The study of Leadership and Safety In the Aviation Industry of Gauteng Province

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Abstract – This research study aims to explore the impact of leadership and safety culture in South Africa's aviation industry in the Gauteng Province. The study is premised on the underlying assumption that the current existing ethical leadership and safety culture has a huge impact on the aviation industry's safety performance.

Ethical leadership and safety culture in aviation are the important factors upon which a civil aviation regulator such as the South African Civil Aviation Authority (SACAA) can get assurance that there is total compliance of regulations by aircraft maintenance organisations (AMOs) to avoid accidents and incidents in aviation.

If one looks at the ICAO Safety Audit Results: Universal Safety Operational Audit Plan (USOAP) interactive viewer (2017), it is revealed that none of the African countries are rated in the top 30 aviation industry in the world. These results raise the issue of ethical conduct, safety culture, training, licensing, oversight, and legislation. It is against this backdrop that this study is being conducted.

The results of the study revealed that the Gauteng aviation industry prioritises ethical leadership from which a safety culture is inculcated across the company, thereby committing safety maintenance personnel and the company as a whole to prioritise safety and maintenance over making money and profits. The results further revealed the existence of a safety climate across the company and positive organisational safety performance.All hypothesis of the study where proven to be positive. The hypothesised model was revealed to be a perfect fit confirming significant relationship and influence between ethical leadership, safety culture, aircraft maintenance engineers and organisational safety performance.

Keywords: Ethical Leadership, Safety Culture, Aviation Industry, Aircraft Maintenance Engineer, Aircraft Maintenance Organisation, Safety Climate. Safety Management System (SMS).

1. Introduction

The following study seeks to explore ethical leadership and safety culture effect on aviation organisations in Gauteng province. Factors such as ethical leadership and safety culture play an important role in providing an assurance to the South African Civil Aviation Authority (SACAA) that there is a commitment by maintenance organisations to comply with of regulations by aircraft maintenance organizations (AMOs) to avoid accidents and incidents in aviation.

According to Gill (2018: 7) the only quickest mode of worldwide transportation is air transport network. Air transport network enables tourism and global business to flourish in different countries. Worldwide transporting network play a huge role on economic growth for developing nations. Over four (4) billion passengers worldwide are transported in a single year. In 2017 alone, a recorded passenger kilometre totalled about eight (8) trillion.

Through air transport, countries are able to trade amongst each other within acceptable period of time. Through trade, the concept of globalisation of production increases access to international markets and as such various countries contribute to the global economy. In 2017 alone, about sixty-two (62) millions of tonnes of freight were transported through air transport. Six (6) trillion US dollars' worth of goods were transported through air transport which represent 35% of all global trade (Gill, 2018: 7).

It is alluded by Brown and Trevino (2002: D1-D6) that ethical leaders are able to demonstrate the ability to behave appropriately through their actions and interpersonal skills. Such leaders are able to promote their positively spirited conduct to their subordinates by way of communication, decisive decision making, and reinforcement. According to International Civil Aviation Organisation (ICAO) Safety Management Manual (SMM) policy, senior management's

commitment is established to continuously improve safety by creating measures that are attainable for the fulfilment of industrial safety objectives (ICAO SMM Doc, 2013: 9859).

For its member states, ICAO SMM Doc (2013: 9859) requires a strict but fair monitoring to adherence of the institutional, technical and operational areas in the industry by all civil aviation authorities which are its member states, and therefore South African aviation industry is not exception to the rule. In other words, ethical leadership and safety culture in the aviation industry are of outmost importance. According to ICAO SMM Doc (2013:9859), Characterization of culture within the communities, groups and organisation lies within the shared beliefs, biases, values and their resultant behaviour. For efficient safety management, a total understanding of the mentioned cultural components as well as the interaction between them is of most importance.

For these mentioned cultures, reporting culture becomes a key component. Various organisations possess various mixtures of cultural components which may influence hazard reporting negatively. Once the organisation values safety and prioritise it at national as well as professional level, Continuous improvement on safety performance becomes a reality. Collaboration in aviation industry such as, safety regulating organisations, aircraft airlines, aircraft manufactures, pilots, air traffic controllers has made air traveling safer. Aircraft maintenance engineers (AME) forms part of stakeholders in aviation Industry. These groups of aviation professionals are seldom mentioned in comparison to their counterparts however their contribution to improvement of aviation safety cannot be overemphasized.

Most studies have provided recommendations on transformational leadership; however none of the studies have explored relationship between leadership and safety culture in aircraft maintenance organizations in detail. Most studies are conducted on several industries such as manufacturing companies and chemical industries (Martínez-Córcoles, Gracia, Tomás, &Peiró, 2011: 1118-1129). Furthermore, on the study of ethical leadership by Khasawneh, Jawarneh, Abu-Alruzz, and Al-Zawahreh (2016: 60) recommended that further research on the topic of leadership will be cantered around relationship between ethical leaders and employees' outcome. The mentioned outcomes will be around how the entire organisation performs employee job satisfaction, workplace deviance as well as organisational citizen behaviour.

For SACAA to achieve its objected goals of safer aviation industry, leaders whom are ethical in their conduct have to be appointed in different organisations to ensure that safety culture is implemented across the industry as a whole. Most of the aircrafts used in commercial operations across Africa are pre-owned and, in some cases, have a bad maintenance history. Furthermore, the mentioned aircrafts are no longer permitted to operate in European Countries as well as United States of America (USA) due to new regulation those continents. As a result of strict regulations in USA and Europe, African continent has become a dumb site for many of the poorly maintained old aircrafts. For the mentioned reasons, there is a need for ethical leadership and safety culture to avoid tragedy from happening in the industry.

- Hypothesis1: There is significant relationship between ethical leadership and safety culture.
- Hypothesis2: Ethical leadership has significant influence on organisational safety performance
- Hypothesis3: Safety culture has significant influence on organisational safety performance
- Hypothesis4: Safety culture has significant influence on commitment of aircraft maintenance personnel
- Hypothesis 5: Aircraft maintenance personnel commitment influence Aviation Safety performance.

Figure 1: Theoretical Construct: Hypothesis 1 to Hypothesis 5.
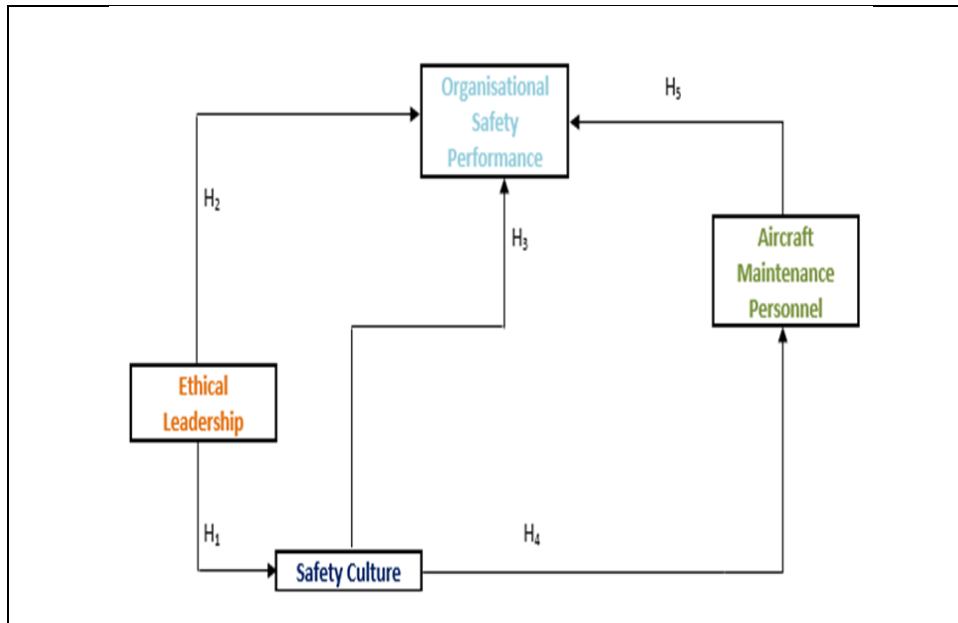
1.1. Leadership and Leadership

Ethics is applied and evaluated through philosophy, personal beliefs, level of attainment, laws, expects, code of conduct and government institutions within a specific nation the application and evaluation of morality is called literature review. Combination of personal values such as morals, social expectations, and laws (ethics) of a particular nation, expects, private institutions, private institutions will form a solid and sustainable organisation that is efficient in-service delivery (Uys,2012: 16-21).Toor and Ofori (2009:533-547) explains that honesty, caring for others, fairness, and honesty are some of the key principles of ethical behaviour. Ethical behaviour demonstrates the engagement of leaders in behaviour that benefits people rather that the behaviour that harms them.

Nwinyokpugi and Nwibere(2014: 01-10) mentions that ethics is when justice and truthfulness are fairly applied in the business world, or when certain regulations in relation to a competition guarantees honesty, integrity and fairness in a market and put forth restrictions that seek to protect the employee rights, shareholders, and customers. For others, business ethics is only a relative means or tool to safeguard the objectives of business, that is to say, higher profits and productivity.

According to Nanjundeswaraswamy and Swamy (2014:57) leaders through social influence, are able to voluntarily persuade their followers to comprehend their goals in order to achieve goals that are set by their organisation. The ability to convince and persuade subordinates to willingly do things, and complete tasks set by their leader in an organisation with no friction is called art of leadership. The major role of a leader in any organisation is to provide direction to individual's behaviour towards a particular chosen path or desired goal.

In order to share a common vision with his followers or subordinates, leaders have a responsibility to influence them. It is about influencing others to bring about organisational change toward a desired future. Leadership is more than just administrating paper work or planning. It is people activity. Leadership is not what is done to people but what occurs among people. Where there is leadership there is followers (Daft, 2015:4).

Demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement, and decision-making refers to ethical leadership (Rubin, Dierdorff& Brown, 2010: 216-217; Zhang, Zhou & Mao, 2018:2).

In order to comprehend the transformational leadership theory, one has to measure it against to transactional leadership theory. While transactional leadership are efficient, they are short term based and focuses on keeping the organisation operational. Some of the functions that transactional leadership is good at traditional management functions such as organisational planning, budget, and commonly concentrate on measured characteristics of job performance. Transactional leadership in some organisation can be moderately effective and efficient. Transactional leadership seek to maintain status qou. Rather than advocating for organisational wide change, they forever follow set organisational rules. Transactional leadership is fixated on maintaining organisational stability (Draft, 2011: 320-321).

The difference between transformational and transactional leadership are illustrated on Table 1 below:

Table 1: Transformational v/s Transactional leadership

Transformational	Transactional
Create a Vision	Agree on objectives
Communicate meaning	Share information
Inspire their followers	Motivate followers
Empower employees	Bargain instead of empowering
Stir	Promote Security
Take risks and challenge status qou	Concerned with Stability

Source: Adapted from Grobler (2012:70).

According to Zhang et al., (2018:2) ethical leaders gain their legitimacy from "modelling normatively appropriate behaviours such as honesty, fairness and care" and further asserts that such leaders go beyond merely paying attention to ethics by also taking action to prioritise ethics in their social environments and inculcate ethics in their decision-making processes.

Ethical leaders are concerned about their employee's well-being, emotional state and will always provide support and assurance to their followers that they are not alone during a time of need (Kalshoven& Boon, 2012: 60-68). Pietersen, Dalgish, Du Plessis, Lues, Ngunjiri and Kablan (2017:171) The concept of morality is about guiding people or followers on what to do and not to do. The concept guides followers about what is right and what is wrong. Moral leadership brings about understanding of one's actions. It defines which actions are appropriate and which ones are not.

1.2. Culture

According to Tom, Noort, Shorrock, and Kirwan (2015:770-789) safety culture concept develops from a philosophy and research showing organizational management, morals, customs, activities, and history in order to shape the safety and employee in an organisation. Organisations such as maintenance organisations are safety-critical organisation. As a result, safety in maintenance organisations is critical. Maintenance organisations must implement measures in place to identify, control, and prevent potential hazards at their organisations.

For AMOs, all services provided such as repairs and inspections carried out can be analysed as cultural products. The argument is that safety culture is approached from a wider organisational perspective. With vibrant relations between wide range of organisational resources, organisational culture will evolve with time (Atak&Kingma, 2011: 268-278).

Through investigation of several accidents and incidents, it was established that insufficient or faulty maintenance are one of the main contributors of unexpected events in several safety-critical critical domains such as aviation industry and other industries (Reiman, 2010: 1-28).Because aviation industry is safety critical organisation Tom et al. (2015:770-789), it is then associated with safety culture because of the severe consequences when things go wrong (Atak&Kingma, 2011: 268-278).

Service design and delivery is mainly influenced by national culture. Institutions inherit their nations' culture, norms, and beliefs (Yayla-Kullu, Tansitpon, Gnanlet, McDermot&Durgee, 2015: 101-117). Yayla-Kullu et al. (2015: 101-117) argues that airlines normalise their service delivery process and work to create and deliver reliable service to their customers. Normalisation of service delivery is done to ensure consistency in quality of service as well as to

minimise the inconsistencies in services delivered to customers. Norms and morals by specific employee's culture dictate how they think and act.

ICAOSMM Doc (2009:9859) states that one of the benefits of having organisational culture in terms of management safety is that it shapes the reporting procedure or hazards, accidents, and incidents by operational personnel. Since operational members face hazard or potential hazard every day, they are in a better position to report the existence of such hazards. They are in a better position to advice management on what works and what doesn't. The foundation of effective safety reporting to management lies with operational personnel since they are practically involved with day to day running of the organization.

1.2.1.   Safety Climate vs Safety culture

Aviation safety is of paramount importance to the sustainability of the civil aviation industry. Aviation activities are growing steadily, and the industry is becoming more complex. At the top of the ICAO agenda is the management of aviation safety to ensure growth and sustainability. In the next 15 years, air traffic globally is expected to double, safety risks have to be addressed proactively to enable the projected increase of air traffic to be carefully managed and maintained through strategic regulations and infrastructure (SACAA State Aviation Safety Programme, 2017). According to Skeepers and Mbohwa(2015: 10-16) Values in any organisation forms core of culture observed and manifested in behaviours.

According to Cooper (2016:3) a strong corporate atmosphere influences how senior personnel manages safety in any organisation is defined as safety culture. Organisation (How we do safety around here). Cooper (2016: 3) state that safety climate is considered to reflect the perceptions shared by employees about the way safety is being managed more so at particular moment in time (what we think of safety right now). Safety culture is "a product of the patterns of values, attitudes, competency and behaviours of individuals and groups which determine the adequacy, style and persistency of implementation of the organisation's health and safety programs".

Policies in any organisation are developed and implemented to achieve all objected organisational goals Since there are various different objected organisational goals, there are also different policies or ways to achieve them. Such policies are developed at a high-level customer management services, product quality and employee safety. It is for the mentioned reason that safety climate is correlated to shared perceptions concerning safety policy, processes and implementation. Research has shown that although safety climate and safety culture are different, they are often used interchangeably (Tengilimoglu, Celik&Guzel, 2016:1-12).

1.2.2.   Safety angles in an organisation

There are three (3) angles upon which safety culture can be approached from as stated by (Guldenmund, 2010) namely: Anthropological/academic, psychological/analytical, and experimental/pragmatic. All three angles are defined below Guldenmund (2010):

- **Psychological/Analytical assessment approach**

The most popular of the three (3) approaches of safety culture psychological/Analytical assessment approach. This approach focuses mainly safety climate. Employees complete questionnaires specific to safety standards such as giving perception/opinion (or the perception that is shared among co-workers) on certain safety related dimensions. Survey doesn't have to be big since they are specific in nature.

- **Anthropological/Academic assessment approach**

Anthropological/Academic assessment approach focuses on statistics such as accidents stats, and policy statements. Antonsen (2009:172) mentions that rather than judging organisational safety culture, this approach which is descriptive, seeks to describe and understand safety culture. According to Sodexo Institute for Quality of Life (2017) in anthropological/Academic approach, information and data collected during "fieldwork" from several sections of the organisation is used. Such information gathered during "fieldwork" is gathered by using different data collection techniques. According to Sodexo Institute for Quality of Life (2017) some of the techniques used for the collection of information are listed below:

1. Generating an impression of distinctive artefacts of an organisation through observation.
2. Analysis of organisational documents to divulge artefacts or values advocated by the organisation.
3. Interviewing organisational managers regular as well as safety managers and employees in high risk sections or areas to gain more knowledge about management and safety practices in place which will in turn provide insight into complex contexts.
4. Hold group discussions to discuss observations, findings and recommendations, and help to gather a more qualitative insight into an organisation.

- **Experimental /Pragmatic assessment approach**

Experimental/Pragmatic assessment approach focuses on the assessment of an organisation's current state of maturity concerning safety culture. The current safety status will be ranked and tested against predefined 'cultural maturity ladder' that shows different levels or stages of cultural maturity. The purpose for this approach is to identify what needs to be done in order to develop the organisation's safety culture to a higher level of maturity. This approach is future-oriented and prescriptive as opposed to descriptive.

2. Safety Inspections

There are many reasons for aircraft accidents. Threats such as environmental impact, human factors, human factors, and technical factors may lead to aircraft accidents. Research has identified factors influencing aircraft incidents in many countries. Factors identified are internal factors of the aircraft and external conditions of the environment in a state of the operator. It is very important that the current low level of aircraft accidents is maintained through aviation safety. Aircraft operators need to become more proactive and dealing with regulations and other identified threats rather than being reactive in order to deal with the probability of a mishap (Bala, Sharma, Kumar & Shrivastava, 2014: 37-44).

According to Smith, Roelen and Den Hertog (2016: 1-11) a number of accidents in a low-cost airline by aviation organizations as well as those who operates aged aircraft is quite alarming.

Smith et al. (2016:1-11) state that analysis of all the accidents in a low-cost airline and operators with aging fleet indicated that half of airlines had at least one or more recorded accidents before. This issue brings into the spotlight the continued oversight by authorities. ICAO and EASA are already planning to effect Performance Based Regulation (PBR) and Performance Based Oversight. PBR revolves around Key (safety) Performance Indicators (KPI).

2.1. Aircraft Maintenance Organisations.

According to (SA-CAR 2011: Part 145) organisations are compelled to have management staff responsible for day to day running of maintenance organisation. Under management, there are three aspects need to be considered such as corporate commitment, management personnel, as well as duties and responsibilities of the management personnel. Due to the reliability of the infrastructure in use by aviation industry, aircraft maintenance organisation forms a key element of the safety in air transportation as stated by (Borener&Guzhva, 2014: 1753-1762). Maintenance organisations are responsible for providing different types of aircraft maintenance. Major/Heavy maintenance, which is exhaustive and sophisticated type of maintenance due to its scheduled package as set by the manufacture.

During this type of maintenance, the focus is on airframe maintenance, components and accessories removal or maintenance. Types of major/heavy maintenance are classified as Level C and Level D maintenance checks and are usually carried out annually or as recommended by aircraft manufacture (Ward, McDonald, Morrison, Gaynor, &Nugents, 2010: 247-267).

According to Regattieri, Giazzi, Gamberi, and Gamberini (2015: 8-20) because of the nature of services that aircraft maintenance provides in aviation industry, it his highly regulated by both local authorities and international authorities. Internationally, European Safety Agency (EASA) caters for European countries while Federal Aviation Administration (FAA) looks after USA aviation industry.

2.2. Aircraft technical personnel (AME & Aircraft Mechanic)

Nobody is allowed to act as an aircraft maintenance engineer unless he/she has been authorised by SACAA through valid AME licence. AME must be validated by the Director of civil aviation authority to carry out any maintenance according to his/her rating. An authorised AME holder will only exercise only privileges granted by the Director of civil aviation (SACAA, CAR 2011:66.01.2).

According to Kim & Song (2016:333-334) engineers in aircraft maintenance provide support services by performing troubleshooting as well as providing a range of technical resources to field mechanics. Engineers will ensure that they provide and supply quick solutions by consulting with aircraft manufactures. In case an aircraft mechanic encounters a technical snag that is not in the maintenance manual, aircraft engineers come forward to provide their expertise. For operators in sub-Saharan region, South Africa has become a maintenance centre of their aircrafts (Sunjka& Murphy, 2014: 59).

2.3. Aircraft maintenance programme

Rao et al. (2017: 249-270) argues that organisational objectives must guide or influence aircraft maintenance programme in order to provide the safety of engineers. Such objectives specific to the maintenance programme are listed below:

1. Maintenance of each aircraft released to service and deemed airworthy.
2. All modifications by appropriate person are performed, in accordance with the maintenance manual.
3. Only authorised person and approved AMO with adequate equipment can perform maintenance and alterations on the aircraft.

According to SA-CAR (2011: 43.02.1) South African civil aviation regulations dictate that every aircraft which operates within the republic shall be maintained or serviced in accordance with Approved Maintenance Programme (AMP). The aircraft owner must establish AMP which conforms to the provision of the regulator. Once the AMP is fully developed, the aircraft owner shall submit approval request to the Director of civil aviation.

3. Research methods

For the research methodology and design of this study, the fundamental rationale applied is to discover the thread of excellence for the research result and analysis. The different methods applied in the compilation of data in this study collectively with the customs applied to analyse data are explored and discussed. The selections of samples and research zone jointly with the reasons for these are given.

3.1. Research design

As Creswell (2014:141) stated, the research design is appropriate when applied at the beginning phase of the study, and it valuable when gathering surrounding material, while attempting to tackle research questions that entails the how, when, what, why and how.This study applied the mono quantitative method. This simply means that only one method was utilised to explore and react to the research questions of the study, namely a questionnaire. The study opted for the questionnaire because of its inclusive, cost-efficient and non-personality (Saunders et al., 2016:181). The survey questions also facilitate collection of quantitative data and are linked to the chosen research, given that a quantitative research strategy (questionnaire) is characterised by a deductive approach (Bahari, 2010:20).

Saunders et al. (2016:437) describes a questionnaire as a data collection instrument wherein targeted population is expected to answer to the same set of questions in an order that has been predetermined. The questionnaire was influenced mainly by the research hypothesis.

The questionnaire was intended subsequent principles of vigorous questionnaire layout. The questionnaire is made of 65 questions of which all were aimed at addressing issues concerning ethical leadership, aircraft maintenance personnel,safety culture, and organisation safety performance in the Gauteng aviation industry.

A research questionnaire was distributed to various maintenance personnel across Gauteng Province in the quest to achieve the primary objective. A questionnaire was divided into six sections to cover all research variables namely: Biographical information, ethical leadership, safety culture, aircraft maintenance personnel, safety climate and organisational safety performance.

3.2. Data Analysis

Data analysis means that the progression of converting data collected from primary sources into information and knowledge, which also translates to exploring the relationship between variables (Sharma, 2018:4). The reviewed literature suggests that there might be correlations among ethical leadership, aircraft maintenance personnel, organisational safety performance, and safety culture. To independently evaluate and test the relationship amongst different variables, The Structural Equation Modelling – Path Analysis (SEM-PA) method was used to give an overall measure for the model. If the level of significance for null hypothesis will be rejected if P-value obtained from data analysis falls below 0.05.

Sharma (2018:4) views analysis of data as a procedure of "systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data". For this study, the data obtained from the primary research was coded and captured into a computer-based database for further breakdown. The analysis for this study was launched with the purpose of Statistical Package for the Social Science (SPSS) 25, a quantitative data analysis software designed for the social sciences. Explanatory and inferential statistics were also applied to lay down the primary data attained from the research. The inferential analysis was done in regression analysis terms.

3.3. Population and Sampling

The targeted population consists maintenance organisations that are recognised and approved by civil aviation authority, more specifically; the following professionals in these organisations will be targeted: Senior managers, Managers, Artisans, Engineers and Administrators. After receiving authorization from SACAA, the survey will be sent to different AMOs for participants to provide their own understanding and knowledge of their various approved organisation by answer questions to the best of their ability. Participants will give details about a phenomenon through ways of collecting data via questionnaires as stated by (Kumar 2016: 31).

A small sample, on the other hand, is much less accurate but more convenient. A census, which is a survey of the whole population, would have been more accurate than a survey using a restricted sample, but as highlighted by Saunders et al., (2016:274) above, it would have been expensive, and its results would have taken long to analyse. To this end, for collection of quantitative data, this study aimed getting a total of 210 participants who received the questionnaires at different AMOs in the Gauteng province to be collected through probability sampling. However out of the 210 participants, only 108 participants completed the questionnaire.

4. Findings

A structured and self-administered research questionnaire was used, and it was administered to 210 randomly selected study participants. From the 210 participants selected, 108 participants completed the survey. To guarantee the accuracy and dependability of this study, the questionnaire consisted of 65 questions; 5-point scale Likert-type questions which were designed at focusing on matters in relation to ethical leadership and safety culture on organisation safety performance in the Gauteng aviation industry.

The maintenance organizations recognised and approved by civil aviation authority was targeted for the survey and the following professional disciplines were targeted: Senior managers, Managers, Artisans, Engineers and Administrators. Samples for the research were chosen randomly and the composed data was subsequently recorded, summarised and tabulated. SPSS 25 was utilised to analyse and examine the data.

Given that the study's main objective is to create a framework that develops a model linking both ethical leadership and safety culture and assessing how they fit within the model, and further to explore the influence of ethical leadership, safety climate, safety culture on organisational safety performance and offer recommendations about the whether such relationship amongst the mentioned variable indeed does exists, the study findings will first discuss the demographic profile of the participants, and will further be organised around the research hypothesis according to the following themes: (1) Demographic profile of participants, (2) whether ethical leadership has any significant

influence on organisational safety performance, (3) to further establish if organisational safety culture has any degree of influence on organisational safety performance, (4) level of significance between ethical leadership and safety culture, (5) how safety culture on has impact on aircraft maintenance personnel and (6) to establish if maintenance personnel contribute positively or negatively to organisational safety performance.

Table 2: Correlations of research variables.

CORRELATIONS		Ethical leadership	Safety culture	Aircraft Maintenance Personnel	Organisational Safety Performance	Safety Climate
Ethical Leadership	Pearson Correlation	1	.674**	.515**	.652**	.575**
	Sig. (2tailed)		0.000	0.000	0.000	0.000
Safety Culture	Pearson Correlation	.674**	1	.529**	.681**	.634**
	Sig. (2tailed)	0.000		0.000	0.000	0.000
Aircraft Maintenance Personnel	Pearson Correlation	.515**	.529**	1	.491**	.516**
	Sig. (2tailed)	0.000	0.000		0.000	0.000
Organisational Safety Performance	Pearson Correlation	.652**	.681**	.491**	1	.609**
	Sig. (2tailed)	0.000	0.000	0.000		0.000
Safety Climate	Pearson Correlation	.575**	.634**	.516**	.609**	1
	Sig. (2tailed)	0.000	0.000	0.000	0.000	

Table 3: Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Ethical leadership	108	2.33	4.83	3.7624	.42637
Safety culture	108	1.58	4.67	3.7569	.47622
Aircraft Maintenance Personnel	108	1.83	4.67	3.7546	.51482
Organisational Safety Performance	108	1.00	4.40	3.6056	.47789
Safety Climate	108	2.21	4.47	3.7588	.38435
Valid N (listwise)	108				

Correlations and Descriptive statistics among the study variables are displayed in Table 2 and Table 3above.

- **Hypothesis 1:** There is a significant relationship between ethical leadership and safety culture.

The implication from the results on Table 2 is that when majority of respondents positively appraised ethical leadership, the more positive they evaluated safety culture as well. From the correlations on Table 2 and descriptive statistics on Table 3, ethical leadership is directly proportional to safety culture. First, it could be seen that the standardized direct effect of service quality to customer loyalty is significant (0.674; $p<0.001$), supporting the notion that there a significant relationship between ethical leadership and safety culture strongly exist, therefore providing strong support for H_1.The findings on ethical leadership showed that ethical leadership is crucial for organisational safety performance. Without aviation management abiding to ethical values, organisational and aircraft safety performance may be compromised.

Majority of the study questionnaire respondents believe that management in the aviation industry is driven by ethical values and abide by organisational processes. Specifically, a total of 72 out of 108 (with 48 participants in agreement and 24 strongly agreeing) participants believe this to be true, constituting 66.6% of the total number of respondents and a mere 8 respondents constituting 7.4% are of the view that this is not the case and disagree with his statement.

- **Hypothesis 2:** Ethical leadership has a significant influence on organisational safety Performance.

Results show that safety is highly valued as a principle in the aviation industry in Gauteng. In response to the key statement on whether safety is a core value in the company, the majority ofparticipants (either agree and strongly agree), 62 participants, with the majority of the participants drawn from technical employees and the management team (managers, supervisors and senior managers), constituting 57.4% of the total number of respondents believed that safety is the fundamental element within aviation organisations under study. 40 participants, constituting 37% neither agreed nor disagreed – the majority of these participants were drawn from non-technical staff and most of them have been with the company for 3-10 years.

Simple linear regression was used to investigate hypothesis two (2) stating that ethical leadership has a significant influence on organisational safety performance. Assumption of regression was tested and found to hold, with exception of 1 outlier. This case was removed, and regressions run again. Results show that the model was significant F (1. 105) 58.408, P = 0.000 as shown on Table 4.

Table 4: Analysis of Variance (ANOVA) for Hypothesis 2

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.285	1	6.285	58.408	.000[b]
	Residual	11.299	105	.108		
	Total	17.584	106			

a. Dependent Variable: Organisational Safety Performance

b. Predictors: (Constant), Ethical leadership

Table 5: Regression Model for hypothesis 2

MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.598[a]	.357	.351	.32804

a. Predictors: (Constant), Ethical leadership

b. Dependent Variable: Organisational Safety Performance

The model summary on Table 18 above shows that the ethical leadership explains 35.7% of variance in organisational safety. According to Steyn and Ellis (2003:51-53) this represents a practically important effect size.

Table 6: Coeffiient of determination for Hypothesis 2

COEFFICIENTS

Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	1.360	.299		4.553	.000		
Ethical leadership	.601	.079	.598	7.643	.000	1.000	1.000

a. Dependent Variable: Organisational Safety Performance

In the coefficients Table 19 above, it is established that ethical leadership is indeed a significant predictor of organisational safety performance where B = 0.601, P = (0.000).

- **Hypothesis 3:** Safety culture has a significant influence on organisational safety performance.

On the statement whether management is concerned with ensuring safety than making commission, and a similar statement that states that management hardly ever questions a technical personnel's conclusion to setback a flight for safety purposes related issues; the majority of respondents in the former statement, 62 respondents constituting 57.4% confirmed that management is prioritises safety over making money; and 69 participants constituting 63.9% confirmed the latter statement that management rarely question technical experts' decisions to delay the flight for safety related issues, further confirming that safety is prioritised over making a profit.

In the former statement, 15 participants disagreed with this statement, constituting 13.9% of the total number of respondents and 31 participants who opted for Option 3 = neither agreed nor disagreed with the former statement. Regarding the latter statement, only 9% of participants chose to disagree with the question constituting 8.3% and 8 respondents constituting 7.4% neither agreed nor disagreed with the statement.

A simple linear regression was used to investigate hypothesis three (3) namely safety culture has a significant influence on organisational safety performance. The assumption of regression was tested and found to hold. Results show that the model was significant $F_{(1, 105)}$ 55.235, P = 0.000 as illustrated by Table 7 below:

Table 7: Analysis of Variance (ANOVA) for Hypothesis 3

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.062	1	6.062	55.235	.000[b]
	Residual	11.523	105	.110		
	Total	17.584	106			

a. Dependent Variable: Organisational Safety Performance

b. Predictors: (Constant), Safety culture

Table 8: Regression Model for Hypothesis 3.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.587[a]	.345	.338	.33127

a. Predictors: (Constant), Safety culture

b. Dependent Variable: Organisational Safety Performance

The model summary on Table 8 above shows that the ethical leadership explains 34.5% of variance in organisational safety. According to Steyn and Ellis (2003:51-53) this represents a practically important effect size.

In the coefficients Table 9 below, confirmation is made that safety culture is indeed a significant predictor of organizational safety performance. B = 0.588; P = 0.000).

Table 9: Coeffifient of determination for Hypothesis 3

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	1.524	.285		5.343	.000		
Safety culture	.558	.075	.587	7.432	.000	1.000	1.000

a. Dependent Variable: Organisational Safety Performance

- **Hypothesis 4:** Safety culture has a significant influence on commitment of aircraft maintenance personnel.

The majority of the participants surveyed are of the opinion that chief aircraft maintenance officers are readily available to help, with 83 participants constituting 76.9% believing this to be true, 9 participants constituting 8.3% disagreeing with this statement and 16 participants constituting 14.6% neither agreeing nor disagreeing. The results are a clear indication that safety culture secures the commitment of aircraft maintenance personnel, especially their understanding of risks associated with flight operations and their readiness and availability to help.

Furthermore, the majority of respondents believe that Aircraft maintenance engineers and artisans are keen to report information regarding unsafe actions of operations department with 79 participants constituting 73% agreeing with the statement, a mere 11 participants constituting 10.2% disagreeing and 18 participants constituting 16.7% neither agreeing or disagreeing.

A simple linear regression was used to investigate hypothesis 4 namely safety culture has a significant influence on commitment of aircraft maintenance personnel.The assumption of regression was tested and found to hold, with exception of 2 outliers. This case was removed, and regressions run again. Results on Table 10 below show that the model was significant F (1. 104) 27.4339, P = 0.000. According to Steyn and Ellis (2003:51-53) this represents a practically important effect size

Table 10: Analysis of Variance (ANOVA)for Hypothesis 4

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.871	1	4.871	27.339	.000[b]
	Residual	18.528	104	.178		
	Total	23.398	105			

a. Dependent Variable: Aircraft Maintenance Personnel

b. Predictors: (Constant), Safety culture

The percentage variance on Table 11 below: R square = 20.8% is moderately significant on a practical level according to (Steyn & Ellies, 2003:51-53).

Table 11: Regression Model for Hypothesis 4.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.456[a]	.208	.201	.42208

a. Predictors: (Constant), Safety culture

b. Dependent Variable: Aircraft Maintenance Personnel

In the coefficients Table 12, it is confirmed safety culture has a significant influence on commitment of aircraft maintenance personnel. B = 0.541; P = 0.000.

Table 12: Coeffifient of determinationforHypothesis 4.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.836	.375		4.903	.000		
	Safety culture	.514	.098	.456	5.229	.000	1.000	1.000

a. Dependent Variable: Aircraft Maintenance Personnel

- **Hypothesis 5:** Aircraft maintenance personnel commitment influence organizational safety performance.

On the question of whether aircraft maintenance personnel commitment to safety influence organisational safety performance, findings displayed that aircraft maintenance has an influence on overall safety performance of an organisational. The survey findings showed that the safety culture secures the commitment of aircraft maintenance personnel, their comprehension of their responsibility on issues of safety and their prioritisation of safety which in turn increases the organisational safety performance. On organisational safety climate, the results exhibited that the organisational safety climate is influenced by ethical leadership wherein management inculcates a safety culture within the organisation as evidenced by the commitment of technical personnel by adhering and prioritising safety and maintenance.

A simple linear regression was used to investigate Hypothesis 5, namely aircraft maintenance personnel commitment influences organizational safety performance. The assumption of regression was tested and found to hold, with exception of 2 outliers.

This case was removed, and regression run again. Results show that the model was significant F (1. 104) 29,876, P = 0.000 as illustrated on Table 13 below. According to Steyn and Ellis (2003:51-53) this represents a practically important effect size

Table 13: Analysis of Variance (ANOVA) for Hypothesis 5

ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.464	1	3.464	29.876	.000b
	Residual	12.057	104	.116		
	Total	15.520	105			

a. Dependent Variable: Organisational Safety Performance

b. Predictors: (Constant), Aircraft Maintenance Personnel

The R square of 22.3% on the below mode summary Table 14 is moderately significant on a practical level as stated by (Steyn & Ellies, 2003:51-53).

Table 14: Regression Model forHypothesis 5

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.472a	.223	.216	.34049

a. Predictors: (Constant), Aircraft Maintenance Personnel

b. Dependent Variable: Organisational Safety Performance

**Table 15: Coeffifient of determination ofHypothesis 5**

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.296	.249		9.236	.000		
	Aircraft Maintenance Personnel	.358	.065	.472	5.466	.000	1.000	1.000

a. Dependent Variable: Organisational Safety Performance

The coefficients on Table 15 above confirm that aircraft maintenance personnel have a significant influence on organisational safety performance. B = 0.358; P = 0.000.

Figure 2: Results of the research model (All Hypothesis tested positive for the Model)
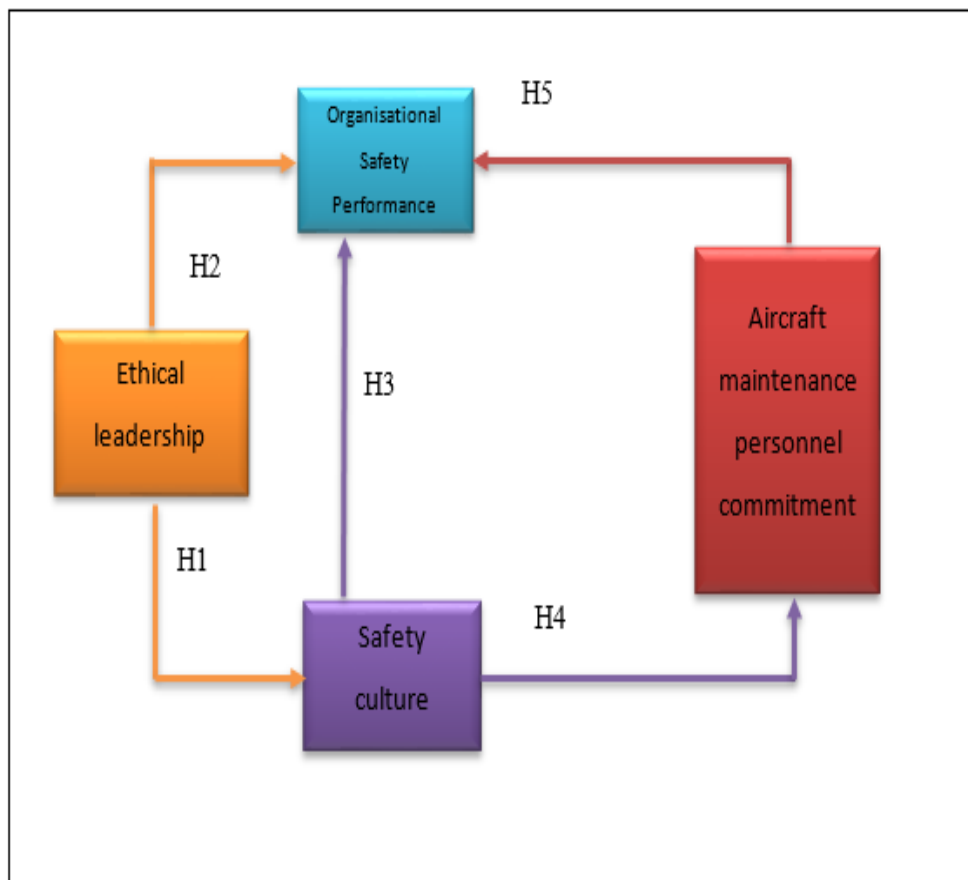
After all the hypothesises where tested, the proposed model revealed an excellent match for all five (5) hypothesis as illustrated above on Figure 2. Parameters which were estimated at the beginning of the research study become statistically significant for the envisaged model were ($p < .01$) showed the projected sign, conceding support for the model.

It is therefore concluded that the primary objective which is to create a framework that develops model linking both ethical leadership and safety culture and assessing how they fit within the model is achieved. As illustrated by the model of Figure 2, Ethical leadership and safety culture are the role players in the model.

1. Ethical leadership role and how it fits within the model

As illustrated in Figure 2, ethical leadership is the main role player within the model. It represents the beginning or the starting point for the entire developed model. Without ethical leadership the model does not exist. From the model, both organisational safety culture and the organisational safety performance are driven by ethical leadership. The implication therefore is that for aviation industry to succeed and maintain its status as one of the safest means of transport, is has to employ and retain highly valued individuals with high set of morals to take the aviation industry in Gauteng to greater heights.

2. Safety culture role and how it fits within the model

As shown by Figure 2, aviation industry is one of the highly regulated industries. Safety is a priority and cannot be compromised. Within the created model, the role of safety culture is fundamental to the success of the industry as a whole. For any maintenance to take place, suitably qualified personnel have to take their position within workplace.

However, the model indicates that those qualified individuals have to be guided by the organisational culture which for the purposes of this study it is referred to as organisational safety culture. The role of safety in guiding the personnel to follow correct procedures and to report hazards or risks is of most importance to the overall organisational safety performance. Building a reputation for the organisation, the industry and ultimately the country through safety performance as the direct results of safety culture cannot be overemphasized.

5. Discussion and Conclusions

To conclude the study, the general findings from the researched themes in aviation industry of Gauteng Province namely: ethical leadership, safety culture, aircraft maintenance personnel, and organisational safety performance showed an overall ethical leadership culture that the Gauteng aviation industry enjoys, which has inculcated a safety culture thereby committing safety maintenance personnel and the company as a whole to prioritise safety and maintenance over making money and profits.

The conclusion from the study is that correlation between ethical leadership and safety culture in aviation industry of Gauteng Province exists, and commitment of technical maintenance personnel to prioritise and adhere to safety measures and encouraging an overall safety climate within the company that leads to the success of the company and increased safety organisational performance.

5.1. Recommendations

As discussed, the study aimed to achieve the primary objective of creating a framework that develops a model linking both ethical leadership and safety culture and assessing how they fit within the model, to explore the impact of ethical leadership and safety culture on the organisational safety performance and finally to offer recommendations about the relationship between ethical leadership and safety culture in the aviation industry.

Primary objective of recommending a framework that develops a model and testing the relationship between ethical leadership and safety culture, and the secondary objective of making recommendations about the relationship between ethical leadership and safety culture in the aviation industry has been addressed as shown in Figure 22. Since the model illustrates the perfect fit with a high correlation, therefore it is recommended that the model be used as part of AMO management structures which seeks to appoint accountable managers that possess ethical leadership qualities. Research has shown that if the leaders are corrupt or lack ethics, the whole workforce will

reflect as such. The model can be incorporated into HR organisational Human resource policies to ensure that capable staff is recruited to enable safety an ethics to flourish in Gauteng Aviation Industry.

The model should be used as part of the induction for new recruits. The study has shown that safety training forms part of the organisational induction. It is for the same reason that the model be incorporated into the induction process. of introducing organisational expectations. Lastly the model should form part of MOP which calls for appointment of post holders in AMOs with specific attention given to Accountable manager, Safety manager, and Quality assurance manager (SACAA, CAR 2011: Part 145.02.1).

Once the model becomes part of the MOP for maintenance organisations, the organisation becomes responsible for carrying out inspections and internal audits to make sure that processes and procedures regarding organisational safety are not short circuited by all organisational employees. Pioneers of the aviation and stakeholders must strive for the appointment of transformational leaders (Pietersen et al., 2017:222) to take charge of maintenance operations as mentioned by (SACAA, CAR 2011: Part 143).

The model of study in Figure 2 confirms a fit between all the hypothesises tested. The tests have reflected that each of the role of moral leadership that encourages safety culture is of the most importance in ensuring aviation safety, and if one of them is not effective, the overall performance of the AMO will be negatively affected and a surge in organisational hazards, incident, and accidents will emerge. Adherence to the SACAA (CAR, 2011: Part 140) to make implementation of SMS in all AMO mandatory is supported by the findings of the study which reflects a significant correlation between safety culture, ethical leadership, maintenance personnel, as well as organisational safety performance of the model on Figure 2.

5.2. Recommendations on improving practice

As discussed in one of the study objectives is to give recommendations about the relationship between ethical leadership and safety culture. Below recommendations, where made from reviewing relevant literature as well as findings of the research.

Firstly, this study recommends the adoption of transformational ethical leadership approach in the appointment of the leadership including Accountable managers, Safety managers, Quality assurance managers, senior manager, managers to drive a safety concept which will subsequently drive a positive organisational performance. To this end, the study recommends appointment of leaders who are ethical in their conduct, creating a safe environment for the aviation industry to reach its set goals without compromising due process in maintenance procedures that are crucial in ensuring optimal safety.

The transformation leader, as highlighted byDaft (2015:169) set an ethical tone of the organisation and is responsible for being a role model by setting up a conducive working environment for his/her followers, they signal what matters to an organisation through their behaviour, as shown by Makhan (2014:28) to employees and the statement holds true "what interests my manager fascinates me". As highlighted above, transformational ethical leaders will not maintain the status quo of meeting the set targets and expectations of the organisation (which is what operational leaders will do) but will be the agents of change, doing what is necessary, responding to the needs as they arise, motivating their followers to improve and do better.

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