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Assessing productivity to address safety concerns for information technology and promoting global standardization within aviation practices

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Abstract

Productivity assessment reflects the trend of technological practices and engineering standards for business performance. The environment factors of these standards in aviation have a long-term standing involving the impact of globalization in the development cost analysis [15]. Comparing these concepts with the usage of productivity assessment current design standards in implementing technological systems create concerns in safety performances [5]. However, evaluating this approach from the historical perspective of aviation and aerospace development the innovation of safe operation still remain the top priority as it did a hundred years ago [4]. This raised concerns in determining the improvements of manufacturing practices in the aviation and aerospace industry as it relates to the technological advancement [4]. The cost of business operation will have to be address and it is vital to the management success of technological development in the field of aviation and aerospace practices [4]. The technology developmental risk was a concern in the Wright Brother era and the approach in implementing best solution practices based on simulating and testing standards to meet the goals in today's operation is still an issue [4]. Effective modeling in promoting environmental changes for operational practices can present a risk concern in the developmental approach if productivity is not assessed [1]. Steps are needed to be taken to improve the environmental factors in the business efforts of promoting alternative energy; nonetheless, the long-term effects of not prioritizing the development standards on the global level may cause risk concerns in assessing aviation practice [1]. Realizing the sensitivity of the system development and the tradeoffs in implementing effective practices can also create awareness in the long-term efforts of environmental factors and its impact on operational cost improvements [10]. The ethical standards for human factors to improve the quality of people lives in addressing the challenges faced may be a concern

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going into the 21st century [7]. The tradeoffs of prioritizing can present both pros and cons; however, developmental practices are risky without modeling long-term impact and exploring different applications in adopting business practices [6]. Flexibility is an importance aspect in evaluating the productivity of long-term practices while using modern technology [6]. The productivity assessment impact in future implications and it influences to integrate traditional technology within the modern environment.

Keywords:

1. Historical Perspective of Aviation and Aerospace Development

In evaluating the historical perspective of aviation and aerospace development, the specific reason for its success yields to the innovation of revolution design in operating a plane effectively [4]. According to the author Bereiter (2009), in the article, *Innovation in the absence of principled knowledge: The case of the Wright Brothers,* describes the following:

> Although the **Wright Brothers** are most famous for achieving the first successful manned powered flight, their innovation that had a revolutionary effect on airplane design was a plane capable of making banked turns. Yet this appears to have been an unintended by-product of their effort to maximize control, in contrast to the efforts of competitors to maximize stability. The success of the **Wright Brothers** in this effort can be attributed to their taking an approach that was on one hand well adapted to the low state of aeronautical knowledge existing at the time but that on the other hand was committed to the construction and pursuit of principled knowledge. This involved the use of analogies, not as a source of problem solutions but as an aid in developing theory-like principles. (p. 234)

This approach is a contrast to engineering development related to traditional standards and the industry commitment to improving technological advancement in knowledge areas by modeling methods to address common practices faced in today's air transportation [4]. In the Wright Brothers discovery of basic aerodynamics and it capabilities using wind tunnel testing for aircraft performance, the influence of investigate the best techniques by aiding innovative design approaches [4]. Testing aerodynamic data on which performance and design plays a role allows effective modeling methods to address solutions based on theory like principles [4]. Adopting this historical perspective into the modern engineering practices help creates productivity standards linked to the aeronautical industry [4]. This approach relates back to the first successful manned powered flight that reflects upon innovation development using simulation and testing methods [4]. Technological advances created real world design approaches in understanding and achieving techniques that impact evolution development and success adopted within the aeronautical standard [4]. These challenges are related to the innovation of manufacturing successful ideas that influence the performance and safety of global standards [4]. This was established using instrumentation and related products to manufacture a safe flying machine in the operational development for stability in aeronautical design methods [4].

In utilizing the Wright Brothers historical moment as a case study this presents how performance based testing can be successfully used in addressing ambiguities within aeronautical engineering practices [4]. The technological approach has been valuable to implement and achieving the first successful manned powered flight known to mankind [4]. Establishing the historical connection with the first successful manned powered flight creates an innovative approach to the effectiveness of productivity assessment and its importance in developing long-term standard for excellence [4]. The manufacturing process of modeling increases performance quality by minimizing risk in the developmental phases in predictable outcomes [4]. Realistic experiments minimize risk and gives solution based development to safety operate at high demands [4].

2. Aviation and Aerospace Development and the Success of Standardization

Effective modeling increases the performance quality for risk management in the developmental approach that involves implementing best safety practices [1]. The decision-making and policy-making processes are often complex to support environmental factors in the aviation and aerospace application that deals with safety performance using productivity [1]. This approach supports needed modeling by evaluating a balance global market to assess the productivity in areas of requirements and demands connected with aviation and aerospace industries [1]. Designing an approach that is efficient enough to meet the infrastructural approach creates a practical design that addresses globalized standards for performance in aeronautical applications [1]. This system will influence the implementation of performance practices in the development phases concerning aeronautical operation safety [1].

The aviation and aerospace communities support the efforts of improving performance by emphasizing standards in promoting safety and development [3]. The level of safety in aeronautics development presents ethical standards for the field of aviation and aerospace system [4]. Complex applications in the aeronautics system are challenge with environmental development that surrogates modeling for uncertainty that relates to technological performance [1]. This surrogate modeling for uncertainty supports the importance of assessing the engineering practice in implementing technological applications within the aviation and aerospace environment [1]. In realizing the system development, confidence tradeoff for effective practices establish engineering modeling to compute performance by simulating operational design and testing [1].

3. Aviation and Aerospace in Global Environmental Practices to Support Technological Developments

The environmental variables within the aviation and aerospace culture create awareness of emission reduction that accounts for effectiveness in assessing transportation practices [10]. Growing a sustainable aviation industry by addressing the methods and the impact emissions caused on the global market in the development of clean energy [8]. The effect of carbon dioxide (CO_2) and its impact on the environmental factors pertaining to global change is a challenge according to the International Civil Aviation Organization (ICAO) [8]. In the international aviation emissions findings the calculated result for 2006 was 587 million tons that were attributable to international flights [8]. This is a concern with global aviation expected to grow strongly based on the traffic increasing at an average rate of 4.4% per year over the period of several years [8]. However, there has not been a regulatory action on CO_2 in the aviation industry for emissions reductions [8]. Based on these findings organizational practices have been criticized for not addressing policies with the aviation community that involves the impact of CO_2 in transportation [8]. The effect of CO_2 impacts air quality, this finding in alternative energy could potential reduce cost for productivity within the aviation and aerospace communities [8].

Renyu Fan and Zhang Man [13]. describes the airworthiness requirements for future certification standards and the design perspective focus on the aviation development of ICAO current practices creates concerns in the next generation of commercial aircraft operations. The special focus on the commercial aircraft operation is a minute part of the impact environmental factors can have on the evaluation of air quality productivity in the aviation community [6]. Identifying aviation gasoline as the largest source of lead emissions to the air in the United States, this evaluation is based on used (avgas) aviation gasoline at and near general aviation airports [6]. Comparing these detail results to procedures used for air quality modeling within the U.S. Environmental Protection Agency' (EPA) American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) which can accurate assess the emissions improvements for best operational practices [6]. As a result, in this analysis, alternative energy impacts the operational practices in these areas by improving cost associated to environmental operation and business functions that involves renewable sources in the aviation and aerospace culture [6].

4. Implications involving Aviation and Aerospace Safety on Information Technology and Standardization

The impact of improving the aviation and aerospace culture through engineering technology practices reflect potential innovation for developing future changes in aircraft effectiveness involving sustainability [9]. The safety impacts in technological and operational innovations mitigate the fast-growing demand in sustainable air transportation and the future of aircraft performance [9]. Improving the airborne systems and equipment to assurance levels of software failure in safety measures can provide software verification for testing and engineering advancement provides technological design standards in navigation safety [2]. Safety challenges have a major effect on IT development in business quality. Developing new technology in aeronautical systems with reliability in services aimed for error free developmental practices concerning technology operation. Engineering innovative technological services have an effect on numerous of people lives in safety standards and challenge ethics of aviation industrial practices (Brooks, 2010).

Services on how the human interaction improves the quality safety operation challenges business standards to meet the stakeholder's requirement for effective aeronautical IT development. Unraveling new methods in IT development by improving the practices in business decision making process could be examine by Brooks (2010), who focuses on "the last 25 years, people have seen an overwhelming technology infusion affecting business, education, and society. Virtually all areas of the society have been transformed by the usage of technology. The change is important from an ethical perspective in terms of which Information Technology (IT) workers are today and what their tasks are" [7]. Safety is the main concern of the investigation of people's lives on practices in the IT system and standards in the developmental process in assessing business risk and productivity. These standards in engineering technology related to IT systems on a global level have challenged the performance of technology even in aeronautical development.

The strategic approach in productivity assessment for new aviation safety products and technologies are modeled and evaluated in this table below:

Table 1. Concept of Operating Aviation Safety Applications [14].

Metric	Definition	Source
1. Technical development risk	Measures the ability to meet technology performance goals.	NASA, FAA, Volpe, Sandia, The Aerospace Corporation, Georgia Institute of Technology, University of Virginia (ConOps 2005).
2. Implementation risk	Assesses the various implementation schemes historically used by the FAA and industry and the success rate of these schemes to build an initial baseline.	NASA Langley, NASA Glenn and Swales Aerospace (NASA 2004).
3. Fatal accident rate reduction	Reports percentage decrease in fatal accident rate.	DAI Technologies, NASA Langley and NASA Glenn Research Centers (NASA 2004).
4. Safety benefits and costs	Measures the projected reductions in injuries, fatalities, hull loss and other accident outcomes as well as the reduction in operational effects from mitigations of the underlying accident causes and the system and business impacts of the proposed AvSP products.	Volpe National Transportation Center (NASA 2004).
5. Safety risk reduction	Assesses the projected impact the AvSP products may have on reducing safety risk in the NAS.	Rutgers University (NASA 2004).

This implementation risk assessment acts as an initial baseline that historically used by the FAA and aeronautical industry to examine the success rate to implementation a new application [14]. The decision making approach used to capture the requirements of understanding the technical development risk, implementation risk, fatal accident rate reduction, safety benefits and costs, and safety risk reduction all impacts the operation of the aviation engineering practices [14]. Evaluating the productivity assessment of the effectiveness by anticipating performance provides answers to valuable concerns in how the aeronautical industry assesses productivity in it standards [14]. The decision-making process is determine ultimately on the research and develop of aeronautical products and technologies focused on the national goal to reduce the fatal aircraft accident rate by 80% [14].

According to authors Sharma et al., [14] in the article, *A decision analytic approach for technology portfolio prioritization: aviation safety applications,* explains that: "To support pilots and air traffic controllers, as well as provide information to assess situations and trends that might indicate unsafe conditions before they lead to accidents. A portfolio of 48 new aeronautical products and technologies has been developed. These 48 products are grouped into seven product suites as follow: Accident Mitigation (AM), Synthetic Vision Systems (SVS), Single Aircraft Accident Prevention (SAAP, Aviation System Monitoring and Modeling (ASMM), System-Wide Accident Prevention (SWAP), Weather Accident Prevention (WxAP) and Aircraft Icing (AI) (p. 844)." This assessment focuses on the safety factors associated with aviation accidents given the highest priorities to implement strategies that address multiple classes of causal factors [14]. Each strategy defines and quantities a decision analytic approach for evaluating current changes in the National Airspace System [14].

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