



# Stakeholders' views regarding macro-environment impacts on commercial flight operations in South Africa



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**Background:** Worldwide, the aviation industry facilitates the efficient movement of passengers and goods across borders to support economic access to various local, regional and international markets. As an indirect stimulus for other economies, the aviation industry is known for distinct economic competitiveness, low profit margins and vulnerability to macro-environment fluctuations. Although many studies have focused specifically on scheduled airline's operations, this study of commercial flight operations in South Africa encompasses both airline operations and charter/on-demand operations.

**Objectives:** The key research objective was to critically review stakeholders' perceptions on the macro-environment's influences on the flight operations subsector of South African aviation industry.

**Method:** As research methodology to explore manifest and latent meaning in dialogue, qualitative content analysis was employed in this study. Data were collected through interviews with the stakeholders of South African aviation industry and analysed using qualitative content analysis.

**Results:** This study revealed stakeholders' views on the effects of political, economic, sociocultural, technological, legal and ecological (PESTLE) framework embedded in the macro-environment of commercial flight operations in South Africa.

**Conclusion:** Although the macro-environment is uncontrollable by the industry, each of the PESTLE framework's dimensions presents challenges as well as growth opportunities. Continuous monitoring and a comprehensive understanding of the probable impacts of the macro-environment are necessary to remain competitive.

**Keywords:** stakeholders' views regarding macro-environment; commercial flight operations; management; transportation; air transport.

## Introduction

### Social value

Although commercial flight operations include the transport of passengers and cargo through scheduled and non-scheduled air transport operations (international and domestic), empirical data available on South African aviation industry remained focused on scheduled passenger transport, and failed to address non-scheduled or charter operations (Mabotja et al. 2019). The scope and economic value of non-scheduled market is frequently underestimated, as an estimated 6000 aircraft support non-scheduled flight operations and 240 aircraft facilitate scheduled/airline flight operations in South Africa (Dillman 2019). This article has an all-inclusive approach towards the aviation industry and includes scheduled and non-scheduled flight operations as probable service providers to the general public.

Regardless of the nature of the flight operations activity undertaken, the Department of Transport (2017) defined five categories of stakeholders in the aviation industry, namely, governance, commercial, support, society and security stakeholders. Previous studies have focused primarily on commercial stakeholders engaged in airline operations, but the insight provided in this study equally embraces the contribution of other stakeholder groups.

### Scientific value

Apart from direct economic contribution, the aviation industry facilitates economic growth by enhancing links between businesses and economies through increased access to resources and international capital markets (Gill 2016). Amankwah-Amoah (2018) argues that competitiveness

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in the aviation industry is frequently reduced by the failure of organisations to consider the consequences of changes in the external environment. This study provides insight on the external environment's influences according to the acknowledged political, economic, social, technological, legal and environmental (PESTLE) framework, which addresses uncertainty from the macro-environment (Frue 2016; Pratap 2016).

This study includes previously omitted services of the local aviation industry, as well as the perceptions from an all-inclusive stakeholder group, thereby producing novel empirical data associated with the economic activity undertaken by South Africa's aviation industry.

## Literature overview

Aviation is a complex socio-technical system because of interrelationships on multiple levels such as people, organisations, institutions and technologies (Grundgeiger, Sanderson & Dismukes 2014; Harris & Stanton 2010), and is highly regulated worldwide (Palko 2014). The environment is characterised by high velocities of changes, and sustainable adaption to such changes implies agility and resilience in the system itself (Wensveen 2018); however, inadequate adaption to changes in the external environment has consequences of high commercial failure rate (Amankwah-Amoah 2018; Wensveen 2018).

### Political factors

The state of public institutions, the development, structure and administration of the legal framework, governmental policies, and regulations as well as political and security stability constitute the political environment (Itani, O'Connell & Mason 2014; Potgieter 2014).

Local government's role in creating a conducive atmosphere for aviation operations includes the development of policies promoting sustainable economic development and regulating operating standards to assure the safe transportation of passengers (Amankwah-Amoah 2018). The Department of Transport (2017:2) endorsed four principles for policy development, namely, aviation safety and security are of paramount importance; the market should resolve economic decisions; users' interests in relation to safety and reliability should be considered; and all participants in the air transport market should be treated equally before the law.

Whilst the South African Civil Aviation Authority (SACAA 2011) governs local aviation legislation incorporating global operating norms, the Air Services Licensing Council (ASLC) acts as the economic regulator with the mandate to monitor a licence holder's financial viability to fund the necessary controls supporting the safety and reliability of the service to the public (Department of Transport 2017). Although the mandate for governing and enforcement must be applied impartially to all industry participants (Department of Transport 2017), Mhlanga

(2018b) identified a distorted market resulting from political protectionism of state-owned entities.

The United States Agency for International Development (USAID 2018) expressed concerns over unbiased economic development in the South African environment based on lacking governance strength, government ownership/control over critical infrastructure, bribery and corruption, and trade restrictions and additional costs associated with transformation policies such as Broad-Based Black Economic Empowerment (BBBEE).

### Economic factors

The nature and direction of national economy and the resultant interchanges between recessions and economic expansions are triggered by uncertainty constituted by economic factors (Potgieter 2014; Rizetto 2017) and generate cyclical increases and decreases in the industry's economic activity (Itani et al. 2014). Continuous surveillance of economic factors is required to maintain profitability and competitiveness (Sammut-Bonnici & Galea 2015).

Whilst the aviation industry contributed to 3.1% of South Africa's gross domestic product (GDP) in 2009 (International Air Transport Association [IATA] 2011), the contribution increased to 3.5% in 2014 (Smith 2018). Although the aviation industry's contribution to the GDP in South Africa showed a slight decline in 2017 to 3.2%, 100% growth is projected over the next two decades (IATA 2019). This estimation could stimulate an increase of 23.8 million passengers transported, 372 000 employment opportunities and a total GDP contribution of \$20.2 billion by 2037 (IATA 2019). As IATA (2020) projects a \$3bn revenue loss for 2020 in the South African context because of rapid restrictions on air travel brought on by the COVID-19 pandemic, the short- and medium-term economic sustainability of private and state-owned entities in South African aviation industry is threatened significantly (Smith 2020). However, the International Civil Aviation Organization (ICAO 2020) foresees aviation in the African region to reclaim its growth path by June 2020, thereby gradually reinstating its direct, indirect and catalytic facilitation of economic activity.

Fluctuating factors, such as the exchange rate, oil price and GDP growth rate, stimulate economic turmoil, which remain difficult to accurately forecast and timely adapt strategic planning (Mhlanga & Steyn 2017). Such fluctuations increase the direct operating costs of air travel by 31% (Mhlanga & Steyn 2017), thereby increasing consumer cost and, in turn, influence the consumer demand for air travel. Consumer cost is also influenced by fuel levies and various taxes (Mhlanga & Steyn 2017).

The IATA (2019) estimates 79% increase in local aviation employment opportunities by 2037. To the National Treasury (2018:17), 'private sector job-creation remains the only sustainable way to reduce unemployment'. Given the aviation industry's diverse socio-technical environment and

the niche service it provides, it requires highly qualified workforce with specific skills (Gill 2016). The development of scarce skills has been identified (Kraemer-Mbula 2008) as being critical for the aviation industry. Smith (2019b) promotes the development of scarce skills and cautions against the ageing current workforce. Employment opportunities not only directly impact economic status but also underpin sociocultural development through skills development and indirect prosperity (Njoya 2013).

### Sociocultural factors

Sociocultural factors include the attitude and cultural values of society that could influence an entity's business conduct such as cultural, demographic and educational circumstances (Potgieter 2014). In South Africa, the recent growth of consumer groups with access to air transport has stimulated a change in client profiles and a 48% increase in demand between 2001 and 2013 (Mhlanga & Steyn 2017). This revolution in consumer behaviour has facilitated recent growth of low-cost carriers in South Africa (*The Citizen* 2016) and positive competitiveness in the economic environment (Mhlanga 2017).

Skills development in the aerospace industry cannot be separated from the military and government-owned origin of the industry (Kraemer-Mbula 2008). Before opening the market to private entities (Pirie 1992), aviation-related qualification and training focused on military and government-owned entities (Kraemer-Mbula 2008). The Department of Transport (2017:147) argues that governmental 'line departments and parastatals do not seem to be adequately engaged in training'. However, the SACAA (2017) reports on significant progress made to promote skills development and training through qualification frameworks addressing the demand for diversity and aviation-specific competencies.

Despite this progress, the Department of Transport (2017:12) expresses the need for 'adequate coordination and integration in the training of personnel within the various disciplines of civil aviation'. In addition, the Department of Transport (2017:147) stresses that human resource development in the civil aviation sector needs 'considerably more attention to meet the needs of the industry, especially in the technical field'.

### Technological factors

This dimension includes technological advancements influencing infrastructure and equipment, and the skills, knowledge, and methodological application thereof to produce optimal results (Potgieter 2014). Aviation is at the forefront of groundbreaking tangible technological development, but lacks intangible technological developments (Gill 2016) to create new frontiers and increased boundaries of competitiveness (Sammur-Bonnici & Galea 2015).

Technological factors simultaneously reduce production and operating cost, improve consumer access, improve product/service quality and become drivers of change for both

consumers and the industry (Sammur-Bonnici & Galea 2015). Although new technologies enhance performance and service delivery, it stimulates challenges associated with cost and skills to implement and maintain such technologies and should thus be planned strategically (Potgieter 2014).

The average age of passenger-carrying aircraft in Africa is 20 years (Wensveen 2018), resulting in increased maintenance cost, outdated technologies lacking the capability to reduce aircraft noise and engine emissions (Eller & Moreira 2014), and reduced operational efficiency compared to more advanced aircraft (Wensveen 2018). These factors influence customer perceptions on safety and reliability of the service and inflate ticket prices, thus reducing the organisation's competitive advantage (Eller & Moreira 2014).

The Department of Transport (2017) acknowledges government's role in promoting technology and innovation to maintain economic competitiveness. Although the South African aviation industry community has taken various initiatives, the civil aviation industry lacks a 'coordinated approach to technology adoption, innovation, research and development' (Department of Transport 2017:150).

### Legal factors

Laws, regulation and legislative requirements dictating the operational activities and conduct of an organisation represent the legal environment (Mhlanga 2018a). Bristoll (2013) advises that the contemporary business environment should also consider local and international laws on taxation, consumer relations, employment matters, marketing and advertising, and import and export during strategic planning to remain abreast of all legal factors influencing its business.

The stringency and complexity of civil aviation laws and regulations have rapidly increased over the past decade and elevated the significant impact that legal factors have on the industry's economic performance (Mhlanga & Steyn 2017). The restrictive nature of local aviation-specific laws impedes the direct and indirect development of the industry (Dillman 2019). Mabotja et al. (2019:3) indicate that the local civil aviation legislation is 'cumbersome, complex, costly, long-winded and that it favoured punitive over incentivising measures'. As a further restriction to sustainable growth of the South African aviation industry, regulatory bodies with the responsibility to simultaneously develop and maintain standards are perceived to be 'staffed by employees who lacked aviation knowledge' (Mabotja et al. 2019:3). Conscious institutional efforts with the focus on 'stimulation and changes in the structure and functioning' of the industry are necessary to promote and maintain aviation's economic benefits (Luke & Walters 2013:2).

### Ecological factors

The sustainable use of natural resources and the protection of the physical environment strengthen society's trust and perceived credibility in an organisation or industry, thus contributing to ecological factors in the PESTLE framework

(Pratap 2016). Both the Department of Transport (2017) and the SACAA (2017) emphasise the environmental protection associated with air transport. The aviation industry contributes 2% to the total human-induced carbon emissions globally, in comparison to the 74% contribution by road transport (Air Transport Action Group 2019).

The SACAA (2017) incorporated aviation environmental protection into its scope during the 2016–2017 financial year to monitor and enforce the effective implementation of ICAO standards and recommended practices to preserve the environment. South Africa was the pioneering African country to introduce carbon taxes for aviation operations (Njoya 2016). Mhlanga and Steyn (2017) identified these taxes as one of the contributing factors to increased ticket prices.

The Department of Transport (2017) distinguishes between the policy on environmental protection requirements for infrastructure entities within the industry (such as airports) and the environmental protection policy associated with the operation of aircraft. In both instances, the policy aims to align the developing regulations to the ICAO principles, the National Climate Change White Paper and the Disaster Management Act (Department of Transport 2017).

## Aims and objectives

This study aims to critically review stakeholders' insights on the macro-environment's influences on commercial flight operations in South Africa. In support of this aim, the objectives include to explore stakeholders' views of the impact that political, economic, sociocultural, technological, legal and ecological factors from the external environment have on commercial flight operations in South Africa.

## Research methods and design

This study aimed to derive knowledge and understanding from live experiences of a first-person point of view and was conducted from a phenomenological viewpoint (Smith 2016). Phenomenology is simultaneously focused on subjective experiences and objective constructs from the external environment influencing subjective experiences (Whitehead 2015). To allow for a comprehensive and in-depth inquiry into a specific phenomenon's manifestation within a real-world context, this study followed a descriptive approach towards qualitative research (Strumińska-Kutra & Kołodkiewicz 2018).

## Study design

This study was conducted according to the methodology of qualitative content analysis that embodies existing and newly collected data (Drisko & Maschi 2016). This methodology identifies manifest and latent meaning in purposively selected data sources, therefore identifying the actual discourse as well as the implied, or intended, discourse on a topic of interest (Bengtsson 2016). It considers unique emergent themes through organisation and categorisation of data to elicit a comprehensive understanding of the

phenomenon investigated, relative to the subjective position of a data source (Hashemnezhad 2015).

## Setting

The context of a study refers to a bounded system in which the phenomenon of interest presents itself and should also consider the period in which the phenomena are investigated within the defined contextual boundaries (Strumińska-Kutra & Kołodkiewicz 2018). As Njoya (2013) claims that the value of aviation industry and the continual growth thereof has remained mutually beneficial to all stakeholders, this study considers all categories of stakeholders to the South African aviation industry in a contemporary timeframe.

## Study population and sampling strategy

The study population includes subcategories from a homogenous group of governance, commercial, support, society and security stakeholders to the South African civil aviation industry as defined by the Department of Transport (2017). Although Elo et al. (2014) indicate a typical sample size for qualitative content analysis as being 12 participants, Yin (2018) claims that qualitative studies of a descriptive nature rarely have a sample greater than five participants. The researcher planned to engage with 25 purposively selected participants in total and five participants from each stratum. To increase the appropriateness and relevance of data collected, participants with adequate knowledge on the phenomenon of interest were identified from the sample population (Creswell 2014). As this study was conducted independently from any organisation in the aviation industry and participation was voluntary, participants were selected based on convenience, availability and willingness to participate.

## Data collection

Upon recruitment, research participants were requested to sign an informed consent document allowing for participant preference between face-to-face interviews, video conferencing and engagement via email. All interviews comprised open-ended questions probing participants' perceptions regarding the interrelationship between macro-environment (variables) and the South African aviation industry. Finally, a total of 26 research participants were interviewed.

## Data analysis

Interviews were recorded and transcribed verbatim to warrant accurate recording of elicited data. Where engagement took place via email, the correspondence was reworked into a format comparable to transcribed interviews. In line with the methodology of qualitative content analysis, the data were categorised into codes, similar categories and themes associated with the phenomenon of interest. In support of transparency and to avoid researcher bias, a team of coders employed by a consultation agency analysed the data to generate a comprehensive report.



## Results

Foreign trade relationships with other governments emerged as a positive impact from the political dimension in the macro-environment to facilitate air travel across sovereign borders. Participants indicated a lack of good governance, delays on policy development, corruption, cultural differences, BBBEE policy and political protectionism for state-owned entities as negative impacts from the political sphere of the macro-environment. The impact that the political environment has on the development of aviation regulations appropriate to the South African operating environment emerged as a concern.

Research participants argued that the aviation industry has a positive impact on global and local economic development as it creates investment opportunities, and contributes to employment and economic growth in a favourable economic climate. In turn, the nature of the economy can stimulate a decline in demand for the services the industry provides to the public. Economic indicators such as recessions, slow economic growth and unemployment, reduced demand for air travel, inflation, exchange rate fluctuations, and market limitations negatively impact the aviation industry's operations.

The data indicate that the aviation industry provides a positive sociocultural contribution as it promotes tourism and favourable interrelationships with other nations. In addition, the sociocultural value that the industry provides through specialist operations, such as humanitarian relief and search and rescue missions, was also highlighted. Access to air transport increased over the past two decades with the emergence of low-cost carriers, and this has provided a positive sociocultural value in the form of increased efficiency and safety during travel. A challenge that the sociocultural dimension in the macro-environment poses to the aviation industry includes the significant impact that an organisation's reputation has on consumer preferences. Participants revealed decline in the availability of specialist skills and inadequate initiatives to develop skills addressing the industry's advancement.

The aviation industry is benefitted from the advanced technology and innovation in the macro-environment because such advancements improve the design and manufacturing and efficiency of the services provided. Technological advancements also facilitate reduction in carbon and noise emissions and increased efficiency of the service but present a number of perils for the industry. Such challenges include the rate of technological advancement, its direct and indirect cost, inability to control technological advancement, cyber terrorism, job loss and novel skills required to implement and operate new technology.

Participants revealed that the aviation industry is a highly regulated industry worldwide. This aspect eases worldwide connectivity as operating standards are based on international best practices. The data revealed an increase in unnecessary and impractical aviation regulations without consideration of the local operating environment and complexities in the

industry. In addition, the challenge of lack of appropriate skill set, accountability and efficiency amongst aviation authorities, bureaucracy and inconsistent application and interpretation of regulations also emerged from the data analysis.

Worldwide, the aviation industry impacts the ecological environment by carbon emissions and noise pollution. Whilst carbon offset schemes, technological embodiment on equipment and operational practices were found to mitigate these impacts, carbon taxes emerged as a challenge. Participants argued that the weather patterns associated with the geographical location of the local industry are more conducive to the operation of aircraft through seasonal changes than in other regions, but result in the challenge of market isolation.

## Discussion

The findings revealed participant's perception on the interplay between South Africa's aviation industry and the PESTLE framework embedded in the macro-environment. In addition, this study showed general perceptions on the value of aviation industry and its significant challenges. Research participants indicated that the aviation industry is a safe and efficient mode of transport that enhances freedom of movement across sovereign borders. This movement includes the movement of people and goods and facilitates economic development of other industries. The interplay between the industry and the macro-environment dimensions includes challenges and opportunities from the industry point of view as discussed below.

### Political factors

Echoing research by Itani et al. (2014), Rizetto (2017) and Schmidt (2017), participants highlighted that the aviation industry's facilitation of travel across sovereign borders requires more comprehensive political policy and interstate relationships than other industries. As the institutional application of political governance significantly impacts operational approvals to cross borders (Schmidt 2017), participants stressed that the industry is subsequently both inhibited and stimulated by the standing of political policies, supra-governmental relationships and foreign trade relationships.

Amankwah-Amoah (2018), Mhlanga (2017) and Pirie (1992) suggest that state-owned entities in the aviation industry are either driven by governmental and political premises or the principle to accomplish profitability through reliability of the service. Supporting this view, participants agreed that political interference presents itself strongly in state-owned entities in the South African aviation industry.

Participants indicated the prominent impact of political policy on the development of aviation legislation in South Africa, thereby reinforcing previous research claiming the nature of political policy and governmental institutions' influence on legislative requirements, the nature of its

contents and its application (Chialastri & Pozzi 2008). Although the Department of Transport (2017) underpins the facilitation and promotion of economic development of the industry with equal emphasis on safety and security oversight and enforcement, participants revealed lack of support from governing bodies to promote economic development of the industry.

Bureaucracy on the part of organs of state responsible to promote economic development of the industry through its governing functions emerged as an inhibitor of growth of private sectors, reinforcing previous research on the adverse effects of political policy on unbiased promotion of the industry (Amankwah-Amoah 2018). Research participants agreed with previous research advocating a challenge for the private sector to compete economically and on a safety and security basis with state-owned entities subjected to political protectionism and economic support (LeCordeur 2017; Whitfield 2018).

This study identified participants' viewpoint that, as a result of lack of governance and accountability in the political environment, bureaucracy and corruption became an acceptable norm in the South African culture. Despite its uncomfortable omnipresence, the impact of poor governance, bureaucracy and corruption on the South African aviation industry is emphasised and underpins the USAID's (2018) concerns regarding the influence of local politics on foreign business operations in South Africa.

This study identified alignment between primary data and previous research indicating disconnect between policy development, implementation and the outcome of skills development for the location aviation sector (Kraemer-Mbula 2008). Participants agreed with Kraemer-Mbula (2008) that the responsibility to develop critical skills is transferred to the private sector, but voiced a dichotomous dilemma to simultaneously adhere to stringent qualifications and experience requirements in the aviation industry and BBBEE skills development requirements. Participants argued that this dichotomous dilemma opposes the intention of BBBEE policy because compliance to qualification and competency legislation cannot be compromised in the aviation industry.

## Economic factors

Participants concurred with previous research indicating direct and indirect relationships between economic factors and the aviation industry (Sammut-Bonnici & Galea 2015), insofar as the economic environment can either stimulate or constrain growth in the industry (Industry High Level Group 2017; Rizetto 2017). Research participants argued that the aviation industry is a dollar-based industry and agreed with the previous research revealing that the factors such as the unemployment rate, foreign exchange rate, commodity process, interest rates, consumer income, the rate of economic growth and so on affect the industry (IATA 2017; Pratap 2016).

The findings reveal the industry's significant contribution to the local economy through air transport. This finding concurs with previous research, namely, that the local aviation industry showed an annual contribution of as significant as 3.5% to the local GDP over the past decade (IATA 2011, 2017). The findings also alluded to the future increased economic contribution resulting from prospective growth opportunities and reinforce research forecasting a growth rate of between 4.3% and 5.2% per annum over the next two decades, resulting in a 100% increase in GDP contribution at the end of this period (Industry High Level Group 2017).

Because the aviation is generally a dollar-based industry, fluctuations in the exchange rate and commodity prices have a significant impact on operating costs (Brunvatne 2013; Mhlanga 2018b; Wittmer & Bieger 2011). An inverse to the threat that economic recessions have on the industry, participants observed that favourable economic fluctuations in the macro-environment provide benefits and opportunities to the aviation industry. Research shows that such fluctuations have a 31% effect on operational cost (Eller & Moreira 2014; IATA 2015 in Mhlanga & Steyn 2017), and participants agreed with previous research (Mhlanga 2018b) that the surge in operating cost is often transferred to the consumer through increased service prices, which result in a declining demand for services.

Adding to the economic vulnerability of the industry, previous research has indicated that these fluctuations cannot be accurately forecasted (Brunvatne 2013; Mhlanga & Steyn 2017), but participants stated that the operating trends in Europe and the United States of America usually present themselves in the local market, about 12–18 months later. The primary data revealed the continuous interchange between cyclic economic activity and growth patterns in the industry, which mirrored the research findings by Itani et al. (2014), indicating an equal and cyclic dependence between the economic environment and the aviation industry.

## Sociocultural factors

Participants revealed agreement with Le Cordeur (2017) and Whitfield (2018) that society's trust in an organisation upholds the demand for services and reinforced the notion that a mutually beneficial relationship exists between the sociocultural environment and the aviation industry's efficient provision of connectivity through air travel (Industry High Level Group 2017; Pratap 2016).

Participants concurred with previous research findings supporting the aviation industry's contribution to sociocultural value through transport of goods, healthcare services and associated resources, search and rescue operations, and humanitarian relief (Industry High level Group 2017). This study found that the aviation industry becomes an alliance for the safety and livelihood of society and its indirect customers. By aligning with research on changing consumer behaviour advocating the necessity for strategic attention to the changing attitudes and interests

globally (De Juniac 2017; Gill 2016), participants described a new generation of consumers (millennial consumers) who consider environmentally friendly travel options and a preference for technological connectivity.

Participants reinforced research by Lockwood (2015), which indicates inadequate consideration imparted to the socio-technical nature of the industry and the volume and diversity of skills required to mitigate the critical skills shortage in the South African aviation industry, and added that skills development programmes seem to focus on pilots, and place insufficient emphasis on other critical skills such as aircraft maintenance engineers, air traffic controllers and supportive functions. Likewise, Smith (2019a) reported an imbalance in the age of specialist workforce of aviation industry, and as such, skills remain confined within an age group exceeding 40 years. Although the SACAA (2017) reported significant progress in the development of skills in spite of the concerns raised by previous researchers (Amankwah-Amoah 2018; Kraemer-Mbula 2008; Njoya 2016; Smith 2019b; Wensveen 2018), participants indicated the disconnect between the demand and development of a skilled workforce in the South African aviation industry.

### Technological factors

Participants agreed with previous research findings that technological developments can render existing materials, services, practices obsolete or undesirable (Industry High Level Group 2017). In contrast, primary and secondary data revealed that technological breakthroughs can result in desired effects such as reduced production cost, reduced operational cost, reduced operational and production time, and improved consumer experience (Sammut-Bonnici & Galea 2015), thus driving change for both the global aviation industry and its consumers, in spite of embedded perils (Gill 2016; Schmidt 2017). Participants concurred and added that the rate of technological advancements requires continuous reconfiguration of existing practices and introduction of renewed technology. The embedded cybersecurity risk as a peril to disruptive information technology advancements that facilitate the development of autonomous electronic systems in the aviation industry emerged as a concern in the primary data and aligns with the previous research (De Juniac 2017).

Participants indicated agreement with previous research advocating high modification and embodiments costs, as the ageing African fleet rarely incorporates technological design facets for reducing aircraft noise and engine emissions (Eller & Moreira 2014; Wensveen 2018). However, participants alluded to additional operational procedures that can be implemented to reduce noise levels. Although such operating procedures and limitations are in place to mitigate noise levels, it delays the operation and consequentially increases operational and consumer costs.

In spite of the industry's pioneering role in the advancement and utilisation of progressive technology, research reveals inadequate development of intangible technology such as

new knowledge, new operational practices and improved methods (Amankwah-Amoah 2018; De Juniac 2017; Gill 2016; Kraemer-Mbula 2008; Potgieter 2014). The primary data in this study corresponded with the aforementioned notion, but participants further argued that the development of renewed practices and methods is often stifled by complacency, enforcement of habitual practices by supervisory personnel and inadequate review and analysis of established methods and procedures.

The participant's viewpoint of lack of commitment towards technological development may result from the national research and development strategy's stance to group together research and development associated with both passenger air travel and space (Department of Transport 2017). Previous research conducted by IATA (2017), Kraemer-Mbula (2008) and Mabotja et al. (2019) resonated with the research findings' advocacy for increased commitment, policy development and application of coordinated programmes supporting technological development in South Africa's aviation industry.

### Legal factors

Participants highlighted that the legal environment includes supranational legal authorities and conventions to which a local government subscribes to and which is initiated from a political standpoint (Bristoll 2013; Mhlanga 2018a; Misiura 2015; Pratap 2016). Research reveals that the supranational network of standardised operational practices as governed by the ICAO facilitates equal economic growth opportunity over and above the function to standardise best practices across borders (Sønderby 2015).

Although each sovereign state affiliated to ICAO may develop specific governing requirements (Tjørhom 2010), participants argue that the political influence on regulatory development in South Africa tends to disregard specific regulatory needs of the local industry in favour of mechanical adoption of all ICAO governing requirements in spite of the Department of Transport's (2017) acknowledgements that situations necessitating the development of independent governing requirements include consideration of the local environment, the industry's composition, and the capability to achieve an equivalent standard through alternative processes. The findings revealed that disregard for the industry's specific regulatory needs and ICAO's allowance for justified deviations result in impractical regulations and unnecessary bureaucracy. Participants furthermore strengthened previous research reported by Mabotja et al. (2019), indicating the enforcement of unnecessary and impractical regulations to advance the international standing of South African governing bodies in the aviation industry.

Although the legal environment has historically focused purely on legislative requirements, research suggests a recent evolution towards an underlying focus on reliable organisational systems and control mechanisms promoting compliance to legislation, instead of the compliance itself

(Sønderby 2015; Tjørhom 2015). The primary data from this research indicated that the safety, reliability and legal compliance of an organisation emerge as by-products of robust organisational control systems, and thus support the aforementioned findings.

Tjørhom (2015) further argued that the traditional top-down approach to regulation and enforcement is considered outdated, as it lacks consideration of modern-day complexities or an endeavour for inclusivity. Although participants highlighted the necessity for cooperative inclusivity, its absence in the local context emerged from primary data and contradicts the Department of Transport's (2017) proclamation of inclusivity in the rulemaking process to promote safety, reliability, sustainable and affordable air travel services, and to remain globally competitive in an environment-friendly manner. Although the policy (Department of Transport 2017) mentions the engagement with other organs of the state and entities in the industry to achieve inclusivity in the rulemaking process, participants alluded to inadequate and ineffective consultation resulting in development of redundant, unrealistic and draconian regulation, and that this autocratic approach refutes engagement and consultation in favour of underlying political determination.

As a result of ineffective and biased consultation, research participants and extant texts (Mabotja et al. 2019; Mhlanga & Steyn 2017) claim the implementation of impractical and unnecessary legislation's adverse effects on the industry. In addition, research reveals an intensification of local aviation-specific laws over the past decade (Mabotja et al. 2019; Mhlanga & Steyn 2017). Participants reinforced such research and highlighted that the development of these stringent regulations appears to lack constituent motivation, resulting in the South African aviation industry being unnecessarily overregulated.

Similar to the research conducted by Mabotja et al. (2019), participants argued that the inflexible approach to regulatory development without consideration of socio-technical complexities and the specific local operating environment riddled with technical errors includes incorrect cross-references and poses contradictions between different constructs within the regulations.

This study identified alignment between previous research (Mabotja et al. 2019) and the research participants, revealing inadequate professionalism, skill set and qualification within local governing bodies. Participants argued that the aforementioned results in a skill set imbalance, as the organs of state where inferior qualification and experience were identified, is charged with the responsibility to monitor and enforce regulatory compliance on entities with superior qualification and experience. Although reports from governing bodies claim the opposite (SACAA 2016), the primary data reveal that this irregular distribution of qualification and experience results in an inefficient governance system with a unilateral approach to administration, oversight and enforcement.

## Ecological factors

Participants acknowledged that the coordinated approach from local governing bodies effectively implemented environmental protection principles and control schemes, thereby reinforcing previous research claiming that South African governmental institutions pioneered the implementation thereof in the context of African civil aviation (Njoya 2016). As these control schemes include monitoring of the environmental impact of aviation operations, long-term reduction of the impact through optimising innovation in engineering and operational practices, as well as the execution of taxation (De Juniac 2017), participants warned that increased taxes could result in inflated consumer costs. This suggestion aligns with postulations on the local and global context by Mhlanga and Steyn (2017) and Maurice and Burleson (2012) respectively.

Although previous research reveals an inconsequential level of carbon emissions from the aviation industry in comparison to other modes of transport (Gill 2016), participants highlighted the omnipresent pressure from governing bodies, populist activist groups and the media to reduce carbon emissions intensified by a misrepresentation of the extent to which air travel contributes to carbon emissions in comparison to other modes of transport. As research shows, the global aviation industry's total contribution to human-induced carbon emissions equates to 2% annually (Air Transport Action Group 2019), participants indicated that such calls on the public to distance themselves from air transport seems counterproductive. In spite of the industry's insignificant contribution to total human-induced carbon dioxide emissions worldwide (Air Transport Action Group 2019), multiple initiatives to reduce the impact further through engineering and design innovations, offset schemes, technological development and establishment of operational procedures are in place (De Juniac 2017). Participants noted an increased interest from long-term contractual customers on a supplier's environmental protection approach through offsetting schemes.

Research indicates that climatic and environmental conditions such as weather phenomena, natural disasters and ecological incidences have a significant impact on the operations of aircraft (Passenier 2018). However, this differs between geographical regions and could include expected seasonal conditions (humidity, snow etc.) as well as unexpected occurrences such as volcanic eruptions and severe wind and rainstorms (Rizetto 2017; Wittmer & Bieger 2011). The findings of this study revealed that the local context is not as significantly impacted on by climatic conditions as in the northern hemisphere, where volcanic eruptions or extreme seasonal cold and snow disrupt air travel. The notion that local climatic conditions influencing the operation of aircraft is limited to reduced payloads at high temperatures, isolated corrosive effects of humidity and operating restrictions during inclement weather conditions emerged from the data. In spite of favourable climatic conditions in the local context, participants revealed that climatic conditions associated with foreign operations require



consideration of aircraft systems and equipment, crew training and experience, and infrastructure support.

Dillman (2019) argues that tourist offerings in the South African ecological environment demand the operation of smaller aircraft into remote areas such as game lodges. Participants posited that this type of air service is specific to the African region and necessitates specialised legislation and operating procedures to protect wildlife. Participants revealed that the geographical location of the South African aviation context reduces the probability of establishing a hub of connectivity, as it is geographically removed from major global areas of interest. Similarly, the absence of neighbouring countries on the oceanic edges of South Africa reduces the probable target market.

## Key findings

This study identified the advantageous impact of favourable interstate relationships on South Africa's aviation industry, but revealed the concerning perspective that lack of good governance, corruption and bureaucracy are omnipresent in the South African political environment and impact the industry negatively. Political policy also lacks effective skills development initiatives to address the diversity and rapid rate of change in South Africa's aviation industry.

Similar to the worldwide context, the South African aviation industry is highly competitive, characterised by high operating costs and low profit margins, thus sensitive to economic volatility. The industry provides a platform of economic development for other industries as the supply and demand for its services is influenced by the nature of the economic environment. However, the industry showed a notable contribution to the local economy and presents growth opportunities in spite of current economic turmoil. Although volatility in the economic environment cannot be accurately forecasted and impacts the industry's economic contribution significantly, this study revealed that operational patterns from Europe and the United States of America manifest 12–18 months afterwards in the South African context.

As the aviation industry provides sociocultural value through connectivity between cultures and regions, humanitarian relief and specialist operations, such as medical evacuations, society's perception of an organisation influences consumer behaviour. An exodus of critical skills, the ageing workforce and lack of skills development initiatives pose a sociocultural risk to the aviation industry and reveal the necessity for increasing governmental policy interventions.

Technological advancements drive change for both the consumer and the industry. Although advancements in design and manufacturing technology yield a reduction of aircraft noise and carbon emissions, such technology is rarely embodied in the ageing African fleet and requires costly modifications. The rapid change in technology also brings with it implementation costs, lack of specialist skills, lack of advancements in intangible technology, and cybersecurity.

Although the complexity and stringency in aviation regulations have increased over the past decade, this study found that impractical, unnecessary and draconian regulations developed from unilateral consultations, underlying political agendas and inadequate consideration to the South African operating environment, have negatively impacted the industry. An inflexible and subjective approach to the interpretation and enforcement of regulations because of limited skills, experience and competency amongst aviation authorities was identified. This study revealed a shift in the focus from legislative compliance to the nature of organisational control systems with compliance as a by-product.

Although the South African ecological environment has seasonal weather conditions conducive to aircraft operations, international operations into geographical regions where severe weather patterns are observed, require increased planning in terms of infrastructure support, crew competency and aircraft performance. Although South Africa's geographic location implies market segregation, unique tourism opportunities are available within the region, thereby stimulating a unique operating environment not supported by legislative framework. The nature of aircraft operations impacts the ecological environment through aircraft noise and carbon emissions. Although these emissions are inconsequential compared to other industries, the industry showed favourable reductions through design and manufacturing protocols and operating procedures.

## Strengths and limitations

This study expanded the scope of previous research by including non-scheduled commercial aviation operations into contextual placement to provide a holistic outcome on how the macro-environment influences all South African commercial flight operations. Although participants recruited from the industry have increased knowledge and experience on the research topic, this study also considered the perception of collective stakeholder group, thereby not limiting it to the perceptions of industry participants only. Despite continuous efforts to recruit five participants from the governance stakeholder stratum, only three contributed to the data collected from this category. In turn, participants from the commercial and security stakeholder strata exceeded the intended sample size.

## Implications and recommendations

The macro-environment's diverse and significant impact on the South African aviation industry adds to the competitive nature of the industry. Although the macro-environment remains uncontrollable for industry participants, organisations should continuously monitor the external environment to evaluate its current and prospective impact on sustainability and growth.

The key findings of this study suggest the necessity for governmental intervention and policy to eradicate corruption, decrease bureaucracy in regulatory development and enforcement, address the industry's diverse skills development requirements and promote tangible and intangible

technological development through collaborative engagement between stakeholder.

This study revealed the necessity for sectoral policy and regulatory development to recognise diversity in the type of service delivery, operating conditions and technical operating standards associated with commercial flight operations to develop unbiased legislation equally conducive to the different types of commercial air services authorised in South Africa.

Given the aviation industry's role to facilitate economic development in other industries such as trade and tourism, increased cooperation is recommended between sectoral bodies as well as between the industry and governance entities. Through such initiatives, diversity in the South African aviation industry could be utilised to strengthen strategic alliances throughout the short-, medium and long-term economic supply chain.

Future research opportunities exist in the isolation of PESTLE framework for in-depth understanding of how each of these dimensions impacts the South African aviation industry.

## Conclusion

This study indicates alignment between previous research on the macro-environment's influence on the airline industry in South Africa and such influences on the non-scheduled aviation industry. The macro-environment continuously changes, and each dimension of the PESTLE framework presents opportunities and challenges of various intensities to the aviation industry. However, this study has revealed increasing complexity in the legal environment with inadequate consideration to the nature of the South African operating environment.

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## Competing interests

The authors have declared that no competing interests exist.

## Authors' contributions

The article was drafted from the PhD thesis of E.S., whose thesis was supervised by K.G. All authors contributed equally to this work.

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## Data availability statement

Data sharing is not applicable to this article as no new data were created or analysed in this study.

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