

**Digitalisation, AI and the Human Factor - Looking Forward for Africa with a  
Focus on Souther Africa**

Presented by AASA



Digitalisation, Artificial Intelligence (AI) and the Fourth Industrial Revolution (4IR) are the current buzzwords of business and the focus of most industries to develop better products and services, improve productivity, safety levels as well as implement more efficient environmental and economic capacities. This is very much the case for the aviation sector at this time. But some of these concepts are not that new. As far back as the mid 1940's, American Airlines began experimenting with an automated reservation system culminating in the first Central Reservation System (CRS) introduced by SABRE for American Airlines in 1963. This is probably one of the first examples of AI to be implemented in the aviation industry.

In terms of passenger services, a significant development was IATA's 2004 launch of Simplifying the Business initiative which led to the introduction of digital e-tickets to replace paper tickets, bar coded boarding passes, self-service products (including the introduction of common use self-service kiosks), RFID, automation of cargo and additional Fast Travel products to facilitate a seamless journey for the passenger. Since then, the development of new technologies such as biometrics has accelerated as each organization tries to differentiate their product offering to their customers and create that all important competitive advantage. In addition, these technologies have been adopted by Government Agencies to improve their safety and security controls on the passengers moving through their borders.

As noted above, digitalisation technology and its automation systems have been in the aviation industry since the middle of the 20<sup>th</sup> Century. This is now helping to drive AI development. AI has many definitions, but for the purposes of this discussion Accenture Research provides a relevant interpretation as follows : "AI is the collection of multiple technologies that allow machines to detect, understand, act and learn either on their own or to augment human activities". It is effectively a machine driven by an algorithm to solve specific problems that have traditionally been dealt with by humans, and possibly perform better than humans. Its relevance is that commercial aviation is a service delivery business with multiple customers with multiple needs and requirements that need to be satisfied. The big challenge is to find even better ways to achieve improvements in efficiencies and productivity, and satisfy growing customer expectations. Being able to predict customer behaviour could provide a distinct advantage to airlines, airports and service providers.

In the aviation industry, applications incorporating AI and digitalisation include revenue management, on line or mobile check-in, identification of passengers, with the use of biometrics to enhance innovation at several phases of the passenger's journey, assistance to passengers to deal with resolution of their travel problems at airports with real time provision of information on flight updates, changes, delays and baggage management. AI technology is also being introduced in the maintenance field to predict possible failure of parts, and incorporating this into the maintenance planning schedule. In the flight operations and air traffic control fields, manuals are now available on computers and electronic flight bags, control towers are becoming strip-less, and most of the aeronautical information is exchanged through digital databases. These evolutions are all part of the general digitalisation of aviation.

With continuous technological advancement beyond current applications, AI and digitalisation have through disruptive innovation, the potential to play an even more critical role in the airline industry, revolutionize its future, impacting both airport and airline business models throughout the value chain, including how they deal with and process big data, improve and personalize the entire passenger experience, and use predictive analysis to optimize efficiencies within their operations. However, with the increased use of technology and automation, the impact on the workforce with potential threats to employment has been raised as a concern. This is particularly an issue in countries with active Labour Unions such as South Africa, and needs to be dealt with.

How do these developments impact aviation in Africa and in particular Southern Africa. Firstly IATA predicts that the over the next 20 years the global average passenger growth rate will be 4.6% per annum, with Africa's average growth rate expected to be 5.7% per annum, thereby doubling the market by 2035. Southern Africa continues to be a stable, growing and competitive market expected to match average African aviation growth. South Africa needs to urgently overcome political and economic headwinds, ensuring its GDP growth (currently at just under 1% per annum) matches the global and region's 3.5% GDP growth rate.

Africa's aviation industry is underachieving (only 3% of the current global passenger market) with much unrealized tourism potential, and has potential to reach close to or even exceed double digit growth over the next few years if strategies dealing with challenges confronting African aviation and ensuring sustainable growth into the future are put in place. More passengers bring higher expectations and technology can help to meet those demands. The growth enablers would include improved airspace and airport infrastructure and advanced technologies to meet the demand of increased passengers for access to new technology and facilities, and ensure safe and secure operations.

These must include AI and digitalisation. Throughout Africa, the development of ICT must be prioritized to keep pace with developed countries to improve business performance in all fields including aviation and tourism. Incorporating digitalisation would have the impact of increasing productivity, growing per capital income and raising GDP growth.

As the African and Southern African market grows, passengers who travel internationally, want and expect to enjoy experiences similar to those in other developed countries. This includes all the airline and airport digitalized fast travel / self-service / automated offerings to ensure a smooth incident free path from the time of making a flight reservation to boarding the flight. Most Southern African airlines have introduced on line and mobile applications, and common use self-service options including kiosks, bag drop and self-boarding have been introduced at many airports across Africa.

However, further work is required to fully benefit from current new technology available, including the use of biometrics, particularly to facilitate a secure path through security and immigration processes. The ability to provide access to such facilities is impacted largely by cost constraints. There is limited Government funding available, access to finance is difficult, and user charges are in general currently high and a burden to the passengers. Unfortunately, in addition, challenges being experienced by airlines have largely kept airlines away from investing in new technologies. Notwithstanding, it is important to do the necessary research and benchmark with developed airports to capitalize on new opportunities and compete effectively with global airlines. The more technology that passengers use, the higher the satisfaction rate will be.

Digitalisation and AI technologies are technical enablers for the development of new functions and services, to improve the level of safety, the environmental and economic efficiency, and the capacity in aviation. Yet, for these innovations to become operational, collaboration between ICAO, States and industry is required, in order to setup the adequate frameworks for training, certification, qualification, operations and data sharing. This must be done through the amendment of ICAO Standards and Recommended Practices (SARPS) or the formulation of new SARPS required to regulate new technologies and systems.

The aviation industry is very effectively regulated through the ICAO SARPS as incorporated into State legislation and regulations. However, as was evident at the 39<sup>th</sup> ICAO Assembly held in Montreal in September and October 2019, the development of new SARPS is a lengthy process due to the need for comprehensive consultation across all ICAO member States through the various ICAO panels and working committees. The lack of regulation could hinder the ability to implement new initiatives and systems in the interest of the industry.

From the many papers considered at the Assembly, it is also evident that much work needs to be undertaken by specialist groups to understand what is behind the implementation of new technology and the development of SARPS (and thereafter regulations) to be able to effectively regulate these new systems. However, this must be done without burdening the operators and users, to the extent that such systems become economically unviable. Examples of this impacting the advancement of AI and digitalisation technologies would include RPAS (including drones), resolving airspace utilization by both commercial aviation and RPAS, cyber security and risk based assessment of security concerns.

IATA is responsible for translating many of these SARPS into processes, procedures and best practice for implementation by the airlines. The time taken to formulate and reach agreement on these systems can also be extremely lengthy. An example of this is the implementation of NDC which went through an extremely lengthy consultation phase before full acceptance by aviation and related industries.

From a leadership perspective, it is important to identify experts in the field to lead the processes, even if it means bringing in external consultants to assist ICAO and IATA where they may not have the expertise. Sometimes, one gets the impression that leaders on new initiatives do not carry sufficient background or knowledge on the new projects and they require time to research the new technology and gain an understanding of the requirements to effectively regulate. I believe this could be true for regulation of RPAS and the new and challenging area of cyber security, where developers of the new technology could be requested to assist in drafting regulation. This would continue under the supervision of ICAO and IATA as appropriate.

Policies and regulations which need to be instituted, altered or removed to ensure successful implementation of digitalisation and AI in aviation, are probably self-evident. However, as noted above, it requires experts to lead and drive the process. From a human involvement and development process, it is considered that as the technology evolves and is introduced, and as the business determines targets and goals it wishes to achieve, it will incorporate additional performance based targets and goals.

In respect of the human resource impact from AI and digitalisation, a lot has been said about the negative impact of new technological development and automation on job sustainability. There is no doubt that job descriptions will evolve and new jobs will be created as new technology and systems are developed incorporating AI and digitalisation. This situation is probably true in most

industries, not only aviation. While digitalisation and AI development will certainly disrupt the work environment, with the right strategies in place, it should create more jobs than it removes.

These new developments provide a huge opportunity for upskilling employees and preparing them potentially for new roles and challenges, in particular in the technological field. Without job growth in this area, the increasing demand will not be satisfied and this in turn could lead to a shortage of skills. If there is growth of aviation, more jobs will become available. Customer service is the differentiator in the airline business and many positions could evolve into attending to the needs of customers as they get used to new technology and systems. There will be new opportunities and staff who are prepared to adapt and be part of an exciting innovative time in the airline industry, should easily be accommodated.

AI and digitalisation is a game changer in the world and very importantly in the aviation industry. In an IATA 2018 report, it was said that "The airline industry appears to react to new technology rather than lead the way. Disruption to existing airline models may come from energy breakthroughs, alternative modes of transport, big data and data transparency, new manufacturing tools, and quantum computing." This is changing but the airline industry needs to ensure that it leads with new technology and adapts to new initiatives. If not, other disruptive innovators will no doubt develop alternatives that will meet specific customer needs and potentially replace certain traditional airline products. Aviation needs to still remain a functional but also pleasurable experience. It remains the most efficient means to travel large distances in a relatively short space of time. The industry, both globally and throughout Africa, must embrace the new technology wholeheartedly to ensure it remains competitive and continues to meet and surpass the expectations of its customers.

- END -