL	*M*	*SD*	*n*	*MDN*
STH3	2.32	1.28	25	2.00
STH4	2.61	1.23	28	3.00
TOTAL	**2.42**	**1.20**	**256**	**2.00**

In any state-owned company in South Africa, procurement is a difficult subject. Necessary controls and procedures are often over-regulated and complex for a variety of reasons. Procurement was consistently raised as an issue that affected morale, but due to its complex and sensitive nature it was not included as part of Job essentials in the modelling process. Two items were included for company feedback purposes:

Q71: "*The procurement process adequately prioritises items that are essential to the core business function*"

Q72: "*Overall, I feel ATNS provides enough timeous support through its procurement process to ensure peak core function performance*"

Response frequencies are listed in Table 45 and Table 46:

Table 45: Item Q71 response frequencies

POOL	*M*	*SD*	*n*	*MDN*
NTH1	1.93	1.03	80	2.00
NTH2	2.40	1.10	20	2.00
NTH3	1.93	1.27	27	1.00
STH1	1.89	0.92	55	2.00
STH2	1.67	0.80	21	1.00
STH3	2.28	1.21	25	2.00
STH4	1.86	0.97	28	2.00
OVERALL	**1.96**	**1.04**	**256**	**2.00**

Table 46: Item Q72 response frequencies

POOL	*M*	*SD*	*n*	*MDN*
NTH1	1.93	1.05	80	2.00
NTH2	2.25	1.02	20	2.00
NTH3	2.07	1.14	27	2.00
STH1	1.76	0.90	55	1.00
STH2	1.71	0.78	21	2.00
STH3	2.28	1.17	25	2.00
STH4	1.64	0.68	28	2.00
OVERALL	**1.92**	**1.00**	**256**	**2.00**

Feedback from one of the subject matter experts consulted during the construction of the MoMaD regarding the inclusion of procurement as a theme was:

> *"The question regarding procurement seems unfair/misplaced. Respondents in general will have no frame of reference to the procurement process/supply chain and where the bottlenecks may appear."*

This may be the case, and for that reason procurement was left out of the modelling process and only included as a feedback item. What is clear from the responses is that with a mean of 1.96 and 1.92 to two very simple questions, ATCOs do not have to know where the bottlenecks are, to know that there are bottlenecks and that it are affecting them. A quote from an S19 ATCO summarises the situation:

> *"And then you look at things like in head office...stuff like headsets that needs to be approved from head office. They sit there, they take a while to be approved. The procurement process is slow. But for you to get accommodation tomorrow within in a hotel for a month, they can be approved today, but for headsets it cannot be approved because there's someone sitting there and saying what are these people doing with headsets?"*

One last item that was included for feedback purposes is the influence of rostering, specifically in relation to fairness as a driver of morale. Rostering in a shiftwork environment is a complex subject with many aspects, for instance fairness, consistency, fatigue management, complexity and communication. It is a complex subject all by itself, with research in specifically the aviation environment freely available into its influence on items such as fatigue and productivity.

Rostering was mentioned at five focus group sessions as a theme underlying Fairness as a driver of morale, and for feedback purposes item Q88 was therefore included in the MoMaD: "*Duties on my pool's roster is allocated in a fair manner, considering any staffing and operational constraints*". Response frequencies are listed in Table 47:

Table 47: Item Q88 response frequencies

POOL	*M*	*SD*	*n*	*MDN*
NTH1	3.59	1.09	80	4.00
NTH2	3.20	1.32	20	4.00
NTH3	3.19	1.04	27	3.00
STH1	3.16	1.08	55	3.00
STH2	3.05	0.92	21	3.00
STH3	3.32	1.35	25	3.00
STH4	3.71	1.27	28	4.00
OVERALL	3.37	1.15	256	4.00

It appears as though ATCOs throughout ATNS were relatively content (not particularly happy, but not unhappy either) with the fairness in which their duties were being allocated onto the duty roster.

Hurdles obstructing the effectiveness of drivers by their absence

As a company feedback item, respondents were asked after each section of the MoMaD to point out any of the qualitatively identified themes underlying the driver descriptors (as unpacked in section 6.5.1) that were absent, and thus obstructing each driver from being efficient in influencing morale. An example of the MoMaD item is illustrated in Figure 65, which asked respondents about Communication hurdles:

COMMUNICATION HURDLES:

Please tick all items that are absent, thus obstructing effective communication in your pool:

C1	ACCOUNTABILITY	C2	ACCURACY	C3	AVAILABILITY	C4	BIDIRECTIONALITY	C5	CHANNEL
C6	COMPLETENESS	C7	CONSISTENCY	C8	CONTENT	C9	EASE	C10	EFFECTIVENESS
C11	HONESTY	C12	MANNER	C13	TIMEOUSNESS	C14	TRANSPARENCY	C15	NONE OF THE ABOVE

Figure 65: Communication hurdles (as included in MoMaD for feedback purposes)

Responses were collapsed to pool level, ensuring that pool managers have access to the themes underlying problematic drivers. Table 48 contains the results, with the NTH1 and STH1 pools (representing the largest stations) further subdivided into their smaller pools to ensure that data can be meaningfully utilised.

Table 48: Identified communication hurdles (as a percentage of total responses)

POOL	*n*	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
NTH1	80	36	16	31	25	25	26	**53**	14	29	35	24	20	40	31	9
APP	21	43	19	29	43	19	29	43	10	33	**52**	24	14	**52**	**52**	5
ACC	31	35	19	39	16	29	35	**52**	16	35	39	19	19	**52**	16	13
TWR	11	27	9	36	18	27	36	**64**	27	18	9	36	18	27	18	0
ATSO	17	35	12	18	24	24	0	**59**	6	18	24	24	30	12	41	12
FACT	41	**73**	37	**68**	22	17	29	**73**	20	37	42	46	20	**56**	**61**	5
ACC	16	**63**	31	**75**	13	25	19	**69**	13	44	38	**50**	25	**88**	**75**	13
TWR/APP	9	**100**	44	**89**	**56**	22	**78**	**100**	44	44	**89**	**78**	22	**78**	**56**	0
ATSO	16	**69**	38	**50**	13	6	13	**63**	13	25	19	25	13	13	**50**	0
FAGG	14	**57**	29	36	22	14	22	36	14	22	14	22	22	22	36	14
NTH2	20	45	15	25	10	35	15	**70**	0	20	30	22	22	15	44	19
NTH3	27	**52**	11	19	19	11	19	44	11	11	26	22	22	15	44	19
STH2	21	**62**	38	43	24	24	29	**62**	14	10	43	33	29	**57**	43	5
STH3	25	36	16	24	12	4	12	**56**	8	8	36	20	12	24	36	20
STH4	28	32	25	22	22	7	22	**61**	0	14	14	29	36	25	43	18
TOTAL	**256**	**47**	**22**	**35**	**21**	**18**	**23**	**57**	**11**	**22**	**32**	**30**	**22**	**35**	**42**	**11**

Hurdles that were identified as problematic by their absence by more than 50% of respondents are highlighted in bold for easy reference. From scrutiny of Table 48 it is apparent that consistency is a widespread hurdle preventing effective communication. Likewise, there seems to be an overall communication problem apparent within the TWR/APP pool of FACT, as 9 out of a possible 15 barrier items were indicated by more than 50% of respondents. The purpose of this section of the MoMaD was to provide pool managers with in-depth driver-specific information as a base for addressing problematic drivers – an answer to the "*where do I start*?" question as such.

Complete results for the hurdles obstructing effective Empowerment, Mutual respect, Trust, Teamwork, Reward and recognition, Building and facilities, Job essentials and Occupational health and safety are contained in Appendix I, with the most frequently identified hurdles (as indicated by more than half of respondents) on average throughout the company summarised in Figure 66. This analysis can be visualised per pool for easy reference by pool managers, for instance an example (collated from data contained in Appendix I) is illustrated in Figure 67 for the FAOR APP pool, showing hurdles as identified by more than half of the pool. As Figure 67 illustrates, there were no active Empowerment hurdles identified by pool members at the time of data collection. Working to eliminate each identified hurdle one by one can assist in increased morale driver effectiveness.

For a company such as ATNS that relies on mostly electronic communication to staff, an item such as access to computers being identified by 95% of respondents as a hurdle obstructing effective Job essentials (as is the case in Figure 67) may result in the necessary communication perhaps not reaching its intended audience. This information may assist pool managers in ensuring that for instance communication is disseminated in alternate, more accessible ways, resulting in improved communication effectiveness.

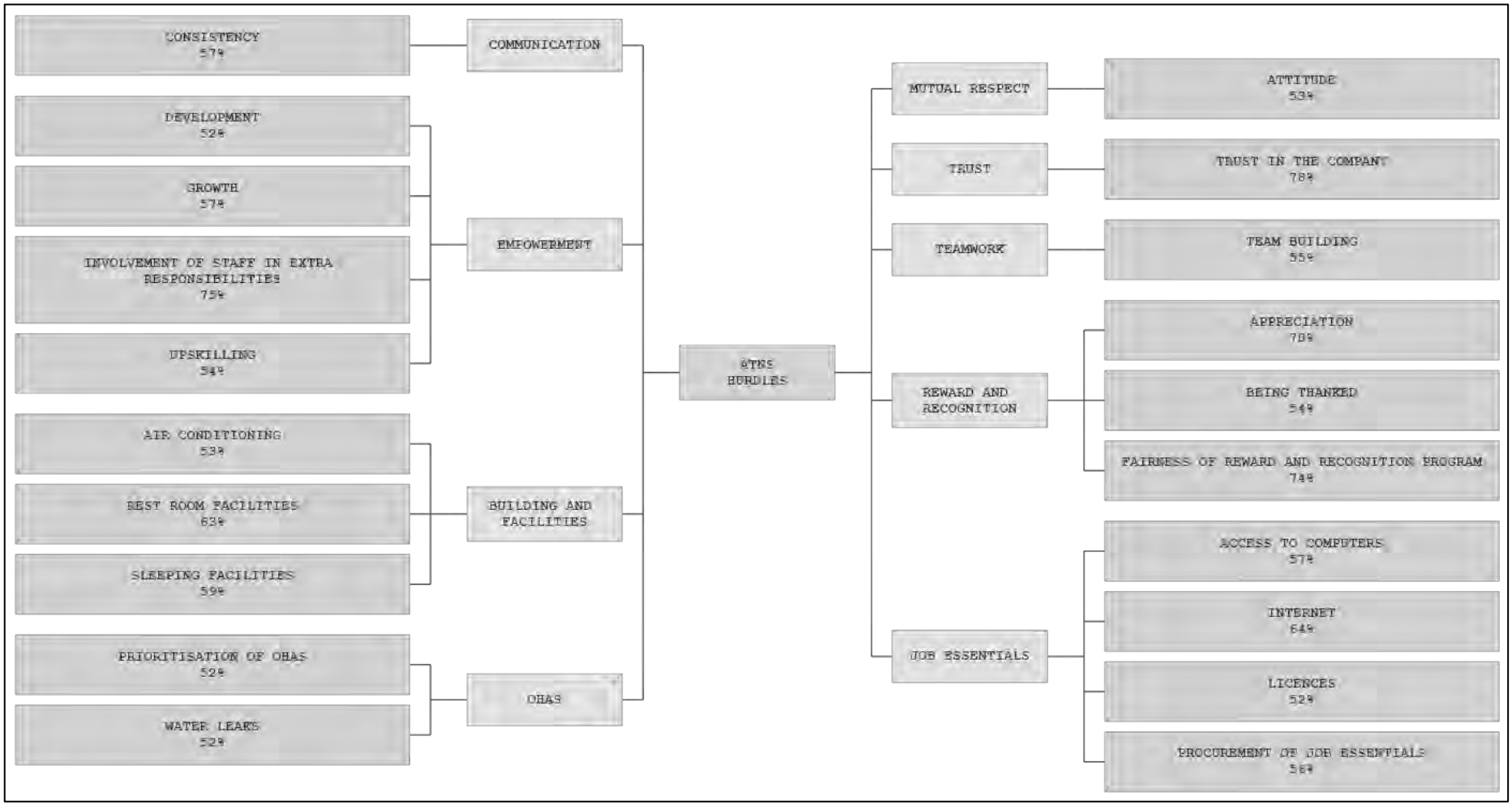

Figure 66: Hurdles to driver effectiveness as identified by more than half of total respondents

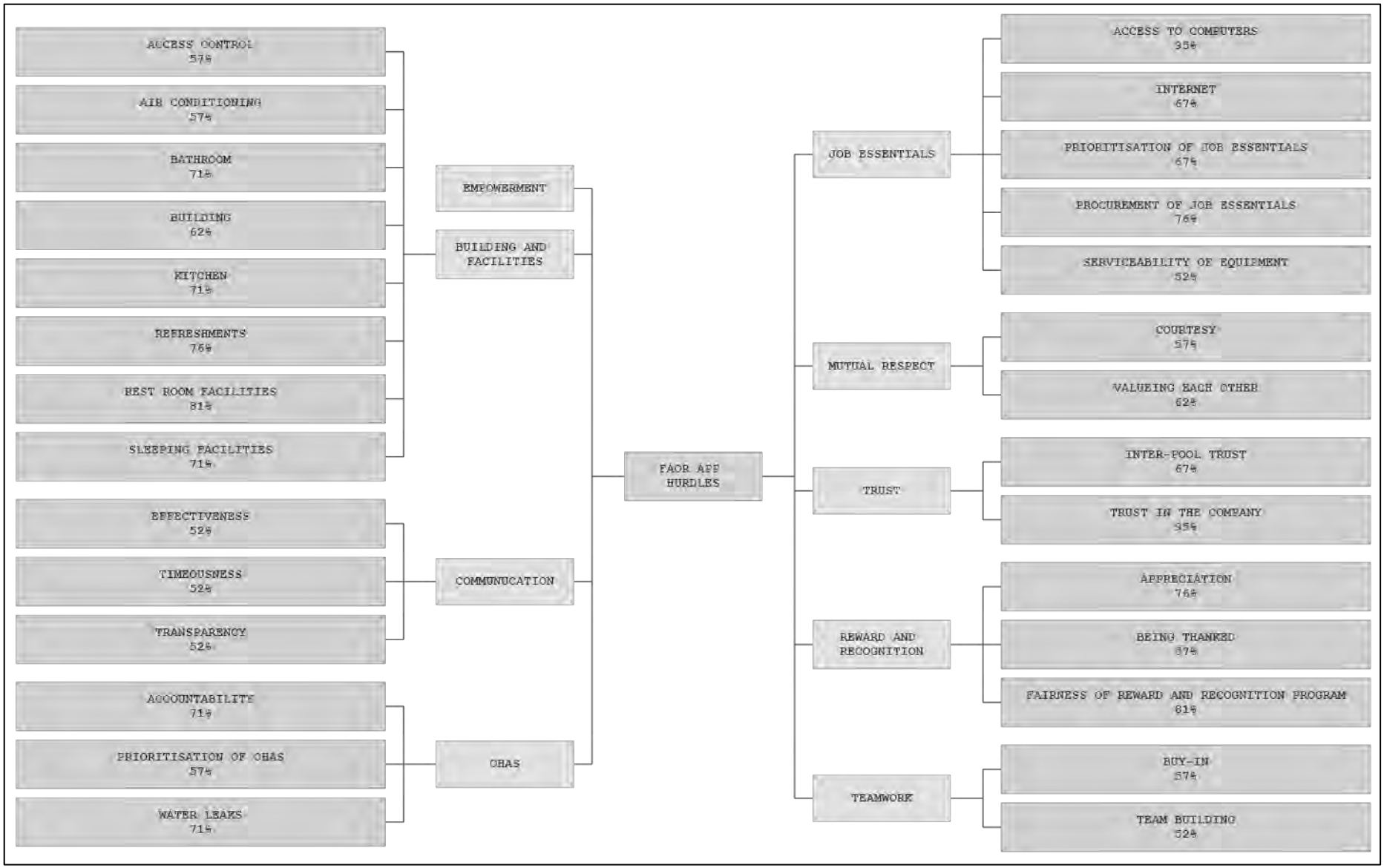

Figure 67: Hurdles to driver effectiveness within the FAOR APP pool as identified by more than half of total pool respondents

Ranked perceived effect on morale of qualitatively identified drivers

Item 89 asked respondents to rate the importance of each qualitatively identified driver of morale in the order of their effect on morale within the pool based on a 10-point scale (1 as least effect to 10 as most effect). The top five drivers per pool are summarised in Table 49:

Table 49: Importance of qualitatively identified drivers of morale within pools

	LARGEST EFFECT				LEAST EFFECT
POOL	**10**	**9**	**8**	**7**	**6**
NTH1	FAIRNESS	TEAMWORK	TRUST	COMMUNI-CATION	MUTUAL RESPECT
NTH2	TEAMWORK	COMMUNI-CATION	TRUST	MUTUAL RESPECT	JOB ESSENTIALS
NTH3	TEAMWORK	FAIRNESS	MUTUAL RESPECT	TRUST	COMMUNI-CATION
STH1	MUTUAL RESPECT	COMMUNI-CATION	TRUST	FAIRNESS	TEAMWORK
STH2	TEAMWORK	COMMUNI-CATION	MUTUAL RESPECT	FAIRNESS	TRUST
STH3	COMMUNI-CATION	TEAMWORK	MUTUAL RESPECT	FAIRNESS	EMPOWER-MENT
STH4	TEAMWORK	TRUST	COMMUNI-CATION	EMPOWER-MENT	JOB ESSENTIALS
OVERALL	**TEAMWORK**	**COMMUNI-CATION**	**TRUST**	**FAIRNESS**	**MUTUAL RESPECT**

The quantitatively ranked overall importance of qualitative themes were compared with the rankings of these themes during the focus group interactions in phase one (summarised in Table 14) in Table 50:

Table 50: Comparison between qualitative and quantitative driver importance results

QUALITATIVE RESULTS: ORDER OF IDENTIFIED DRIVERS		**QUANTITATIVE RESULTS: RANKING OF IDENTIFIED DRIVERS**	
ORDER	**DRIVER**	**RANK**	**DRIVER**
1	COMMUNICATION	**1**	TEAMWORK
2	MUTUAL RESPECT	**2**	COMMUNICATION
3	TEAMWORK	**3**	TRUST
4	BUILDING AND FACILITIES	**4**	FAIRNESS
5	JOB ESSENTIALS	**5**	MUTUAL RESPECT
6	OCCUPATIONAL HEALTH AND SAFETY	**6**	JOB ESSENTIALS
7	TRUST	**7**	REWARD AND RECOGNITION
8	REWARD AND RECOGNITION	**8**	BUILDING AND FACILITIES
9	EMPOWERMENT	**9**	EMPOWERMENT
10	FAIRNESS	**10**	OCCUPATIONAL HEALTH AND SAFETY

Notably, Reward and recognition features low on both rankings, whilst Teamwork and Communication does the opposite.

This section provided a preliminary data analysis, with frequencies and descriptive statistics as well as company specific feedback to ATNS pool managers that was not included in the modelling process. The next section will commence the modelling process.

7.8 Data analysis: exploring relationships amongst variables

Based on the outcome of the preliminary data analysis, the following statistical analysis procedures were selected:

1. Exploratory factor analysis (EFA), to determine the factors that cluster together with the aim of reducing the original set of variables into a smaller set of common underlying factors or dimensions (Venter & Van Zayl, 2018). This is completed first, as the drivers of morale need to be finalised before the relationships between them can be determined and analysed.
2. Top two box (T2B) scores present the performance scores for each driver of morale as identified in the EFA.
3. Regression statistics present the impact scores, analysing the impact of each driver on morale:
    a. correlation analysis, to determine the strength of associations between variables (Venter & Van Zyl, 2018), in this case between the drivers of morale and morale and
    b. regression analysis to identify the variables that best explain variation in an outcome variable (Venter & Van Zyl, 2018), in this case to identify the drivers of morale with a significant impact on morale levels.

7.8.1 Exploratory Factor Analysis

An exploratory factor analysis (EFA) is a statistical technique used to explore the underlying theoretical structure of a dataset by reducing it a set of summative variables (Pallant, 2013). A factor loading can be considered to be significant with a sample size of 250 when the factor loads at 0.35 or more (Hair, 2009). The loading cut-off for this research is set at 0.40, which is more than required. Phase one of this research revealed the drivers of morale to be highly inter-related (see section 5.5.3). Because of this, and to avoid multi-correlation (a phenomenon where there is high inter-relatedness between independent variables (Pallant, 2013)), an orthogonal

varimax rotation method was selected, where axis are maintained at 90 degrees to ensure that factors are uncorrelated to each other and the column of the factor matrix is simplified so that the factor extracts are clearly associated to enhance separation amongst variables by viewing the data through a finer lens (Pallant, 2013).

The 10 factor EFA with orthogonal varimax rotation revealed one factor (factor 9) to have only a single item (Q73) that did not cross-load and with a statistical significance of greater than 0.4, as indicated in Table 51:

Table 51: Exploratory Factor Analysis with orthogonal varimax rotation

ITEM	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
Q42	**0.75**	0.17	0.10	0.11	0.07	0.04	0.03	0.05	0.08	-0.1
Q43	**0.72**	0.12	0.11	0.05	0.06	0.07	0.06	0.05	0.03	-0.1
Q47	**0.72**	0.05	0.11	0.18	0.14	0.06	0.07	-0.1	0.04	-0.1
Q46	**0.70**	0.17	0.01	0.09	-0.0	0.12	-0.0	-0.2	-0.0	0.07
Q40	**0.69**	0.17	-0.0	-0.1	-0.1	0.14	0.12	0.06	0.02	0.11
Q41	**0.69**	0.17	0.08	-0.1	-0.0	0.02	0.14	0.19	0.00	0.08
Q39	**0.68**	0.14	-0.0	-0.0	-0.1	0.26	0.01	0.20	0.06	0.09
Q44	**0.66**	0.11	0.23	0.18	0.08	0.02	0.18	-0.0	0.05	-0.2
Q45	**0.60**	0.13	0.12	0.05	0.13	0.07	-0.0	-0.0	-0.1	0.22
Q29	**0.55**	0.22	-0.0	0.10	-0.0	0.12	-0.1	0.07	**0.49**	0.08
Q30	**0.54**	0.08	0.02	0.06	0.01	0.21	0.01	0.05	**0.45**	0.13
Q27	**0.53**	0.10	0.08	0.16	0.05	0.19	0.12	-0.1	0.23	0.12
Q28	**0.51**	0.13	0.12	0.05	0.00	0.17	-0.1	0.16	**0.42**	0.06
Q36	**0.51**	0.24	0.02	0.07	-0.0	**0.50**	-0.0	0.07	-0.0	0.10
Q31	**0.50**	0.01	0.07	0.27	0.05	0.21	-0.0	-0.0	0.39	0.17
Q22	**0.48**	0.06	0.04	0.15	0.07	-0.1	-0.0	-0.3	-0.1	-0.0
Q10	**0.47**	0.26	0.11	0.34	-0.0	0.22	0.06	0.30	-0.1	0.18
Q32	0.37	0.00	0.18	0.27	0.22	0.24	0.02	-0.0	0.10	0.26
Q86	0.17	**0.83**	0.12	0.12	0.04	0.09	-0.0	-0.0	0.07	0.04
Q85	0.10	**0.82**	0.11	0.07	0.05	0.02	-0.0	-0.0	0.08	0.01
Q87	0.16	**0.76**	0.12	0.11	0.06	0.06	0.02	-0.0	0.03	-0.0
Q15	0.15	**0.71**	0.13	0.21	0.02	0.09	-0.0	0.07	0.04	0.03
Q16	0.08	**0.69**	0.11	0.39	-0.0	0.11	0.06	0.14	-0.0	0.04
Q82	0.27	**0.69**	0.14	0.26	0.11	0.07	-0.1	0.06	-0.0	-0.0
Q19	0.17	**0.68**	0.11	0.07	0.05	0.06	0.08	-0.1	0.07	0.12
Q83	0.15	**0.63**	0.27	0.14	0.17	0.15	-0.0	-0.1	0.08	0.03
Q84	0.16	**0.62**	0.18	0.11	0.21	0.03	0.21	0.07	0.05	0.04
Q38	0.29	**0.50**	0.03	-0.0	-0.0	0.24	0.16	-0.2	0.11	0.12
Q26	0.32	**0.40**	0.05	0.05	0.13	0.14	-0.1	0.15	0.25	0.18
Q52	0.13	0.19	**0.77**	0.10	0.21	0.08	0.06	0.09	-0.1	0.03
Q53	0.11	0.18	**0.75**	0.05	0.13	0.03	-0.0	0.16	0.02	0.08
Q50	0.08	0.07	**0.68**	0.12	0.09	0.10	-0.0	0.06	0.03	0.06
Q54	0.09	0.15	**0.67**	0.10	-0.0	0.02	0.12	-0.1	0.02	0.02
Q51	0.05	0.03	**0.64**	0.12	0.23	0.04	0.11	0.13	0.14	0.08
Q55	0.07	0.11	**0.64**	0.13	0.29	0.20	0.11	0.08	0.12	0.07
Q56	0.03	0.15	**0.56**	0.17	0.01	0.09	0.17	-0.1	0.14	0.07
Q18	0.11	0.24	**0.43**	0.30	0.10	0.10	0.02	-0.0	-0.1	-0.0

ITEM	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
Q48	0.17	0.33	**0.43**	0.37	0.24	0.16	0.12	0.05	0.04	0.05
Q49	0.14	0.29	**0.40**	0.29	0.26	0.09	0.13	-0.0	0.04	-0.1
Q21	0.08	0.27	0.38	0.33	0.27	0.18	0.01	-0.0	-0.1	0.03
Q13	0.07	**0.48**	0.10	**0.64**	0.17	-0.1	0.19	0.10	0.05	-0.0
Q12	-0.0	**0.46**	0.04	**0.58**	0.04	0.02	0.22	0.09	0.01	-0.1
Q9	0.12	**0.21**	0.22	**0.55**	0.25	0.07	0.17	0.18	0.05	0.05
Q17	0.10	**0.43**	0.11	**0.53**	0.17	0.06	0.08	-0.0	0.05	0.09
Q14	0.09	**0.28**	0.21	**0.51**	0.28	0.00	0.19	0.07	-0.0	0.02
Q11	0.33	**0.40**	0.04	**0.46**	0.05	0.11	-0.0	0.26	-0.0	0.18
Q20	0.08	**0.45**	0.28	**0.46**	0.18	0.07	0.02	-0.1	-0.1	0.08
Q25	0.22	0.23	0.19	**0.46**	0.13	0.18	0.07	-0.1	0.23	0.11
Q70	0.06	0.11	0.20	**0.46**	0.05	0.05	-0.0	0.06	0.09	0.08
Q61	0.07	-0.1	0.29	**0.43**	0.25	-0.1	0.02	0.39	0.09	0.07
Q24	0.23	0.16	0.25	**0.42**	0.00	0.29	0.23	-0.0	0.31	0.13
Q23	0.32	0.23	0.21	0.34	0.01	-0.0	0.07	-0.1	-0.1	0.04
Q80	-0.0	0.15	0.20	0.15	**0.82**	0.07	0.11	0.03	0.01	0.02
Q79	0.05	0.12	0.10	0.20	**0.78**	0.09	0.03	0.07	-0.0	0.08
Q81	0.01	0.18	0.20	0.13	**0.77**	0.02	0.20	-0.0	0.06	0.06
Q78	0.03	0.05	0.15	0.03	**0.58**	0.08	0.10	0.13	-0.0	0.18
Q77	0.07	0.12	0.06	-0.0	**0.49**	0.10	0.20	0.25	0.23	0.20
Q57	0.04	0.01	0.26	0.22	**0.49**	0.05	0.18	**0.41**	0.08	0.08
Q62	0.10	-0.0	0.21	0.36	0.37	-0.0	0.31	0.17	0.14	-0.1
Q74	0.04	0.09	0.10	0.25	0.33	0.03	0.31	0.31	0.32	0.26
Q76	0.05	0.22	0.11	0.14	0.29	0.04	0.27	-0.0	0.08	-0.1
Q34	0.29	0.16	0.18	0.01	0.09	**0.76**	0.01	0.01	0.07	-0.1
Q35	0.28	0.14	0.23	0.05	0.11	**0.74**	0.08	-0.0	0.00	0.00
Q33	0.32	0.17	0.11	0.10	0.09	**0.66**	0.06	0.04	0.11	-0.1
Q37	0.22	0.18	0.22	0.35	0.22	**0.44**	-0.0	0.10	-0.0	0.12
Q67	0.17	0.09	0.18	0.18	0.28	-0.0	**0.64**	-0.0	0.06	0.08
Q65	0.09	0.06	0.08	0.09	0.17	0.07	**0.61**	-0.0	-0.1	0.22
Q66	0.04	-0.0	0.09	0.07	0.05	0.03	**0.53**	0.13	0.04	-0.1
Q75	-0.0	-0.0	0.03	0.04	0.38	-0.0	**0.51**	**0.42**	0.04	0.07
Q60	0.04	-0.1	0.16	0.24	0.31	-0.0	0.32	0.28	0.28	0.28
Q58	0.03	0.04	0.18	0.20	0.36	0.05	0.15	**0.59**	0.10	-0.1
Q59	0.01	-0.1	0.08	0.09	0.37	-0.0	0.41	**0.54**	0.11	-0.0
Q73	0.05	0.14	0.12	0.01	0.14	-0.0	0.13	0.08	**0.40**	-0.1
Q68	0.14	0.07	0.09	0.03	0.17	-0.1	0.08	0.00	0.03	**0.64**
Q69	0.09	0.18	0.25	0.24	0.22	0.03	-0.0	0.04	0.05	**0.57**

To name the factors, the items that cluster under each factor as listed in Table 51 were collated and presented to a random dipstick survey of 10 ATCO respondents from the research population, who each gave input as to the name they would give to each factor given the items. The resultant names for each factor were:

1. Factor 1: Team cohesion (TC)
2. Factor 2: Leadership interaction (LI)
3. Factor 3: Staff incentive (SI)

4. Factor 4: Communication management (CM)
5. Factor 5: Workplace health and safety (WHAS)
6. Factor 6: Mutual trust (MT)
7. Factor 7: Technical support (TS)
8. Factor 8: Break facilities (BF)
9. Factor 9: Diversity management (DM)
10. Factor 10: Staffing level (SL)

DM had three items (Q28, Q29, and Q30) that cross-loaded with TC, with only one item remaining (Q73) at $p = 0.40$. This item however did not make sense under DM ("*There is clean drinking water freely available at my station*"). From the qualitative interactions it was clear that there was a high amount of uncertainty and overlap in terms of which theme diversity would fall under. For instance, at S5, when training was discussed in terms of the tolerance levels of instructors towards students, an ATCO said: "*I feel that, that falls firmly under teamwork and mutual respect as well. And also diversity, because it's pretty much seniority and tolerance from that individual towards the student.*" Diversity and cultural respect are noted as themes under the descriptor of RE when it comes to mutual respect (see Figure 49). Teamwork has inter-team understanding as a theme (see Figure 50). DM was therefore reported under TC based on the qualitative findings in phase one. Items Q28, Q29 and Q30 are therefore reported as part of CM.

Researchers may opt to preserve cross-loadings based on empirical and conceptual knowledge or experience of the situation when variables do indeed have double effects on various factors (Le & Cheong, 2010). Items Q11, Q12, Q13, Q17 and Q20 loaded under CM, with significant cross-loadings under LI, which is indicative of pool managers' important role when it comes to communication management. Some substantiating qualitative examples are:

"*Jah, I was about to say I think it's more a planning issue than a communication, because when you [management] plan effectively, it even shows in the way you communicate, how quickly you communicate the means that you communicate the level at which you communicate because we are we may be colleagues here but we're not the same. Therefore, as a manager you should be able to differentiate between the difference ways and the different ways in which you communicate with*

people. For instance, there might be some of us here, who are happy with just a WhatsApp text. And then some of us may be more formal, we prefer email, or some of us actually want to be spoken to face to face. And also if you consider some of the background information that you have about people, that also speaks to how you communicate with the different individuals, I mean, some of us are okay with the company and everything, but really with some individuals, literally the company is skating on thin ice" (S18) and "*Empty promises - does that not speak, all of these things we are talking about...communication, inconsistencies, transparencies, it speaks all to LEADERSHIP, I think, yeah*" (S20). These items are thus retained under CM and interpreted as such despite the cross-loading, as this is considered to be an accurate depiction of the situation.

Item Q36, ("*There is a very high level of trust throughout my pool*") loaded under TC, but displayed a significant cross-loading with MT. This is indicative of the fact that trust is extremely important in a team environment, and the item was thus retained and reported under MT. Item 57 loaded under WHAS with a cross-loading under TS. The item ("*The physical building in which I work is adequately maintained*") was considered to be important enough (the building was mentioned in 10 out of 21 qualitative focus group sessions) to retain despite the cross-loading, and to reside under WHAS rather than TS. Lastly, items Q59 and Q75 cross-loaded significantly under TS and BF. The items are very similar ("*The bathroom facilities are functional*" and "*The ablution facilities are serviceable*") and item Q59 is therefore logically retained under BF where it loads at 0.54 with item Q75 discarded as duplicate.

10 factors were therefore postulated as the drivers of morale, with hypotheses for each driver formulated as follows:

Team cohesion (TC)

H_{TC0} = TC does not have a significant influence on morale as measured by SIM.

H_{TC1} = TC has a significant influence on morale as measured by SIM.

Leadership interaction (LI)

H_{LI0} = LI does not have a significant influence on morale as measured by SIM.

H_{LI1} = LI has a significant influence on morale as measured by SIM.

Staff incentive (SI)

H_{SI0} = SI does not have a significant influence on morale as measured by SIM.

H_{SI1} = SI has a significant influence on morale as measured by SIM.

Communication management (CM)

H_{CM0} = CM does not have a significant influence on morale as measured by SIM.

H_{CM1} = CM has a significant influence on morale as measured by SIM.

Workplace health and safety (WHAS)

H_{W0} = WHAS does not have a significant influence on morale as measured by SIM.

H_{W1} = WHAS has a significant influence on morale as measured by SIM.

Mutual trust (MT)

H_{MT0} = MT does not have a significant influence on morale as measured by SIM.

H_{MT1} = MT has a significant influence on morale as measured by SIM.

Technical support (TS)

H_{TS0} = TS does not have a significant influence on morale as measured by SIM.

H_{TS1} = TS has a significant influence on morale as measured by SIM.

Break facilities (BF)

H_{BF0} = BF does not have a significant influence on morale as measured by SIM.

H_{BF1} = BF has a significant influence on morale as measured by SIM.

Diversity management (DM)

H_{DM0} = DM does not have a significant influence on morale as measured by SIM.

H_{DM1} = DM has a significant influence on morale as measured by SIM.

Staffing level (SL)

H_{SL0} = SL does not have a significant influence on morale as measured by SIM.

H_{SL1} = SL has a significant influence on morale as measured by SIM.

Overall MoMaD model hypotheses were tested as:

H_0 = There are no statistically significant factors between the variables that influence the SIM morale score.

H_1 = There is at least one statistically significant factor between the variables that influence the SIM morale score.

The updated preliminary factor structure is presented in Figure 68, with the EFA identified drivers of morale, as well as the removed MIM morale dimensions leaving perceived morale (measured by SIM of morale) as the dependent variable:

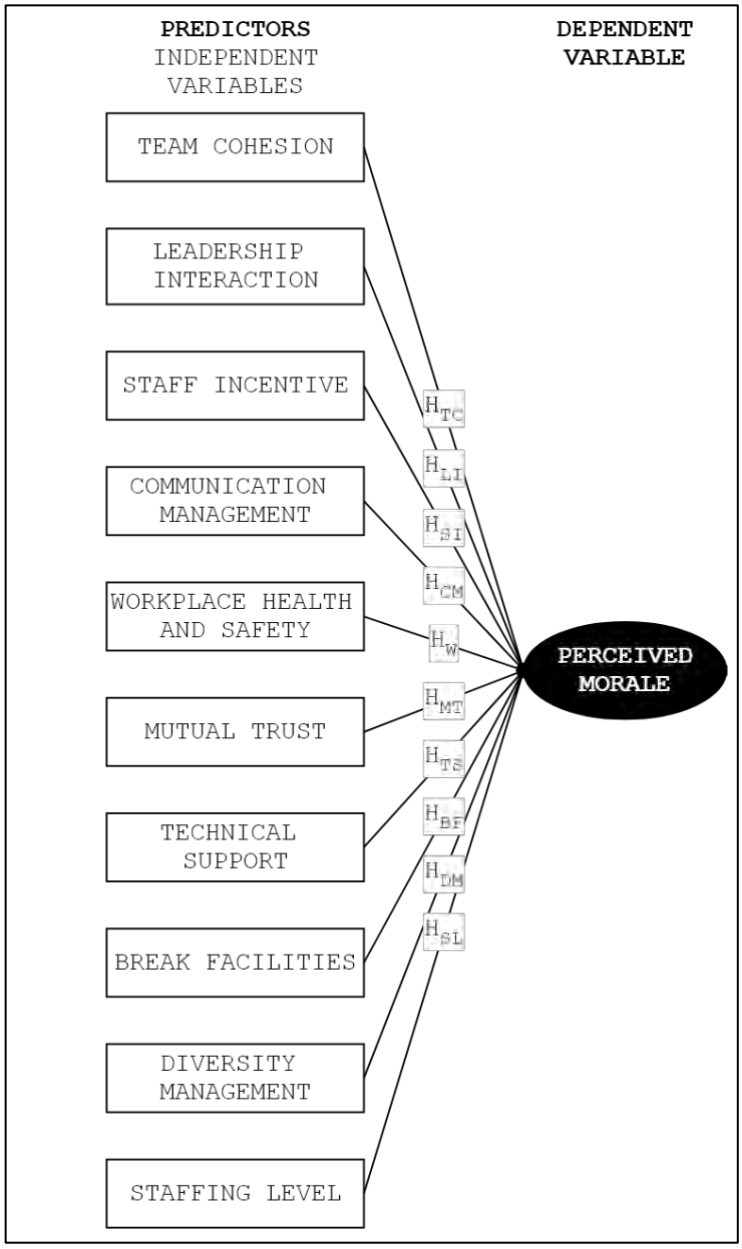

Figure 68: Updated preliminary factor structure (author's own)

As illustrated in Figure 68, the drivers of morale in a safety-critical air traffic control environment are postulated as Team cohesion (TC), Leadership interaction (LI), Staff incentive (SI), Communication management (CM), Workplace health and safety (WHAS), Mutual trust, (MT), Technical support (TS), Break facilities (BF), Diversity management (DM) and Staffing level (SL).

7.8.2 Performance scores

This section describes the frequencies and distributions of each driver of morale as identified in the EFA and reports each driver in terms of its top two box (T2B) and bottom two box (B2B) score. T2B scores are the sum of all responses in the top two "boxes" per item (the most positive responses) while B2B scores are the sum of all responses in the bottom two "boxes" per item (the most negative responses).

Drivers of morale

After an exploratory factor analysis (EFA), the items in the MoMaD were rearranged according to where they cluster together and items with low factor scores were discarded. The post-EFA amended MoMaD scale items are listed in Table 52:

Table 52: Post-EFA amended MoMaD items

OLD ITEM	NEW ITEM	DIMENSION	ITEM
B1	**B1**	BIOGRAPHICAL	AGE GROUP
B2	**B1**	BIOGRAPHICAL	GENDER
B3	**B1**	BIOGRAPHICAL	ROLE
B4	**B1**	BIOGRAPHICAL	STATION
B5	**B1**	BIOGRAPHICAL	POOL
B6	**B1**	BIOGRAPHICAL	EMPLOYMENT DURATION
SIM1	**SIM1**	MORALE	With the definition of morale in mind, please rate the current level of your morale in your pool
Q42	**TC1**	TC	Pool members agree over the appropriateness of pool objectives
Q43	**TC2**	TC	Pool members share the same vision at work
Q47	**TC3**	TC	My pool has clear criteria which pool members try to meet to achieve excellence as a team
Q46	**TC4**	TC	My pool is a high-performance team
Q40	**TC5**	TC	Pool members support each other to get the work done despite challenges at work
Q41	**TC6**	TC	Pool members keep each other informed about work related issues
Q39	**TC7**	TC	Pool members are loyal to each other
Q44	**TC8**	TC	Pool members know what the pool objectives are
Q45	**TC9**	TC	My pool has a good reputation within ATNS
Q29	**TC10**	TC/DM	My pool is sufficiently respectful of diversity and our differences
Q30	**TC11**	TC/DM	Pool members display professional respect at work
Q27	**TC12**	TC	Pool members have a good attitude towards the job
Q28	**TC13**	TC/DM	Pool members display cultural respect at work
Q31	**TC14**	TC	Pool members respect professional hierarchy
Q22	**TC15**	TC	I am held accountable for my performance at work
Q10	**TC16**	TC	Communication between pool members is efficient
Q86	**LI1**	LI	My pool manager makes just and fair decisions
Q85	**LI2**	LI	My pool manager considers my viewpoint
Q87	**LI3**	LI	My pool manager shows care and concern towards me as an employee
Q15	**LI4**	LI	My pool manager understands the problems faced by pool members
Q16	**LI5**	LI	There is effective communication between me and my pool manager

OLD ITEM	NEW ITEM	DIMENSION	ITEM
Q82	**LI6**	LI	My pool manager collects accurate information from pool members necessary to make informed decisions
Q19	**LI7**	LI	My pool manager focuses on corrective action rather than placing blame when I make a mistake
Q83	**LI8**	LI	Opportunities are provided for pool members to challenge decisions made by the pool manager
Q84	**LI9**	LI	Decisions are based on approved standard operating procedures
Q38	**LI10**	LI	My pool manager trusts pool members to make good decisions
Q26	**LI11**	LI	Management and pool members speak to each other in a respectful manner
Q52	**SI1**	SI	Good performance is rewarded at work
Q53	**SI2**	SI	I am incentivised to go the extra mile at work
Q50	**SI3**	SI	I receive financial compensation for above average performance
Q54	**SI5**	SI	I know what is expected of me to qualify for a reward
Q51	**SI4**	SI	There is an effective rewards and recognition system in place
Q55	**SI6**	SI	The rewards and recognition system is fair
Q56	**SI7**	SI	I know exactly what would potentially qualify for reward and recognition
Q18	**SI8**	SI	I have opportunities to develop new skills at work
Q48	**SI9**	SI	My efforts at work are appreciated
Q49	**SI10**	SI	I receive feedback regarding my performance at work
Q13	**CM1**	CM	My pool manager communicates important information frequently
Q12	**CM2**	CM	My pool manager uses a suitable channel of communication (email, WhatsApp, meetings)
Q9	**CM3**	CM	New information regarding my job execution is communicated timeously
Q17	**CM4**	CM	My pool manager is held accountable for effective communication in the pool
Q14	**CM5**	CM	Important information is easily available to me when I need it
Q11	**CM6**	CM	In my pool there is a climate of transparency in communication
Q20	**CM7**	CM	My pool manager ensures that continuous learning is a priority
Q25	**CM8**	CM	Management and pool members appreciate each other's contribution to the organisation
Q70	**CM9**	CM	The administrative process relating to CAA licencing is adequately prioritised
Q61	**CM10**	CM	The resting facilities is adequate in providing the necessary rest and recovery during breaks
Q24	**CM11**	CM	Management and pool members understand what goes into each other's work
Q80	**W1**	WHAS	When OHAS risks are identified in my station, they are rectified as a matter of urgency
Q79	**W2**	WHAS	There is sufficient accountability for reported OHAS risks that remain unrectified after a reasonable period
Q81	**W3**	WHAS	OHAS is a priority at my station
Q78	**W4**	WHAS	There are no water leaks in my station building that could pose a risk to people at work
Q77	**W5**	WHAS	There are no objects that could significantly harm me in the workplace (e.g. sharp protruding corners)
Q34	**MT1**	MT	I believe that people usually keep their promises
Q35	**MT2**	MT	When people make promises, they generally deliver on them
Q33	**MT3**	MT	Most people can be trusted
Q36	**MT4**	MT	There is a very high level of trust throughout my pool
Q37	**MT5**	MT	Pool members trust that management promises will be honoured at work

OLD ITEM	NEW ITEM	DIMENSION	ITEM
Q67	**TS1**	TS	The systems required to do my job are integrated to ensure efficient operations
Q65	**TS2**	TS	The serviceability of core function equipment (headsets, radios) is acceptable.
Q66	**TS3**	TS	There is sufficient access to computers with internet access at my station for work related purposed
Q58	**BF1**	BF	The kitchen facility is adequate
Q59	**BF2**	BF	The bathroom facilities are functional
Q57	**BF3**	BF	The physical building in which I work is adequately maintained
Q68	**SL1**	SL	The staffing levels in my pool are acceptable
Q69	**SL2**	SL	There is sufficient planning in terms of future staffing at work

A Cronbach alpha coefficient was calculated for the adjusted MoMaD scale, as listed in Table 52. The Cronbach's alpha coefficient was evaluated using the guidelines suggested by George and Mallery (2018) where > .9 excellent, > .8 good, > .7 acceptable, > .6 questionable, > .5 poor, and ≤ .5 unacceptable. Table 53 presents the results of the reliability analysis:

Table 53: Scale reliability

FACTOR	ITEMS	α	LOWER BOUND	UPPER BOUND
TC	16	0.92	0.91	0.94
LI	11	0.92	0.91	0.94
SI	10	0.89	0.87	0.91
CM	11	0.88	0.86	0.90
WHAS	6	0.87	0.84	0.89
MT	5	0.85	0.82	0.88
TS	3	0.71	0.64	0.77
BF	3	0.80	0.76	0.84
DM	3	0.81	0.77	0.85
SL	2	0.69	0.62	0.77
MoMaD	67	0.96	0.95	0.96

Note. The lower and upper bounds of Cronbach's α were calculated using a 95% confidence interval.

As presented in Table 53, TC and LI indicate excellent reliability, SI, CM, WHAS, MT and BF good reliability and TS acceptable reliability. SL falls slightly below the acceptable threshold of .70, indicating questionable reliability. The overall MoMaD scale, including the SIM of morale, indicates an excellent reliability of 0.96.

Descriptive statistics are used to show or describe the basic features of data in a meaningful way, describing the central tendencies, statistical dispersion, shape of the distribution and statistical dependence (Leedy & Ormrod, 2014). When the skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its

tendency to produce outliers (Westfall & Henning, 2013). The summary statistics can be found in Table 54:

Table 54: Summary statistics for driver scales

DRIVER	*M*	*SD*	*n*	SE_M	MIN	MAX	SKEWNESS	KURTOSIS	*MDN*
TC	3.53	0.66	256	0.04	1.19	5.00	-0.69	1.01	3.62
LI	3.31	0.80	256	0.05	1.09	5.00	-0.64	0.29	3.45
SI	2.36	0.76	256	0.05	1.00	5.00	0.41	0.25	2.40
CM	2.99	0.77	256	0.05	1.09	4.91	-0.08	-0.30	3.00
WHAS	2.59	0.88	256	0.05	1.00	5.00	0.10	-0.21	2.50
MT	2.76	0.82	256	0.05	1.00	5.00	0.04	-0.21	2.80
TS	2.76	0.99	256	0.06	1.00	5.00	0.14	-0.85	2.67
BF	2.54	1.08	256	0.07	1.00	5.00	0.07	-1.08	2.67
DM	3.62	0.83	256	0.05	1.00	5.00	-0.55	-0.01	4.00
SL	2.70	1.10	256	0.07	1.00	5.00	-0.06	-0.94	3.00

Table 54 shows that all drivers can be considered to be symmetrical and fall well within the normal distribution. Sambandam and Hauser (1998) argued that two items can have the same T2B values, but very different B2B scores. If the B2B scores are not reported, the two values may be considered to be similar even though one may have a much higher B2B score.

Reporting both T2B and B2B scores for large datasets has the disadvantage of removing the practicality from the T2B reporting process and generating just another complex chart (Sambandam & Hausser, 1998). A simplified index score (IXS) is generated by subtracting the B2B score from the T2B score to provide one easily comparable morale index. An example of this calculation is provided in Table 55, based on the morale T2B and B2B scores for pool NTH1:

Table 55: Calculation of IXS for NTH1 pool

DRIVER	T2B	B2B	INDEX
TC	59%	17%	**42%**
LI	64%	16%	**48%**
SI	21%	59%	**-38%**
CM	32%	45%	**-13%**
WHAS	27%	49%	**-22%**
MT	28%	42%	**-14%**
TS	22%	63%	**-41%**
BF	24%	68%	**-44%**
DM	63%	13%	**50%**
SL	39%	40%	**-1%**
MORALE	26%	34%	**-8%**

As Table 55 explains, for the TC driver in the NTH1 pool, the percentage of total respondents who indicated T2B scores outnumbered the percentage of total respondents who indicated B2B scores by a value of 42%. For SI however, the percentage of total respondents who indicated B2B scores outnumbered the percentage of total respondents who indicated a T2B score by 38%, resulting in a negative IXS. The IXS for each driver as well as perceived pool morale (as measured by SIM1) within the various ATNS pools are listed in Table 56:

Table 56: IXS for various ATNS pools in percentage of total respondents

NORTHERN REGION	TC	LI	SI	CM	WHAS	MT	TS	BF	DM	SL	MORALE
NTH1	42	48	-38	-13	-22	-14	-41	-44	50	-1	-8
NTH2	-23	13	-33	7	-3	-31	20	37	30	23	-10
NTH3	56	33	-48	7	-20	2	6	29	53	-43	-4
REGION INDICES	**41**	**39**	**-40**	**-5**	**-18**	**-14**	**-21**	**-16**	**47**	**-6**	**-7**
SOUTHERN REGION											
STH1	33	25	-56	-43	-17	-33	22	-9	44	-18	-40
STH2	52	8	-39	-21	-37	5	-3	3	63	-11	-23
STH3	47	29	-34	7	-10	-19	-4	24	50	-22	16
STH4	57	29	-30	34	-27	-17	-22	-9	61	-16	11
REGION INDICES	**44**	**24**	**-43**	**-13**	**-21**	**-21**	**3**	**0**	**52**	**-17**	**-16**
OVERALL INDICES	**42**	**31**	**-42**	**-9**	**-19**	**-17**	**-9**	**-8**	**50**	**-12**	**-11**

As Table 56 illustrates, the IXS has the advantage of not only providing an easy to understand single value, but also offering enhanced standardisation to enable easier comparison between performances.

Accuracy of qualitatively obtained definition of morale

Respondents were provided with the qualitatively obtained definition of morale (as detailed in section 5.5.1) and asked to answer either YES or NO to the question "*Do you agree that this definition of morale provided below?"* as shown in Figure 69:

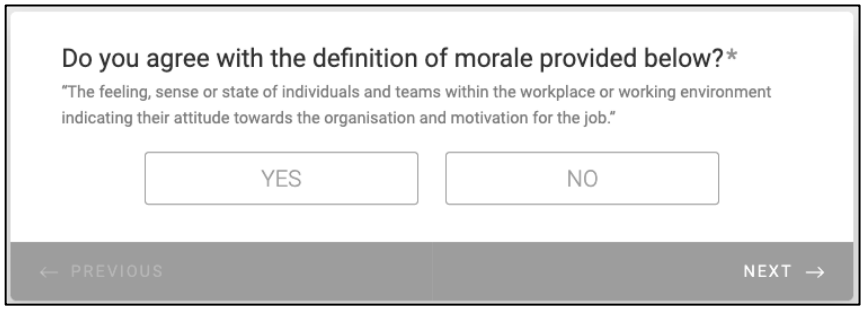

Figure 69: Item Q90 as presented to respondents on the JotForm (2020) survey platform

Of 256 responses, only nine answered “NO”, indicating that 96% of respondents agreed with the qualitatively obtained definition of morale. This was final confirmation that the second empirical objective of this research had been adequately satisfied.

7.8.3 Impact scores

The identified morale drivers were analysed using a correlation analysis, to determine the strength of the associations between them. A regression analysis follows, to determine the constructs that cluster together, enable the validation of concepts into constructs and the conception of a model.

Correlation analysis

A Spearman correlation analysis was conducted among morale (as measured by SIM), TC, LI, SI, CM, WHAS, MT, TS, BF, DM and SL. Spearman's correlation measures the strength and direction of the monotonic association between two variables, such as Morale and TC, and is the nonparametric version of the Pearson product-moment correlation with less restrictive monotonicity (Laerd Statistics, 2018). Preliminary analysis showed the relationship to be monotonic, as assessed by visual inspection of a scatterplot. Cohen's standard was used to evaluate the strength of the relationships, where coefficients between .10 and .29 represent a small effect size, coefficients between .30 and .49 represent a moderate effect size, and coefficients above .50 indicate a large effect size (Cohen, 1988). 1) Correlations provide evidence of association, not causation and the order of variables in a correlation is not important. Positive ρ values indicate positive association between the variables, and negative ρ values indicate negative associations and the correlation (ρ) is always a number between -1 and 1 (Laerd Statistics, 2018). The results of the correlation analysis are shown in Table 57:

Table 57: Spearman correlation analysis between factors

VARIABLE	BY VARIABLE	SPEARMAN ρ	PROB>|ρ|
TC	SIM MORALE	0.2403	0.0001*
LI	SIM MORALE	0.2298	0.0002*
SI	SIM MORALE	0.1941	0.0018*
CM	SIM MORALE	0.3592	<.0001*
WHAS	SIM MORALE	0.1629	0.0090*
MT	SIM MORALE	0.1399	0.0252*

VARIABLE	BY VARIABLE	SPEARMAN ρ	PROB>|ρ|
TS	SIM MORALE	0.0521	0.4064
BF	SIM MORALE	0.1127	0.0719
DM	SIM MORALE	0.1029	0.1004
SL	SIM MORALE	0.1583	0.0112*
SL	DM	0.1220	0.0512
DM	BF	0.0168	0.7896
SL	BF	-0.0164	0.7942
BF	TS	0.0974	0.1199
DM	TS	0.0072	0.9082
SL	TS	-0.0137	0.8275
TS	MT	0.0067	0.9149
BF	MT	-0.0036	0.9549
DM	MT	0.0121	0.8478
SL	MT	0.0060	0.9241
MT	WHAS	0.0448	0.4755
TS	WHAS	0.0641	0.3069
BF	WHAS	0.0471	0.4528
DM	WHAS	-0.0090	0.8861
SL	WHAS	0.0355	0.5714
WHAS	CM	0.0527	0.4012
MT	CM	0.0341	0.5871
TS	CM	0.0490	0.4347
BF	CM	0.0414	0.5098
DM	CM	0.0301	0.6321
SL	CM	0.0128	0.8390
CM	SI	0.0005	0.9936
WHAS	SI	0.0249	0.6915
MT	SI	0.0221	0.7245
TS	SI	-0.0053	0.9331
BF	SI	0.0212	0.7354
DM	SI	-0.0167	0.7906
SL	SI	0.0128	0.8385
SI	LI	-0.0194	0.7570
CM	LI	0.0405	0.5191
WHAS	LI	-0.0156	0.8035
MT	LI	0.0334	0.5949
TS	LI	-0.0449	0.4747
BF	LI	-0.0127	0.8397
DM	LI	-0.0151	0.8097
SL	LI	0.0030	0.9613
LI	TC	0.0368	0.5573
SI	TC	-0.0279	0.6567
CM	TC	-0.0091	0.8851

VARIABLE	BY VARIABLE	SPEARMAN ρ	PROB>|ρ|
WHAS	TC	-0.0445	0.4788
MT	TC	0.0139	0.8244
TS	TC	0.0288	0.6463
BF	TC	0.0270	0.6677
DM	TC	0.0751	0.2313
SL	TC	-0.0134	0.8306

As shown in Table 57, significant correlations were observed between morale and the following variables (TC, MI, SI, CM, WHAS, MT and SL). All of the correlations exceeded 0.138, which is typically considered to fall in the low correlation strength range, and all correlations exhibited a positive relationship. The strongest correlation was observed between morale and CM with a correlation coefficient value of 0.359 which is moderate in terms of strength.

There should be no high correlations (multicollinearity) among the predictors, which can be assessed by a correlation matrix among the predictors. Tabachnick and Fidell (2012) suggested that as long as correlation coefficients among independent variables are less than 0.90 the assumption is met. The correlations of the predictors meet this criterion; therefore, multicollinearity does not exist between the variables of the regression analysis. This has also been confirmed by the VIF values which are all less than the threshold value. The VIF values can be observed in Table 66.

Regression analysis

An ordinal logistic regression was selected to predict morale given the ordinal nature of the data produced by the SIM of morale and the drivers of morale as identified by EFA. For an ordinal logistic regression to be utilised, there needs to be an ordinal dependent variable and one or more continuous or categorical independent variable, there should be proportional odds and no multicollinearity (Hosmer, Lemeshow & Sturdivant, 2013). The first assumption is satisfied with the use of the SIM to measure morale as the dependent variable, (the justification for this decision is provided on page 219) as the SIM is ordinal in nature (5-point Likert-type scale, collapsed in the interest of meaningful modelling to a 3-point scale: HIGH, NEITHER and LOW) as illustrated in Table 58 and Table 59:

Table 58: SIM of morale

MORALE	*n*	*%*
EXTREMELY LOW	30	11.72
LOW	73	28.52
NEITHER HIGH OR LOW	79	30.86
HIGH	65	25.39
EXTREMELY HIGH	9	3.52
MISSING	0	0.00

Table 59: SIM of morale (collapsed)

MORALE	*n*	*%*
LOW	103	40.23
NEITHER	79	30.86
HIGH	74	28.91
MISSING	0	0.00

The second assumption is satisfied with the 10 independent continuous variables namely TC, LI, SI, CM, WHAS, MT, TS, BF, DM and SL. The third assumption is satisfied by complete separation, in that not one of the variables is a perfect fit for the SIM categories. A complete separation happens when the outcome variable separates a predictor variable or a combination of predictor variables completely. Albert and Anderson (1984:2) define this as "*there is a vector α that correctly allocates all observations to their group*."

The proposed ordinal logistic regression model includes the 10 variables obtained from the EFA. The results of the regression analysis indicate that TC, LI, SI, CM, WHAS, MT and SL are significant in determining morale $\rho < 0.05$. Three constructs were not significant in predicting morale, namely TS, BF and DM, as shown in Table 60:

Table 60: Ordinal logistical fit for SIM of morale (collapsed)

SOURCE	LOGWORTH	PVALUE
CM	9.852	0.00000
TC	5.928	0.00000
LI	5.771	0.00000
SI	3.995	0.00010
SL	2.189	0.00647
WHAS	2.105	0.00785
MT	1.771	0.01696
BF	0.821	0.15110
DM	0.644	0.22687
TS	0.116	0.76495

When controlling for the false discovery rate (FDR), due to the fact that several independent variables are tested simultaneously, the resulting *p*-values confirm the 7-parameter result, as shown in Table 61:

Table 61: Effect summary when controlling for false discovery rate

SOURCE	FDR LOGWORTH	FDR PVALUE
CM	8.852	0.00000
TC	5.248	0.00001
LI	5.248	0.00001
SI	3.597	0.00025
SL	1.888	0.01294
WHAS	1.883	0.01308
MT	1.616	0.02422
BF	0.724	0.18888
DM	0.598	0.25208
TS	0.116	0.76495

When conducting an overview of the whole model as shown in Table 62 it is apparent that the result of the test is significant at $\rho < 0.05$, which indicates that the overall model fitted significantly.

Table 62: Whole model test

MODEL	-LOGLIKELIHOOD	DF	x^2	$\rho > x^2$
DIFFERENCE	57.56051	10	115.121	<.0001*
FULL	220.94064			
REDUCED	278.50114			
RSQUARE (U)	0.2067			
AICC	467.165			
BIC	508.423			
OBSERVATIONS (OR SUM WGTS)	256			

RSquare is a goodness-of-fit statistic which ranges from a value of 0 for a poor fit to 1 for a perfectly fitted model. RSquare is generally used for linear regressions. For ordinal logistic regressions we use RSquare(U), which is analogous to RSquare as a goodness-of-fit statistic (Fox, 1997). This model provides a low value of 0.20, indicating a lot of unexplained variation. Such a result is common in logistic modelling, due in part to the fact that continuous data is often used to predict a dichotomous response variable. Additionally, the RSquare(U) statistic commonly produces lower results when describing human perceptions due to the unpredictability of humans versus for instance the variables in a well-defined physical process (Frost, 2020). The proportion of the total uncertainty that is attributed to

the model fit, defined as the ratio of the difference to the reduced negative log-likelihood values. RSquare(U) ranges from zero for no improvement in fit to 1 for a perfect fit (Fox, 1997). An RSquare(U) value of 1 indicates that the predicted probabilities for events that occur are equal to one: there is no uncertainty in predicted probabilities. Because certainty in the predicted probabilities is rare for logistic models, RSquare(U) tends to be small (Fox, 1997). RSquare(U) is sometimes referred to as *U*, the uncertainty coefficient, or as *McFadden's pseudo R2*. Table 66 displays a summary of the various model fit statistics:

Table 63: Fit details

MEASURE	TRAINING	DEFINITION
ENTROPY RSQUARE	0.2067	1-Loglike(model)/Loglike(0)
GENERALIZED RSQUARE	0.4086	(1-(L(0)/L(model))^(2/n))/(1-L(0)^(2/n))
MEAN -LOG P	0.8630	∑ -Log(ρ[j])/n
RASE	0.5641	√ ∑(y[j]-ρ[j])²/n
MEAN ABS DEV	0.5166	∑ |y[j]-ρ[j]|/n
MISCLASSIFICATION RATE	0.4063	∑ (ρ[j]≠ρMax)/n
n	256	n

The entropy RSqure is the identical to as the RSquare(U). The generalised RSquare is another measure of the fit and the outcome indicates a better model fit with a value of 0.409. The misclassification rate is .4063 which indicates that with a large enough sample, the model would accurately classify in which of the three categories participants would fall with a 60% accuracy. Table 64 displays the lack of fit statistics for the regression model"

Table 64: Lack of fit

SOURCE	DF	-LOGLIKELIHOOD	x^2
LACK OF FIT	492	220.94064	441.8813
SATURATED	502	0.00000	$\rho > x^2$
FITTED	10	220.94064	0.9489

A regression model displays lack-of-fit when it is not successful in describing the functional relationship between the response variable and the dependent variables Laerd Statistics, 2018). Lack-of-fit can occur if important terms from the model are not included. It can also result from large residuals when fitting the model.

The model fits the data well when the *p*-value is larger than the alpha of 0.05. The model lack of fit summary indicates that a probability of 0.9489 exists with $\rho > 0.05$p, thus there is no evidence to suggest that the model does not fit with the data. In this case the selected model has been compared to a saturated, unbiased model.

The parameter estimates provide an indication of the size of the influence that the parameter has on the overall morale. The larger the size of the estimate the greater its influence on the overall morale as output by the model. The parameter estimates are the β (beta) values in the equation of the model. Table 65 shows the parameter estimates for the model:

Table 65: Parameter estimates

TERM	ESTIMATE	STD ERROR	x^2	$\rho > x^2$	LOWER 95%	UPPER 95%
INTERCEPT[LOW]	-0.5981499	0.1518592	15.51	<.0001*	.	.
INTERCEPT[NEITHER]	1.26441732	0.169871	55.40	<.0001*	.	.
TC	-0.7043101	0.1560264	20.38	<.0001*	-1.0171018	-0.4101059
LI	-0.6870516	0.1488977	21.29	<.0001*	-0.9932624	-0.3979399
SI	-0.5320672	0.142912	13.86	0.0002*	-0.8136766	-0.260612
CM	-0.9033382	0.1508763	35.85	<.0001*	-1.2058735	-0.6166894
WHAS	-0.3795131	0.142727	7.07	0.0078*	-0.6655611	-0.0993328
MT	-0.336859	0.1411953	5.69	0.0170*	-0.6179374	-0.0603095
TS	-0.0425853	0.1429228	0.09	0.7657	-0.3226242	0.23722777
BF	-0.2073893	0.1448539	2.05	0.1522	-0.4927583	0.07588229
DM	-0.1767713	0.1449918	1.49	0.2228	-0.4656737	0.10998846
SL	-0.401275	0.1479866	7.35	0.0067*	-0.6969399	-0.1120197

A second set of parameter estimates were completed based on the t-values of the factors to determine any possible multicollinearity that may be present. For this purpose the dependent variable was treated as continuous in determining the Variance Inflation Factor (VIF) values. There was no multicollinearity present between factors in the model, as illustrated by the VIF values in Table 66. A VIF value of 1 can be considered to have no correlation between an independent variable and any other variables, 5 to have moderate correlation and greater than 5 to possess critical levels of multicollinearity with questionable ρ values (Hair et el., 2009).

Table 66: Parameter estimates

TERM	ESTIMATE	STD ERORR	t RATIO	PROB>|t|	LOWER 95%	UPPER 95%	STD BETA	VIF
INTER-CEPT	1.8867188	0.041959	44.97	<.0001*	1.8040717	1.9693658	0	.
TC	0.2205651	0.043553	5.06	<.0001*	0.1347797	0.3063505	0.25837	1.0031818
LI	0.1851936	0.043468	4.26	<.0001*	0.0995748	0.2708124	0.217289	1.0025433
SI	0.157268	0.044268	3.55	0.0005*	0.0700727	0.2444633	0.181132	1.0019314
CM	0.3034092	0.044972	6.75	<.0001*	0.2148281	0.3919904	0.344347	1.0040625
WHAS	0.1202045	0.044334	2.71	0.0072*	0.0328794	0.2075296	0.138406	1.0043605
MT	0.1127383	0.045106	2.50	0.0131*	0.0238939	0.2015827	0.127458	1.00229
TS	0.0184757	0.046556	0.40	0.6918	-0.073225	0.1101761	0.020267	1.0051857
BF	0.0871885	0.046292	1.88	0.0608	-0.003993	0.17837	0.096122	1.0038892
DM	0.0718273	0.047516	1.51	0.1319	-0.021764	0.165419	0.077169	1.0044484
SL	0.1295173	0.047801	2.71	0.0072*	0.035365	0.2236697	0.138197	1.0026503

The effect log likelihood ratio test is performed to observe which constructs have a significant influence on the model. The following constructs where found to be significant which includes the TC, LI, SI, CM, WHAS, MT and SL. As shown in Table 67, TS, BF and DM provide results that are not significant, and their effects have a lower impact on the overall model.

Table 67: Effect likelihood ratio tests

SOURCE	NPARM	DF	L-R x^2	$\rho > x^2$
TC	1	1	23.6077083	<.0001*
LI	1	1	22.9147858	<.0001*
SI	1	1	15.1149243	0.0001*
CM	1	1	41.1531245	<.0001*
WHAS	1	1	7.06723789	0.0079*
MT	1	1	5.70099666	0.0170*
TS	1	1	0.08939673	0.7649
BF	1	1	2.06110554	0.1511
DM	1	1	1.4603878	0.2269
SL	1	1	7.41432328	0.0065*

A receiver operating characteristic (ROC) curve is a graphical plot that illustrates the diagnostic ability of a binary classifier system at various discrimination thresholds by plotting the true positive rate against the false positive rate at various threshold settings (Laerd Statistics, 2018). Figure 70 shows the ROC as a visual representation of the model fit. The area is greater than 0.7, indicating that a good fit exists between the model and the obtained data (Laerd Statistics, 2018).

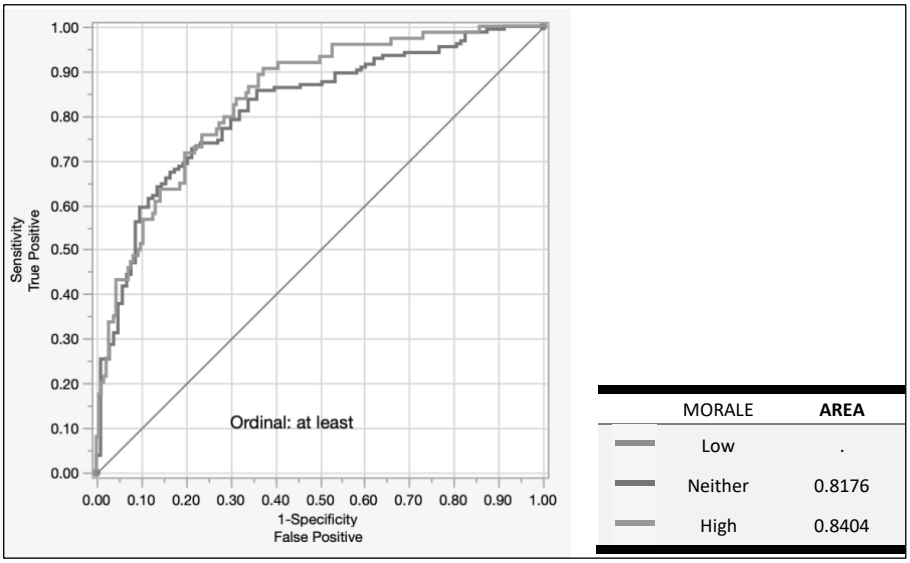

Figure 70: Receiver operating characteristic (IBM, 2020)

An analysis of variance (ANOVA) was conducted to determine whether there were significant differences in morale (as measured by SIM) by TC, LI, SI, CM, WHAS,

MT, TS, BF, DM and SL. As displayed in Table 68, TS, DM and BF are not significant, confirming the result of the effect log likelihood test.

Table 68: One-way ANOVA summary of fit, analysis of variance and Chi-Square approximation

	TC	LI	SI	CM	WHAS
RSQUARE	0.08774	0.05766	0.05251	0.13899	0.02417
ADJUSTED RSQ	0.08052	0.05021	0.04502	0.13218	0.01645
RMSE	0.9270	0.94379	0.92896	0.87263	0.94250
OBS	256	256	256	256	256
ANALYSIS OF VARIANCE					
DF	2	2	2	2	2
MEAN SQUARE	10.4566	6.89458	6.05027	15.5496	2.78271
F RATIO	12.1658	7.7404	7.0109	20.4201	3.1326
ρ **>F**	<.0001*	0.0005*	0.0011*	<.0001*	0.0453*
1-WAY TEST, x^2**APPROXIMATION**					
x^2	20.6784	14.5066	12.5892	33.4157	6.8537
DF	2	2	2	2	2
$\rho > x^2$	<.0001*	0.0007*	0.0018*	<.0001*	0.0325*
	MT	**TS**	**BF**	**DM**	**SL**
RSQUARE	0.04898	0.0059	0.0221	0.0159	0.02570
ADJUSTED RSQ	0.04146	-0.0019	0.0144	0.0082	0.01800
RMSE	0.91359	0.90623	0.9034	0.8831	0.87272
OBS	256	256	256	256	256
ANALYSIS OF VARIANCE					
DF	2	2	2	2	2
MEAN SQUARE	5.43741	0.622987	2.33307	1.5949	5.08374
F RATIO	6.5147	0.7586	2.8588	2.0496	3.3373
ρ **>F**	0.0017*	0.4694	0.0592	0.1309	0.0371*
1-WAY TEST, x^2**APPROXIMATION**					
x^2	11.7712	2.4047	6.6365	5.7232	6.7374
DF	2	2	2	2	2
$\rho > x^2$	0.0028*	0.3005	0.0362*	0.0572	0.0344*

The exploratory analysis of performing the ANOVA, as Table 68 shows, in conjunction with the logistic regression, provide similar outcomes when the significant constructs are compared. This serves as validation that the significant constructs have been correctly identified.

The hypotheses for this research, as introduced in section 7.8.1, were answered in this chapter as follows:

Team cohesion (TC)

TC had a statistically significant effect (L-R$x^2(1) = 23.608, \rho < .0001$) on morale as measured by SIM. Therefore, the null hypothesis (H_{TC0}) is rejected in favour of the alternate hypothesis (H_{TC1}).

Leadership interaction (LI)

LI had a statistically significant effect (L-R$x^2(1) = 22.915, \rho < .0001$) on morale as measured by SIM. Therefore, the null hypothesis (H_{LI0}) is rejected in favour of the alternate hypothesis (H_{LI1}).

Staff incentive (SI)

SI had a statistically significant effect (L-R$x^2(1) = 15.115, \rho = .0001$) on morale as measured by SIM. Therefore, the null hypothesis (H_{SI0}) is rejected in favour of the alternate hypothesis (H_{SI1}).

Communication management (CM)

CM had a statistically significant effect (L-R$x^2(1) = 41.153, \rho < .0001$) on morale as measured by SIM. Therefore, the null hypothesis (H_{CM0}) is rejected in favour of the alternate hypothesis (H_{CM1}).

Workplace health and safety (WHAS)

WHAS had a statistically significant effect (L-R$x^2(1) = 7.067, \rho = .0079$) on morale as measured by SIM. Therefore, the null hypothesis (H_{W0}) is rejected in favour of the alternate hypothesis (H_{W1}).

Mutual trust (MT)

MT had a statistically significant effect (L-R$x^2(1) = 5.701, \rho = .0170$) on morale as measured by SIM. Therefore, the null hypothesis (H_{MT0}) is rejected in favour of the alternate hypothesis (H_{MT1}).

Technical support (TS)

TS did not have a statistically significant effect on morale as measured by SIM. Therefore, the null hypothesis (H_{TS0}) is accepted and the alternate hypothesis (H_{TS1}) rejected.

Break facilities (BF)

BF did not have a statistically significant effect on morale as measured by SIM. Therefore, the null hypothesis (H_{BF0}) is accepted and the alternate hypothesis (H_{BF1}) rejected.

Diversity management (DM)

DM did not have a statistically significant effect on morale as measured by SIM. Therefore, the null hypothesis (H_{DM0}) is accepted and the alternate hypothesis (H_{DM1}) rejected.

Staffing level (SL)

SL had a statistically significant effect (L-R$x^2(1) = 7.414, \rho = .0065$) on morale as measured by SIM. Therefore, the null hypothesis (H_{SL0}) is rejected in favour of the alternate hypothesis (H_{SL1}).

The overall MoMaD model results rejected the null hypothesis (H_0) in favour of the alternate hypothesis (H_1), as TC, LI, SI, CM, WHAS, MT and SL were found to have statistically significant effects on morale as measured by SIM. Figure 71 presents the final factor structure based on the RSquare(U) goodness of fit values presented in Table 62, with the hypotheses forming the backbone of the model:

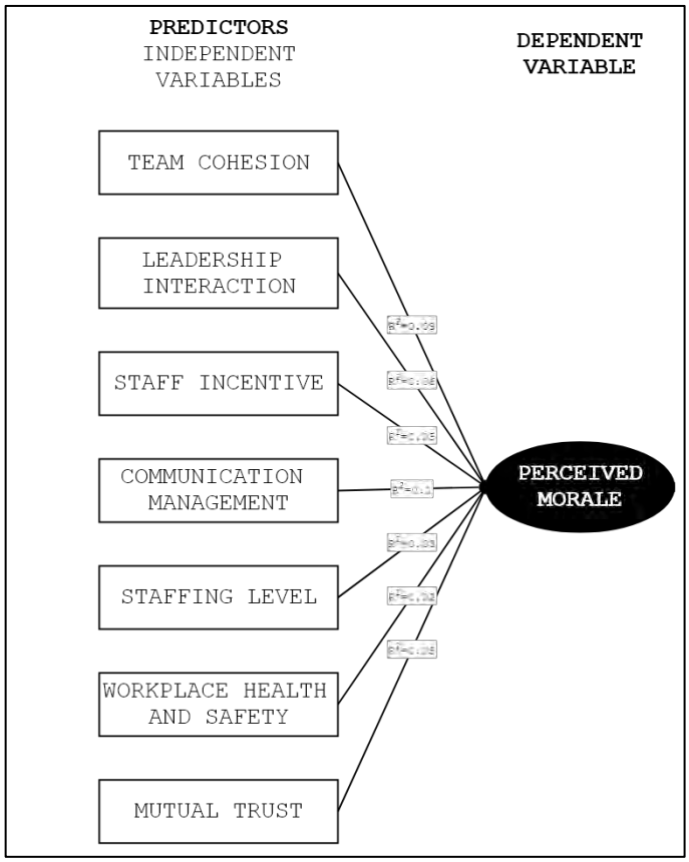

Figure 71: Final factor structure (author's own)

As illustrated in Figure 71, phase two of this research has quantitatively verified the qualitative exploration of themes emergent in the search for the drivers of morale in

phase one. In future studies the constructs of Team Cohesion, Leadership interaction, Staff incentive, Communication management, Staffing level, Workplace health and safety and Mutual trust may be used as drivers of morale. The final items in the MoMaD instrument, based on the seven drivers of morale as illustrated in Figure 71 are listed in Table 69:

Table 69: Final MoMaD instrument items

OLD ITEM	NEW ITEM	DIMENSION	ITEM
B1	**B1**	BIOGRAPHICAL	AGE GROUP
B2	**B1**	BIOGRAPHICAL	GENDER
B3	**B1**	BIOGRAPHICAL	ROLE
B4	**B1**	BIOGRAPHICAL	STATION
B5	**B1**	BIOGRAPHICAL	POOL
B6	**B1**	BIOGRAPHICAL	EMPLOYMENT DURATION
SIM1	**SIM1**	MORALE	With the definition of morale in mind, please rate the current level of your morale in your pool
Q42	**TC1**	TC	Pool members agree over the appropriateness of pool objectives
Q43	**TC2**	TC	Pool members share the same vision at work
Q47	**TC3**	TC	My pool has clear criteria which pool members try to meet to achieve excellence as a team
Q46	**TC4**	TC	My pool is a high-performance team
Q40	**TC5**	TC	Pool members support each other to get the work done despite challenges at work
Q41	**TC6**	TC	Pool members keep each other informed about work related issues
Q39	**TC7**	TC	Pool members are loyal to each other
Q44	**TC8**	TC	Pool members know what the pool objectives are
Q45	**TC9**	TC	My pool has a good reputation within ATNS
Q29	**TC10**	TC/DM	My pool is sufficiently respectful of diversity and our differences
Q30	**TC11**	TC/DM	Pool members display professional respect at work
Q27	**TC12**	TC	Pool members have a good attitude towards the job
Q28	**TC13**	TC/DM	Pool members display cultural respect at work
Q31	**TC14**	TC	Pool members respect professional hierarchy
Q22	**TC15**	TC	I am held accountable for my performance at work
Q10	**TC16**	TC	Communication between pool members is efficient
Q86	**LI1**	LI	My pool manager makes just and fair decisions
Q85	**LI2**	LI	My pool manager considers my viewpoint
Q87	**LI3**	LI	My pool manager shows care and concern towards me as an employee
Q15	**LI4**	LI	My pool manager understands the problems faced by pool members
Q16	**LI5**	LI	There is effective communication between me and my pool manager
Q82	**LI6**	LI	My pool manager collects accurate information from pool members necessary to make informed decisions
Q19	**LI7**	LI	My pool manager focuses on corrective action rather than placing blame when I make a mistake
Q83	**LI8**	LI	Opportunities are provided for pool members to challenge decisions made by the pool manager
Q84	**LI9**	LI	Decisions are based on approved standard operating procedures
Q38	**LI10**	LI	My pool manager trusts pool members to make good decisions
Q26	**LI11**	LI	Management and pool members speak to each other in a respectful manner
Q52	**SI1**	SI	Good performance is rewarded at work
Q53	**SI2**	SI	I am incentivised to go the extra mile at work
Q50	**SI3**	SI	I receive financial compensation for above average performance

OLD ITEM	NEW ITEM	DIMENSION	ITEM
Q54	**SI5**	SI	I know what is expected of me to qualify for a reward
Q51	**SI4**	SI	There is an effective rewards and recognition system in place
Q55	**SI6**	SI	The rewards and recognition system is fair
Q56	**SI7**	SI	I know exactly what would potentially qualify for reward and recognition
Q18	**SI8**	SI	I have opportunities to develop new skills at work
Q48	**SI9**	SI	My efforts at work are appreciated
Q49	**SI10**	SI	I receive feedback regarding my performance at work
Q13	**CM1**	CM	My pool manager communicates important information frequently
Q12	**CM2**	CM	My pool manager uses a suitable channel of communication (email, WhatsApp, meetings)
Q9	**CM3**	CM	New information regarding my job execution is communicated timeously
Q17	**CM4**	CM	My pool manager is held accountable for effective communication in the pool
Q14	**CM5**	CM	Important information is easily available to me when I need it
Q11	**CM6**	CM	In my pool there is a climate of transparency in communication
Q20	**CM7**	CM	My pool manager ensures that continuous learning is a priority
Q25	**CM8**	CM	Management and pool members appreciate each other's contribution to the organisation
Q70	**CM9**	CM	The administrative process relating to CAA licencing is adequately prioritised
Q61	**CM10**	CM	The resting facilities is adequate in providing the necessary rest and recovery during breaks
Q24	**CM11**	CM	Management and pool members understand what goes into each other's work
Q80	**W1**	WHAS	When OHAS risks are identified in my station, they are rectified as a matter of urgency
Q79	**W2**	WHAS	There is sufficient accountability for reported OHAS risks that remain unrectified after a reasonable period
Q81	**W3**	WHAS	OHAS is a priority at my station
Q78	**W4**	WHAS	There are no water leaks in my station building that could pose a risk to people at work
Q77	**W5**	WHAS	There are no objects that could significantly harm me in the workplace (e.g. sharp protruding corners)
Q34	**MT1**	MT	I believe that people usually keep their promises
Q35	**MT2**	MT	When people make promises, they generally deliver on them
Q33	**MT3**	MT	Most people can be trusted
Q36	**MT4**	MT	There is a very high level of trust throughout my pool
Q37	**MT5**	MT	Pool members trust that management promises will be honoured at work
Q68	**SL1**	SL	The staffing levels in my pool are acceptable
Q69	**SL2**	SL	There is sufficient planning in terms of future staffing at work

7.9 Discussion of results

The previous section presented the quantitative results. This section summarises and discusses each of these results individually, as well as contextualising their position and contribution within literature.

7.9.1 Definition of morale

This research qualitatively produced and quantitatively verified the following context-specific ATCO definition of morale in safety-critical environments:

> *"Morale is the feeling, sense or state of individuals and teams within the workplace or working environment indicating their attitude towards the organisation and motivation for the job."*

This definition satisfies the first empirical research objective:

EO1: Explore the meaning of morale as perceived by ATCOs within an ATNS ATC pool environment.

Morale is locality dependent, and "*must be seen as a notion which changes its reality according to the exigencies of the moment, and perceptions of the actors involved*" (Lawley, 1985: 199) It is distinctly present at particular time in a particular place (Smith, 1976). Morale is a "*chameleon-like concept*" which many scholars claim to have fathomed and defined, but "*it proves itself ever elusive, persistently merging into and refusing to be seen as separate from the environment in which it lives*" (Williams & Lane, 1975: 90). It is multi-faceted, with each of its components only readily definable within the context of the operation in which it is measured (Halpin, 1966; Day, 2004). As such, the definition produced by this research does not claim to be generalisable.

You cannot measure what you cannot define, and whilst this empirical objective does not contribute more to the body of knowledge than just another context-specific definition of morale, it serves as a pillar supporting the MoMaD instrument as this research's contribution to knowledge. This research has found the assertion that context-bound definitions are easier to work with and provide more accurate measurement systems at the expense of being transferrable across contexts (Hardy, 2010) to be valid, as revealed by the process followed in the attainment of the third empirical objective.

7.9.2 Drivers of morale

The drivers of morale within a safety-critical ATC environment were identified as Team cohesion (TC), Leadership interaction (LI), Staff incentive (SI), Communication

management (CM), Workplace health and safety (WHAS), Mutual trust (MT) and Staffing level (SL). These drivers satisfy the second empirical research objective:

EO2: Determine the most applicable drivers of morale within a safety-critical ATC environment.

The drivers of morale identified in this research largely resonates with existing literature on the subject as discussed in 3.6.4 and are summarised in Table 70:

Table 70: Identified drivers of morale as embedded in literature

DRIVER	SOURCE IN LITERATURE
TC	"Cohesive pride"(Smith, 1976); "Fellow employees" (Baehr & Renck, 1958); "Unity of purpose" (Deckler et al., 1998); "Developing teams and pomoting team-related activities" (Ngambi, 2011); "Workplace cooperation" (Minor et al., 2014); "Teamwork/pulling together" (Hardy, 2010)
LI	"Managerial behaviour" (Baird & Bradley, 1978); "Leadership synergy" (Smith, 1976); "Immediate supervision" (Pestonjee & Singh, 1977; Wofford, 1971; Baehr & Renck, 1958; Wong, 1991; Erickson, 1997; Behm, 2009; Ngambi, 2011; Ibeziako, Chabikuli & Olorunju, 2013; Coetzee, 2017; Coetzee & Henning, 2019)
SI	"Material rewards" (Baehr & Renck, 195); "Personal challenge (Smith, 1976); "Empowerment" (Decker et al., 1998; Abbott, 2003); "Organisational fairness" (Minor et al., 2014)
CM	"Good communication"(Decker et al., 1998; Hardy, 2010); "Communication" (Boyt et al., 2015; Day et al., 2006; Ngambi, 2011)
WHAS	"Working conditions"(Worthy, 1950)
MT	"Mutual trust" (Peterson et al., 2008); "Trust" (Boyt et al., 2015; Ngambi, 2011); "Trusted" (Hardy, 2010)
SL	"Coverage for absent employees"(Decker et al., 1998); "Staffing" (Day et al., 2006); "Succession planning" (Ngambi, 2011)

While Worthy (1950) is the only apparent source in literature of working conditions as a driver of morale, he qualified this finding by stating that working conditions are often misunderstood as a driver of morale. He contended that *"good equipment, pleasant and attractive surroundings, well-maintained washrooms and so on can never, of themselves, develop high morale. Their absence, however, can be a source of real difficulty. If employees are discontented with any phase of their relations with management, they are likely to seize upon and magnify any inconveniences arising from their physical surroundings. They can tolerate situations they know are difficult for management to correct. But where annoyances are apparently unnecessary, employees are likely to interpret the condition as evidence of management's lack of concern for them as people. It is against this attitude that employees rebel. The poor working conditions are merely evidence of the attitude and a convenient target against which to direct complaints"* (Worthy, 1950: 65).

Contrary to this statement, this research found working conditions (WHAS) to be a driver of morale, albeit in a low morale environment ($\mathrm{M} = 2.80, n = 256, \mathrm{B2B} = 40.6\%$) which could imply that findings may differ in a high morale environment if what Worthy (1950) contended is true. Worthy (1950) argued that improving the working conditions cannot by itself develop high morale, but that working conditions are just a convenient scapegoat for a general discontent with management. In a systems approach to safety this is not entirely untrue, as no factor works by itself in a linear causal manner to 'cause' anything else in complex systems – everything is inter-related. But WHAS certainly cannot be discounted as a driver of morale, as this research has shown that it has a statistically significant effect (L-R$x^2(1) = 7.067, \rho = .0079$) on morale in a safety-critical ATC environment, implying that an improvement in WHAS is likely to assist in causing an increase in morale. This is contrary to Worthy's (1950) argument that working conditions cannot cause high morale, even as this research confirms much of the rest of his statement and further research into the effect of WHAS on morale in high morale environments should clarify the matter entirely.

This research has therefore confirmed the identified drivers of morale (on which it has based the creation of its model) to be soundly grounded in theory, widely accepted and not controversial in their nature. Whilst the contribution to knowledge in this particular area is limited only to confirming the otherwise sparsely mentioned WHAS as a driver of morale, meeting this empirical objective serves as a solid platform for the creation of the MoMaD model as this research's contribution to knowledge.

7.9.3 Level of ATCO pool morale

Both a single-item measure (SIM) of morale and multi-item measure (MIM) of morale were used to measure the levels of morale within ATNS ATCO centres. As discussed on page 219, the SIM provided a more accurate measurement of the level of morale within this specific safety-critical environment ($\mathrm{M} = 2.80, n = 256, \mathrm{B2B} = 40.6\%, \mathrm{IXS} = -11\%$). Whilst the MIM proposed by Hardy (2010) did not produce invalid results ($\mathrm{M} = 3.60, n = 256, \mathrm{B2B} = 16.2\%$, Cronbach's $\alpha = .85$) and could have been utilised as a base for the MoMaD, this research revealed one of the items in this generalisable MIM to not be particularly compatible with an ATCO environment

and prone to skewing the scale results as explained on page 216 shown in Figure 63. The third empirical research objective was thus satisfied by the SIM of morale results ($\mathrm{M} = 2.80, n = 256, \mathrm{B2B} = 40.6\%$) as summarised by pool level in Table 35 and Table 38:

EO3: Measure the levels of morale within each ATC centre in ATNS.

A contribution to knowledge by this objective was thus that the MIM scale proposed by Hardy (2010) as a generalisable scale for morale, whilst valid and reliable, should be used with great care in ATCO environments, if at all. This is significant because the researcher was unable to locate another generalisable scale for morale in the manner that it is delineated in this research (as separate from job satisfaction, motivation, happiness, work engagement and employee attitude – see page 100), which makes any findings that assist in its accurate employment particularly beneficial.

7.9.4 Level of each morale driver

The levels of each identified driver of morale were measured for each pool within ATNS as follows:

1. TC ($\mathrm{M} = 3.53, n = 256, \mathrm{IXS} = 42\%$, Cronbach's $\alpha = .92, 95\%\ \mathrm{CI}[.91, .94]$)
2. LI ($\mathrm{M} = 3.31, n = 256, \mathrm{IXS} = 31\%$, Cronbach's $\alpha = .92, 95\%\ \mathrm{CI}[.91, .94]$)
3. SI ($\mathrm{M} = 2.36, n = 256, \mathrm{IXS} = -42\%$, Cronbach's $\alpha = .89, 95\%\ \mathrm{CI}[.87, .91]$)
4. CM ($\mathrm{M} = 2.99, n = 256, \mathrm{IXS} = -9\%$, Cronbach's $\alpha = .88, 95\%\ \mathrm{CI}[.86, .90]$)
5. WHAS ($\mathrm{M} = 2.59, n = 256, \mathrm{IXS} = -19\%$, Cronbach's $\alpha = .87, 95\%\ \mathrm{CI}[.84, .89]$)
6. MT ($\mathrm{M} = 2.76, n = 256, \mathrm{IXS} = -17\%$, Cronbach's $\alpha = .85, 95\%\ \mathrm{CI}[.82, .88]$)
7. SL ($\mathrm{M} = 2.70, n = 256, \mathrm{IXS} = -12\%$, Cronbach's $\alpha = .69, 95\%\ \mathrm{CI}[.62, .77]$)

The SL scale fell slightly short of the acceptable Cronbach's alpha score of .70, which indicates that the resulting mean ($\mathrm{M} = 2.70$) and index score ($\mathrm{IXS} = -12\%$) may be questionable. A probable cause is the dual item nature due to only two items surviving the factor analysis. Strengthening this specific scale with more items to ensure enhanced future reliability is recommended. This section served to enable the achievement of the fourth empirical research objective, as detailed in the next section.

7.9.5 Impact of each driver on morale

This chapter used correlation coefficients, regression analysis and analysis of variance to determine the impact of each identified driver of morale on perceived morale (as measured by SIM). Social sciences generally display weaker correlations due to the unpredictability of humans versus for instance the variables in a well-defined physical process (Frost, 2020). Table 70 confirmed that each identified driver of morale is substantiated in literature. The unique contribution of this research is to demonstrate that their influence is in fact statistically significant, as illustrated in Figure 72:

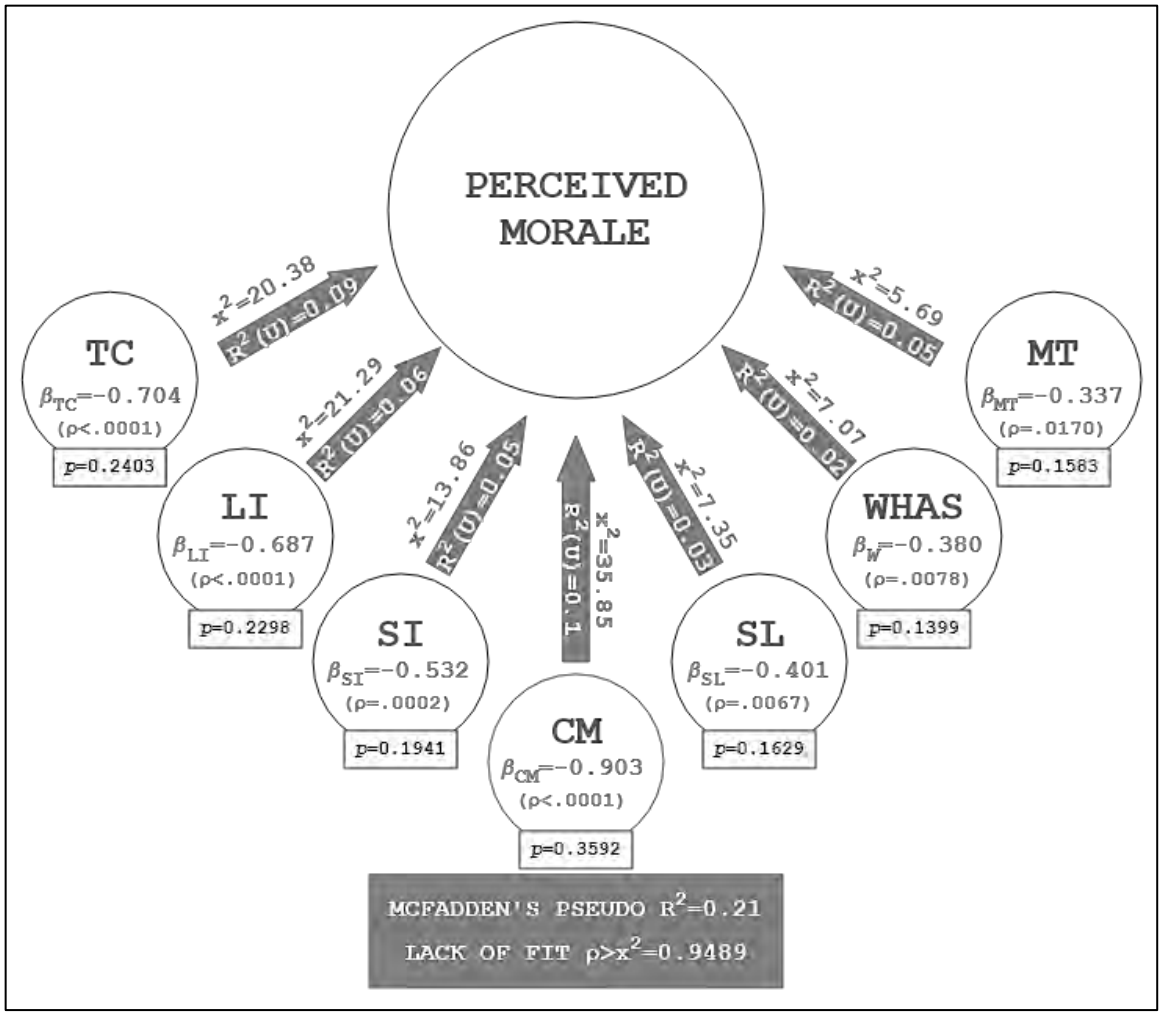

Figure 72**: MoMaD ordinal linear regression model fit (author's own)**

The significant impact of LI on perceived morale is also verified qualitatively in section 5.5.5, where 75% of respondents indicated that they believe direct supervision to have a high effect on morale. As illustrated in Figure 72, phase two of this research has identified the drivers of morale in a safety-critical ATC environment, and

determined the impact of each driver on morale through correlation and regression analysis, thus satisfying the fourth empirical research objective:

EO4: Identify the impact of each driver on ATCO morale levels.

7.9.6 Final morale model

The unique contribution of this research is a model for morale in a safety-critical ATC environment. By achieving the first four empirical objectives, the foundation of the morale model was established. Objective one determined the context-specific definition of morale, objective two determined the context-specific drivers of morale, objective three measured the levels of morale and the fourth objective determined the impact of each of these drivers on ATCO pool morale. This research examined morale in the area where followership, organisational culture and climate and human performance variability intersect.

The concepts of climate, culture and morale are closely interwoven in literature. Both climate and culture have been shown to be associated with work morale in a safety-critical environment (Galdikiene et al., 2016). Morale is propelled by corporate climate (Turnipseed 1988; Wallace, Hunt & Richards, 1999; Sempane et al., 2002; Grobler & Jansen van Rensburg, 2018), and embedded in corporate culture (Jones & James, 1979). Any form or organisational change (such as a collaborative effort to improve morale) requires a change in climate to precede a change in culture, as culture is not directly manipulable (Schneider et al., 1996, Schneider et al., 2013). Research objective two revealed the context specific drivers of morale, which can be individually influenced to produce a change in morale.

Such a change will however not be successful in the long-term without propelling it via climatic intervention to embed it in the corporate culture. Organisational climate and culture, in that specific order, thus act as the vehicles through which any lasting change in morale can be achieved.

This research viewed the crucial leadership relationship from the bottom up by utilising a followership angle from which to confront the gap in morale literature. Both the definition and context-specific drivers of morale were determined from a follower perspective by interacting with followers, hearing their stories and taking the time to

understand their world, ensuring that any attempt at morale management is cemented within in the people it concerns – the ATCOs.

Human performance variability can and should never be fully eliminated, and any system that seeks to do so will certainly lose the safety war (Reason, 1990). It is argued that accident prevention strategies aimed at strengthening system defensive barriers (which implies reducing barrier erosion) instead of a dated and harmful view of causality are more efficient (Reason et al., 2006). Latent conditions for failure erode system defences against active failure (Reason, 1995). Low morale has been identified as one of several possible latent failure conditions, created by organisational processes, that can promote the commission of errors and violations in the workplace (Reason, 1995). Improving levels of morale will therefore logically assist in removing at least one latent failure condition from the system, thereby strengthening system barriers and assisting in preventing opportunities for active errors to penetrate such barriers and result in disaster.

Achieving the fourth empirical objective has demonstrated that the identified context-specific drivers of morale has an impact on morale. Improving the levels of these drivers may assist in enhancing the levels of morale, thus aiding the strengthening of system barriers against active error. Figure 73 presents the updated MoMaD conceptual model, reflecting the outcome of each of the research objectives as described in this section:

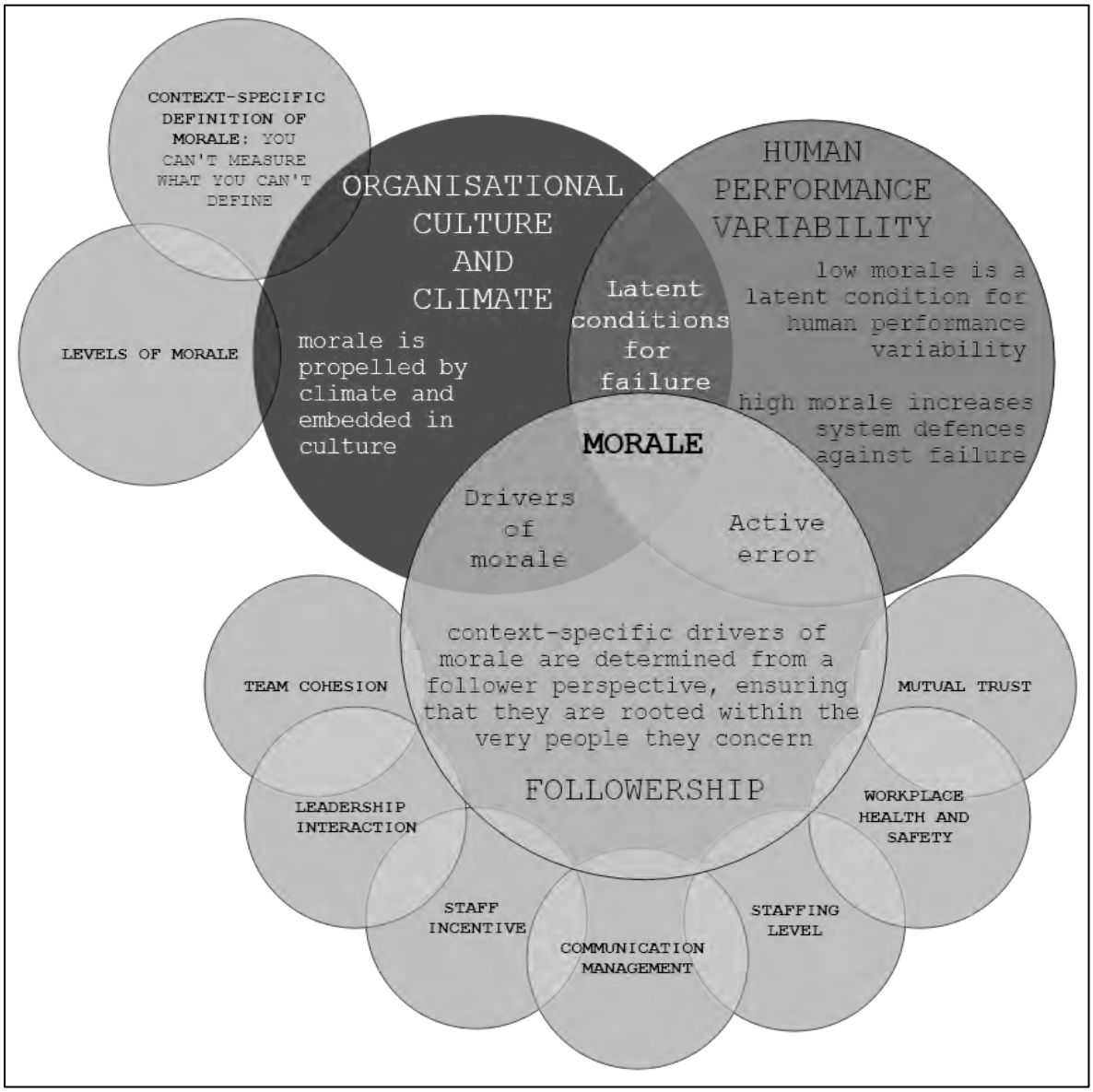

Figure 73: Updated preliminary conceptual model (author's own)

As illustrated in Figure 73, the preliminary MoMaD model was updated by adding the drivers uncovered by phase two of the research and illustrated in Figure 72 to the conceptual model. The updated conceptual model shows morale as residing at the intersection of organisational culture and climate, followership and human performance variability. The drivers of morale (objective two) are embedded into followership, as they were determined from a follower perspective and are rooted in the everyday lived experience of the ATCOs themselves. Where followership and organisational culture and climate overlap represents the source of the drivers of morale – the organisation itself as the place where followers experience these drivers and their effect on morale (objective four).

The context-specific drivers of morale (objective one) and the levels of morale (objective three) are embedded into the organisation through corporate culture and propelled by climate. As a latent condition for human performance variability residing like a pathogen in the organisational body, the overlap between organisational culture and climate and human performance reliability represents this phenomenon - latent conditions for system failure, implying weakness in system defences in the case of low morale and strengthened system defences in the case of high morale. Active error is located at the intersection of followership and human performance variability, as it is the followers (ATCOs in this specific case) that demonstrate human performance variability when they produce active errors at the sharp end of the system.

Figure 77 is presented as the final MoMaD conceptual model, and the MoMaD instrument, forming the practical backbone of the MoMaD model, is presented in Appendix B. The fifth and final empirical research objective is thus satisfied:

EO5: Construct a final follower-centric model for the measurement and management of morale in a safety-critical ATC environment.

The achievement of this research objective serves as the research's unique contribution to knowledge: the MoMaD model. In the next chapter, the overarching systems theory lens (as illustrated in Figure 3) that was removed in Figure 25 to enable the individual scrutiny of each underlying concept is returned, to present the final MoMaD model as illustrated Figure 77.

7.10 Reporting of research results to ATNS

The reporting of research results to the researched company is an important aspect of any organisational research (Saunders et al., 2015) This research ensured that the most important research findings were shared with both participants and managerial structures through a purpose-created website accessible by entering the URL https://moralesurvey.weebly.com into any web browser.

The URL was additionally shared by posting the QR code illustrated in Figure 74 onto the social media group created as described in section 7.3.

Figure 74: QR code for sharing research results with ATNS (Egoditor, 2020)

Over and above the data required to attain the research objectives, this research gathered company-specific data for feedback to pool managers. The results of this section of the research, as reported on page 220, were also shared in the above manner.

7.11 Applying the MoMaD model as a consulting tool

The MoMaD model produces five results (as per empirical objectives), of which three (described in sections 7.9.3, 7.9.4 and 7.9.5) can be operationalised as “scores” to assist in measuring and managing morale in safety-critical ATC environments. Consulting tools are practical applications of academic outcomes, that visualise results in a manner that is easy to interpret and compare (Burtonshaw-Gunn, 2010). They should be simple and easily digestible, offering enhanced utility and practicality for busy corporate executives (Burtonshaw-Gunn, 2010). This section details the suggested operationalisation of the MoMaD as a consulting tool for morale measurement and management.

7.11.1 Performance scores

This research provided performance scores for the level of morale and the levels of each driver of morale. Top two box scores (T2B) are used to summarise the positive responses from a Likert-type scaled survey item. It combines the total number of responses returned indicating the two highest scale items into one number, which is then presented as a percentage of the total number of responses. Reporting both T2B and B2B scores for large datasets has the disadvantage of removing the practicality from the T2B reporting process and generating just another complex chart (Sambandam & Hausser, 1998). A simplified index score (IXS) is generated by

subtracting the B2B score from the T2B score to provide one easily comparable index for each variable.

Bottom two box scores (B2B) perform the same function for the responses indicating the two lowest scale items. This was visualised in a simple manner, in line with the Burtonshaw-Gunn's (2010) simplicity recommendations as the example for TC in Figure 75 illustrates:

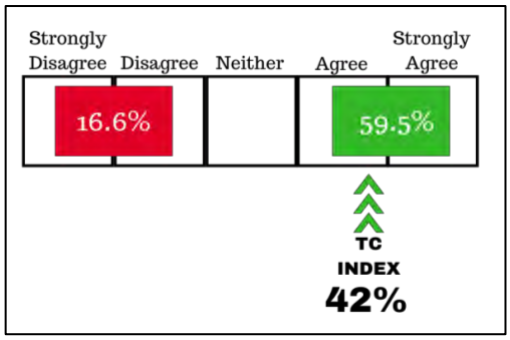

Figure 75: Suggested visualisation of T2B, B2B and IXS scores

The visualisation illustrated in Figure 75 provides a simple and easily comparable scale-like representation, where the index score moves either left or right according to the change in calculated difference between the T2B and B2B scores between measurements and the red (B2B) and green (T2B) colouring provides quick visual reference of where problem areas might be.

7.11.2 Impact Scores

The processes followed in this chapter, namely correlation analysis, regression analysis and analysis of variance, culminated in impact scores (RSquare(U)) as visualised in Figure 72, describing the nature of each driver of morale's impact on morale. The x^2 scores as listed in Table 65 and verified in Table 68 were added to create an easily visualisable figure depicting the impact and significance of each driver on morale, as described in the next section. The idea was to visualise the impact that an improvement in each driver of morale would have on the overall level of morale, implying that elevating the levels of the drivers with higher impact scores would have a larger impact on the level of morale.

7.11.3 Visual representation of MoMaD as an organisational consulting tool

A suggested visualisation of the the MoMaD model for organisational consulting purposes is illustrated in Figure 76:

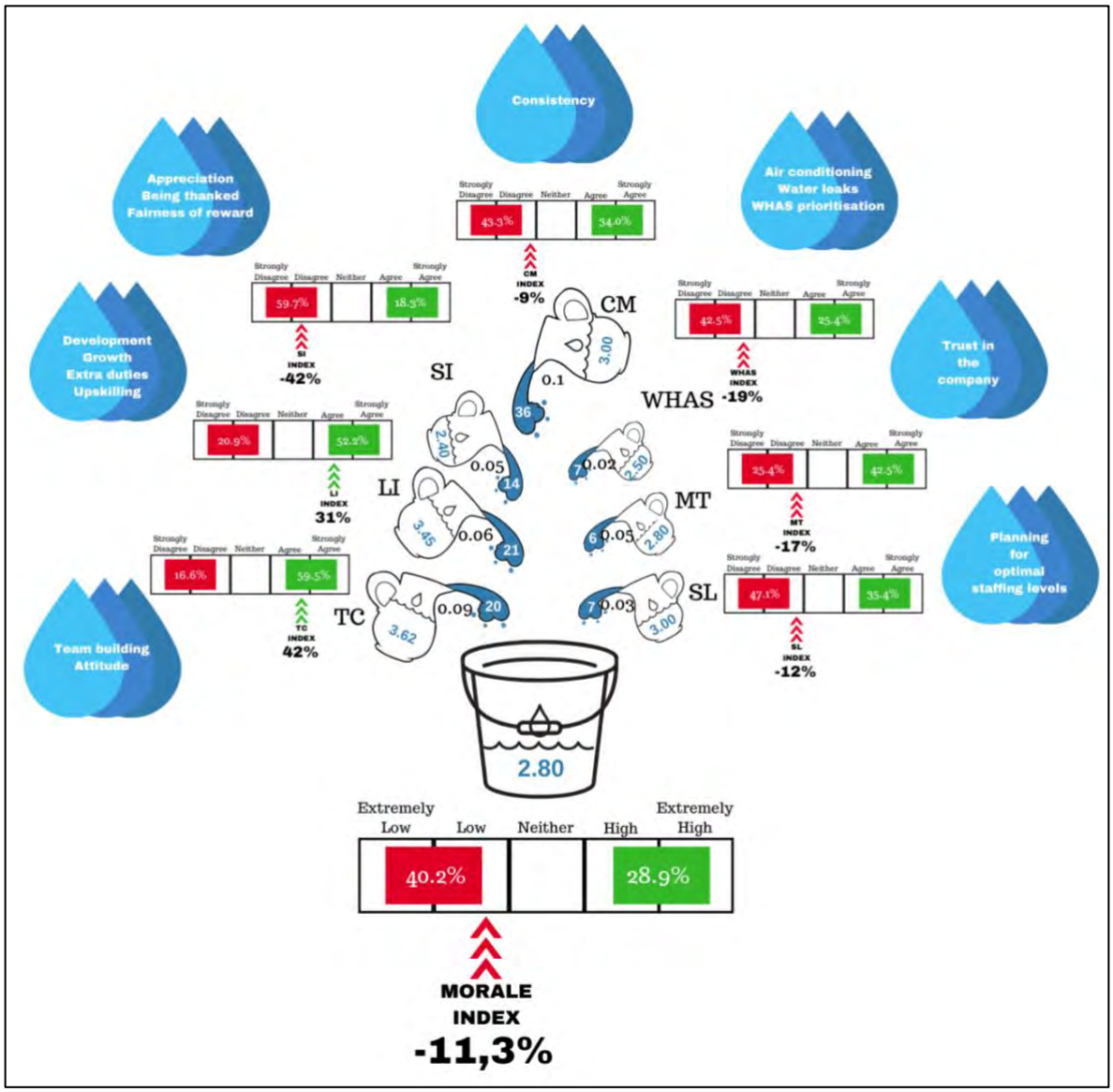

Figure 76: Suggested visualisation of the MoMaD as an organisational consulting tool

In Figure 76, the levels of each morale drivers are exemplified as jugs of water flowing into the pail of water which signifies morale. Fuller jugs would imply a higher level of each drivers, and the level in the pail would lift as it gets filled by the jugs. The mean of each driver (as shown in Table 35 and Table 54) is indicated in blue under the water level of each jug, visualised as the level of water in each jug. The driver can therefore only “fill” the morale jug with the amount of water that it contains, implying

that fuller jugs will enable the morale pail to be filled more. The T2B, B2B and IXS scores add a final visual reference of the level of each driver.

The impact scores (RSquare(U) scores as shown in Figure 71) are visualised as a black number under each water spout, with the significance of each driver (x^2) in white text on the water that is pouring from each jug. Each jug is sized accordingly. The CM jug, for instance, is larger (for visual effect, not necessarily scaled precisely), implying water from CM jug will fill up the morale bucket quicker than water from, for instance, the SL or MT jugs.

Executives can quickly ascertain what can be done to improve drivers that are ascertained from inspection to be problematic by referring to the water drops on the edge of the illustration, serving as “sources of water” for the jugs. Addressing the issues listed in each water drop (as identified qualitatively and summarised in Figure 66) will provide access to more water for the respective jugs, elevating their levels and resulting in fuller jugs with more water available for the morale pail.

The goal of this suggested visualisation is not rigorous academic interpretation, but rather to provide simple, easy access for busy executives to information for decision-making without having to spend time interrogating the academic nature of the model.

7.12 Synthesis

This chapter presented the quantitative research results obtained from administering the MoMaD to the research population, the development of a model for ATCO morale in a safety-critical ATC environment and a discussion of how the research results achieved the research objectives, thereby contributing and integrating into literature. The next chapter conveys the conclusions and implications resulting from this research.

Chapter 8: Conclusions and implications

"It is good to have an end to journey toward; but it's the journey that matters, in the end."

- Ursula K. Le Guin (1975:197)

8.1 Introduction

The purpose of this exploratory-sequential mixed method study was to develop a follower-centric model that delivers the definition and drivers of morale in an ATC environment and enables the measurement and management of air traffic controller (ATCO) team morale. Grounded in a pragmatic worldview, it applied the theoretical framework of systems theory to address the gap identified in the body of knowledge surrounding the concept of morale, specifically in a South African aviation context. Knowledge gained from the fields of followership, performance variability and organisational culture and climate informed the answering of the research question.

Qualitative focus group data collection informed the development of a quantitative survey questionnaire from a follower perspective in phase one, which was operationalised to collect quantitative data in phase two. Harvested quantitative data informed the development of the model by means of correlation analysis, exploratory factor analysis and regression analysis.

Research was conducted among operational ATNS ATCOs at ATNS operational ATC centres. Whilst this delimitation was set to ensure the manageability of an already large project, it is also in line with the followership perspective of the research, as leader opinions regarding morale and its drivers were not included in the data gathering process or results. A choice was made to utilise a SIM of morale for modelling purposes in this research by asking respondents to rate their morale based on a qualitatively obtained definition, due to an observed inaccuracy (although not enough to warrant the chosen MIM unreliable, thus representing a delimitation choice) in the measured mean of morale as measured by the chosen MIM. Whilst a validated MIM is based on the theoretical dimensions of morale, a SIM only measures one-dimensional perceived morale. Lastly, the proposed model does not claim to offer widespread generalisability, and instead provides a context-specific approach to the management of morale within a safety-critical ATCO team environment.

The previous chapter presented the quantitative results, described the modelling process and discussed the overall research results. This chapter concludes the research by presenting the factual and conceptual conclusions, the practical and theoretical implications as well as implications for further study and noting the limitations of the research.

8.2 Limitations of the study

The availability and cooperation of participants, as well as their eagerness to contribute was a limitation to the already limited sample size – there were only 540 ATCOs in South Africa at the time of data collection and motivating them to contribute in a low morale environment was particularly challenging. The lengthy survey instrument did not assist in this regard. The substantially abridged final version, proposed as the new MoMaD instrument and attached as Appendix B, should assist in diminishing this limitation for any possible future research efforts in low morale environments. It warrants mentioning that an electronic survey method was utilised for quantitative data collection, opening the results up to possible distortion resulting from common method variance (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Lastly, this research took place within the South African context only, negating the opportunity for test-retest reliability data or other forms of validity examination.

8.3 Researcher's reflection on the study

Perhaps a reason why morale is so enigmatic as a research topic is because of what general Eisenhower said: "*The best morale exists when you never hear the word mentioned. When you hear a lot of talk about it, it's usually lousy*" (Garner, 2012: 50). Much like talking about morale, it is conceivable that it is possibly only ever studied when it is low. Research completed on morale in low morale conditions is particularly difficult – it is arduous to coerce participation due to low levels of interest and motivation, as well as more symptomatic manifestations such as fear of reprisal. This research was completed not only in low morale conditions, but in the midst of salary negotiations that had stalled for over a year, implying no annual increases. It was additionally preceded by several surveys that had been completed in the recent past, promising both change and feedback and delivering neither ("*we've gone through so many of these, why should this be any different*?" (S2) and "*There are always*

surveys…They are always questionnaires, there are always everything, but never implementation on what comes out of it." (S19)). Despite these challenges, a 47% response rate was achieved…possibly indicating hope for an outcome, a yearning for change and a certain amount of trust in the process, all of which this research outcome sincerely hopes to not disappoint in.

Researchers, particularly PhD candidates, set out on a learning journey which necessarily implies not having all the answers at the beginning, or even perhaps not knowing exactly where to start or how to go about it. They learn as they go, often making mistakes along the way that with any luck are not fatal to their endeavour. A particular challenge in this case was to stay true to the practical *raison d'être* of this research, the very motive for its commencement – to at least *try* and make a difference to the day to day life of the followers, the ATCOs, even as it became increasingly hard to maintain personal motivation in the face of such a barrage of consistently negative inputs.

On a factual level, discarding the MIM morale data was one of those watershed moments. The research results may have been slightly stronger and certainly more straight forward, resulting in the usual multi-linear regression approach with simpler interpretations…but the resultant high mean morale score would not have reflected the lived experiences that were encountered and recorded in the qualitative phase. Thus, there was simply no choice if the research was to remain true to its followership calling, and so the comparatively complex process of making meaningful and useful sense out of the SIM morale data commenced. Growth in the researcher's understanding of the complexities surrounding the dimensions of morale means that it is likely that the unsuitable item in Hardy's (2010) MIM of morale would have been identified and somehow corrected before use if the knowledge and experience gained by means of this journey had been available at the start. Such is the nature of learning.

Conceptually, this research has introduced the researcher to an entirely different way of thinking as the intrinsically systemic nature of the entire endeavour became apparent. In complex safety-critical environments such as ATC, nothing can be isolated and everything is interrelated. This was superficially acknowledged at the start of this project, but as the research progressed and the researcher was slowly introduced to the Safety-II systems approach as a way of thinking, the entire paradigm

shifted away from the familiar human error approach to a new, blended performance variability and Safety-II approach that combines the best of both worlds without totally discarding human error's valuable portions.

Kuhn's (1996) notion of a paradigm shift, implying that a person's perspectives and beliefs have changed, is perhaps somewhat applicable here even though the idea of human error is not discarded entirely. Burgess (1973) believed that it is sometimes impossible for a writer to remain the same over a long period of time, and that the growth and maturation that accompanies lengthy projects requires a certain amount of change. Now the morale problem was approached from a "how can we do more of what we are doing right to solve this" perspective, instead of the usual approach of trying to eliminate what we are doing wrong. During each focus group session the researcher, as moderator, made a point of reminding participants that the process is a positive one, with no scapegoats or blame, and that the idea was to collectively identify the things that make morale go both up and down in their pool environment.

Interestingly, in the months since data gathering was completed, the COVID-19 pandemic has provided the perfect opportunity to save a lot of time and effort in reversing the snowball at the bottom of the hill, as the industry nose-dived and ATCOs watched their aviator colleagues become redundant *en masse*. A new emerging gratitude for the simple privilege of continued employment has, in the opinion of the researcher, negated the flywheel effect to some extent and provided an unprecedented opportunity to equal years' worth of morale changing effort in a considerably reduced time frame.

Without the Safety-II paradigm shift having taken place, this opportunity would have come and gone unnoticed, but a new way of thinking has ensured that this opportunity was communicated to management accordingly. Such is the intricate and essentially pluralist nature of research journey, and this researcher is certainly all the better for it.

8.4 Conclusions

This section reveals the factual and conceptual conclusions of this research project. It commences by revisiting the empirical research objectives, presenting both the research propositions and answered hypotheses in line with an abductive approach to

reasoning, and concludes by presenting the conceptual contribution of the research in the form of the MoMaD model.

8.4.1 Factual conclusions

Factual conclusions were drawn from collected evidence. The factual conclusions of this research are consequently summarised.

Empirical objectives

The empirical objectives of this research were:

EO1: Explore the meaning of morale as perceived by ATCOs within an ATNS ATC pool environment.

EO2: Determine the most applicable drivers of morale within a safety-critical ATC environment.

EO3: Measure the levels of morale within each ATC centre in ATNS.

EO4: Identify the impact of each driver on ATCO morale levels.

EO5: Construct a final follower-centric model for the measurement and management of morale in a safety-critical ATC environment.

This research subscribed to a pragmatic research paradigm, which utilised abductive reasoning to perform action (with a caveat as indicated on page 118) and survey research in a mixed method manner, completing a cross-sectional study by means of focus group interviews and questionnaires. The research commenced with an inductive qualitative inquiry to ascertain and propose a context-specific definition of morale and the context-specific drivers that influence it from a follower perspective. The context specific definition of morale proposed by this phase of the research was:

> *"Morale is the feeling, attitude, sense or state of individuals and teams within the workplace or working environment indicating their attitude towards the organisation and motivation for the job."*

The context-specific themes emergent from the search for the drivers of morale and proposed by the qualitative phase of the research were Communication, Mutual respect, Teamwork, Working environment, Support for the core business,

Occupational health and safety (OHAS), Trust, Reward and recognition, Empowerment and Fairness.

Deductive, quantitative examination followed, in which the proposed drivers of morale were operationalised into a survey instrument to enable the achievement of the last three research objectives. The quantitative data revealed the levels of morale within ATNS ATCO teams and confirmed the definition of morale as acceptable within the context. Through exploratory factor analysis, the resultant context-specific drivers of morale were identified as Team cohesion, Leadership interaction, Staff incentive, Communication management, Workplace health and safety, Mutual trust Technical support, Break facilities, Diversity management and Staffing level. Correlation and regression analysis, confirmed by ANOVA, revealed the impact of each driver on morale and hypotheses were accordingly answered as detailed in section 7.8.3.

Morale is a component of performance variability and the elevation of morale is part of a systems approach to safety as a small fragment of improving the system's barriers of defence against failure (Reason, 1995). A context-specific definition of morale as well as the context-specific drivers of morale allowed the construction of the MoMaD model that allows ATC leaders to measure levels of morale in their teams and understand the level of influence that specific individual drivers have on ATCO morale in a safety-critical air traffic control environment. The researcher was unable to find a similar model for morale measurement in a safety-critical ATC environment despite its importance, specifically in a South African ATC organisational context (Joubert, 2014; Coetzee, 2017; ATNS, 2017; Reid, 2017; Coetzee & Henning, 2019).

8.4.2 Conceptual conclusions

The three theoretical objectives of this research were attained by providing an overview of existing literature in the fields of performance variability, followership, organisational culture and climate and morale management, illuminating the gap in the literature relating to morale and constructing a preliminary conceptual framework based on the literature review. The discussion of results in section 7.9 presented a brief assimilation of each of the research results into these various aspects of literature. This section serves to conceptualise the factual research conclusions.

Followership as a guiding principle

This research was commenced, conducted and completed with followership at the helm of every action and interaction. As a guiding principle, the intention was not to contribute to the body of followership knowledge, but rather to apply its principles to every step of the research, ensuring that research outcomes are grounded within the people that it concerns – the ATCOs. Nevertheless, there appears to be some resonance with Kelley's (1988) followership dimensions and styles. Is it conceivable that low morale moves followers into the 'alienated' category? Further research into this possibility is certainly warranted, as remarks during the focus group interactions highlighted: *"So it's those little things, like there's a don't care attitude towards not knowing what's going to happen. And that has now made me as an employee, not care."* (S14) "…*if you have somebody that's very good with something that steps forward to say 'let me help with this, let me get involved with this' and then being side-lined. It stops them from trying again*." (S7). Kelley (1988) described alienated followers as passive critical thinkers that are highly abrasive as they constantly try to spread their negative energy to the rest of the group. This phenomenon seems to be already present within ATNS, as one S5 ATCO remarked: "*One thing is inter-colleague morale, because it's a company-wide thing the salary negotiations, but if I have to sit in the restroom again and have to listen to…I won't mention our controllers' names…but if I have to listen to them moan and b*tch again (sorry for the word) about the salary negotiations, I'm going to lose it!*"

Human envelope model positioning

As a link between organisational culture and performance variability, Westrum & Adamski's (1999) human envelope model postulated that each type of culture has a different effect on the human envelope which shields the system from adverse performance variability effects with a surrounding 'envelope'. Such an envelope provides more, or less protection, based on the number of residual pathogens in the prevailing corporate culture (Westrum & Adamski, 1999).

ATNS is found to inhabit the bureaucratic category, with this outcome corroborated in Table 71:

Table 71: Substantiation of ATNS's bureaucratic position within Westrum and Adamski's (1999) human envelope model

WESTRUM & ADAMSKI, 1999	ATNS	SOURCE
Information may be ignored	*"…you send an email, no respond a month pass, you even forget sometimes that you're waiting for something."*	S21
Responsibility is compartmentalised	*"Yes you have access to your licence, but it's in a locker in someone's office who is supposedly managing it. Yet people's ratings lapse, or medicals are almost past due, or licences have expired. What are they doing? You get paid to do that, but you're not doing it."*	S21
Organisation is just and merciful	ATNS has a just culture policy in place	(ATNS, 2019b)
New ideas create problems	*"Yeah, because that's the thing. I had some ideas and it was pretty excited about '*this is what I'm gonna do in the company, do these things*'. And that policy, I just lost a lot of morale and I'm not even interested anymore."*	S16
Bureaucracy specifically mentioned	*"The bureaucracy is terrible, like that's the truth."* *"Yes, because a lot of … those things are coming from bureaucracy now."*	S21 S14

As Table 71 demonstrates, ATNS appears to have entered in the bureaucratic category of the human envelope model. Bureaucratic organisations tend to falter when presented with non-routine problems or serious emergencies as they are unable to adapt their responses to situational requirements (Westrum & Adamski, 1999) and ATNS should take note of this positioning, as the flexibility to adapt to unexpected situations is a critical defence against disaster in safety-critical environments (EUROCONTROL, 2013).

Returning a systems theory lens to the conceptual model

We need to engage in systems thinking in order to get to the real root of the problem by looking at the parts as well as the entire system – only then will we be able to come up with real, lasting solutions (Rutherford, 2018). As our world, and particularly the aviation environment, becomes more complex with an ever-increasing amount of change, systems thinking will assist us in managing, adapting to, and seeing the selection of choices within our reach (Meadows, 2008). The entire conceptual model of this research resides under the overarching and containing lens of systems theory, implying that nothing operates in isolation and the collective goal of the entire model is to assist in increasing morale resulting in fewer 'holes in the cheese' (Reason,

1997). There are several ways in which systems theory concepts, introduced in Chapter 2, conceptually explain the conclusions of this research.

The flywheel effect of morale, performance variability and explosive instability

Morale is a self-perpetuating concept (Worthy, 1950; Hardy, 2010; Hardy, Alcock & Malpass, 2015), which acts like a flywheel in that it resists changes to its rotational speed due to inertia. The flywheel effect of morale was raised in several focus group sessions, but succinctly verbalised by an S2 ATCO as follows:

> *"Exactly, it goes lower and then it becomes our new norm. So, this was…our new norm, now we had a negative driver, so morale dropped, but for eight years that same negative driver's there, and then eventually all the new people that come in think that this is the norm, this is our morale. Then we have another negative driver and then morale drops again. If you don't fix these things, and it is happening…if you don't fix these things you're never going to pick up morale. You might be able to pick up from where morale was yesterday. But it's like a snowball -* ***it becomes very hard to stop at the bottom of the hill****."*

Ominously, this may raise concerns about the possible presence of explosive instability within the system, as introduced on page 46. As low morale is identified as a latent condition for performance variability within a system (Reason, 1995), ATNS should prioritise the introduction of negative feedback in this regard, since the process may become explosive and progresses into a 'runaway' state (Henning, 2009), resulting in fewer barriers against system failure.

Field expert involvement and local rationality

Recognising, including and involving the people that make the system function the way that it does in every aspect of system improvement, assists in understanding system behaviour (EUROCONTROL, 2014). ATCOs are experts at making the ATC system work, and their input is invaluable in ensuring that system improvement actions have the desired results. They should be recognised as partners in system improvement, and not simply objects of study or targets for interventions (EUROCONTROL, 2014). In line with a systems theory approach to safety, the context-specific drivers of morale were determined from an ATCO perspective (by means of Field expert involvement – see page 50), ensuring that any attempt at manipulation of morale emanates from within the midst of the very people it concerns on a daily basis. With an inside perspective into system functionality it becomes

easier to understand why the system functions the way it does. This can be achieved by means of as much input from field experts as possible (EUROCONTROL, 2014). Listening to ATCO stories of lived experience and trying to obtain an understanding of their point of view, as well as seeking multiple perspectives assisted this research to understand the intricacies of morale within the complex ATC system.

8.5 Unique contribution to the body of knowledge

This research integrated applicable aspects of morale, followership, performance variability and corporate culture and climate in safety-critical environments through the lens of systems theory. The research question for this study was:

How can a model for ATCO team morale in a safety-critical air traffic control environment be best described?

This question is answered by means of the unique interaction of these elements as viewed through the overarching lens of systems theory. The interactions of the various elements as described in 7.9.6 are now returned to reside under the lens of systems theory as described in the previous section, by recognising that every single component from the smallest most insignificant to the largest, most obvious and most important are intricately connected and completely inseparable. As illustrated in Figure 77, the MoMaD model places morale at the heart of a systems approach to safety that involves the interaction of followership, human performance variability and organisational culture and climate in a way that is unique and original. The goal of the model is to create one less hole in Reason's (1995) cheese by enabling the elevation of morale through its definition, measurement and management by means of the identified drivers of morale: Team cohesion, Leadership interaction, Staff incentive, Communication management, Workplace health and safety, Mutual trust and Staffing levels.

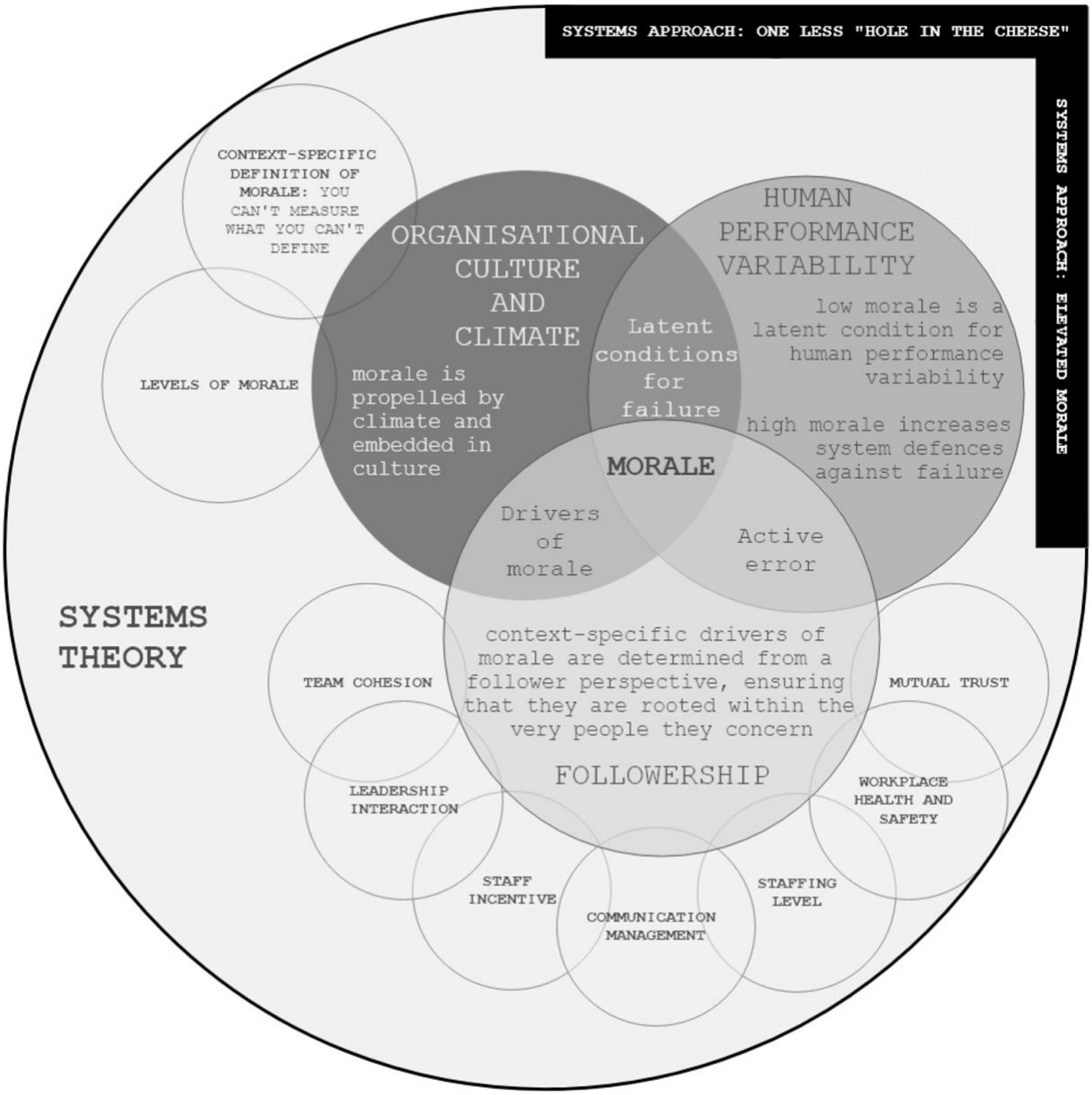

Figure 77: Final MoMaD conceptual model (author's own)

The final MoMaD model illustrated in Figure 77 is presented as the answer to the research question as well as the unique, integrated contribution of this research to the body of knowledge.

8.6 Implications of the study

This section discusses the theoretical and practical implications of this research, as well as implications for future research.

8.6.1 Theoretical implications

This research produced a new framework for morale in safety-critical air traffic control environments, consisting of a context-specific definition of morale and seven drivers: Team cohesion, Leadership interaction, Staff incentive, Communication management, Workplace health and safety, Mutual trust and Staffing level. The model's measurement of morale may be refined by the replacement of the SIM of morale with a context-sensitive, literature-based MIM of morale.

8.6.2 Practical implications

The MoMaD provides a practical method for ATC team leaders to keep a pulse on ATCO team morale within their safety-critical environments. Cooper (2003) opined that there is a need for recommendations to be realistic and to take certain fundamental aspects into account, in that such recommendations should:

1. advance organisational learning;
2. add value in terms of profitability and productivity;
3. operate seamlessly within the recognised business framework;
4. not add barriers day-to-day decision-making activities;
5. effortlessly overlay typical senior management decision-making processes;
6. provide feedback for evaluation and control purposes.

In line with Cooper's (2003) guidelines, and in the spirit of the followership-guided research angle taken by this study, it is recommended that ATNS adopts a reverse mentorship program to assist in addressing the issues identified by this research as affecting morale. This approach, successfully implemented by Virgin Atlantic initially to address initially diversity (Jolin, 2018), but also potential silos and the communication gaps within their organisation (Virgin Atlantic, 2019), involves rotating field experts through a 'job shadowing' period with company executives. This could be particularly useful for ATNS, due to the very different daily realities experienced by ATCOs and corporate executives, noted as a 'silo mentality' in 15 out of the 21 of the focus group interactions undertaken by this research. As an S4 ATCO noted, "…*the opposite of silos would be teamwork*". This research recommends a reverse mentorship program for ATNS executives as a step in the direction of company-wide teamwork.

8.6.3 Implications for future research

The goals of this research were to explore the meaning of morale as perceived by ATCOs within an ATNS ATCO pool environment, determine the most applicable drivers of morale within a safety-critical ATCO environment, measure the levels of morale within each ATCO centre in ATNS, identify the impact of each driver on ATCO morale levels and construct a final model for defining and measuring morale in a safety-critical ATCO environment. During the research process these goals were achieved with Team cohesion, Leadership interaction, Staff incentive, Communication management, Staffing level, Workplace health and safety and Mutual trust presented as constructs that drive morale, though further work is desirable for this research area to progress to fruition.

Further inquiry into morale as a driver of morale is required. The phenomenon, termed 'the flywheel effect of morale', its self-perpetuating nature (Worthy, 1950; Hardy, 2010; Hardy, Alcock & Malpass, 2015) is a field that requires serious scrutiny given the implications of explosive instability in complex systems such as ATC.

Hardy's (2010) MIM for morale did not function optimally in the ATC context due to the reasons discussed on page 219. The data produced by the MoMaD instrument could be appropriately enriched with the addition of a newly developed MIM that reflects the complexity and specificity of the ATC context. Research that seeks to develop and validate an ATC-compatible MIM for morale is encouraged.

8.7 Synthesis

The previous chapter presented the quantitative research results, described the MoMaD modelling process and discussed the overall research results. This chapter completed the research report by examining the conclusions, contribution, implications and limitations of this research project.

This research produced a follower-centric, context-specific model for the measurement and management of morale in a safety-critical air traffic control environment. Why is morale an important research topic? In safety-critical environments, morale is important because its level influences the amount of protection that the system has between it and disaster. Low morale erodes system

defences against failure, whilst high morale reinforces it. Why is this model significant? The MoMaD model is significant, because there appears to be no other model available within a safety-critical air traffic control environment that enables air traffic control team leaders to measure and manage the morale within their teams. Measurement enables management, which enables ATC team leaders to elevate morale levels within their teams, thereby reinforcing system defences against failure.

"Morale is the greatest single factor in successful war."

- Dwight D. Eisenhower (1948:210)

Like war, safety requires precision, determination, and collective buy-in. Like war, the consequences of failure in safety-critical environments are disastrous. Like war, marginal gains in safety seem insignificant when compared to glorious front-line victories. High morale is indeed a marginal gain. It will likely never be highly visible, nor widely celebrated. Like General Eisenhower also said, "*The best morale exists when you never hear the word mentioned.*" (Garner, 2012: 50). By its very nature, high morale evades recognition when present, making early detection of declining morale a real challenge. The flywheel effect of morale implies that the longer it is allowed to decline, the harder it is to recover. This research provides a practical tool to assist safety-critical organisations in overcoming this challenge by regularly measuring morale within their teams to ascertain areas of concern before they become arduous to reverse.

In low morale environments, it can often be so pervasive that organisations find it easier to ignore the problem than to address it. Simply ascertaining where to start becomes difficult when attempting to reverse the course of the low morale flywheel. This research provides such organisations with an instrument enabling the crucial first step in reversing a low morale problem: measurement of morale and its drivers. Practically useful feedback, such as "*we need to focus on communication management and staff incentive*" enables easier implementation when compared to blanket statements such as "*morale is low, we need to fix it*".

This research argues that we can no longer ignore morale's influence on safety. The time has come to value morale as a crucial component of the safety system, requiring pro-active measurement and management in safety-critical environments.

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Appendix A: Qualitative Focus Group Discussion Guide

DISCUSSION GUIDE FOR FOCUS GROUPS TO DETERMINE THE DEFINITION OF MORALE AND ITS DRIVERS AMONGST ATCOs IN ATNS

1. Introduction

Thank you for your attendance and participation. Please remember that while your responses will be treated with the highest confidentiality and anonymity, care should be taken to not divulge any personal or identifiable information at any stage. This focus group proceedings will be recorded to ensure accuracy in data analysis.

2. Definition of morale

There are several academic definitions of morale, for instance:

"Morale is a mental state which can be distinguished from other phenomena. It is influenced by stimuli which impact the individual's affective state and sense of the future either directly or through moderation by others. It affects performance although not in all cases and is believed to be an important factor for individuals and in organisations." (Hardy, 2010)

"a general attitude of workers based upon their faith in fairness of employer's policies and behaviour, adequacy of immediate leadership, a sense of participation in the organization and an overall belief that the organization is worth working for" (Pestonjee & Singh, 1977)

"the extent to which staff feel good about their jobs and work environment such that they experience a sense of belonging and are motivated to expend the effort to pursue workplace goals." (Minor, Wells, Lambert & Keller, 2014)

HOW WOULD YOU DESCRIBE AN ATCO DEFINITION OF MORALE WITHIN ATNS?
LET'S DISCUSS, UNPACK, AND AGREE ON A COLLECTIVE ATCO DEFINITION.

3. Drivers of morale

Drivers are factors that cause a particular phenomenon to happen or develop. Consequently, when these drivers are lacking or deficient, the development of such a phenomenon will lose momentum or even regress.

WHAT ARE THE DRIVERS OF MORALE WITHIN YOUR POOL? AND WITHIN ATNS?
(THEY COULD BE THE SAME, OR DIFFERENT FOR EACH UNIT OF ANALYSIS)
HOW WOULD YOU DESCRIBE EACH OF THESE DRIVERS?

4. Briefing on the process from here

The definition of morale and its drivers within ATNS will be collated from all received responses. A questionnaire will be sent out shortly to measure the levels of morale and its drivers (as defined by you) within ATNS. Your cooperation will be highly appreciated to complete the research process.

Appendix B: Quantitative Survey Instrument

MEASURE OF MORALE AND ITS DRIVERS (MoMaD)

This questionnaire measures morale and its drivers in a safety-critical environment. Your answers will remain anonymous and completely confidential at all times. Please complete all questions.

1. Biographical data for statistical purposes

For statistical purposes, please complete the following. All information is 100% confidential, and no identifying information is collected:

(PLEASE MARK WITH AN X)

B1	AGE GROUP	18-29		30-39		40-49		50-59	60+
B2	GENDER	FEMALE				MALE			
B3	ROLE	ATCO				ATSO			
B4	STATION	FABE	FABL	FACT	FAEL	FAGG	FAGM	FAKM	FAKN
		FALA	FALE	FAMM	FAOR	FAPE	FAPM	FAPN	FAPP
				FAUP	FAUT	FAVG	FAWB		
B5	POOL	ACC	APP	ATSO	TWR	TWR/APP			
B6	EMPLOYMENT DURATION (YEARS)	0-5	6-10	11-15	16-20	21-25	26+		

2. Single-Item Measure (SIM) of Morale

This section measures perceived morale at ATNS pool level. For the purpose of this questionnaire, morale within ATNS is defined by the ATS staff as:

"The feeling, sense or state of individuals and teams within the workplace or working environment indicating their attitude towards the organisation and motivation for the job."

With this definition in mind, please rate the current level of your morale in the following context:

Item		Extremely low	Low	Neither high or low	High	Extremely high
		1	2	3	4	5
SIM1	My pool					

3. Measure of Morale Drivers

This section measures the drivers of morale at pool level. Please indicate your honest opinion when you complete the questionnaire.

PLEASE READ THE TERM "POOL MANAGER" TO MEAN POOL MANAGER ONLY IF YOU DO NOT HAVE AN OIC.

(PLEASE MARK WITH AN X)

	TEAM COHESION Listed below are several statements about team cohesion in your pool as it relates to morale. Please indicate your level of agreement with each statement by indicating an **X** on the sliding scale next to each item.	strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
		1	**2**	**3**	**4**	**5**
TC1	Pool members agree over the appropriateness of pool objectives					
TC2	Pool members share the same vision at work					
TC3	My pool has clear criteria which pool members try to meet to achieve excellence as a team					
TC4	My pool is a high-performance team					
TC5	Pool members support each other to get the work done despite challenges at work					
TC6	Pool members keep each other informed about work related issues					
TC7	Pool members are loyal to each other					
TC8	Pool members know what the pool objectives are					
TC9	My pool has a good reputation within ATNS					
TC10	My pool is sufficiently respectful of diversity and our differences					
TC11	Pool members display professional respect at work					
TC12	Pool members have a good attitude towards the job					
TC13	Pool members display cultural respect at work					
TC14	Pool members respect professional hierarchy					
TC15	I am held accountable for my performance at work					
TC16	Communication between pool members is efficient					

TEAM COHESION HURDLES:

Please tick all items that are absent, thus obstructing effective team cohesion in your pool:

T1	BUY-IN	T2	COLLEGIALITY	T3	COMMITMENT	T4	EQUAL CONTRIBUTION
T5	INTER-TEAM UNDERSTANDING	T6	INTRA-TEAM UNDERSTANDING	T7	LOYALTY	T8	PROFESSIONAL COMPATIBILITY
T9	PUNCTUALITY	T10	RESPECT FOR BOUNDARIES	T11	SOCIAL INTERACTION	T12	TEAM BUILDING
T13	ATTITUDE	T14	COURTESY	T15	CULTURAL RESPECT	T16	HIERARCHICAL RESPECT
T17	INTEGRITY	T18	INTER-TEAM RESPECT	T19	INTRA-TEAM RESPECT	T20	PROFESSIONAL RESPECT
T21	TEAM REPUTATION	T22	RESPECT FOR DIVERSITY	T23	UNDERSTANDING OF OTHER ROLES	T24	VALUEING EACH OTHER
				T25	NONE OF THE ABOVE		

LEADERSHIP INTERACTION

Listed below are several statements about leadership interaction in your pool as it relates to morale. Please indicate your level of agreement with each statement by indicating an **X** on the sliding scale next to each item.

		strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
		1	2	3	4	5
LI1	My pool manager makes just and fair decisions					
LI2	My pool manager considers my viewpoint					
LI3	My pool manager shows care and concern towards me as an employee					
LI4	My pool manager understands the problems faced by pool members					
LI5	There is effective communication between me and my pool manager					
LI6	My pool manager collects accurate information from pool members necessary to make informed decisions					
LI7	My pool manager focuses on corrective action rather than placing blame when I make a mistake					
LI8	Opportunities are provided for pool members to challenge decisions made by the pool manager					
LI9	Decisions are based on approved standard operating procedures					
LI10	My pool manager trusts pool members to make good decisions					
LI11	Management and pool members speak to each other in a respectful manner					

LEADERSHIP INTERACTION HURDLES:

Please tick all items that are absent, thus obstructing effective leadership interaction in your pool:

L1	CAREER PROGRESSION	L2	DEVELOPMENT	L3	GROWTH
L4	INVOLVEMENT OF STAFF IN EXTRA RESPONSIBILITIES	L5	UPSKILLING	L6	NONE OF THE ABOVE

STAFF INCENTIVE Listed below are several statements about staff incentive in your pool as it relates to morale. Please indicate your level of agreement with each statement by indicating an **X** on the sliding scale next to each item.		strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
		1	2	3	4	5
SI1	Good performance is rewarded at work					
SI2	I am incentivised to go the extra mile at work					
SI3	I receive financial compensation for above average performance					
SI4	I know what is expected of me to qualify for a reward					
SI5	There is an effective rewards and recognition system in place					
SI6	The rewards and recognition system is fair					
SI7	I know exactly what would potentially qualify for reward and recognition					
SI8	I have opportunities to develop new skills at work					
SI9	I receive feedback regarding my performance at work					

REWARD AND RECOGNITION HURDLES:

Please tick all items that are absent, thus obstructing effective reward and recognition in your pool:

R1	APPRECIATION	R2	BEING THANKED	R3	PEER RECOGNITION	R4	NONE OF THE ABOVE

COMMUNICATION MANAGEMENT Listed below are several statements about communication management in your pool as it relates to morale. Please indicate your level of agreement with each statement by indicating an **X** on the sliding scale next to each item.		strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
		1	2	3	4	5
CM1	New information regarding my job execution is communicated timeously					
CM2	Important information is easily available to me when I need it					
CM3	Management and pool members appreciate each other's contribution to the organisation					
CM4	The administrative process relating to CAA licencing is adequately prioritised					
CM5	The resting facilities is adequate in providing the necessary rest and recovery during breaks					
CM6	Management and pool members understand what goes into each other's work					

COMMUNICATION MANAGEMENT HURDLES:

Please tick all items that are absent, thus obstructing effective communication in your pool:

C1	ACCOUNTABILITY	C2	ACCURACY	C3	AVAILABILITY	C4	BIDIRECTIONALITY	C5	CHANNEL
C6	COMPLETENESS	C7	CONSISTENCY	C8	CONTENT	C9	EASE	C10	EFFECTIVENESS
C11	HONESTY	C12	MANNER	C13	TIMEOUSNESS	C14	TRANSPARENCY	C15	NONE OF THE ABOVE

WORKPLACE HEALTH AND SAFETY Listed below are several statements about workplace health and safety (WHAS) at your station as it relates to morale. Please indicate your level of agreement with each statement by indicating an **X** on the sliding scale next to each item.		strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
		1	2	3	4	5
W1	When WHAS risks are identified in my station, they are rectified as a matter of urgency					
W2	There is sufficient accountability for reported WHAS risks that remain unrectified after a reasonable period					
W3	WHAS is a priority at my station					
W4	There are no water leaks in my station building that could pose a risk to people at work					
W5	There are no objects that could significantly harm me in the workplace (e.g. sharp protruding corners)					

WORKPLACE HEALTH AND SAFETY HURDLES:

Please tick all items that are problematic about the workplace health and safety in your pool:

WH1	ACCOUNTABILITY	WH2	AIR QUALITY	WH3	DRINKING WATER	WH4	ESCAPE PLAN
WH5	PRIORITISATION OF OHAS	WH6	SHARP CORNERS	WH7	WATER LEAKS	WH8	NONE OF THE ABOVE

MUTUAL TRUST Listed below are several statements regarding mutual trust at your station. Please indicate your level of agreement with each statement by indicating an **X** on the sliding scale next to each item.		strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
		1	2	3	4	5
MT1	I believe that people generally keep their promises.					
MT2	When people make promises, they generally deliver on them					
MT3	Most people can be trusted					
MT4	Pool members trust that management promises will be honoured at work					

MUTUAL TRUST HURDLES: Please tick all items that are absent, thus obstructing effective trust in your pool:							
T1	CREDIBILITY	T2	INTER-TEAM TRUST	T3	INTRA-TEAM TRUST	T4	TRUST IN THE COMPANY
T5	NONE OF THE ABOVE						

STAFFING LEVEL Listed below are statements regarding the staffing level at your station as it relates to morale. Please indicate your level of agreement with each statement by indicating an **X** on the sliding scale next to each item.		strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
		1	2	3	4	5
65	The staffing levels in my pool are acceptable					
66	There is sufficient planning in terms of future staffing at work					

Appendix C: Participant Informed Consent Sheet

Graduate School of Business Leadership, University of South Africa PO Box 392 Unisa 0003 South Africa
Cnr Smuts and First Avenue Midrand 1685 Tel: +27 11 652 0000 Fax: +27 11 652 0299
Email: sbl@unisa.ac.za Website: www.sblunisa.ac.za

Informed consent for participation in an academic research project

A follower-centric model for employee morale in a safety-critical air traffic control environment

Dear Respondent

You are herewith invited to participate in an academic research study conducted by Lonell Coetzee, a student in the Doctor of Business Leadership at UNISA's Graduate School of Business Leadership (SBL).

The purpose of the study is to investigate what air traffic control officers (ATCOs) within ATNS define 'morale' to be, and to determine the ATCO-specific drivers of morale.

All your answers will be treated as confidential, and you will not be identified in any of the research reports emanating from this research.

Your participation in this study is very important to me. You may however choose not to participate and you may also withdraw from the study at any time without any negative consequences.

There are two things that will be required from your participation in this study. Firstly, your attendance of a specified pool meeting, where there will be a focus group discussion to define morale and determine its drivers. Secondly, you will be given a questionnaire to complete.
Please answer the questions in this questionnaire as completely and honestly as possible as and when you receive it. This should not take more than 30 minutes of your time.

The results of the study will be used for academic purposes only and may be published in an academic journal. I will provide you with a summary of my findings on request.

Please contact my supervisor, Dr Sanchen Henning (hennis@unisa.ac.za) if you have any questions or comments regarding the study. Please sign below to indicate your willingness to participate in the study.

Yours sincerely

Lonell Coetzee

I, _____ herewith give my consent to participate in the study. I have read the letter and understand my rights with regard to participating in the research.

_____ _____
Respondent's signature **Date**

Appendix D: Participant Information Sheet

Graduate School of Business Leadership, University of South Africa PO Box 392 Unisa 0003 South Africa
Cnr Janadel & Alexandra Avenue Midrand 1685 Tel: +27 11 652 0000 Fax: +27 11 652 0299
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PARTICIPANT INFORMATION SHEET

1 October 2019

A follower-centric model for employee morale in a safety-critical air traffic control environment

Dear Prospective Participant

My name is Lonell Coetzee and I am doing research with Dr Sanchen Henning, an associate professor in the Department of Leadership and Organisational Behaviour at the School of Business Leadership towards a Doctor of Business Leadership qualification at the University of South Africa. We are inviting you to participate in a study entitled *A follower-centric model for employee morale in a safety-critical air traffic control environment*.

WHAT IS THE AIM/PURPOSE OF THE STUDY?

The aim of this study is to produce a practically applicable model enabling pool managers measure levels of air traffic controller (ATCO) morale by defining ATCO morale and determine its context specific drivers.

WHY AM I BEING INVITED TO PARTICIPATE?

As a valid ATCO within ATNS, you have been chosen for this research as it directly affects you. By participating in this research you will be able to assist in the creation of an instrument for the measurement of ATCO morale. All valid ATCOs within ATNS will be invited to participate on a voluntary basis.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY /WHAT DOES THE RESEARCH INVOLVE?

As an ATCO research participant, you will firstly form part of a focus group discussion where the definition of morale will be unpacked, and its drivers determined. Secondly, this information will lead to the completion of a questionnaire, which will determine the levels of morale and its drivers within your pool.

The study involves your attendance of a pool meeting, where the focus group discussion will take place to determine the definition and drivers of morale. It will be audio taped for

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accurate transcription. Secondly, you will be required to complete a survey questionnaire which will ask you questions regarding morale and its identified morale drivers.

The first phase of the research will take roughly an hour of your time for physical participation in a group discussion after a scheduled pool meeting. The second phase will require roughly half an hour of your time to complete a survey questionnaire.

CAN I WITHDRAW FROM THIS STUDY?

Being in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time before submission of your completed questionnaire, and without giving a reason. Once you have submitted your questionnaire however it will be impossible to withdraw due to the anonymous nature of your contribution – it will be impossible to identify and withdraw your contribution.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

Morale is an important aspect of safety, with low morale classified as a latent condition for human error. This research aims to provide each ATCO pool manager with a practically useful tool to enable the measurement of morale within their pool, and the identification and classification of morale drivers. What can be measured can be improved, and elevated morale is an anticipated benefit of this study.

WHAT IS THE ANTICIPATED INCONVENIENCE OF TAKING PART IN THIS STUDY?

Possible inconvenience will be the attendance of a pool meeting for roughly an hour longer usual, as well as 30 minutes of your time to complete a survey questionnaire.

There are no possible or reasonably foreseeable risks of harm or side-effects to the potential participants.

WILL WHAT I SAY BE KEPT CONFIDENTIAL?

As an ATCO, your name will not be recorded anywhere and no one will be able to connect you to the answers you give.

Your answers may be reviewed by people responsible for making sure that research is done properly, such as members of the Unisa Research Ethics Committee. Anyone other

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than the researcher who accesses the research data will be bound by signed confidentiality agreements before being given access to the data.

A report of the study will be submitted to ATNS and may be submitted for publication, but individual participants will not be identifiable in such a report.

Create a sentence to inform participants that their anonymous data may be used for other purposes, e.g. research report, journal articles, conference presentation, etc. Also indicate how privacy will be protected in any publication of the information.

FOCUS GROUP PARTICIPATION

During a focus group, a group of individuals are brought together in a room to engage in a guided discussion of a topic. Focus group discussions will be completed as part of pool meetings during the first phase of this research.

While every effort will be made by the researcher to ensure that you will not be connected to the information that you share during the focus group, I cannot guarantee that other participants in the focus group will treat information confidentially. I shall, however, encourage all participants to do so. For this reason, I advise you not to disclose personally sensitive information in the focus group.

HOW WILL INFORMATION BE STORED AND ULTIMATELY DESTROYED?

Hard copies of your answers will be stored by the researcher for a period of 5 years in a locked cupboard at the researcher's residence for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Information will not be destroyed.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

No payment or incentive is offered for participation.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the College of Economic and Management Sciences, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

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Cnr Janadel & Alexandra Avenue Midrand 1685 Tel: +27 11 652 0000 Fax: +27 11 652 0299
Email: sbl@unisa.ac.za Website: www.sblunisa.ac.za

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS?

If you would like to be informed of the final research findings, please contact Lonell Coetzee on 0825627837 or email lonell@mweb.co.za. The findings are accessible for a period of one year after the completion of the study.

Should you require any further information or want to contact the researcher about any aspect of this study, please feel free to contact me as mentioned above.

Should you have concerns about the way in which the research has been conducted, you may contact Dr Sanchen Henning on hennis@unisa.ac.za.

Thank you for taking time to read this information sheet and for participating in this study.

Sincerely

Lonell Coetzee

Appendix E: UNISA Ethical Clearance

Graduate School of Business Leadership, University of South Africa, PO Box 392, Unisa, 0003, South Africa
Cnr Janadel and Alexandra Avenues, Midrand, 1685, Tel: +27 11 652 0000, Fax: +27 11 652 0299
E-mail: sbl@unisa.ac.za Website: www.unisa.ac.za/sbl

SCHOOL OF BUSINESS LEADERSHIP
RESEARCH ETHICS REVIEW COMMITTEE (GSBL CRERC)

04 December 2019

Ref #: 2019_SBL_DBL_019_FA
Name of applicant: Mrs L Coetzee
Student #: 33564450

Dear Mrs Coetzee

Decision: Ethics Approval

Student: Mrs L Coetzee, 33564450@mylife.unisa.ac.za, 082 562 7837

Supervisor: Prof S Henning, hennis@unisa.ac.za, 011 652 0311

Project Title: A follower-centric model for employee morale in a safety-critical air traffic control environment

Qualification: Doctorate in Business Leadership (DBL)

Expiry Date: October 2023

Thank you for applying for research ethics clearance, SBL Research Ethics Review Committee reviewed your application in compliance with the Unisa Policy on Research Ethics.

Outcome of the SBL Research Committee:
Approval is granted for the duration of the Project

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the SBL Research Ethics Review Committee on the 28/11/2019.

The proposed research may now commence with the proviso that:

1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2) Any adverse circumstance arising in the undertaking of the research project that is

45 Building leaders who go beyond

SBL GRADUATE SCHOOL OF BUSINESS LEADERSHIP UNISA

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relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the SBL Research Ethics Review Committee.

3) An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.
4) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

Kind regards,

Prof R Ramphal
Chairperson: SBL Research Ethics Committee
011 – 652 0363 or ramphrr@unisa.ac.za

Prof RT Mpofu
Executive Dean (Acting): Graduate School of Business Leadership
011- 652 0256/mpofurt@unisa.ac.za

45 Building leaders who go beyond

SBL
GRADUATE SCHOOL OF BUSINESS LEADERSHIP
UNISA

Appendix F: ATNS Research Permission

Dear Lonell Coetzee

PERMISSION TO COLLECT RESEARCH DATA ON ATNS PREMISES

I, Thomas Kgokolo, the Chief Executive Officer of this company hereby grant permission to collect data at our sites nationwide for your research project titled:

"A follower-centric model for employee morale in a safety-critical air traffic control environment".

I grant this permission as the authorised person to do so in this company and am aware of the following:

1. The study is conducted as a UNISA researcher and remains the property of UNISA.
2. You can use the name of the company in your research project.
3. All data and information collected will be solely in the possession of the researcher.
4. I will require feedback of the research.
5. The research may be published in the public domain under the supervision of the supervisor.

I wish you the best and success in this research.

Sincerely

Thomas Kgokolo
Chief Executive Officer (interim)
ATNS SOC Ltd

Air Traffic and Navigation Services SOC Limited
Company Reg. No. 1993/004150/06
ISO 9001 certified

Eastgate Office Park, Block C,
South Boulevard Road, Bruma
Private Bag X15, Kempton Park 1620
Tel +27 11 607 1000 | Fax +27 11 607 1570
www.atns.com

Appendix G: Permission to use the MIM as part of the MoMaD

Lonell Coetzee
544 Peacehaven Road
Rietvalleirand
0181
SOUTH AFRICA

5 August 2019

Dr Ben Hardy
SOAS University of London
10 Thornhaugh Street
London, W1CH 0XG

Dear Dr Hardy

PERMISSION TO USE MULTI-ITEM MORALE MEASURE (MIM)

I am a doctoral candidate from the University of South Africa's School of Business Leadership writing my dissertation titled *A follower-centric model for employee morale in a safety-critical air traffic control environment* under the supervision of Professor Sanchen Henning.

I would like to request your permission to reproduce and use your survey instrument, the Multi-Item Measure for morale, in my research project. I would like to use and print your questionnaire under the following circumstances:

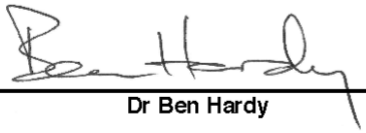
1. I will use this survey only for my research project purposes, and will not sell it or be in any way compensated for it.
2. I will not use it for any curriculum development or related activities.
3. I will include a copyright statement with the names of all authors on all copies of the instrument.
4. I will send my completed research report, as well as any articles that make use of its data promptly for your attention.

If you find these conditions acceptable, please indicate your acceptance by signing a copy of this letter in the space provided below and returning it to me via email: lonell@mweb.co.za

Sincerely

Lonell Coetzee
Doctoral candidate

I hereby authorise Lonell Coetzee to use the Multi-item Measure (MIM) for morale in her research as stipulated in the conditions listed above.



Dr Ben Hardy

Appendix H: Drivers of morale as identified at ATNS stations

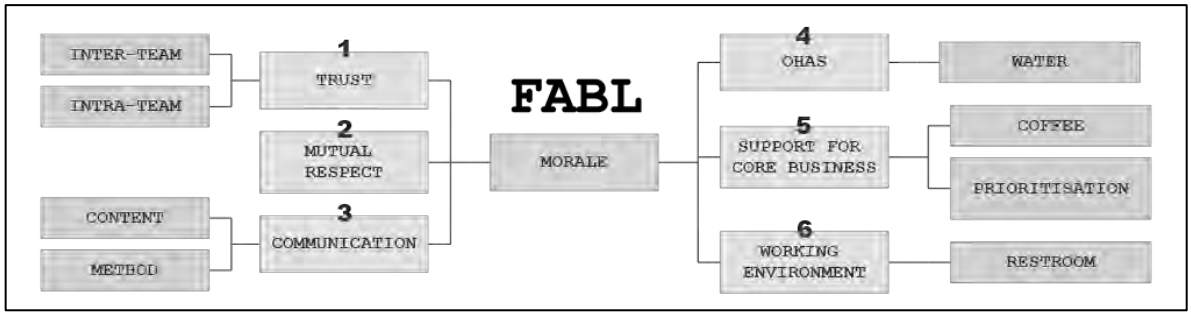


Figure H-1: Drivers of morale at Bram Fischer International Airport as identified during focus group session **(author's own)**

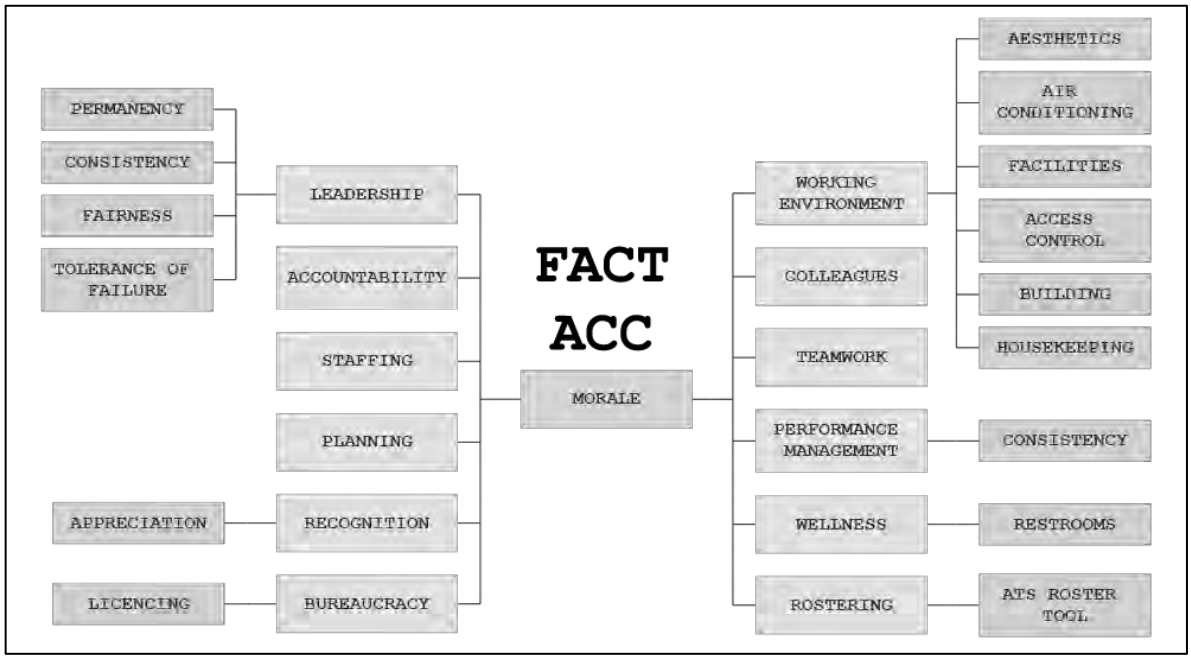


Figure H-2: Drivers of morale at Cape Town International Airport Area Pool as identified during focus group sessions **(author's own)**

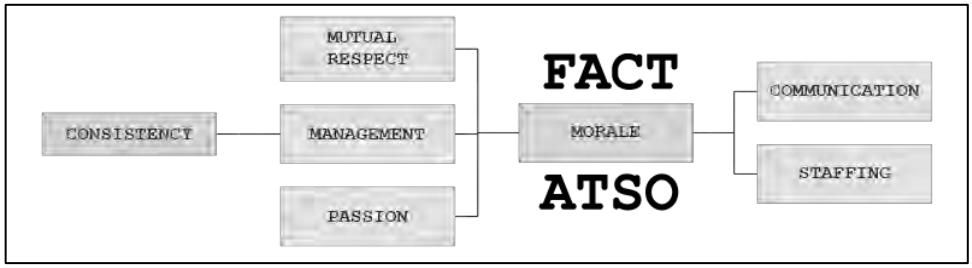


Figure H-3: Drivers of morale at Cape Town International Airport ATSO Pool as identified during focus group session**s (author's own)**

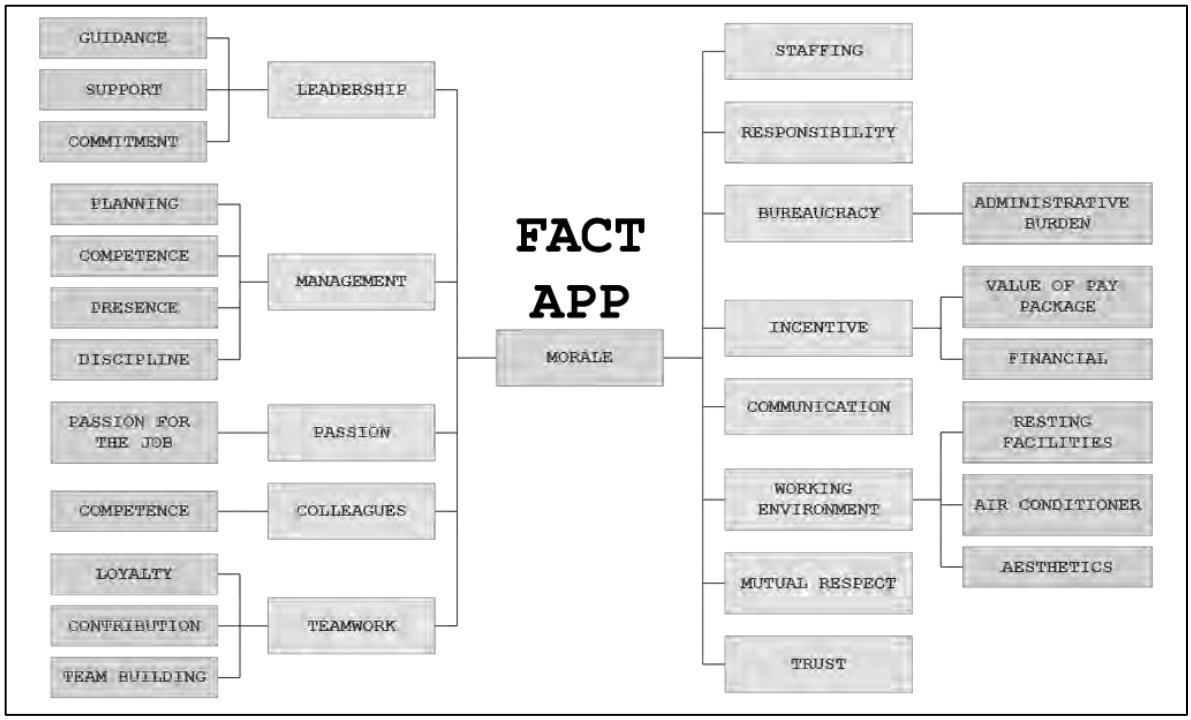


Figure H-4: Drivers of morale at Cape Town International Airport Approach Pool as identified during focus group ses**sions (author's own)**

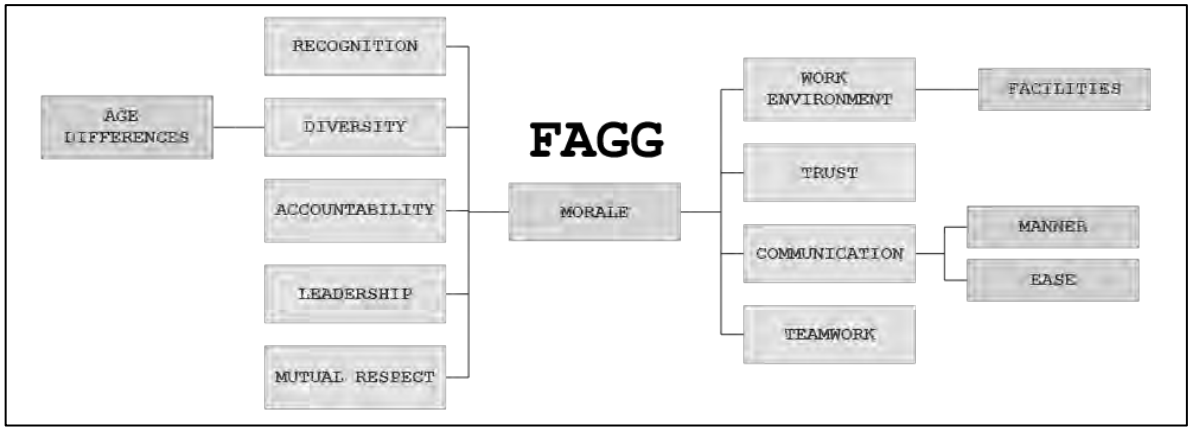


Figure H-5: Drivers of morale at George Airport as identified during focus group session **(author's own)**

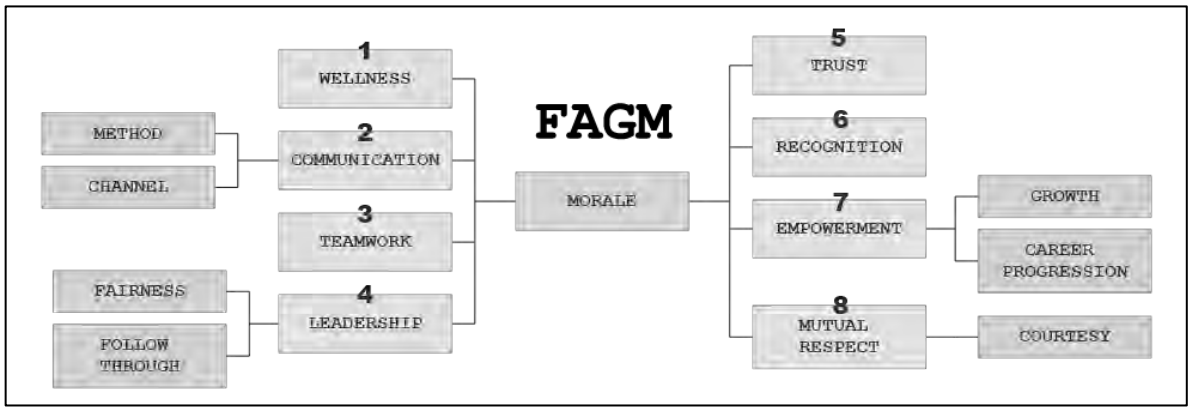


Figure H-6: Drivers of morale at Rand Airport as identified during focus group session **(author's** own)

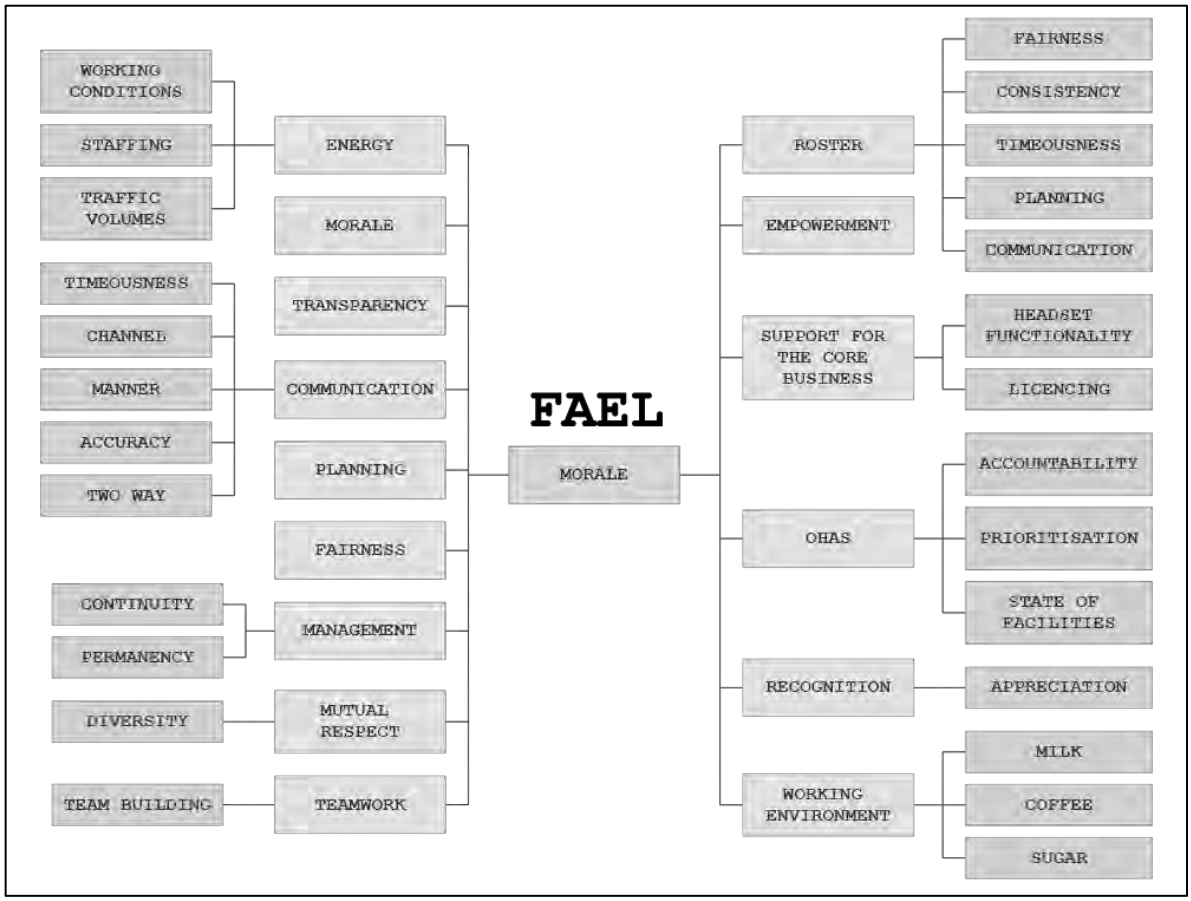


Figure H-7: Drivers of morale at East London Airport as identified during focus group session **(author's own)**

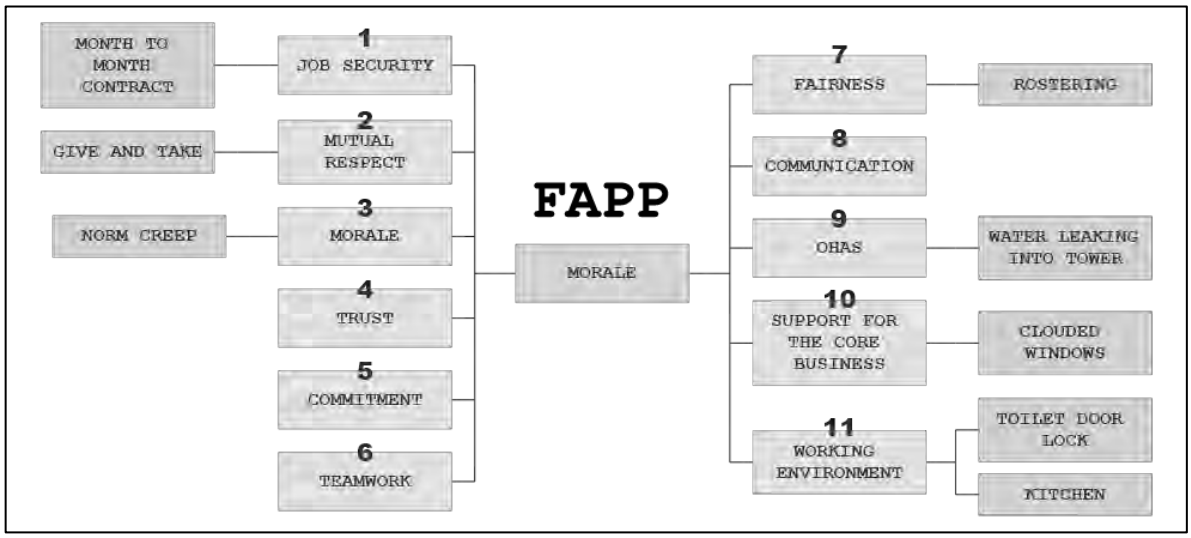


Figure H-8: Drivers of morale at Polokwane International Airport as identified during focus group session **(author's own)**

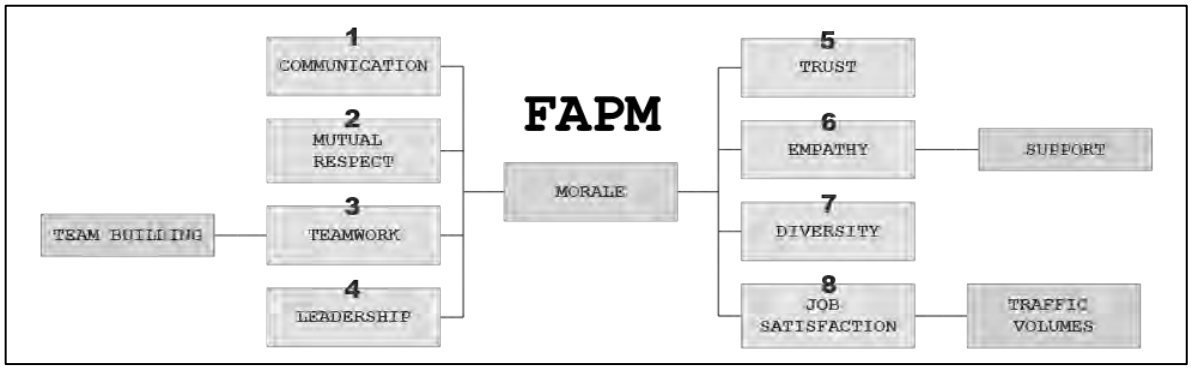


Figure H-9: Drivers of morale at Pietermaritzburg Oribi Airport as identified during focus group session **(author's own)**

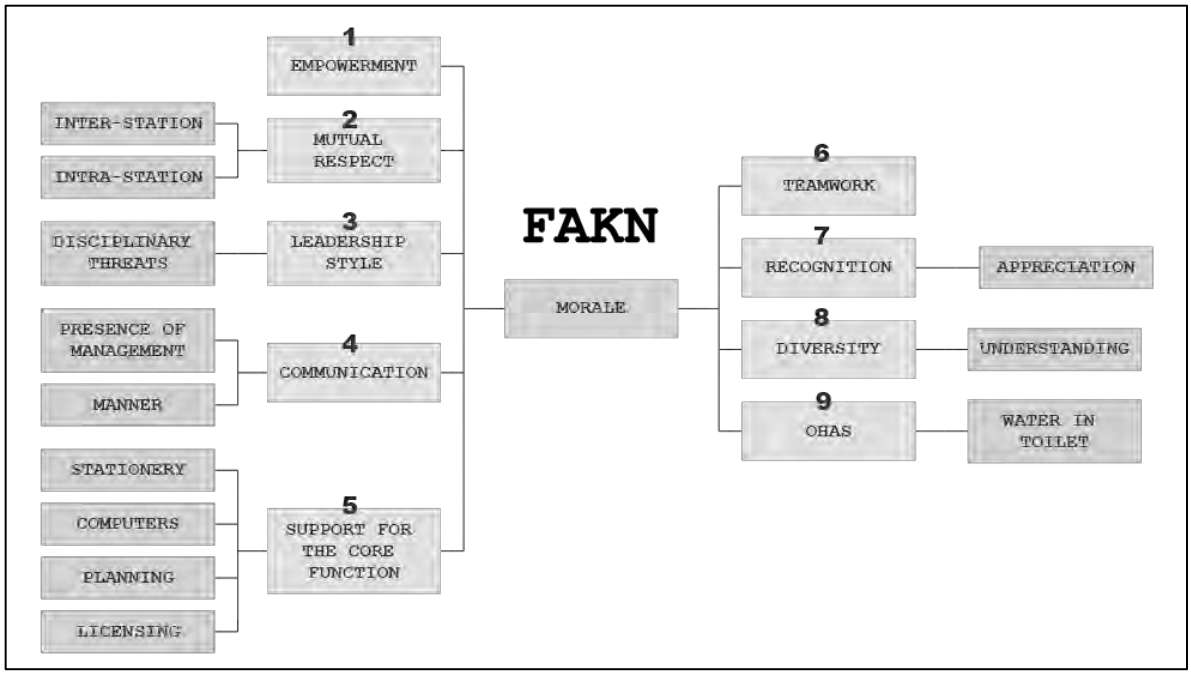


Figure H-10: Drivers of morale at Kruger Mpumalanga International Airport as identified during focus group session **(author's own)**

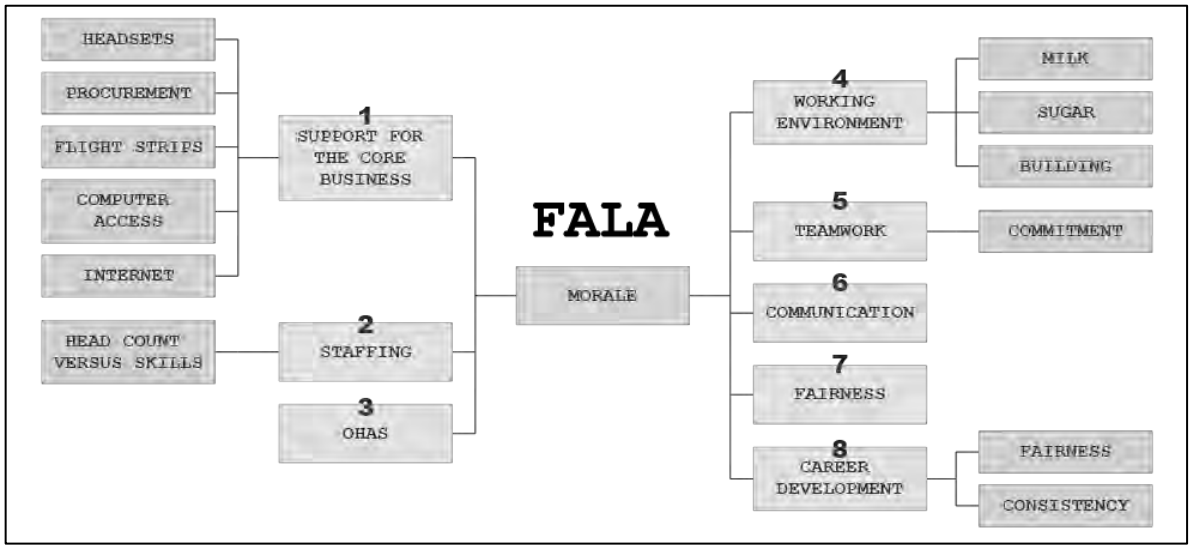


Figure H-11: Drivers of morale at Lanseria International Airport as identified during focus group session **(author's own)**

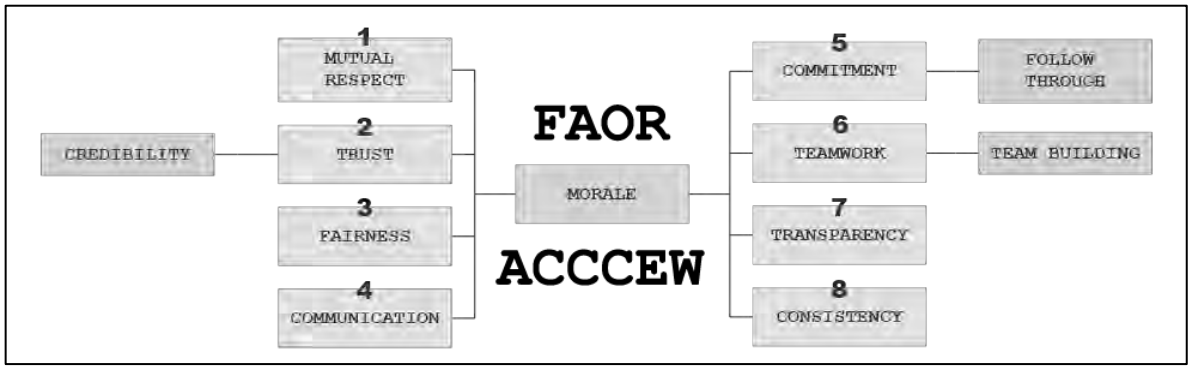


Figure H-12: Drivers of morale at OR Tambo International Airport Area Central/East/West Pool as identified during focus group session **(author's own)**

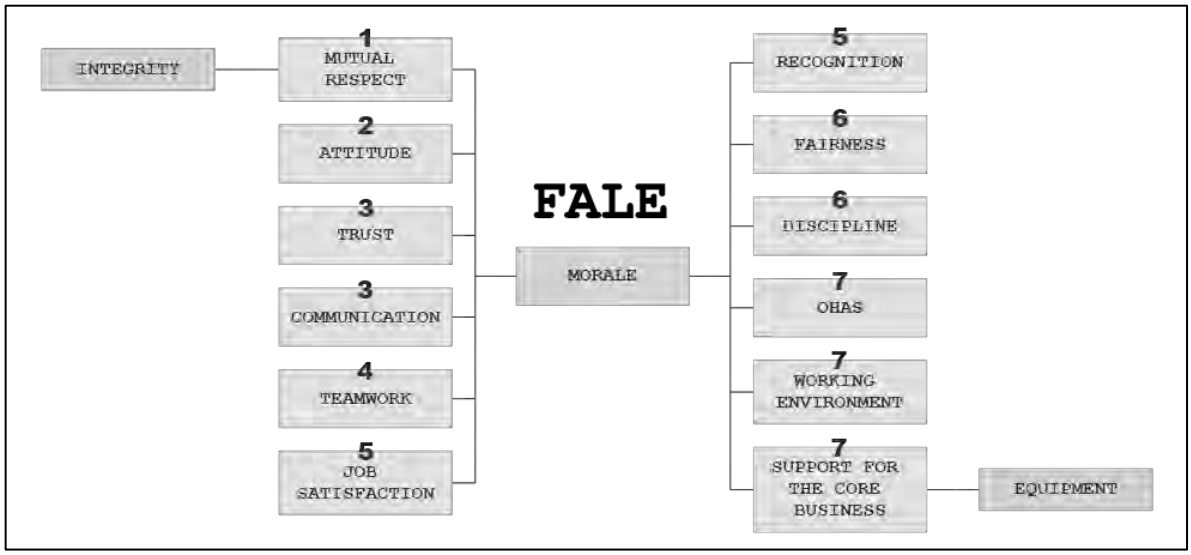


Figure H-13: Drivers of morale at King Shaka International Airport as identified during focus group session **(author's o**wn)

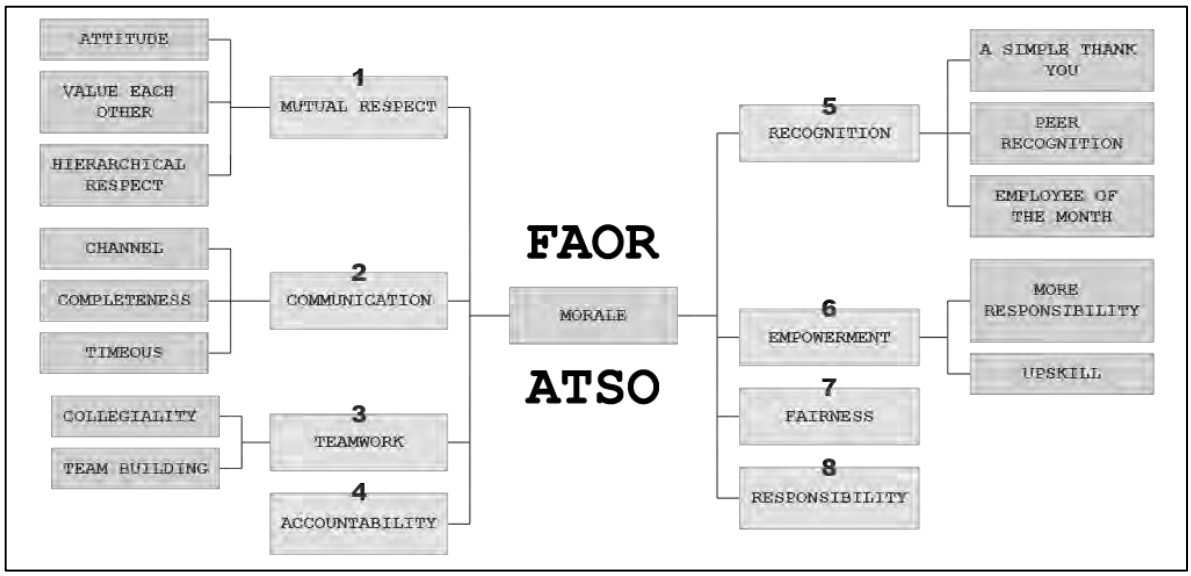


Figure H-14: Drivers of morale at OR Tambo International Airport ATSO Pool as identified during focus group session **(author's own)**

Figure H-15: Drivers of morale at OR Tambo International Airport Area North/South Pool as identified during focus group session **(author's own)**

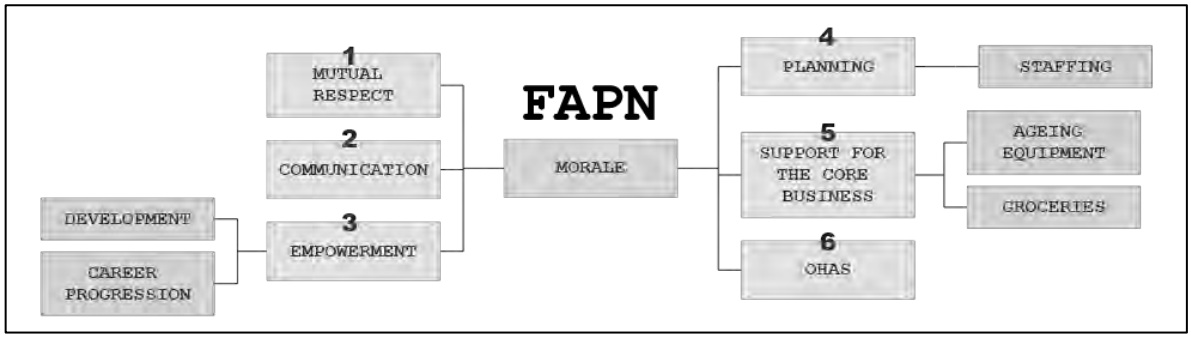


Figure H-16: Drivers of morale at Pilanesberg International Airport as identified during focus group session **(author's own)**

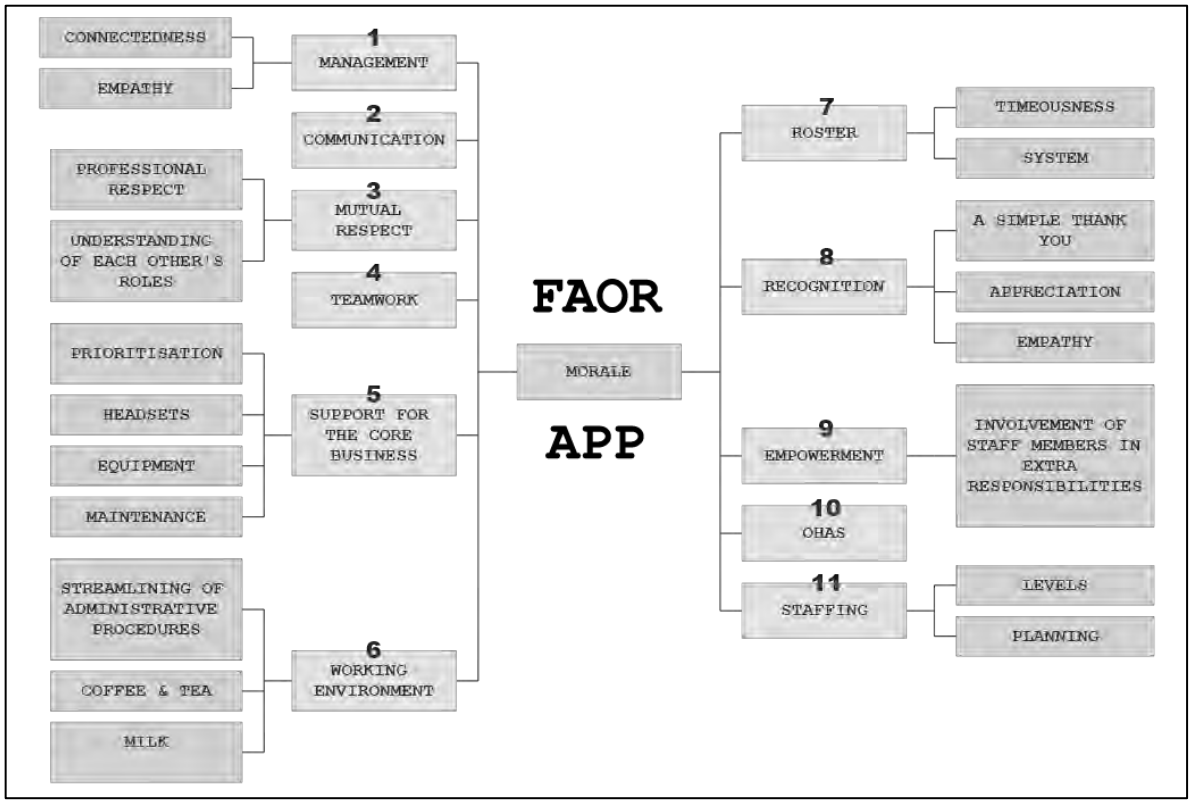


Figure H-17: Drivers of morale at OR Tambo International Airport Approach Pool as identified during focus group session **(author's own)**

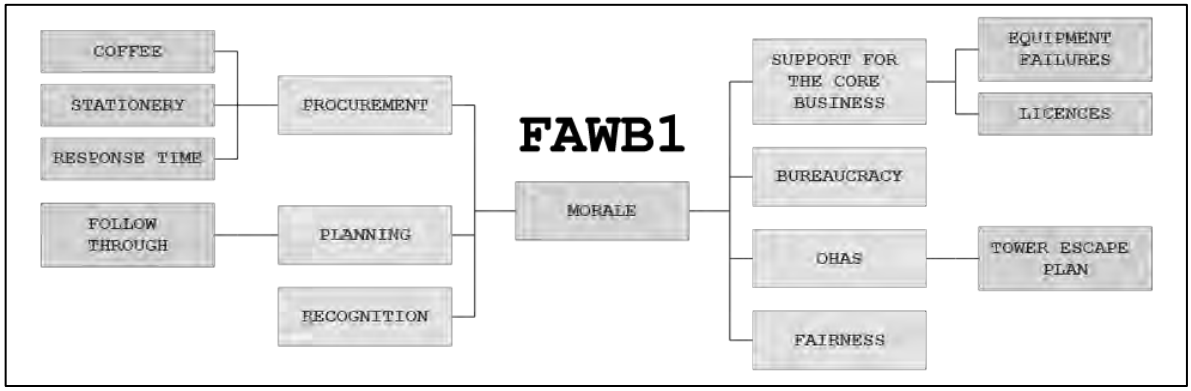


Figure H-18: Drivers of morale at Wonderboom International Airport as identified during the first focus group session **(author's own)**

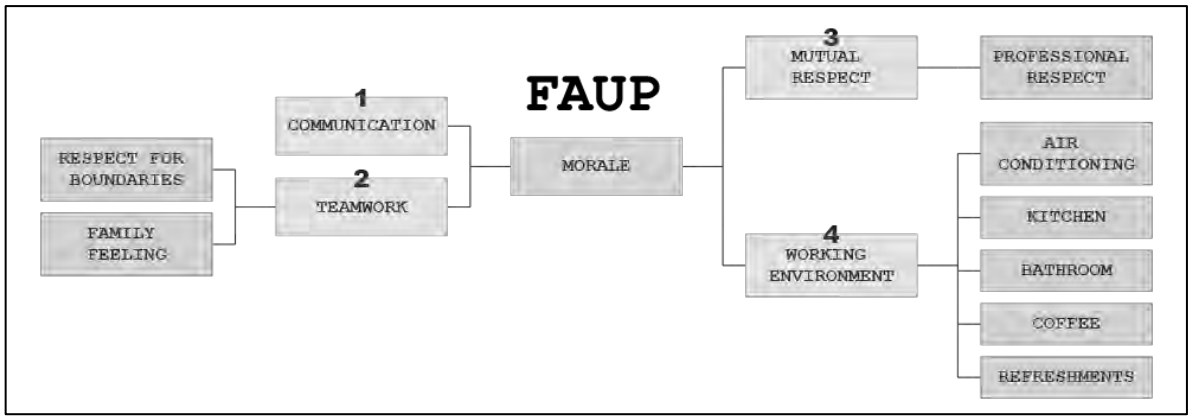


Figure H-19: Drivers of morale at Upington International Airport as identified during focus group session **(author's own)**

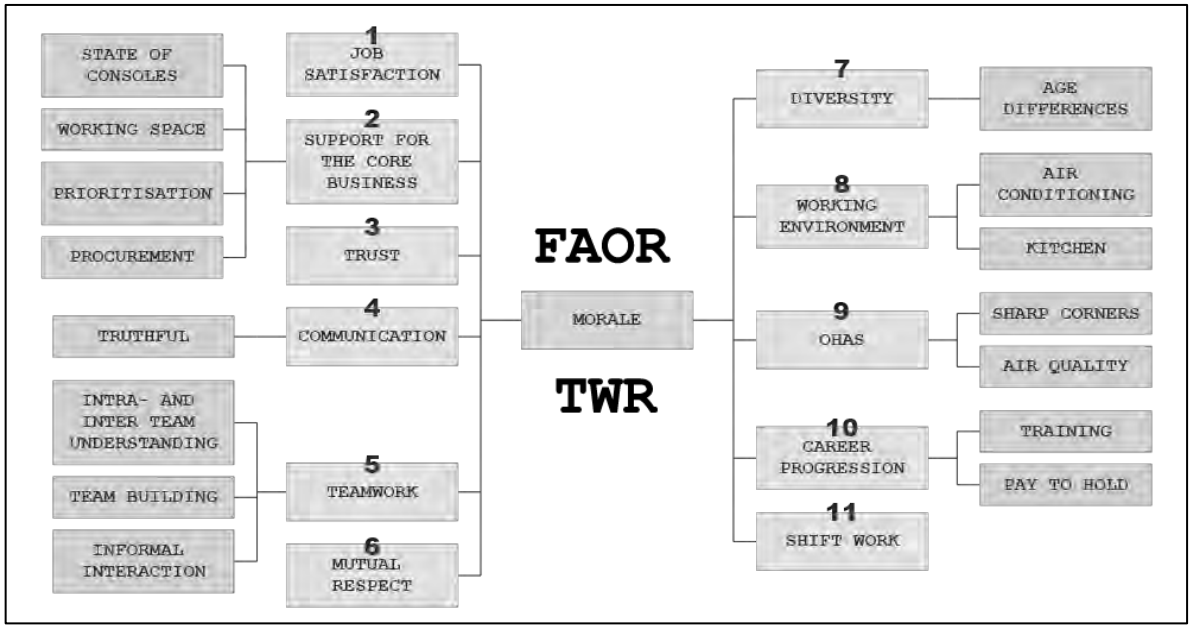


Figure H-20: Drivers of morale at OR Tambo International Airport Tower Pool as identified during focus group session **(author's own)**

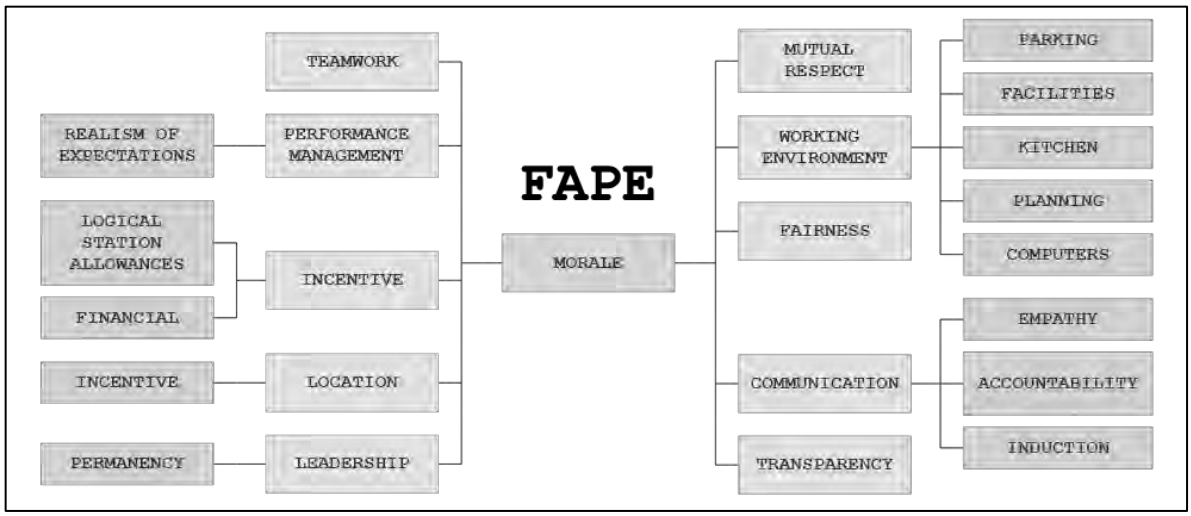


Figure H-21: Drivers of morale at Port Elizabeth International Airport as identified during focus group session **(author's own)**

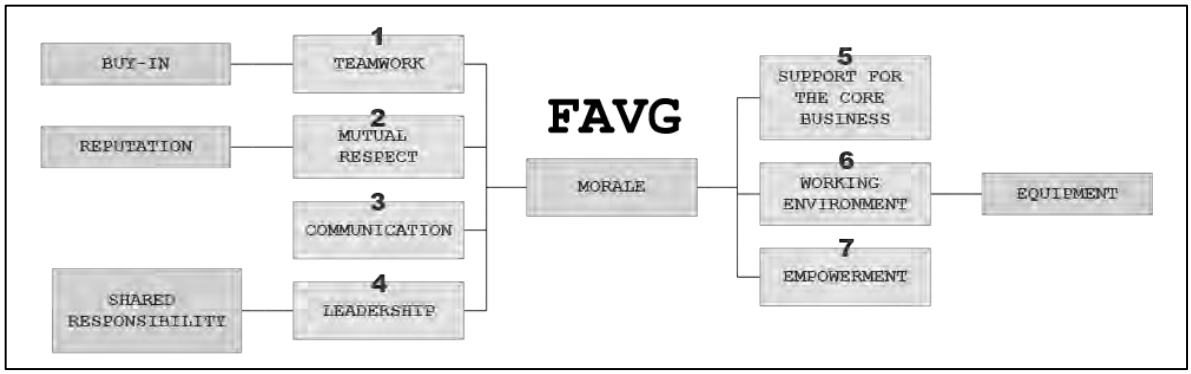


Figure H-22: Drivers of morale at Virginia Airport as identified during focus group session **(author's own)**

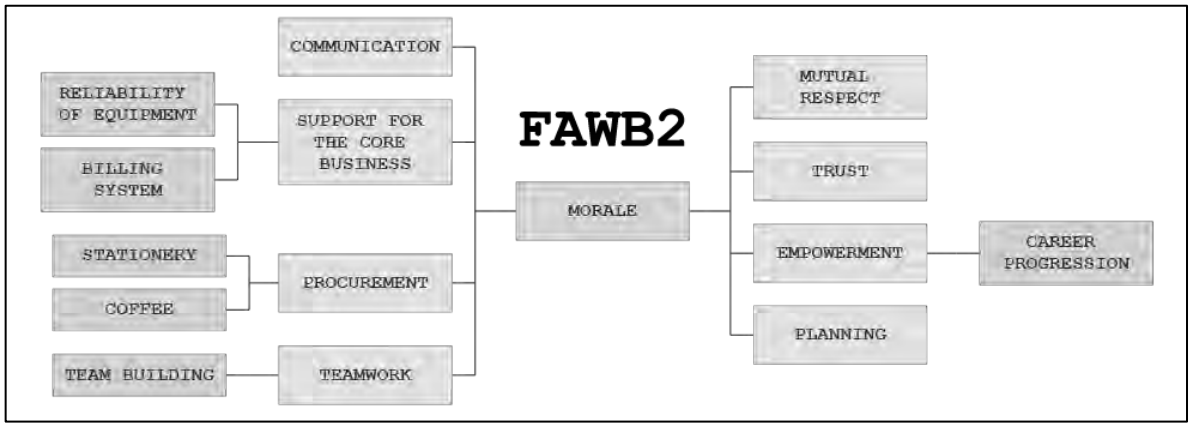


Figure H-23: Drivers of morale at Wonderboom Airport as identified during the second focus group session **(author's own)**

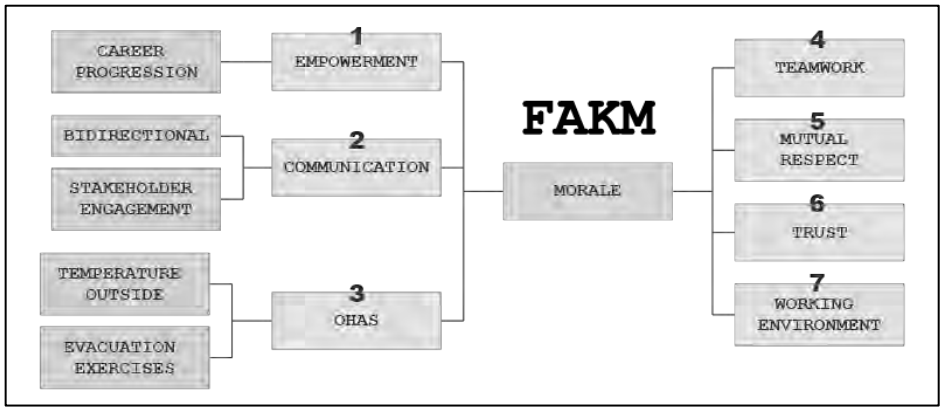


Figure H-24: Drivers of morale at Kimberley Airport as identified during focus group session **(author's own)**

Appendix I: Driver hurdle item results

Table I-1: Identified empowerment hurdles (as a percentage of total responses)

POOL	n	E1	E2	E3	E4	E5	E6
FAOR	**80**	**50**	**58**	**64**	**75**	**51**	**75**
APP	21	44	33	22	37	41	26
ACC	31	**55**	**52**	**61**	**84**	**52**	**71**
TWR	11	**55**	**64**	45	**73**	**55**	**73**
ATSO	17	29	47	**53**	**76**	41	**88**
FACT	41	32	42	39	**68**	37	**88**
ACC	16	**50**	**56**	44	**69**	**50**	**75**
TWR/APP	9	22	22	33	**68**	44	**89**
ATSO	16	19	38	38	**69**	19	**100**
FAGG	14	**57**	**50**	**50**	**64**	**64**	**79**
NTH2	20	35	**60**	**70**	**80**	**50**	**75**
NTH3	27	**56**	37	44	**85**	**51**	**78**
STH2	21	**57**	**52**	**62**	**71**	**67**	**86**
STH3	25	36	48	**52**	**80**	**56**	**84**
STH4	28	**50**	**68**	**75**	**75**	**71**	**64**
TOTAL	**256**	**46**	**52**	**57**	**75**	**54**	**78**

Table I-2: Identified mutual respect hurdles (as a percentage of total responses)

POOL	*n*	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13
NTH1	80	55	31	24	33	25	31	26	34	18	15	31	49	15
APP	21	**57**	24	24	19	19	43	33	38	24	14	29	**62**	14
ACC	31	48	26	19	42	32	26	19	29	10	10	29	32	19
TWR	11	**82**	**55**	45	36	18	36	27	27	0	18	36	**64**	9
ATSO	17	47	35	18	29	24	24	29	41	35	24	35	**53**	12
FACT	41	**56**	44	20	34	37	27	32	42	20	15	46	42	10
ACC	16	**69**	38	25	44	38	31	44	44	25	12	**63**	31	6
TWR/APP	9	**56**	**67**	22	44	44	22	11	44	22	22	22	**56**	11
ATSO	16	44	38	13	19	31	25	31	38	13	13	44	44	13
FAGG	14	**57**	36	**50**	22	43	22	22	**57**	7	**50**	**50**	**72**	7
NTH2	20	**50**	25	35	30	40	25	20	45	20	25	35	**50**	20
NTH3	27	48	48	30	44	19	41	22	37	15	15	**56**	41	15
STH2	21	43	43	14	10	33	24	5	14	1	10	29	24	33
STH3	25	44	44	20	16	20	20	12	20	8	12	16	28	16
STH4	28	**61**	**61**	14	21	11	21	11	21	4	7	25	46	21
TOTAL	**256**	**53**	**32**	**24**	**29**	**27**	**28**	**21**	**33**	**14**	**16**	**35**	**44**	**16**

Table I-3: Identified trust hurdles (as a percentage of total responses)

POOL	*n*	T1	T2	T3	T4	T5
NTH1	80	40	48	39	**81**	10
APP	21	38	**67**	43	**95**	5
ACC	31	39	26	42	**77**	16
TWR	11	36	45	27	**100**	0
ATSO	17	38	**65**	35	**59**	12
FACT	41	49	37	32	**85**	2
ACC	16	31	44	38	**100**	0
TWR/APP	9	**67**	22	22	**89**	0
ATSO	16	**56**	38	31	**69**	6
FAGG	14	**64**	43	36	**72**	7
NTH2	20	**50**	25	40	**90**	5
NTH3	27	30	26	22	**85**	15
STH2	21	43	10	5	**71**	14
STH3	25	28	36	20	**68**	20
STH4	28	39	36	21	**57**	14
TOTAL	**256**	**41**	**36**	**29**	**78**	**11**

Table I-4: Identified teamwork hurdles (as a percentage of total responses)

POOL	*n*	TW1	TW2	TW3	TW4	TW5	TW6	TW7	TW8	TW9	TW10	TW11	TW12	TW13
NTH1	80	41	9	31	40	28	21	36	31	**52**	28	29	44	11
APP	21	**57**	5	29	48	33	19	29	38	24	14	43	**52**	10
ACC	31	35	10	23	35	19	23	29	29	**55**	19	19	26	23
TWR	11	45	9	27	45	36	18	53	29	**55**	18	18	45	0
ATSO	17	29	12	**53**	35	29	24	45	27	**82**	**65**	35	**65**	0
FACT	41	24	17	42	**54**	20	20	24	34	37	27	22	**78**	2
ACC	16	31	12	38	**56**	31	25	25	38	38	31	19	**75**	0
TWR/APP	9	33	22	**56**	44	11	11	44	44	33	33	33	**67**	11
ATSO	16	12	19	38	**56**	12	19	12	25	38	19	19	**88**	0
FAGG	14	36	14	43	50	36	21	36	35	57	36	36	22	14
NTH2	20	30	10	40	50	40	35	**60**	30	25	35	35	**80**	10
NTH3	27	11	4	37	44	22	15	22	15	30	26	37	**63**	19
STH2	21	10	5	43	33	10	5	29	10	43	24	33	**62**	10
STH3	25	8	4	28	40	32	4	28	32	**56**	12	24	44	20
STH4	28	32	7	11	43	22	14	14	21	39	32	14	**50**	21
TOTAL	**256**	**27**	**9**	**33**	**44**	**25**	**18**	**31**	**27**	**44**	**27**	**28**	**55**	**13**

Table I-5: Identified reward and recognition hurdles (as a percentage of total responses)

POOL	*n*	R1	R2	R3	R4	R5
NTH1	80	**69**	**56**	**76**	48	10
APP	21	**76**	**57**	**81**	48	10
ACC	31	**71**	**55**	**74**	42	6
TWR	11	**73**	**64**	**91**	**64**	9
ATSO	17	**53**	**53**	**65**	47	6
FACT	41	**80**	**59**	**73**	**54**	10
ACC	16	**75**	44	**75**	**50**	19
TWR/APP	9	**100**	**100**	**100**	**56**	0
ATSO	16	**75**	**50**	**56**	**56**	6
FAGG	14	**71**	**57**	**57**	**43**	22
NTH2	20	**60**	45	**70**	45	8
NTH3	27	**67**	**70**	**81**	37	4
STH2	21	**76**	**57**	**62**	**52**	10
STH3	25	**80**	28	**80**	48	8
STH4	28	**57**	**50**	**75**	43	4
TOTAL	**256**	**70**	**54**	**74**	**47**	**9**

Table I-6: Identified building and facilities hurdles (as a percentage of total responses)

POOL	*n*	BF1	BF2	BF3	BF4	BF5	BF6	BF7	BF8	BF9	BF10	BF11	BF12	BF13	BF14
NTH1	80	40	**59**	**69**	**60**	31	40	**70**	44	38	45	**78**	**78**	**51**	1
APP	21	**57**	**57**	**71**	**62**	33	43	**71**	48	29	38	**76**	**81**	**71**	0
ACC	31	48	**68**	**77**	**71**	32	45	**84**	39	**52**	**52**	**84**	**74**	**61**	3
TWR	11	18	**91**	**73**	**82**	36	27	**82**	**55**	45	**64**	**64**	**64**	45	0
ATSO	17	18	24	47	24	24	35	35	41	18	29	**76**	**88**	12	0
FACT	41	24	**80**	44	**59**	15	22	**51**	27	**51**	24	24	**93**	39	0
ACC	16	25	**88**	**69**	**56**	12	38	**62**	31	75	19	**94**	**100**	69	0
TWR/APP	9	33	**100**	44	**78**	44	22	**67**	11	33	33	**67**	**100**	44	0
ATSO	16	19	**62**	19	**50**	0	6	31	31	38	25	**62**	**81**	6	0
FAGG	14	14	43	**57**	29	14	36	36	14	43	43	**72**	36	43	7
NTH2	20	20	15	25	25	25	30	25	5	20	35	45	20	35	30
NTH3	27	44	**63**	30	41	22	41	19	26	11	26	**67**	**52**	26	7
STH2	21	19	48	33	**62**	38	24	33	**52**	24	**57**	48	38	33	5
STH3	25	16	40	32	28	**68**	36	28	16	24	**72**	40	**68**	20	0
STH4	28	43	36	**61**	39	**64**	43	43	11	29	**79**	36	11	21	4
TOTAL	**256**	**31**	**53**	**49**	**48**	**34**	**35**	**46**	**29**	**32**	**46**	**63**	**59**	**37**	**5**

Table I-7: Identified job essentials hurdles (as a percentage of total responses)

POOL	*n*	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16
NTH1	80	**86**	2	32	**69**	26	38	**50**	**59**	**56**	49	35	32	9	20	34	2
APP	21	**95**	0	29	**67**	24	29	**67**	**76**	**52**	48	48	24	5	29	38	0
ACC	31	**90**	0	16	**74**	19	35	**52**	**58**	**74**	**77**	16	16	3	16	42	3
TWR	11	**73**	0	**55**	**73**	**55**	**91**	**55**	36	**55**	18	**82**	**91**	27	18	18	0
ATSO	17	**76**	12	**53**	**59**	24	18	24	**53**	29	18	24	35	12	18	24	6
FACT	41	34	2	12	39	**83**	**71**	**56**	**51**	**56**	44	**59**	17	**63**	29	34	0
ACC	16	50	0	12	44	**100**	**69**	**50**	**62**	**75**	**69**	**50**	31	38	38	**50**	0
TWR/APP	9	33	0	22	44	**89**	**100**	**100**	**89**	**78**	33	**89**	11	**89**	33	33	0
ATSO	16	19	6	6	31	**62**	**56**	38	19	25	25	**50**	6	**75**	19	19	0
FAGG	14	29	14	0	**50**	**79**	43	29	**50**	14	7	14	21	21	21	29	7
NTH2	20	**50**	5	40	**75**	**65**	30	20	40	15	15	10	10	45	15	30	15
NTH3	27	**59**	4	37	**78**	41	33	48	**63**	**59**	7	**59**	11	19	26	19	11
STH2	21	**57**	5	5	**71**	**57**	**57**	**67**	**67**	38	24	33	19	48	**52**	10	0
STH3	25	44	36	40	**80**	44	28	36	36	32	12	**52**	16	16	44	16	4
STH4	28	39	18	**68**	**57**	**71**	46	**68**	**68**	**54**	29	**50**	21	**50**	**79**	25	0
TOTAL	**256**	**57**	**9**	**31**	**64**	**52**	**44**	**46**	**56**	**47**	**31**	**41**	**22**	**31**	**33**	**27**	**4**

Table I-8: Identified occupational health and safety hurdles (as a percentage of total responses)

POOL	*n*	O1	O2	O3	O4	O5	O6	O7	O8
NTH1	80	**54**	49	21	28	49	26	**50**	0
APP	21	**71**	43	29	29	**57**	24	**71**	0
ACC	31	**58**	**55**	23	32	**61**	6	**61**	0
TWR	11	45	**82**	27	18	**55**	**100**	27	0
ATSO	17	29	24	6	24	12	18	18	0
FACT	41	**54**	**51**	39	29	**73**	7	**61**	0
ACC	16	**50**	**69**	44	**50**	**62**	12	**56**	0
TWR/APP	9	**89**	**100**	**56**	22	**100**	0	**78**	0
ATSO	16	38	6	25	12	**69**	6	**56**	0
FAGG	14	21	14	**50**	**50**	29	0	7	0
NTH2	20	30	10	**60**	15	45	15	**62**	0
NTH3	27	33	**56**	44	30	**63**	4	**63**	0
STH2	21	**57**	33	29	38	**57**	14	**62**	0
STH3	25	40	24	20	28	36	24	**52**	0
STH4	28	25	21	25	**50**	**50**	11	**64**	0
TOTAL	**256**	**44**	**38**	**32**	**32**	**52**	**16**	**52**	**0**

Appendix J: Dataset code books

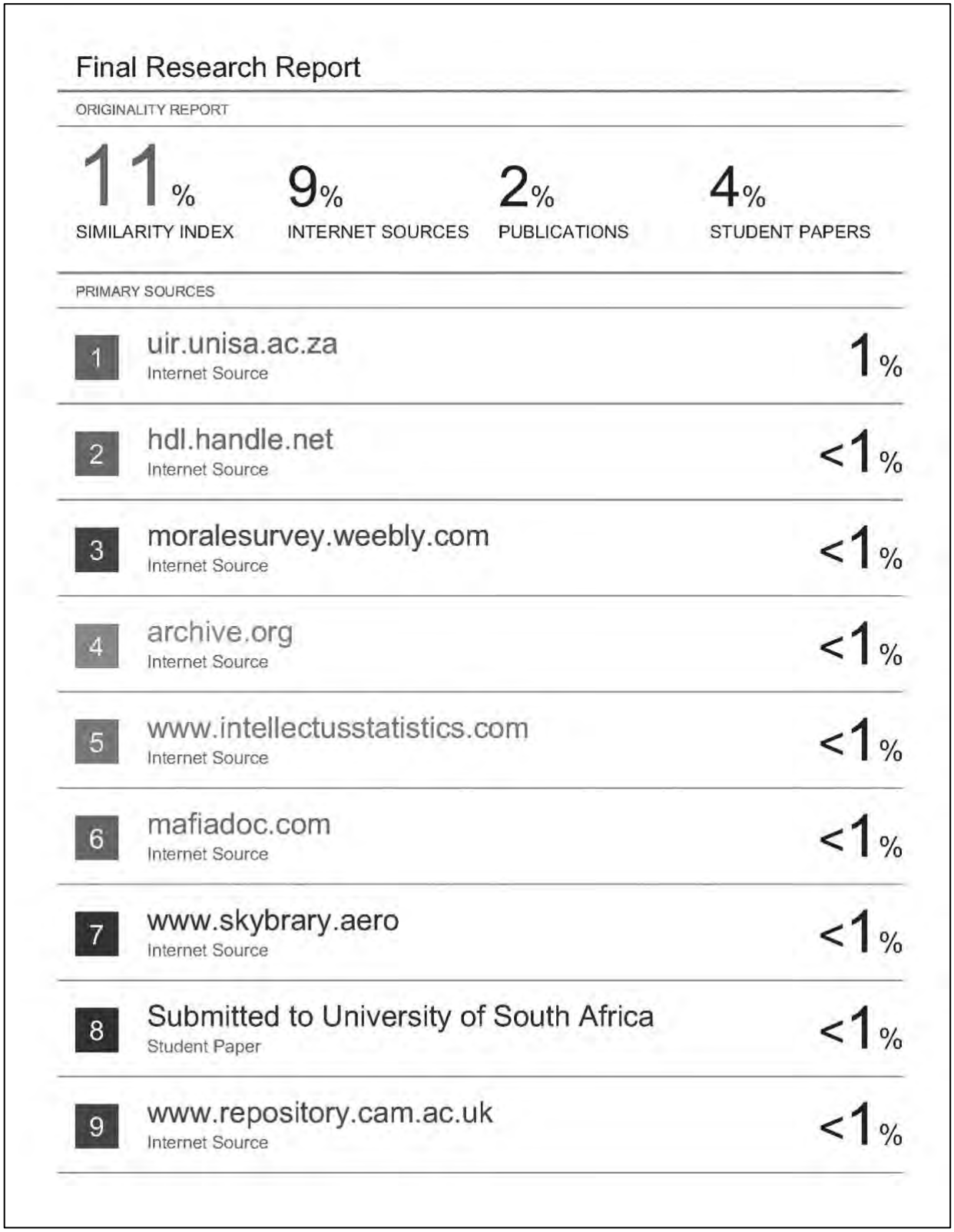
Table J-1: Code book for age group, gender, role, employment duration and pool

AGE GROUP		GENDER		ROLE		EMPLOYMENT DURATION		POOL	
CATEGORY	CODE	CATEGORY	CODE	CATEGORY	CODE	CATEGORY	CODE	CATEGORY	CODE
18-29	1	FEMALE	1	ATCO	1	0-5	1	ACC	1
30-39	2	MALE	2	ATSO	2	6-10	2	APP	2
40-49	3					11-15	3	ATSO	3
50-59	4					16-20	4	TWR	4
60+	5					21-25	5	TWR/APP	5
18-29	1					26+	6		

Table J-2: Code book for station

STATION	
FABE	1
FABL	2
FACT	3
FAEL	4
FAGG	5
FAGM	6
FAKM	7
FAKN	8
FALA	9
FALE	10
FAMM	11
FAOR	12
FAPE	13
FAPM	14
FAPN	15
FAPP	16
FAUP	17
FAUT	18
FAVG	19
FAWB	20
FHSH	21

Appendix K: Turn-it-in certificate



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Appendix L: Language editing certificate

ERNA JÖRGENSEN

Proofreading and Editing Services

Office@51, 51 Gemsbok Street, Pretoria, South Africa

CERTIFICATE OF EDITING (COE)

This is to certify that the following thesis was proofread and edited for proper English language, grammar, punctuation, spelling and overall style, by me, Erna Jörgensen, and returned on 10 October 2020:

Title of the thesis

A FOLLOWER-CENTRIC MODEL FOR EMPLOYEE MORALE IN A SAFETY-CRITICAL AIR TRAFFIC CONTROL ENVIRONMENT

Submitted for

DOCTOR OF BUSINESS LEADERSHIP

For the University of South Africa

Author: Lonell Coetzee

Student Number: 33564450

Disclaimer: Neither the author's statements nor intentions were altered by the language editor, and the author was free to accept/reject any changes suggest by the language editor.

Signed: _____

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