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Digital Leadership in Aviation Perception of Leaders Driving Technology Adaptation

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ABSTRACT

The aviation sector is examples of such an industry operating on a road towards digital transformation with the latest innovations of AI and Cloud and Biometric system. Leadership has been an important component of change that can help drive an organization to success with technology adaptation in such an environment. This paper emphasizes on the role digital leadership plays on technology adoption in aviation sector and how it forms a bridge of mediation between leader's perceptions. Quantitative research methodology was followed with the help of a structured questionnaire in order to gather information about the professionals, who worked in the aviation industry. The results show that the technology adaptation is influenced by digital leadership with a positive and strong influence. Results also show that the digital leadership is significant towards the leader perception of the emerging technologies. Furthermore, a positive perception of the leader was another factor that positively influenced the adaptation of the technology. The mediation analysis provided that leader perception mediates the correlation between digital leadership and technology adaptation partially, which suggests that the digital leadership has a direct and indirect impact on technology adaptation through perception of the leader. These findings highlight the importance not only of the technological infrastructure in technological transformation but also of the leadership competences and of cognitive perceptions. The results of these findings can be very beneficial for the aviation industry managers, policymakers and other stakeholders who are interested in better understanding about the technology adoption and organizations' performance.

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Introduction

Today, aviation is in the midst of an industry-wide systemic shift toward more complex digital ecosystems – be they in the passenger experience, with biometric technology that processes and verifies travelers' identities or in the air traffic management business, where Artificial Intelligence (AI) enables an even smoother sky. Today the aviation industry is in the midst of an industry-wide systemic shift toward more complex digital ecosystems, ranging from biometric technology that processes and verifies passengers' identities or AI in air traffic management for an even smoother sky. Digital leadership here is considered a strategic competency of the aviation executives to lead the organization in an environment where technology constantly evolves and to ensure that the culture of the organisation values and promotes digital competence and innovation (Hensellek & Simon, 2020). In aviation, a regulated and safety-conscious profession, the "look" of leadership is the basic cognitive sieve that new technologies must successfully pass before determining how operationally practical they are and how well they will yield an ROI. To lead the way towards "Aviation 4.0", leaders need a specific mind-set that is digital and at the same time understands the safety requirements inherent in aviation. The studies imply that aviation leaders who view digital technologies as critical keys to running their operation more effectively and positively impact passengers' experiences are much more likely to overcome these structural and financial hurdles when it comes to large-scale technology adoption (Vial, 2019). Conversely, if the leadership's view of the situation is based on a fear of "digital failure" or a lack of understanding of the intricacies of being digital, then the organization could end up facing the risk of falling into "digital silos" that scatter innovation, and uptake remains stagnant.

Leaders who view these changes as a chance to improve transparency, and safety practices are more likely to help their employees navigate the complexities of the digital age. The aviation industry increasingly relies on data to understand what needs to be done to maintain its aircraft and what technologies it can use to operate, and the leader is a digital orchestrator who coordinates human resources with the available capabilities (Ibrahim et al., 2025; Aziz et al., 2025). Therefore, an empirical study exploring the details of leader perceptions is imperative to developing an understanding of how such perceptions can either help or hinder the technology adaptation in the ever more digitalized world of aviation.

It's an expectation in the aviation industry – not just for the sophisticated, tech-forward digital solutions but for AI-powered predictive maintenance and biometric passenger handling. Based on current literature, the successful implementation of these innovations may also rely on the ability of the leader as a strategic change agent to move beyond simply overseeing it to creating a setting of digital fluency (Karimi & Walter, 2015). That's what the transformation means, there's a two-sided part of the leader's role in the safety critical industry: The managerial side where he/she has to deal with the complexities of the aviation industry and the other side is to deal with the psychological stress and resistance that comes with the rapid technological change. (Roman et al., 2019).

Rudolf led how decision makers' perceptions of positive internal technology evaluation are indeed the key drivers of systemic adaptation, based on evidence-based reflections. Executives who consider digital tools strategic enablers describe their organization as being more agile and competitive against other players, and report that measurable results can be shown. (Solberg et al., 2020). The gap between perception and reality can result in digital initiatives that fail to take root: massive investments in digital projects with no cultural and structural change and support to bring efficiency benefits to the fore. In aviation management the implications are obvious and interventions need to be combined with their efforts to build digital competencies and a leader's perception to ensure that the 'human cockpit' of the organization is as technologically advanced as the 'metal cockpit' of the devices in operation (Fitzgerald et al., 2013).

The aviation industry is in the midst of a digital revolution with prolific use of latest technological advancements including Artificial Intelligence (AI), cloud computing, biometric systems, predictive maintenance, block chain systems and data-driven operational platforms. These technologies are increasingly being adopted in the quest to enhance the experience, enhance efficiency, improve the organization's agility, and boost the safety standards in airports and in airlines (Vial, 2019). Significant investments have been made in digital infrastructure but many aviation organizations are still struggling to adopt and embed the technologies within their operating systems.

However, a significant challenge that lies in this transformation process is not just all the technical jargon - it is the actual leadership essential to digital change. In aviation, but possibly in other sectors, the first responders, as leaders, play a major role in the perception of new technologies as opportunities or risks during operations. (Zeike et al., 2019).

Although there have been independent studies regarding digital leadership and technology adaptation, there has been a dearth of research that has looked at the mediating effect of leader perception between digital leadership and technology adaptation in aviation organizations (Sow & Aborbie, 2018). Given this research gap, the purpose of this study was to fill the void by exploring the relationship between digital leadership and technology adaptation, and determine if there was a mediating effect of leader perception in this relationship in the aviation industry. The aim of the study is to provide theses and hypotheses with empirical information to demonstrate the impact of competences of leaders, psychological evaluation, and together on digital transformation in aviation contexts.

This research aims to specifically investigate: How digital leadership affects the effective adoption of technology in the aviation industry and how is this mediated through leader perception? The study aims to explore these dynamics to gain an appreciation of the mental models that aviation executives have, and how they can enable or hinder the integration of new, disruptive digital systems.

The link between these constructs is based on the assumption that the digital transformation is a multi-level process which starts at leadership skills. The first is digital leadership, the foundation from which the vision for the aviation organization is guided and the technical prowess and literacy is gained to navigate through the complicated course of change. (Al-Romeedy, 2024). They shape the leader's attitude in the usefulness of the technology and how easy or difficult it will be to implement. This psychological evaluation is a gatekeeper or mediator, in that the leader's skills influence the internal evaluation, high e-competencies leading to a decreased sense of effort to move through and a higher sense of getting better in the process. (Roman et al., 2019).

The main theories of the study are the demand to adapt existing models of leadership and adoption of technology in the realm of high-risk and regulated industries. The Unified Theory of Acceptance and Use of Technology (UTAUT) and Digital Leadership have been established in the general business environment but there are only limited adaptations of the two theories when applied to understand the psychological mechanisms of "Aviation 4.0". In this way, the author's research can have value for organizational behavior demonstrating how capable the leader is does not guarantee outcomes but must be mediated through the cognitive evaluations of the decision-maker; thus providing a link in the organization that is vital for determining the outcome of the decision-making process. This contributes to the theory of individual cognition's role in systemic technology adaptability in contexts where safe, reliable operations are key to success. (Ahammad et al., 2021).

On a pragmatic level, the aviation industry is dealt a problem in that there is a huge capital investment in digital innovation, while not delivering a complete turnkey way of operating. This study tackles this implementation gap by pinpointing the factors that hamper or support this transition from legacy systems to advanced digital ecosystems and how this maps to executives' mental models and attitudes.

Literature Review

Digital technologies have evolved into the aviation operating environment at a very fast pace. As the aviation industry grows more digital, artificial intelligence, predictive analytics, cloud-based systems, biometric security and advanced passenger automated technology are essential components of the digital ecosystems that modern aviation relies on to achieve better performance, effectiveness, and safety standards and enhance passenger experience (Hussein et al., 2024). With the advent of the 21st-Century and its technologically driven environment, the need to adopt a new form of leadership has grown ever more significant. Digital leaders should have strategic agility, technological skills, innovation and change management capabilities to navigate organizations through a constant wave of technological disruption (Larjovuori et al., 2018). Literature has indicated that having a digital leader within the organization supports a culture for innovation, acceptance of technology, and adaptable behavior towards new digital systems (Cortellazzo et al., 2019).

The literature also indicates that Digital leadership and Leader perception are inter-related constructs that impact each other in the process of technology adaptations. Highly digitally literate and visionary leaders tend to feel it is easier to envision the positive impacts granted by digital technologies, to use these technologies within the organization, and to leverage them strategically for the organizations growth (Kokot et al., 2021). This literature review examines critically the research and theoretical evidence underpinning the constructs to support the conceptual basis of the proposed research framework.

The Unified Theory of Acceptance and Use of Technology (UTAUT) of "Venkatesh" is the main theoretical basis of this study. UTAUT model provides the understanding of the behavioral intention to adopt and use a new technology. The theory dictates that there are four major determinants affecting technology acceptance including performance expectancy, effort expectancy, social influence and facilitating conditions, which in the context of the theory is shown to result in a good model for understanding how awe of aviation leaders to the emerging technologies affect their technology acceptance and adaptation. Performance expectancy is how much leaders perceive the potential benefit of using digital technologies in their organizations to make them more efficient, effective and to better make decisions. Effort expectancy is the ease of use to implement and use the digital systems (Venkatesh et al., 2003). These perceptions are especially significant within aviation organizations, as digital technologies typically entail operations with safety or security implications, as well as significant economic investment. Leaders that believe that digital systems will be helpful and controllable tend to support the innovation and organizational change brought by digital systems.

Digital leadership, which started as the traditional management concepts, has now become a new specialized approach brought about by the 4th Industrial Revolution. It's a strategic asset for them that allows them to organize digital assets, including AI solutions in logistics and biometrics, and generate institutional value. There are three key competencies that define this kind of leadership, namely 'e-trustworthiness', 'e-change management' and 'e-tech savviness' - all of which help aviation executives overcome disruptive, changing dynamics and stay on track (Huyler & McGill, 2019). Recent research has placed a focus on digital leadership being a sensing and seizing skill (Jasim et al., 2024), digital leaders need to be proactive in identifying new technologies that will meet or exceed the rigorous security and efficiency standards of the aviation industry (Tagscherer & Carbon, 2023).

A very important aspect of the digital transition is an introspection conducted on the inside by decision makers. Drawing on the Unified Theory of Acceptance and Use of Technology

(UTAUT), we consider the perception of the leader, and the two main cognitive factors that affect it, performance expectancy (utility belief) and effort expectancy (ease to implement belief) (Davis, 1989). In aviation industry, where clocking a cost on failure is significant, these perceptions could certainly be related to technological literacy of the leader, a leader with high digital literacy is more inclined to view a complex data-analytics tool as a strategic solution rather than an 'operational turn-bug' (Solberg et al., 2020). Empirical evidence shows that it is this inner perception that serves as a crucial screening that leads to aspects of either championing a technological initiative or sticking to legacy systems (Cortellazzo et al., 2019)

At the end of the digital path, technology adaptation takes place when innovations like block chain in the supply chain, or prediction algorithms for maintenance, are completely embedded in the organization's DNA (Hensellek & Simon, 2020). Adaptation entails the level of "deep integration" at which the technology is leveraged to the max in order to enhance passengers' experience and safety measures (Kane et al., 2019). In aviation, research shows that successful adaptation involves aligning culture from the top, making some investments and providing some support. If this does not happen, there will be Digital Decay, where an investment in technology does not lead to tangible results in the agility or resilience of an organization (To & Lee, 2024).

Existing literature implies a sequential effect and pinpoints the quality of leadership as a direct determination of the cognitive medium of the organization (Karimi & Walter, 2015). Research indicates that digital leadership skills are not alone enough to influence organization outcomes but rather operate by helping to “fine-tune” the leader's perception, thus “catalyzing technology adaptation” (Avwokeni, 2024). If leaders are very digitally agile, their understanding and exposure to danger is dampened and they are more likely to perceive disruptive tools positively.

H1: Digital Leadership has a significantly and positively influences Leader Perception.

H2: Leader Perception significantly contributes towards positively Technology Adaptation.

H3: Digital Leadership has a significantly and positively influences Technology Adaptation

H4: The effect of Digital Leadership on Technology Adaptation is significant mediated by Leader Perception.

Conceptual Framework

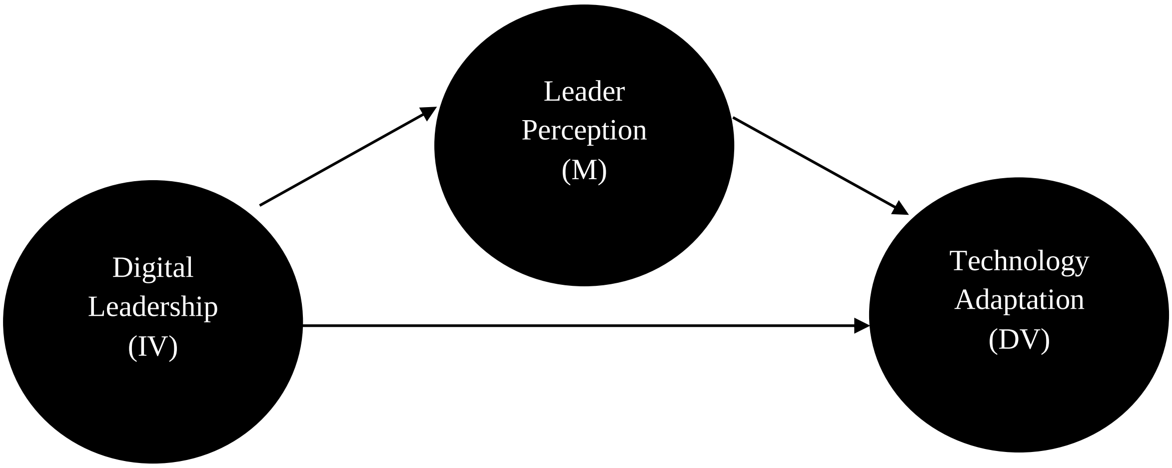


Figure 1 Conceptual Framework

Research Methodology

This study takes a Quantitative Research Methodology, which is driven by the necessity for empirical accuracy and the statistical applicability in the aviation industry. This methodology supports the scientific method that states that the phenomena of leadership and technology adoption could be observed, measured and analyzed objectively and numerically (Solberg et al., 2020). The quantification of the abstract concepts of "digital competence" and "psychological perceptions" enables the researcher to focus on the patterns of behavior that may emerge and the causal relationships that may be uncovered, but that cannot be seen when observing them qualitatively.

Population and Sample

The research context would be established in the context of the international aviation environment, with respect to entities that are active in the transition in aviation industry. The specific target market will be International Tier-1 & Tier-2 Airports, Commercial & Cargo Airlines. These are organizations that are oriented towards high reliability and have strict safety requirements, as well as having multi-generational workforces. These are a great environment for experimentation related to the perception of the leaders and the introduction of disruptive technologies like AI, Internet-of-Things (IoT) and biometric-based passenger processing. The participants involved in this environment are representatives of organizational executive management responsible for balancing safety requirements inherent in legacy systems and the need for greater technological agility. Through addressing this specific environment, the research highlights distinctive features of the business context, including safety regulations and heavy capital expenditure required for introducing innovations, distinguishing aviation from other industries (Teece, 2007).

The study environment is the commercial aviation sector targeted to decision makers and managers responsible for implementing digital innovation projects. The survey collects data about several dimensions of professional characteristics to provide a representative sample. Table 3 below describes the classification of the demographic profile of the respondents according to job roles and organizational typology.The study design is Explanatory Correlational Research Design which is suitable for testing structured relationships between constructs identified. The difference between an explanatory design and a descriptive design is that an explanatory design is designed to identify the nature of the relationship between variables (whether the effect of a change in one variable is positive or negative). In the study, the regression-based mediation method was employed to understand whether the digital leadership perception is a mediating variable between digital leadership and technology adaptation. By being cross-sectional, the design enables collection of data from aviation organizations that give a full picture of the state of the industry's digital capability. **(Preacher & Hayes, 2008)**.

Ethical Considerations

The research was conducted having considered ethical issues to ensure academic honesty as well as safety of the participants. All the respondents were briefed and provided with their consent to gather data from them. Information concerning personal identity and organization of respondents was anonymized and held in strict confidentiality. All respondents participated voluntarily and they had the freedom of withdrawing from participating in the study at any time they wanted. Besides, all the data gathered were handled with utmost confidentiality.

Data Analysis

Demographic data analysis was done descriptively with the SPSS software. The demographics of the respondents were summarized using frequencies, percentages, means and standard deviations. Additionally, model of the research was tested by using Partial Least Squares Structural Equation Modeling (PLS-SEM). This involved evaluation of structure model and measurement model to establish the analytical impacts of independent variables on digital leadership. The overall model fit was also assessed with the help of SmartPLS. Reliability analysis Cronbach's Alpha, discriminant validity and convergent validity were determined in order to examine the measurement model. In addition, the research model was tested using a partial least. The original and revised models were also investigated, the inner (structural) model was calculated to determine the R^2 values and the path coefficients and the significant testing.

Analysis and Results

Analysed collected data for the research is represented in this chapter. The analysis includes demographic analysis, research' model was examined using PLS-SEM. The data was examined using SPSS and SmartPLS. A full of **202 responses** were involved in the final analysis.

Demographic Analysis

Table 1: ***Demographic Profile of Respondents***

Category	Classification	(f)	(%)	Cumulative (%)
Job Role	Executive	48	23.8	23.8
	Senior Manager	56	27.7	51.5
	Technical Lead	52	25.7	77.2
	Operational Head	46	22.8	100.0
Experience	1-5 years	64	31.7	31.7
	6-10 years	58	28.7	60.4
	11-15 years	42	20.8	81.2
	15+ years	38	18.8	100.0
Organization type	Full-service carrier	82	40.6	40.6
	Low-cost carrier	60	29.7	70.3
	Airport Operator	60	29.7	100.0

The demographic profile showed a good sample of 202 respondents across job roles, experience levels and organization types across the aviation industry. Senior Managers made up the largest representation (27.7%), followed by Technical Leads (25.7%), Executives (23.8%) and Operational Heads (22.8%). As to experience, the majority of respondents possessed 1-5 years of professional experience (31.7%) or 6-10 years of experience (28.7%) and 18.8% had more than 15 years of experience while 20.8% had experience of 11-15 years. As to organizational affiliation, the majority of respondents (40.6%) were employed by Full-Service Carriers, with Low-Cost Carriers and Airport Operators coming in with 29.7% each.

The sample as a whole is representative of a variety of professional backgrounds, which increases the representativeness of the results of the study.

Correlation Analysis

Relationship among the variables **AH, TP, CS, and CR** was examined by correlation analysis.

Table 2: ***Correlation Matrix***

Variable	DL	LP	TA	Variable
DL	1			DL
LP	0.761	1		LP
TA	0.816	0.776	1	TA

From the correlation analysis, strong positive correlation is found between all the study variables. Digital Leadership (DL) is positively and significantly related to Learning Performance (LP) ($r = 0.761$, $p < 0.001$), meaning that as digital leadership increases so does the learning performance. Likewise, Digital Leadership is highly significantly and positively correlated with Technology Adoption (TA) ($r = 0.816$, $p < 0.001$), indicating that when leaders are effective, so is the adoption of the technology. In addition, there is a strong and positive correlation between Learning Performance and Technology Adoption ($r = 0.776$, $p < 0.001$), meaning that there is a positive relationship between the variables, and learning performance increases as technology adoption increases. The results show that the variables are statistically significant ($p < 0.001$), which provide some initial support for the hypotheses that were set forth and for meaningful relationships among the variables.

Reliability Analysis

Cronbach Alpha was used to measure the reliability. The range of values is amid 0 and 1. Score of 0.5 to 0.6 is adequate in some conditions (Kerlinger & Lee, 2011).

Table 3

Variable	NO. of items	Cronbach's Alpha
DL	4	0.853
LP	4	0.805
TA	4	0.926

The Cronbach's Alpha value for every variable is more then 0.8, representing **excellent internal consistency** and reliability of the measurement scales used in this research. This indicates that each construct's elements are quite consistent in assessing the same fundamental idea.

Convergent Validity

Researchers are attempting to explain the theoretical connections between the constructs in order to explain convergent validity. (Hair et al., 2013) It is asserted that three approaches exist for assessing convergent validity: composite reliability, factor loading (outer loading) and average variance extracted (AVE). Factor loading value shows how strong each item in a construct would be. According to (Fornell & Larcker, 1981) an item loading should not be less than 0.50 to be deemed appropriate in multivariate analysis. It is clear from the table that every item's loading is more than the 0.50 minimum permissible range. The number of items attempting to measure the underlying construct is called composite reliability (Hair et al., 2011). The suggested composite reliability value put out by (Fornell & Larcker, 1981) and (Administration et al., 2015) is 0.70. The table shows that all composite reliability scores lie between 0.75 and 0.926. The third criteria of convergent validity of the model is called average variance extracted (AVE). The recommended (Fornell & Larcker, 1981) and (Administration et al., 2015) suggest the ideal scores that AVE should take which exceed 0.50. Given that every AVE number in the table falls between 0.501 and 0.552. The model's convergent validity is supported by all of the results.

Table 4: ***Measurement Model- Convergent Validity***

VARIABLES	LOADING	C.R	AVE
DL1	0.803		
DL2	0.840	0.859	0.694
DL3	0.826		
DL4	0.861		
LP1	0.887		
LP2	0.513	0.867	0.644
LP3	0.841		
LP4	0.906		
TA1	0.908		
TA2	0.927	0.927	0.818
TA3	0.884		
TA4	0.898		

The results of convergent validity show that all constructs have well to excellent measurement characteristics. The factor loadings for this factor range between 0.513 and 0.906 with a CR of 0.867 and an AVE of 0.644, which are above the recommended values of 0.70 and 0.50 respectively and considered satisfactory convergent validity, although LP2 has a relatively low loading. The loadings of the items for Technology Adoption (TA) range from 0.884 to 0.927 with a CR of 0.927 and AVE of 0.818, indicating strong reliability and convergent validity. In general, all constructs satisfy the recommended criteria for factor loadings, indicators composite reliability and average variance extracted, indicating the measurement model has adequate convergent validity that the indicators measure their intended constructs.

Discriminant Validity

Purposed by (Hair et al., 2013), the degree to which a construct measures what it is supposed to assess. Also suggested that there are two criterias for examining discriminant validity, the preceding one is Fornell and Larcker’s criteria which is the square root of AVE of each construct.

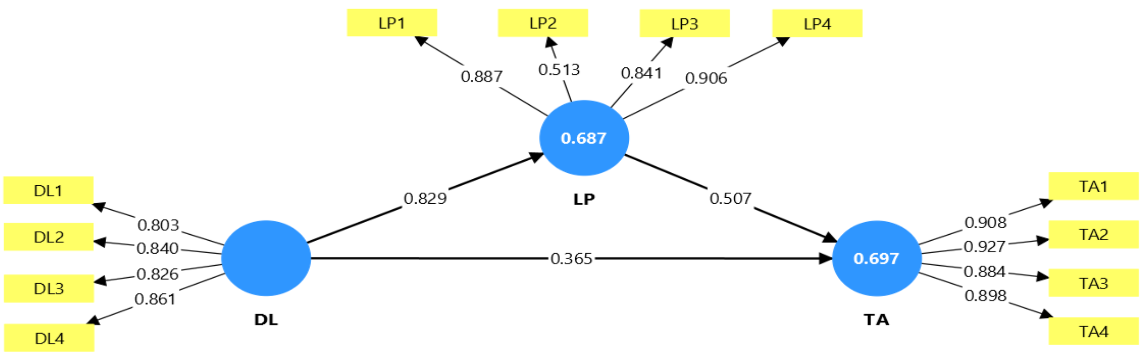
Table 5: ***Discriminant Validity Fornell - Larcker Criterion***

	DL	LP	TA
DL	0.833		
LP	0.829	0.803	
TA	0.785	0.810	0.904

Discriminant validity among the constructs in the study was tested by the Fornell–Larcker criterion. The Average Variance Extracted (AVE) square root for Digital Leadership (DL = 0.833), Learning Performance (LP = 0.803) and Technology Adoption (TA = 0.904) is shown on the diagonals of the matrix. The diagonal value must be higher than the correlations of each construct, in order to establish the discriminant validity. The results show that DL (0.833) is greater than its correlations with LP (0.829) and TA (0.785), while TA (0.904) is greater than its correlations with DL (0.785) and LP (0.810). With regard to discriminant validity, however, LP (0.803) is somewhat lower compared to DL (0.829). The results on this minor point indicate that the constructs are generally separable from each other but further testing with other indicators of discriminant validity, such as the HTMT ratio, might be warranted.

Measurement model

Originally, the research framework consisted of three main constructs: Digital Leadership, Leader Perception, and Technology Adaptation. PLS-SEM approach was used to study these constructs. Before evaluating structural relationships, the measurement model was examined through Confirmatory Factor Analysis (CFA) to examine the reliability and validity of the indicators. The figure indicates that Digital Leadership was gauged using 4 indicators (DL1 – DL4), Leader Perception using 4 indicators (LP1-LP4) and Technology Adaptation using 4 indicators (TA1-TA6).



In the process, of the CFA analysis, the low loading factors were examined, and the items whose measures could not be trusted were eliminated, to make sure that the model is valid.

Determination of R2

The coefficient of determination (R^2) values show that the model explains well the endogenous variables. The variance in Learning Performance (LP) is 68.7% explained by Digital Leadership (DL) ($R^2 = 0.687$), and the adjusted $R^2 = 0.684$ indicates that this is stable even after taking into account the complexity of the model. Digital Leadership and Learning Performance also account for 69.7% of the variance in Technology Adoption (TA) ($R^2 = 0.697$) with an adjusted R^2 of 0.691. Acceptable rules of thumb are that R^2 values greater than 0.50 are significant. Thus, the findings imply that the suggested model is capable of predicting Learning Performance and Technology Adoption and the small gap between the R^2 and adjusted R^2 values are good evidence that the model fits well with little overfitting. As illustrated in the table.

Table 6: ***R Square of Endogenous Variable***

Variables	R Square	R Square Adjusted
Leader Perception	0.687	0.684
Technology Adaptation	0.697	0.691

Path Coefficients and Significance Test

(Hair et al., 2011) states that average t values, path coefficients and significance levels are used for testing hypotheses. Standardised beta values make up the path coefficients. The signs of the coefficients are either + or - and their number is one or more. A score of +1 shows strong positive relationship; a score of -1 shows strong negative relationship (Henseler & Chin, 2010). If the hypothesized direction of the path coefficients is opposed by the signs, the hypothesis is rejected. According to (Hair et al., 2013), those empirical supported paths have the sign that is consistent with the direction of the hypothesis. Firstly, the researcher performs PLS algorithm and thereby ascertains the path coefficients and then tests the hypotheses by using bootstrapping on structural model. The degree of importance of the constructs studied and the route coefficient are presented in the table below.

Hypotheses Testing (Direct Paths)

Table 7: Path Coefficients and Significance Test

Path	P’coefficient	T values	P values
DL -> LP	0.829	19.237	0.000
DL -> TA	0.365	3.168	0.002
LP -> TA	0.507	4.051	0.000

Direct relationship results studied in this paper are presented in Table 7. These findings were gotten using the bootstrapping process in SmartPLS. The first hypothesis was that Customer The path coefficient analysis shows that all the hypothesized relationships in the model were statistically significant and positive. The findings showed that the Digital Leadership (DL) had a strong positive relationship with Learning Performance (LP) with a value of $\beta = 0.829$, $t = 19.237$ and p-value < 0.001, thus higher levels of digital leadership would significantly have a positive effect on learning performance. The digital leadership also has a positive direct effect on Technology Adoption (TA) with a coefficient of 0.365 ($t = 3.168$, $p = 0.002$), meaning that higher the digital leadership level, the higher the likelihood that organizations will adopt new technologies. Moreover, Learning Performance has a positive effect on Technology Adoption ($\beta = 0.507$, $t = 4.051$, $p<0.001$), indicating that an increase in learning performance helps to increase technology adoption. All the p-values are less than 0.05 and all the t-values are greater than 1.96, so all the hypotheses are accepted and supported. The results validate the association between Digital Leadership and Learning Performance as well as between Learning Performance and Technology Adoption, wherein Learning Performance also has a significant role in facilitating Technology Adoption.

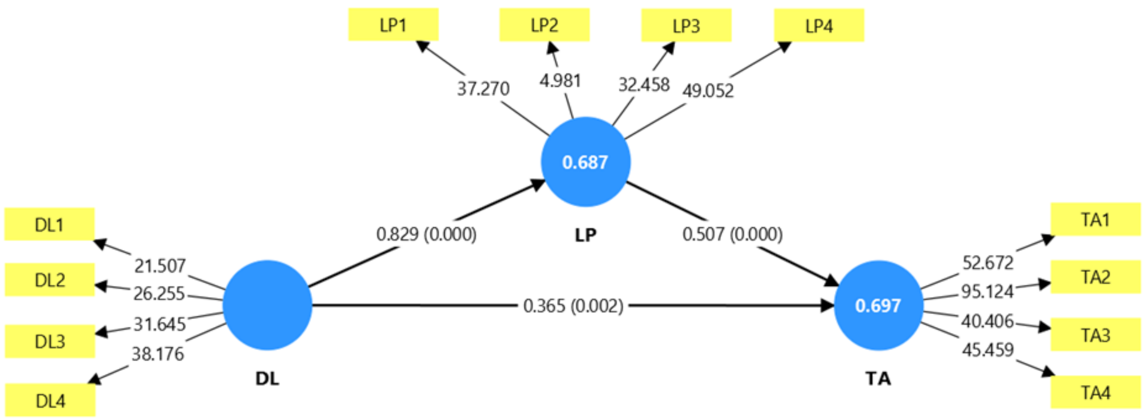
The Interaction Effects (Indirect Paths)

Table 8: ***Interaction Path Coefficients and Significance Level***

Path	Path coefficient	T value	P value
DL -> LP -> TA	0.420	4.102	0.000

The results showed that there was a significant indirect effect of DL with LP as an intermediary variable with path coefficient (β = 0.420), t = 4.102, and p = 0.000. The positive coefficient indicates that DL indirectly affects TA in a positive direction through LP; that is, an increase in DL results in an increase in LP and this increase in LP further results in an increase in TA. The t-value indicates that this relationship is statistically significant and the p-value (< 0.001) is very highly significant, meaning that the effect is not likely to have occurred by chance. It seems that overall, LP is a useful mediator between DL and TA.

Figure 3: ***Structural Model***



It demonstrates a clear and statistically significant relationship between the variables DL, LP and TA. There is a very strong positive correlation between DL and LP (β = 0.829, p < 0.001); an increase in DL also results in significant improvement in LP. The influence of LP towards TA is significant (β = 0.507, p < 0.001), which means that LP has an important role in forming TA. There is also a direct positive association between DL and TA (β = 0.365; p = 0.002), indicating a direct effect of DL on TA aside from the indirect effect through LP. This suggests that LP partially mediates between DL and TA, as both direct and indirect routes are important. The model is also very explanatory, the R2 values are 0.687 for LP and 0.697 for TA, meaning that DL accounts for a large proportion of LP and DL and LP together a substantial proportion of TA. In summary, overall, LP acts as an important mediator and DL is an important direct predictor of TA.

Discussion

In the current study influence of Digital Leadership on Technology Adaptation in aviation with the mediator variable – Leader Perception was analyzed. Chapter 4 outlined empirical testing of the proposed theoretical model by means of Hayes' PROCESS Macro. The current chapter presents a critical evaluation of the empirical findings in the context of related academic literature, theoretical framework and specifics of the aviation industry.

All of the four hypotheses put forward in the study received a strong empirical support in the form of high and significant correlations found on a sample of $N = 202$ professionals active in the aviation industry as pilots, engineers, airline executives and other professionals employed in different organizations such as aviation academies and airlines. The most important finding from the conducted analysis of the empirical data is the confirmation of partial mediation. It is clear that technological adaptation in aviation occurs neither in the form of a cognitive void nor an order by the airline executives.

Hypothesis 1, predicting Digital Leadership has a significantly positive and positive influence on Leader Perception, received a very stable, solid support from the empirical data ($B = 0.726$, $t = 16.58$, $p < 0.001$). A good correlation ($\beta = 0.827$) indicating that, with good digital leadership, a clearly communicated digital vision, forward looking strategic intent and involvement with digital architectures, the overall perception of technology by leaders fundamentally changes. Investment that have to do with cloud, the AI and the biometric intelligence are priorities for top management, which helps to diminish some of the "cognitive inertia" or "doubt" that sometimes exists with mid-level and operational management. An effective technology leader defines technology and its role, and shifts the overall culture from seeing technology as a burdensome, regulatory distraction to seeing it as a means to increase efficiency and improve customer satisfaction.5.2.2 Leader Perception and Technology Adaptation (H2)

Hypothesis 2 stated that Leader Perception has significant positive effect on Technology Adaptation. This pathway was supported by the quantitative results ($B = 0.438$, $t = 6.42$, $p < 0.001$).

While potentially mandatory compliance is an important first step to adopting a technology, actual technology adoption (such as, for example, easy integration of AI driven predictive maintenance, or biometric based passenger boarding) can't happen without a real psychological shift in the mindsets of the leadership teams that lead day to day operations. The positive empirical coefficient establishes that when the leadership perceives a high level of reliability of the technology, strategic value, and operational enabling, the leadership starts to promote their use, remove blocks in their teams, and hasten adaptation workflows.

Hypothesis 3, which stated there is a direct positive relationship between Digital Leadership and Technology Adaptation was supported ($B = 0.607, t = 9.32, p < 0.001$). When taking into account the psychological mediator (Leader Perception), the direct influence is still very dynamic. Aviation is a capital driven industry and from any digital leader's point of view, the ultimate solution is a direct need for some systems to become part of the fleet and adopted, at a speed that is driven by the culture lag. The direct relationship indicates that infrastructural empowerment and strategic clarity play a crucial role in digital transformation.

According to Hypothesis 4, Digital Leadership has a significant mediating effect on the relationship between Digital Leadership with Technology Adaptation. The bootstrapping analysis confirmed a significant indirect effect (B = 0.318$, $95% {BootCI } [0.195, 0.431]$). The direct effect ($c' = 0.607$) and indirect effect of this model occurred at the same time. This model exhibited Partial Mediation pattern.

Limitations and Future Research

Based on the findings of this study, some recommendations are proposed to aviation organizations, aviation stakeholders and future researchers. Aviation related organizations should have a digital leadership development program. The training programs are expected to consider improving digital capabilities, technological awareness and strategic decision making of the leaders in terms of emerging technologies. It is an organization's duty to foster and propagate innovations, a digital culture, and openness towards technological change. Leaders should work towards communicating the benefits of digital technologies to employees, so that resistance to their use and acceptance is overcome. At the early stages of projects that involve implementing technology, the leadership teams of aviation industries should be involved. When the leaders are aware and endorse the digital initiatives, the chances of successful technology adoption are multiplied. Organizations are urged to make efforts to improve leaders' attitudes for emerging technologies, through workshop, demonstration and pilot action. These activities can help leaders to become more familiar with the value, and the workability, of the digital tools. Future research on other factors that are likely to influence technology adoption should be explored, such as organizational culture, employee preparedness, regulatory programs, and technological frameworks. Longitudinal studies will also be able to provide deeper insights into how digital leadership will affect the technological changes in the long-term.

This study has a number of limitations which need to be considered. The study design used was the cross sectional design implying that all the data were obtained at one time. The research only identifies the relationships between the variables and does not identify the causes over the longer term. A self-reported survey data from the respondents was used as the basis of the study. Self-reported information can be also affected by the personal bias, difference in perceptions or social desirability and this can influence the accuracy of self-reported data. The sample size used in the research was 226 respondents in which 202 valid respondents, although it is enough to conduct statistical analysis, might not be as representative as to the diversity of the global aviation industry. There may also be opportunities for some regions/ organizations to be digitally more/ less mature when it comes to their leadership. The study only included three variables, which were digital leadership, perception of the leader, and technology adaptation. Other important factors such as organizational culture and financial resources, regulatory frameworks and technological infrastructure were not taken into account in the model. Finally, they broadly examined the aviation sector by avoiding any segmentation of the airlines, the airports and the aviation regulator. Because of their organizational structure, these industries could change digitally in a variety of ways.

Conclusion and Contributions

The research question investigated in this study was: How digital leadership could influence technology adoption in Aviation and the perception of the leaders acted as mediator of digital leadership and technology adoption. The study employed quantitative analysis and mediation test to confirm that digital leadership is key to technological change in the aviation organizations. The results show that digitally competent leaders tend to make successful adoption and integration of new technologies within organizations that they lead. Digital leadership improves the ability of the organization to change towards technology, by fostering innovation, strategic vision and digital competency in the management. The study reveals the importance of leader perception to the development of technology adaptation. The more positive leaders feeling about the value and viability of digital tools, the more likely they are to adopt and integrate digital tools into their working systems. The findings from the mediation indicate that the concept of the leaders exists as a medium term between the leaders' ability and implementation of the technology. From these findings, the emergence of technological change in the aviation industry seems to be not a ‘simple' technically enacted process, but a ‘led' process. It is noted that cognitive attitudes and vision of the leaders have a great impact on how the organizations are responsive to the Digital Innovations. Digital leadership and leader perception are key to enabling a successful adaptation of technology to the aviation industry. Companies that want to attain sustainable digital transformation should invest in competencies that could enhance leadership qualities that foster positive attitudes towards emerging technologies.

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