International Journal of Advanced Research in Science, Communication and Technology

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal



Volume 5, Issue 9, June 2025

Adoption of Remote Pilot Training Platforms: Technology Acceptance and Organizational Readiness

Raveendra K Wagh¹ and Dr Premalatha Packirisamy²

Research Scholar, School of Management and Labour Studies, Tata Institute of Social Sciences, Mumbai¹ Professor, School of Management and Labour Studies, Tata Institute of Social Sciences, Mumbai²

Abstract: The growing demand for unmanned aerial vehicle (UAV) pilots has accelerated remote pilot training platform (RPTP) creation. RPTPs employ online technologies to simulate flight scenarios, evaluate regulatory competency, and provide skill ratings. This conceptual framework document speaks of the application of remote pilot training platforms by integrating the Technology Acceptance Model (TAM) and theory of Organizational Readiness. It is proposed to provide a theoretical basis for explaining how technical, organizational, and human problems influence the uptake of remote pilot training systems. The primary constructs of perceived usefulness, perceived ease of use, top management support, digital infrastructure, and employees' readiness are examined to explain user acceptance and institutional readiness. The proposed model forms a foundation for future empirical research and serves as a guide for training providers, operators of drones, and policymakers to create policy that facilitates the successful integration of digital training platforms in aviation and drone training centers.

Keywords: Technology Acceptance, Remote Pilot Training, Conceptual Framework, Organizational Readiness, E-learning Adoption, Digital Training Platforms, Drone Education, Institutional Preparedness, Training Technology Integration.

I. INTRODUCTION

Implementation of remote pilot training websites, more so those that are founded on cutting-edge technologies like virtual reality (VR), augmented reality (AR), and mixed reality (MR), is rapidly transforming the landscape of aviation training. The growing complexity of unmanned aerial vehicle (UAV) missions and the need for qualified remote pilots have fueled the creation of new models of training that are efficient as well as effective. Existing innovation in simulation settings, as argued by O'Keeffe et al. (2017) in the application of Oculus Rift for training drone pilots, acknowledges the ability of immersive technologies to enhance pilot preparedness and immersion. Liu et al. (2018) and Zheng et al. (2019) also prove that simulation-based systems for UAV training are capable of simulating flight conditions in real environments with high fidelity, enhancing situation awareness and decision-making potential. AR usage in external training centers also bridged the gap between virtual simulation and reality application (Pascoal & Sofia, 2018). Nguyen and Dang (2017) also indicate the convenience of integrating AR/VR learning environments using such platforms as Unity, citing availability of the platform. Mixed reality products such as those cited by Go et al. (2020) are adaptive and interactive training solutions that cater to the requirements of numerous learning requirements and operational requirements. In support of such technologies are human factors studies such as Bolstad et al. (2010), which demonstrates that computer-based instruction can positively contribute to enhancing situational awareness of general aviation pilots.

Moreover, organizational readiness and intensive training systems enable efficient use of such technologies. Ebbage and Spencer's (2004) research and initiatives like the "Pilot Training Next" program of the American Air Force (Gonzalez, 2019) prove institutional support necessary for technology adoption. Dymora et al. (2021) and Hight et al. (2022) report empirical evidence for the effectiveness of VR training for development in piloting skills, as well as at the ab initio (novice) level. Concerning the development of remote pilot training platforms, technological adoption and

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IJARSCT

ISSN: 2581-9429



DOI: 10.48175/IJARSCT28215



International Journal of Advanced Research in Science, Communication and Technology

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 5, Issue 9, June 2025



organizational readiness are the overriding drivers of ensuring effective use and utilization of such innovation in training frameworks. The higher utilization of new technologies in training centers, particularly remote pilot training, necessitates the organization to prepare a seamless technology adoption strategy responsive to organizational preparedness and user acceptance. With virtual reality simulation capabilities, such as those presented by Nguyen and Dang (2017), being increasingly accepted as in remote pilot training, organizations need to take into account their technological preparedness and maturity. The theory of technology readiness, which was first created by Mankins (1995) and then used by Martínez-Plumed et al. (2021) for AI systems, is a model used to ascertain the level of feasibility and implementation needed in such technology.

At the organizational level, adoption decisions tend to be driven by a mix of internal strengths and external forces. Alsheibani, Cheung, and Messom (2018, 2019a) investigated AI-readiness and found a number of organizational factors-such as strategic alignment, technological infrastructure, and leadership support-that have a significant impact on the adoption process. Such findings support more integrated IT adoption research (Arpaci et al., 2012), which emphasizes organizational culture, knowledge management, and employee engagement as being key determinants of successful embedding of novel technology. Secondly, consumer acceptance theories, such as those developed by Atwal and Bryson (2021), emphasize the relevance of perceived usefulness and trust in determining behavioral intentionprotection that may also be transferred to institutional stakeholders in aviation training. And then there are the ethical and social dimensions of adopting new technologies. Developments in AI and virtual training environments do promise increased efficiency and skill acquisition (Boden, 2018), but there are ongoing concerns around privacy, displacement from employment, and who is in charge with technologies (Boyd & Holton, 2018; Bowcott, 2020). All these factors also enhance the complexity of organizational decision-making, and therefore, an extensive scrutiny by training organizations has to be undertaken of the technological capability as well as the organizational readiness of their people and systems. Therefore, the comprehension of the two-faceted nature of technology acceptance and organizational readiness becomes paramount to ensuring proper adoption of remote pilot training solutions in the midst of accelerated digital change. This paper formulates a conceptual framework to describe determinants of adoption by integrating findings from technology acceptance and organizational readiness research.

2.1 Technology Acceptance Models

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ISSN: 2581-9429

II. LITERATURE REVIEW

Technology Acceptance Model (TAM) has been the preferred model of new technology adoption in most industries, the fast-evolving world of remote pilot training platforms not being an exception. Spurred to consider users' adoption of information systems, It emphasizes two central constructs: perceived usefulness and perceived ease of use. The model has been extended throughout the years and coupled with other models to fit different dissimilar adoption scenarios, especially for new technologies such as AI, VR, and AR. Recent research uncovers how Technology Acceptance Model has been adapted to fit organizational and environmental contexts, such as in the work of Chatterjee et al. (2021), where a hybrid TAM-TOE approach was applied to study AI adoption among manufacturing firms. This model combines user attitude and infrastructural preparedness, and this applies directly to drone training programs upon robust technical infrastructure and facilitative leadership. Similarly, Chen et al. (2021) applied Technology Acceptance Model in their determinant identification of AI adoption by telecommunication firms, citing mapping perceived advantage against strategic goals and user confidence in technical reliability.

Even in training and learning contexts, as with the remote pilot training, Technology Acceptance Model remains pertinent. Sánchez-Prieto et al. (2020) built a Technology Acceptance Model -based instrument of students' acceptance of AI-based test systems further to extend the diversity of Technology Acceptance Model to measure cognitive and affective responses towards new learning technology. Smith et al. (2021) applied the Technology Acceptance Model theory in comparing virtual training environments for certifying drone pilots and illustrated the influence of perceived interactivity, realism, and quality of feedback on adoption. Adoption of compared to comparatively new technology such as VR and AR for training on drones has been fueled by work that, if described differently, adheres to TAM's constructs. For instance, O'Keeffe et al. (2017) and Pascoal & Sofia (2018) employed realism, usability, and environmental integration—characteristics that are facilitation ease of use and perceived usefulness. Nguyen and Dang

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DOI: 10.48175/IJARSCT28215



International Journal of Advanced Research in Science, Communication and Technology

Inte IJARSCT ISSN: 2581-9429

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 5, Issue 9, June 2025



(2017) also referred to intuitive interfaces and motivated learners as inherent elements of AR/VR interfaces, affirming the use of Technology Acceptance Model.

Technology Acceptance Model -based studies are increasingly integrated with technology readiness and maturity assessment. Ellefsen et al. (2019) and Sadiq et al. (2021) refer to AI maturity models, talking about organizational readiness—a variable in line with extended TAM models encompassing readiness factors. Martínez-Plumed et al. (2021) become more explicit on this nexus by situating the stages of AI development within Technology Readiness Levels (TRL), highlighting the requirements of ensuring user acceptability to be in concordance with technological capability. Finally, adoption models also require socio-psychological impacts of AI and automation to be addressed. Strich et al. (2021) outlined the influence of substitutive AI systems on the role identity of employees, a theory-driven concept that drives acceptance by human operators or trainers to adapt to more automated settings. As pilot training facilities remotely become wiser and more immersive, technology acceptance in the guise of an amended TAM model—but complemented by organizational and maturity factors—is still the key to successful and sustainable uptake.

2.2 Organizational Readiness

A strong understanding of determinants of organizational readiness is crucial to the effective use of remote pilot training platforms, particularly simulation, virtual reality, and artificial intelligence-based ones. They constitute a range of core readiness factors—infrastructure of technology, capital, expertise and training culture of people, leadership, and alignment of policy and compliance—taken together determining the capacity of an organization to implement and sustain such advanced technologies. Technology infrastructure forms the bedrock for any technology adoption program. Alsheibani et al. (2018) observe that robust IT infrastructure is at the heart of AI-readiness, influencing both scalability and system integration. With regard to UAV training, studies by Zheng et al. (2018, 2019) and Liu et al. (2018) highlight the need for high-processing simulation environments and stable networks to support real-time feedback, immersive experience, and semi-physical simulation platforms. Such technologies not only need the technical hardware but also compatibility with installed training management systems—where relatively low readiness can create high adoption barriers. Financial resources constitute yet another underlying determinant. Remote advanced training technologies require extensive hardware investment, software subscription, and ongoing upkeep. Klievink et al. (2017) argue that budgetary limitations and reluctance towards return on investment frequently discourage technology take-up, particularly in the public and training contexts. This is further compounded by ongoing upgrade costs for systems, cyberprotection, and support services, all of which must be taken into account during organizational planning.

As important is staff availability of knowledge and facilitative training culture. Kokina and Davenport (2017) and Kim and Heo (2022) demonstrate how skill gaps and lack of digital literacy hinder the effective use of AI. In drone pilots' training, where teachers and learners work with advanced interfaces and systems (Nguyen & Dang, 2017), inadequacy in proper training undermines the effectiveness of such technology. Klumpp (2018) also emphasizes the need for human-machine collaboration skills and encourages a shift in training schools towards adopting continuous learning and digital transformation. Leadership commitment is a strategic readiness determinant. Leadership not just impacts resource deployment and policy formulation but also sets the tone for organizational innovation. Alsheibani et al. (2018) and Kolbjørnsrud et al. (2016) highlight the role of visionary leadership in overcoming resistance to change and driving technology adoption department by department. If top management is involved and initiates projects like VR-based pilot training, adoption will have a priority and will be institutionalized.

Finally, policy and compliance ensure that novel training technologies are implemented according to regulatory standards and ethical considerations. Makarius et al. (2020) argue that businesses ought to prepare themselves for issues around data protection, algorithmic justice, and compliance for business. This is particularly true when it comes to the industries applicable for UAVs, where flight safety acts are strictly regulated, handling data procedures are highly controlled, and the accreditation for training is tightly monitored. Mankins (1995) and Martínez-Plumed et al. (2021) also point out the criticality of preparation test tools like Technology Readiness Levels (TRLs), which facilitate timely, as well as policy-required, adoption of technology. Overall, successful adoption of remote pilot training platforms is based on synergistic readiness in infrastructure, finance, people, leadership, and governance. Shortfalls in any of these

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DOI: 10.48175/IJARSCT28215





International Journal of Advanced Research in Science, Communication and Technology

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 5, Issue 9, June 2025



can halt or derail implementation procedures. Firms that are ready to implement advanced UAV training systems must thus conduct thorough readiness assessments and strategic planning to enable efficient and sustainable implementation.

III. CONCEPTUAL FRAMEWORK

The conceptual framework graphically depicts the multi-dimensional determinants of Remote Pilot Training Platforms (RPTPs) adoption, highlighting the interaction between individual-level and organizational-level determinants. The following figure illustrates the conceptual framework.





Above framework, the figure Adoption of Remote Pilot Training Platforms box points towards the two boxes demonstrating that effective adoption relies not only on user acceptance but also on an organizational environment supporting it. The model posits that even where people are motivated and competent, institutional preparedness may prevent adoption, and conversely. The model therefore offers an inclusive, integrated view of the enabling conditions under which remote training solutions may be effectively deployed and used in aviation and drone-related industries.

the Individual Factors box recognizes four essential elements: Perceived Usefulness, Ease of Use, Digital Literacy, and Social Influence. These capture the degree to which users—e.g., trainees, instructors, or administrative personnel—view the platform as useful for improving training outcomes (usefulness), how easily they can interact and work with the system (ease of use), their general comfort and familiarity with digital tools (digital literacy), and the impact of peers, supervisors, or industry trends on whether they will use the technology (social influence). All of these factors are responsible for users' personal motivation and willingness to adopt and use remote training environments.

The second cluster of impactful variables under Organizational Factors. It encompasses Infrastructure Readiness, or the presence and sufficiency of technological infrastructure like internet connectivity, hardware, and software that enable remote delivery of training. Leadership Commitment emphasizes the responsibility of organizational leaders in spearheading the adoption effort, budgeting, and institutional culture that promotes digital transformation. Cost-Effectiveness is the perceived value proposition of RPTPs by the organization—how the payoffs in training efficiency, coverage, and adaptability are greater than the costs of investment. Policy and Regulatory Fit emphasizes fitting in with aviation authority regulations (e.g., FAA, DGCA, EASA), as conformity to official requirements guarantees credibility

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DOI: 10.48175/IJARSCT28215





International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 5, Issue 9, June 2025



and operational legitimacy. Staff Competence and Support, lastly, depicts the organization's ability to deliver continuous technical support, trainer training, and user support needed for effective integration.

IV. CASE STUDY: ADOPTION OF REMOTE PILOT TRAINING PLATFORMS AT SKYTECH AVIATION ACADEMY

SkyTech Aviation Academy, a small to medium-sized drone training center in South India, initiated a digital transformation program in 2023 to integrate a Remote Pilot Training Platform (RPTP) into its courses. This move was motivated by the twin compulsions of increasing enrollments and meeting new guidelines from India's Directorate General of Civil Aviation (DGCA), which promoted convergence of virtual training to raise accessibility and standardization. At first, the academy experienced conflicting responses from trainers and trainees. Most trainers were anxious about using the platform and wondered whether it could provide hands-on flight experience online. However, most students, who were already digitally literate and experienced in making use of online learning tools, were more than eager to learn and adopt the technology. This discrepancy emphasized the effect of individual-level factors—particularly digital literacy, perceived usefulness, and ease of use—in influencing acceptance. Students reported that the RPTP enabled them to review theoretical modules, rehearse simulation exercises several times, and receive immediate feedback, which enhanced considerably their learning and performance in end-of-unit tests.

At the organizational level, SkyTech made investments to improve its IT infrastructure, providing high-speed internet and implementing advanced simulation systems. This was a display of robust infrastructure preparedness. Additionally, the leadership of the academy showed dedication by convening intensive faculty training workshops and hiring a digital learning coordinator to offer sustained support. These strategic actions assisted in closing the instructors' skills and confidence gap.One key breakthrough was the alignment of the platform with the regulatory requirements of DGCA, which put management's mind at ease regarding its legitimacy and long-term applicability. Furthermore, a cost-benefit analysis indicated that although the initial outlay for the platform was high, it minimized reliance on physical field activity, optimized training batch capacity, and enhanced pass rates—making the shift worthwhile from a financial perspective.

Within half a year of its adoption, SkyTech experienced a 35% rise in trainee enrollments, a 20% drop in training delivery expenses, and enhanced course completion rates. Student and instructor feedback became much better after the second cycle of training, suggesting that the combined influences of individual acceptance and organizational readiness had evolved into a long-lasting adoption model. This example highlights the need for a balanced strategy—addressing both human and institutional factors—to the effective integration of RPTPs in aviation education.

V. CONCLUSION

This paper addressed a conceptual model to explain remote pilot training platform adoption, combining knowledge from technology acceptance and organizational readiness areas. Empirical evidence and stakeholder experience are the focused of the model, which presents a structured viewpoint for future studies, innovation, and strategic planning in aviation training development. The study Highlighted the interaction between individual-level factors and organizational-level determinants for Adoption of Remote Pilot Training Platforms: Technology Acceptance and Organizational Readiness.

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IJARSCT

ISSN: 2581-9429



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ISSN: 2581-9429



DOI: 10.48175/IJARSCT28215





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DOI: 10.48175/IJARSCT28215





IJARSCT ISSN: 2581-9429

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