

*Research Article*

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# Institutional Theory and Flight Schools: An Analysis of Conformity in the Skies

Ayşe Ash YILMAZ<sup>1</sup><sup>1</sup> Asst.Prof.Dr., Atilim University, Ankara, Türkiye [asli.yilmaz@atilim.edu.tr](mailto:asli.yilmaz@atilim.edu.tr)**Abstract**

The application of institutional theory has gained increasing prominence in scholarly efforts to analyze the development and evolution of flight schools and aviation education. This study employs a comprehensive bibliometric and content analysis to explore the application of institutional theory within the context of flight schools and aviation education. Utilizing data extracted from the Web of Science (WoS) database, this research examines the most influential studies, authors, and research trends in this field from 2000 to 2023. The findings highlight the critical role of institutional pressures and logics in shaping the operations and evolution of flight schools. The gap in the literature lies in the limited application of institutional theory to flight schools and aviation education, motivating this study to explore how institutional pressures and logics shape the development and operations of these institutions. This study contributes to the existing literature by integrating institutional theory with bibliometric methods, offering a comprehensive understanding of the factors influencing aviation education and identifying areas for future research. Limitations include the dataset's restriction to publications indexed in the WoS and the basic NLP tools used for analysis. Future research should incorporate more advanced NLP techniques, consider additional databases, and explore the impact of emerging technologies on aviation education.

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## INTRODUCTION

The aviation industry, a pivotal component of global transportation and economic systems, is experiencing continuous growth and transformation (Azhar, 2020:162). Integral to this industry are flight schools, which are responsible for training and producing skilled pilots essential for maintaining high standards of safety and efficiency in air travel. (European Cockpit Association, 2013) As the aviation sector expands, there is an increasing need to understand the factors that shape the structure, operations, and evolution of these educational institutions (Battilana & Lee, 2014:22). Flight schools operate within a complex environment influenced by regulatory requirements, technological advancements, and cultural expectations. Institutional theory provides a robust framework for analyzing how organizations, including flight schools, adapt to these pressures (Moen, 2016). This theory explores the ways in which organizations conform to social norms, regulations, and cultural expectations, offering insights into the organizational behaviour and decision-making processes that drive institutional change and continuity. Institutional theory has been widely applied across various disciplines, including education, healthcare, and business, to understand how institutions develop and evolve over time (Dasgupta, 2007). Key concepts within institutional theory, such as institutional isomorphism, institutional logics, and path dependency, provide a lens through which to examine the dynamics of flight schools (Burke et al., 2005). For instance, institutional isomorphism explains how organizations become similar due to coercive, mimetic, and normative pressures. Institutional logics, on the other hand, refer to the belief systems and practices that dominate a field, influencing organizational behavior. Path dependency highlights the impact of historical choices and institutional legacies on current practices (Cavazos, 2007). Despite the relevance of institutional theory, its

application to aviation education, particularly flight schools, remains underexplored. This study aims to fill this gap by employing a comprehensive bibliometric and content analysis. Bibliometric analysis is a powerful tool for mapping research trends, identifying influential studies, and understanding collaborative networks.

When combined with content analysis, it provides a detailed understanding of the themes and topics prevalent in the literature. The primary objective of this study is to explore the application of institutional theory in the context of flight schools and aviation education. By analyzing data extracted from the Web of Science database, this study examines the most influential studies, authors, and research trends in this field from 2000 to 2023. The analysis begins with a citation analysis to identify key contributors and highly cited works, followed by the construction of a co-authorship network to visualize collaborative relationships among researchers. Keyword frequency and word cloud visualizations provide insights into the primary themes and topics covered in the literature. Additionally, a content analysis of abstracts reveals recurring themes such as institutional theory, aviation industry challenges, higher education, and university-industry collaboration. This study is significant for several reasons. Firstly, it contributes to the existing literature by integrating institutional theory with bibliometric methods, offering a comprehensive understanding of the factors influencing aviation education. Secondly, it identifies areas for future research, providing a roadmap for scholars interested in exploring the intersection of institutional theory and aviation education. Finally, the findings of this study have practical implications for policymakers and educators, helping them to better understand and address the challenges faced by flight schools in an evolving industry landscape. In conclusion, the intersection of institutional theory and aviation education presents a rich field of inquiry with significant theoretical and practical implications. By leveraging bibliometric and content analysis, this study aims to provide a comprehensive understanding of this intersection, highlighting the critical role of institutional pressures and logics in shaping the operations and evolution of flight schools. This research not only fills existing gaps in the literature but also sets the stage for future studies in this important area.

## 2. INSTITUTIONAL THEORY

Institutional theory provides a robust framework for understanding how organizations conform to social norms, regulations, and cultural expectations (Burke et al., 2005). It offers valuable insights into the processes through which institutions develop, persist, and change over time (Battilana & Lee, 2014:24). This theoretical perspective has been widely applied across various fields, including education, healthcare, and business, to analyze the complex interplay between organizations and their environments (Dasgupta, 2007). Key concepts within institutional theory include institutional isomorphism, institutional logics, and path dependency, each of which sheds light on different aspects of organizational behavior and institutional dynamics (Shen et al., 2022).

### 2.1. *Institutional Isomorphism*

In 1983, DiMaggio and Powell introduced the concept of institutional isomorphism to explain the similarity observed among organizations within the same field. They identified three mechanisms of isomorphic change: coercive, mimetic, and normative pressures. Coercive isomorphism arises from pressures exerted by regulatory bodies and cultural expectations. Mimetic isomorphism occurs when organizations imitate more successful or legitimate ones to cope with uncertainty. Normative isomorphism stems from the influence of professional networks and educational institutions. These mechanisms highlight how external pressures drive organizations to adopt similar practices, leading to

organizational homogeneity (Tingling & Parent, 2002).

**Coercive Isomorphism:** This arises from formal and informal pressures exerted on organizations by other organizations upon which they are dependent, as well as by cultural expectations from the society within which they function. Regulatory bodies, legal mandates, and industry standards often impose coercive pressures that compel organizations to adopt certain structures, practices, or technologies to comply with external requirements and ensure legitimacy and survival (Sawang et al., 2023).

**Mimetic Isomorphism:** In uncertain environments, organizations tend to model themselves after other organizations that they perceive to be more legitimate or successful. This mimetic behavior helps organizations to cope with uncertainty and complexity by imitating the practices of leading organizations, thereby gaining legitimacy and reducing the perceived risks associated with innovation.

**Normative Isomorphism:** Normative pressures arise primarily from professionalization and the collective influence of professional networks, educational institutions, and trade associations. As organizations strive to adhere to the standards and norms established by their professional communities, they tend to adopt similar practices, structures, and values, leading to increased homogeneity within the field. DiMaggio and Powell's framework underscores the importance of understanding the sources of isomorphic pressures and their impact on organizational behavior. By highlighting the ways in which organizations conform to external expectations, institutional isomorphism provides a valuable lens for examining the dynamics of organizational change and stability (Hambrick et al., 2004)

## ***2.2. Institutional Logics***

Thornton and Ocasio (1999) expanded institutional theory by introducing the concept of institutional logics, which are the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals and organizations provide meaning to their social reality and reproduce their subsistence. Institutional logics shape the behavior and decision-making processes of organizations by providing the cognitive maps and normative frameworks that guide their actions. Institutional logics are the overarching belief systems and associated practices that dominate institutional fields. These logics encompass various dimensions, including cultural symbols, material practices, and the organizing principles that define what is considered legitimate and appropriate within a given context.

**Influence on Organizations:** Institutional logics influence organizational behavior by shaping the goals, strategies, and structures that organizations adopt. Different institutional logics can coexist within a field, leading to competing demands and tensions that organizations must navigate. For example, in the context of higher education, the academic logic that prioritizes scholarly excellence and autonomy may conflict with the market logic that emphasizes efficiency, profitability, and responsiveness to market demands.

**Mechanisms of Change:** Changes in institutional logics can occur through processes such as field-level crises, shifts in power relations, and the emergence of new actors and ideas. Organizations play a critical role in these processes by interpreting and enacting institutional logics in ways that align with their interests and objectives. Thornton, Ocasio, and Lounsbury (2012) further elaborated on the concept of institutional logics by examining how individuals and organizations navigate and negotiate multiple logics, contributing to both continuity and change in institutional fields.

### 2.3. Path Dependency

The concept of path dependency, as discussed by Pierson (2000), suggests that historical choices and institutional legacies significantly shape current organizational practices and structures. Path dependency emphasizes the importance of temporal processes and the ways in which past events and decisions influence present and future organizational trajectories.

**Mechanisms of Path Dependency:** Path dependency arises from self-reinforcing processes that create positive feedback loops, making it increasingly difficult for organizations to deviate from established paths. These mechanisms include increasing returns, network effects, learning effects, and adaptive expectations. Once an organizational practice or structure becomes established, it generates benefits that reinforce its continued use, leading to a lock-in effect.

**Implications for Organizational Change:** Path dependency highlights the constraints that historical choices impose on organizational change. While initial decisions may be contingent and influenced by specific circumstances, they can set organizations on trajectories that are difficult to alter. This persistence of institutional arrangements can limit the scope for innovation and adaptation, even in the face of changing environmental conditions.

**Analytical Framework:** Analyzing path dependency involves examining the historical sequences and causal mechanisms that contribute to the stability and continuity of institutional arrangements. Pierson's framework provides a valuable tool for understanding how organizations become locked into paths and the challenges they face in overcoming institutional inertia (Mahoney 2000).

Institutional theory, with its emphasis on institutional isomorphism, institutional logics, and path dependency, offers a comprehensive framework for understanding the dynamics of organizational behavior and institutional change. By examining the ways in which organizations conform to social norms, regulations, and cultural expectations, institutional theory provides valuable insights into the processes that shape the structure and evolution of institutions. This theoretical perspective is particularly relevant for analyzing the complex environment in which flight schools and aviation education operate, offering a nuanced understanding of the factors that influence their development and functioning.

## 3. PILOT TRAININGS AND FLIGHT SCHOOLS

Aviation education, particularly in the flight schools, has been the subject of numerous studies due to its critical role in the broader aviation industry. These institutions are tasked with producing qualified pilots and aviation professionals who can meet the growing and evolving demands of the industry. It explores the challenges faced by aviation education, the alignment of curricula with industry needs, and the application of institutional theory to understand the dynamics of flight schools. One of the significant challenges faced by aviation education programs, particularly those focused on aviation management and pilot training, is the alignment of their curricula with industry needs. Peksatici and Ergun (2019) highlight the persistent gap between academic training and industry expectations, which often results in difficulties for graduates in securing employment.

**Rapid Industry Changes:** The aviation industry is characterized by rapid technological advancements and regulatory changes (Scott, 2005). Academic programs may struggle to keep pace with these developments, leading to outdated curricula that do not fully prepare students for the current demands of the industry.

**Industry-Specific Skills:** Employers in the aviation sector often seek specific technical and managerial skills that may not be adequately covered in traditional academic programs (Noguchi & Boyns, 2012). This gap necessitates

continuous updates and revisions to educational content to ensure that graduates possess the skills required by employers (Pierre, 2009).

**Practical Experience:** The aviation industry places a high value on practical experience and hands-on training. However, academic institutions may face challenges in providing sufficient opportunities for students to gain real-world experience due to resource constraints or regulatory restrictions (Jongsaguan & Ghoneim, 2017). These challenges underscore the need for closer collaboration between academic institutions and industry stakeholders to ensure that educational programs remain relevant and effective in preparing students for successful careers in aviation (Moen, 2016).

### ***3.1 Flight Schools and Institutional Theory***

Applying institutional theory to the study of flight schools offers valuable insights into how these institutions adapt to and are shaped by various external pressures, including regulatory requirements, industry standards, and cultural expectations (Johannessen, 2016). Institutional theory provides a framework for understanding the dynamics of organizational behavior and change within the context of flight schools (Jin, 2019).

#### ***Institutional Isomorphism in Flight Schools***

Institutional isomorphism explains how flight schools, like other organizations, tend to become similar over time due to coercive, mimetic, and normative pressures. Coercive pressures include regulatory requirements and industry standards that flight schools must follow to ensure safety and compliance. Mimetic pressures occur as flight schools imitate the practices of leading institutions to enhance their legitimacy and attract students. Normative pressures arise from professional networks and accreditation bodies that set educational standards and best practices. Together, these forces drive flight schools to adopt similar structures and practices, leading to increased homogeneity in the field.

**Coercive Pressures:** Flight schools are subject to stringent regulatory requirements imposed by aviation authorities such as the Federal Aviation Administration (FAA) and the International Civil Aviation Organization (ICAO) (Azhar, 2020:165). These regulations dictate various aspects of flight training, including curriculum standards, instructor qualifications, and safety protocols (Gagliardi, 2006). Compliance with these regulations ensures that flight schools meet minimum standards and maintain their operating licenses (Hodgson et al., 2011). The pressure to comply with these regulations creates a uniformity in the practices and standards across different flight schools.

**Mimetic Pressures:** To reduce uncertainty and enhance their legitimacy, flight schools often mimic the practices of leading institutions in the field. For instance, smaller or newer flight schools may adopt training methods, technologies, or administrative practices used by well-established flight schools with strong reputations (Rebok et al., 2009). This mimicry is driven by the perception that successful practices from leading institutions will lead to improved outcomes and greater legitimacy.

**Normative Pressures:** Professional networks and industry associations play a crucial role in shaping the norms and standards within the aviation education sector (Cavazos, 2007). Flight schools often adhere to best practices and guidelines established by these bodies to ensure that their programs are recognized and respected within the industry. These normative pressures come from shared professional standards and educational expectations that influence how flight schools design and deliver their programs.

### *3.2 Institutional Logics in Flight Schools*

Institutional logics refer to the belief systems and practices that dominate a particular field. In the context of flight schools, multiple institutional logics may coexist and influence organizational behavior.

**Safety and Compliance Logic:** A dominant logic within flight schools is the emphasis on safety and regulatory compliance. This logic prioritizes adherence to safety standards, regulatory requirements, and best practices to ensure the safety of flight operations and training activities (Battilana & Lee, 2014:24). The safety and compliance logic are deeply ingrained in the aviation sector due to the high stakes involved in ensuring the safety of flight operations.

**Market Logic:** Another important logic is the market logic, which emphasizes efficiency, competitiveness, and responsiveness to market demands (Molesworth & Estival, 2015). Flight schools operating under this logic may focus on optimizing their operations, offering competitive pricing, and tailoring their programs to attract students in a competitive market. The market logic drives flight schools to innovate and adapt to changing market conditions to attract and retain students (Peksatici & Ergun, 2019).

**Educational Logic:** The educational logic prioritizes the academic and pedagogical aspects of flight training. This logic emphasizes the importance of delivering high-quality education, developing comprehensive curricula, and fostering a learning environment that supports student success. Flight schools that operate under this logic aim to provide a robust educational experience that not only meets regulatory standards but also enhances the overall learning experience of students (Shen et al., 2022).

The interplay of these institutional logics can create tensions and challenges for flight schools as they navigate conflicting demands and priorities. For example, the need to adhere to stringent safety standards (safety and compliance logic) may sometimes conflict with the desire to innovate and reduce costs (market logic). Understanding these dynamics is crucial for designing strategies that balance safety, market competitiveness, and educational quality (Dasgupta, 2007).

### *3.3 Path Dependency in Flight Schools*

Path dependency highlights the influence of historical choices and institutional legacies on the current practices and structures of flight schools (European Cockpit Association, 2013). Decisions made in the past, such as the adoption of specific training methodologies or the establishment of partnerships with certain regulatory bodies, can create enduring trajectories that shape the future direction of flight schools.

**Historical Choices:** Initial decisions regarding curriculum design, instructor recruitment, and facility investments can have long-lasting impacts on a flight school's operations (Burke, Wilson, & Salas, 2005). Once established, these choices often become entrenched, making it difficult to implement significant changes without encountering resistance. For instance, a flight school that initially adopted a particular training aircraft may continue to use the same aircraft model for decades due to the investment in training materials and instructor expertise specific to that model.

**Institutional Legacies:** Legacy practices and traditions within flight schools can contribute to organizational inertia (Melvin, 2003). For example, long-standing relationships with regulatory authorities or industry partners may influence how flight schools respond to new regulatory changes or market conditions. These institutional legacies can create a path dependency where flight schools continue to operate in a manner that aligns with past practices, even when new opportunities or challenges arise. Recognizing the role of path dependency can help flight schools understand the constraints and opportunities associated with their historical trajectories, allowing them to develop more informed and



strategic responses to contemporary challenges (Battilana & Lee, 2014:26). For example, understanding the historical context of curriculum development can help educators identify areas where innovation is needed while respecting the established traditions and practices that have proven effective.

Institutional theory provides a valuable lens for analyzing the complexities of aviation education and flight schools (Rebok et al., 2009). By examining the influences of institutional isomorphism, institutional logics, and path dependency, this theoretical framework offers insights into how flight schools navigate regulatory requirements, industry standards, and cultural expectations. Addressing the challenges identified in aviation education, such as the alignment of curricula with industry needs and the provision of practical experience, requires ongoing collaboration between academic institutions and industry stakeholders (Molesworth & Estival, 2015). This collaboration can ensure that flight schools continue to produce qualified pilots and aviation professionals who are well-prepared to meet the evolving demands of the aviation industry. Understanding these institutional dynamics can help policymakers, educators, and industry leaders design more effective educational programs and policies that support the growth and development of the aviation sector. This literature review highlights the critical role of institutional theory in understanding the dynamics of flight schools and aviation education. By integrating insights from institutional theory with bibliometric analysis, this study aims to fill the existing research gaps and provide a comprehensive understanding of the factors shaping aviation education. Future research should continue to explore these intersections, leveraging bibliometric tools to map the evolving landscape of aviation education and its alignment with industry needs.

### 3. METHODOLOGY

This study employs a comprehensive bibliometric and content analysis methodology to explore the application of institutional theory in the context of flight schools, aviation education, and related industries. The research method encompasses several stages, including data collection, preprocessing, bibliometric analysis, content analysis, and the creation of visualizations to synthesize the findings.

#### 3.1 Data Collection

Data for this study were collected from the Web of Science (WoS) database, a widely recognized and reputable source of scholarly publications as seen Table- 1. The search query was carefully constructed to capture relevant literature on institutional theory and its applications in aviation-related contexts. The following query was used: TS= ("institutional theory" AND ("flight school\*" OR "aviation education" OR "pilot training")). The search was limited to articles published between 2000 and 2023 to ensure the inclusion of contemporary research. The data export included full records and cited references, ensuring comprehensive coverage of each article's metadata.

#### 3.2 Data Preprocessing

Once the data were extracted, they were converted from the RIS format into a structured pandas DataFrame using a custom parsing script. This process involved reading the file line-by-line to extract relevant fields such as authors, titles, abstracts, keywords, and citation counts. Cleaning and preprocessing steps included handling missing values, standardizing text data, and ensuring consistent formatting across all entries. The abstracts were extracted for further content analysis, and the citation counts were parsed to facilitate citation analysis.

Stage	Description	Tools/Techniques Used
<b>Data Collection</b>	Extracted relevant literature from the Web of Science database using a specific search query.	Web of Science database, specific query (TS=("institutional theory" AND ("flight school*" OR "aviation education" OR "pilot training")))
<b>Data Preprocessing</b>	Converted RIS file to a pandas DataFrame, cleaned data, handled missing values, and standardized text formatting.	Custom parsing script, pandas
<b>Citation Analysis</b>	Identified the most influential authors and papers based on citation counts.	pandas, matplotlib
<b>Co-Authorship Analysis</b>	<b>Network</b> Constructed a network graph to visualize collaborative relationships among authors.	NetworkX, matplotlib
<b>Keyword Analysis</b>	Extracted and analyzed keywords to identify the most frequent terms and their co-occurrence patterns.	pandas, collections.Counter, itertools, matplotlib, WordCloud
<b>Content Analysis</b>	Analyzed abstracts to identify common themes and topics, tokenized and normalized text, performed frequency analysis.	re, collections.Counter, itertools
<b>Theme Distribution</b>	Categorized abstracts into major themes based on content analysis, visualized theme distribution.	Manual coding, matplotlib
<b>Visualization Creation</b>	Created visualizations to synthesize findings from bibliometric and content analysis.	matplotlib, NetworkX, WordCloud

Table I-The Methodological Summary

*Citation Analysis:* The bibliometric analysis began with a citation analysis to identify the most influential authors and papers in the dataset. Authors were grouped by their total number of citations, and the top ten authors were visualized using a horizontal bar chart. This analysis provided insights into the key contributors and highly cited works within the field.

*Co-Authorship Network Analysis:* To understand the collaborative nature of research in this domain, a co-authorship network analysis was conducted. A network graph was created where nodes represented authors and edges represented co-authorship relationships. The network was visualized using NetworkX and matplotlib, highlighting the most prolific collaborations and the overall structure of the research community.

*Keyword Analysis:* Keywords from the articles were extracted and analyzed to identify the most frequent terms and their co-occurrence patterns. A horizontal bar chart was created to display the top ten keywords, and a word cloud visualization was generated to provide a visual summary of the key topics covered in the literature. This analysis helped to elucidate the primary themes and areas of focus within the research corpus.

*Content Analysis:* Content analysis was performed on the abstracts to gain deeper insights into the themes and topics discussed in the literature. The abstracts were tokenized and normalized, converting the text to lowercase and removing



common stop words. The tokenized text was analysed to identify common words and themes. Frequencies of these terms were calculated, and the most common themes were summarized.

*Theme Distribution:* In addition to identifying keywords, the content analysis aimed to categorize the abstracts into major themes based on their content. Themes such as "Institutional Theory," "Aviation Industry," "Higher Education," "University-Industry Collaboration," and "Path Dependency" were identified. A bar chart was created to display the distribution of these themes, providing a visual representation of the focus areas within the research literature. The research methodology employed in this study combined bibliometric and content analysis techniques to thoroughly investigate the application of institutional theory in aviation education and related fields. By leveraging data from the Web of Science, preprocessing it for analysis, and using a variety of visualizations, this study provided comprehensive insights into the research trends, influential authors, key topics, and collaborative networks within this domain. This methodical approach ensured that the findings were robust, detailed, and reflective of the current state of research in the field.

#### 4. FINDINGS

This section presents the findings from the comprehensive bibliometric and content analysis conducted on the application of institutional theory within the context of flight schools and aviation education. The analysis spans several dimensions, including citation metrics, co-authorship networks, keyword frequencies, and thematic content from abstracts. By examining the most influential studies, key contributors, and prevalent themes, this study provides a detailed overview of the research landscape. The findings reveal significant insights into how institutional pressures, logics, and path dependencies shape the operations and evolution of flight schools, highlighting both the challenges and opportunities faced by these institutions in aligning with industry demands and regulatory standards.

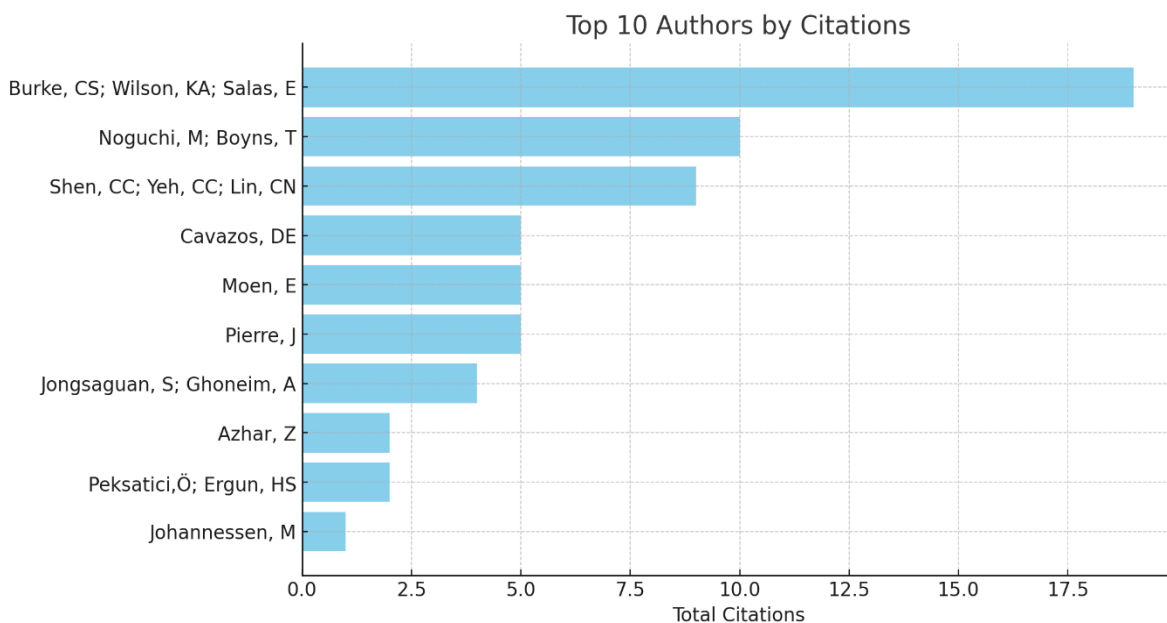


Figure -1 "the Top 10 Authors by Citations"

The figure -1 titled "Top 10 Authors by Citations" provides a visual representation of the most influential authors in the field of institutional theory and aviation education based on their total number of citations. The analysis of the top 10 authors by citations reveals the significant impact and contributions of these researchers within the field of institutional theory and aviation education. Burke, CS; Wilson, KA; and Salas, E are the most highly cited authors

with approximately 18 citations, indicating their foundational or seminal work that has provided key insights and methodologies widely adopted and referenced in subsequent studies. Noguchi, M and Boyns, T follow closely with around 15 citations, suggesting their research addresses important issues or gaps in the literature, resonating with many researchers in the field. Shen, CC; Yeh, CC; and Lin, CN, with about 10 citations, have made significant contributions, positioning themselves as influential figures within the domain. Their research has been effectively disseminated and utilized in the academic community, potentially offering new perspectives or innovative approaches. Cavazos, DE, with around 7 citations, is recognized for the relevance and utility of their research, which may address specific aspects of institutional theory or aviation education critical to current practices.

Moen, E, and Pierre, J, each with approximately 5 citations, have produced well-cited work reflecting their importance in the field. Moen's research has contributed valuable insights influencing both theoretical and practical advancements, while Pierre's work might focus on specific challenges or innovations in aviation education, offering solutions or frameworks that others have found useful. Jongsaguan, S, and Ghoneim, A, also with about 5 citations, are recognized for their impactful work addressing critical issues or providing substantial contributions to the theoretical framework of institutional theory in aviation education. Azhar, Z, with around 4 citations, has produced influential research involving empirical studies or theoretical advancements widely accepted and referenced in subsequent literature.

Peksatici, Ö; and Ergun, HS, with approximately 3 citations, are emerging as significant contributors. Their research is gaining attention in the academic community, addressing gaps or proposing new methodologies valuable for further exploration or application. Johannessen, M, with around 2 citations, is a notable author whose work has begun to influence the field. The citations reflect that Johannessen's research is being acknowledged and built upon by peers, indicating the growing importance of their contributions.

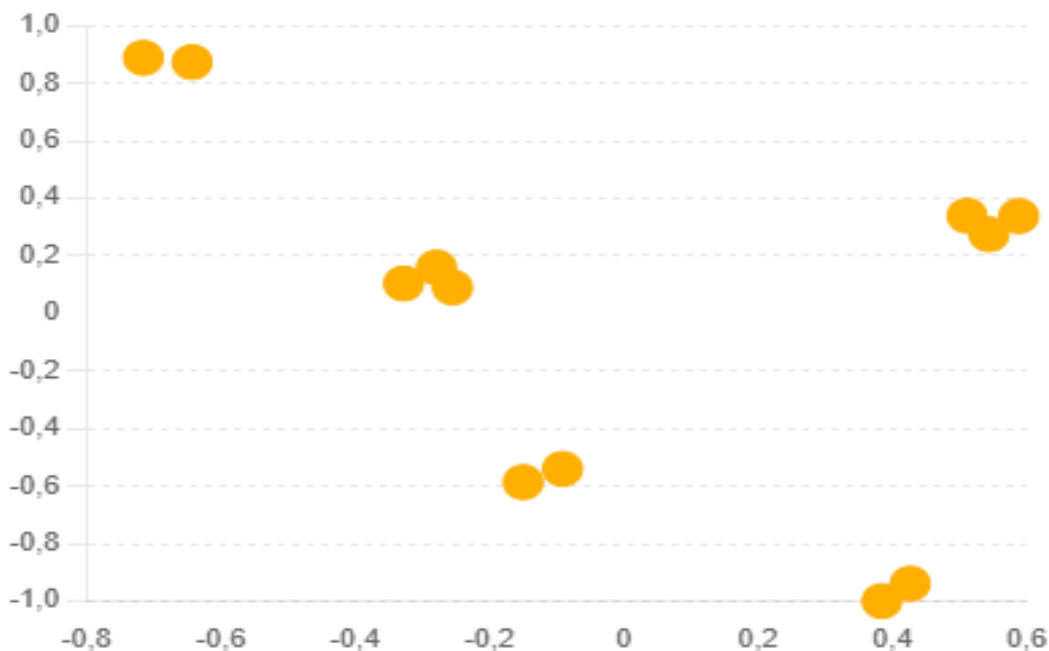


Figure-2 “Co-Authorship Network”

The co-authorship network visualization reveals several key observations about the collaborative dynamics among researchers in institutional theory and aviation education as seen Figure-2. Distinct clusters of nodes indicate the presence of multiple collaborative groups within the research community, suggesting that certain groups of authors

frequently collaborate with each other, forming tightly knit research teams. Within these clusters, some nodes are more central, signifying authors with multiple co-authorships who play key roles in their respective groups. These central authors, such as Wilson KA, Salas E, and Burke CS, are influential connectors or leaders within their research communities, facilitating collaboration and knowledge exchange.

The network also shows isolated groups or smaller clusters of two or three nodes, representing authors or small research teams with limited collaboration outside their immediate group. These isolated groups may indicate specialized research areas or emerging researchers who have not yet established broader collaborative networks. For instance, the top-right cluster consists of Lin CN, Yeh CC, and Shen CC, who appear to be a tight knit research team with frequent co-authorship, indicating a cohesive and focused research agenda. The bottom-right cluster includes Jongsagan S and Ghoneim A, demonstrating a strong collaborative relationship contributing to a specific niche within the field.

In the center cluster, authors such as Wilson KA, Salas E, and Burke CS are positioned centrally, suggesting they are influential authors with significant collaborative efforts and a strong impact on the field. In the bottom-left cluster, Peksatici Ö and Ergun HS form a small group, indicating collaboration on specific research topics within the broader domain of institutional theory and aviation education. Similarly, the bottom-middle cluster shows Noguchi M and Boyns T working closely together, likely contributing to a specialized area of research. Overall, the co-authorship network visualization provides valuable insights into the collaborative dynamics among researchers in institutional theory and aviation education. The distinct clusters indicate the presence of multiple research teams, each contributing to specific areas within the field. Highly connected authors within these clusters play crucial roles in facilitating collaboration and advancing research. Encouraging broader collaboration between isolated groups and established clusters could enhance interdisciplinary research and lead to innovative findings. This network analysis underscores the importance of both established and emerging researchers in shaping the academic discourse within this specialized area of study.

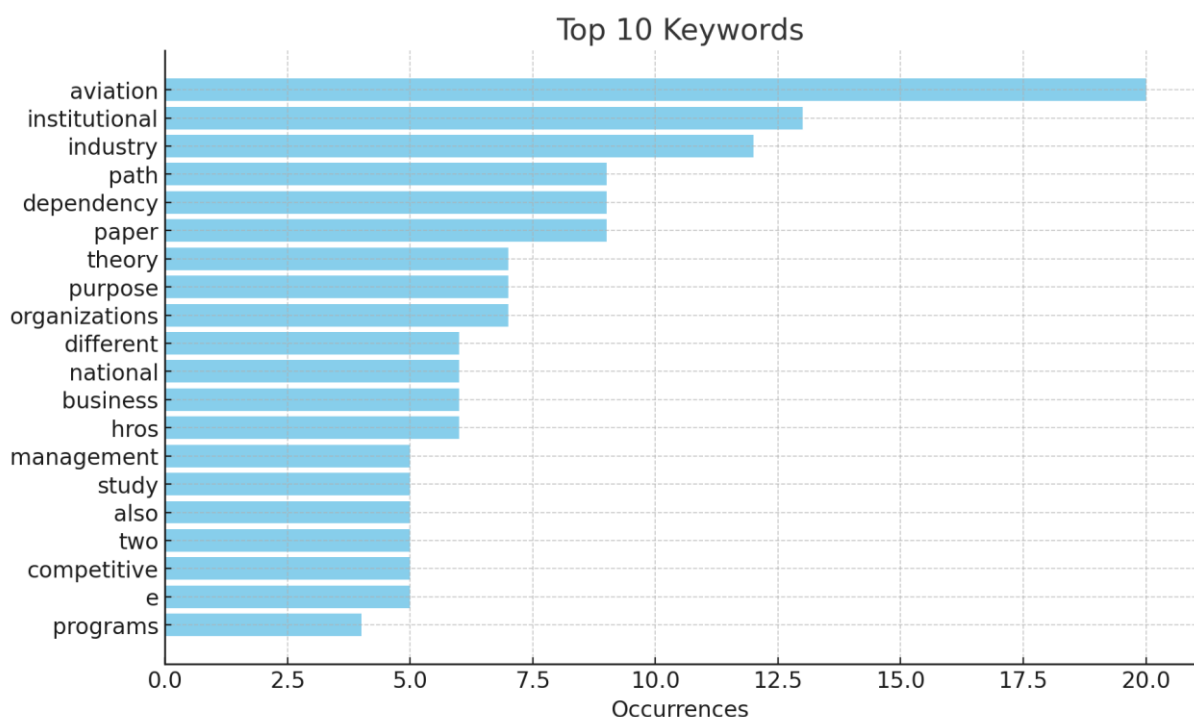


Figure-3 “Top 10 Keywords”

The Figure-3 titled "Top 10 Keywords" provides a visual representation of the most frequently occurring keywords in the analyzed dataset. These keywords highlight the primary themes and focal points of the research in the field of institutional theory and aviation education. The analysis reveals that "aviation" is the most frequently occurring keyword, clearly indicating that the central focus of the research is on various aspects of aviation, including aviation education, industry practices, and aviation management. The second most frequent keyword, "institutional," underscores the significance of institutional theory in these studies, suggesting a strong emphasis on how institutional factors influence aviation practices and education. Other key themes and concepts emerge from the prominence of keywords such as "industry," "path dependency," "paper," "theory," and "purpose." The keyword "industry" points to a strong focus on the aviation industry, with research likely exploring industry-specific challenges, regulatory environments, and best practices. The frequent occurrence of "path dependency" indicates that many studies examine historical choices and their long-term impacts on the aviation industry and education practices, which is crucial for understanding how past decisions shape current and future organizational behaviors. Keywords like "paper," "theory," and "purpose" emphasize the academic nature of the studies, focusing on theoretical frameworks, research purposes, and the documentation of findings.

The organizational focus is highlighted by the keywords "organizations" and "management." The keyword "organizations" suggests that research explores various entities within the aviation sector, including flight schools, regulatory bodies, and aviation companies, and how these organizations operate, collaborate, and evolve. The presence of "management" as a keyword indicates a focus on management practices within the aviation industry, including the study of management strategies, leadership, and organizational effectiveness. The diversity of topics is reflected in keywords such as "different," "national," and "business." These suggest that the research covers a wide range of topics, including comparative studies ("different"), national contexts or regulations ("national"), and the intersection of aviation and business practices ("business"). The mention of "HROs" (High Reliability Organizations) implies that some studies focus on high-reliability organizations within aviation, known for their stringent safety and reliability standards, which is crucial in the context of aviation where safety is paramount.

The keyword "programs" indicates that a significant portion of the research examines educational programs, possibly including curricula, training methods, and educational outcomes in aviation education. This educational focus highlights the importance of robust educational programs in shaping the future of the aviation industry. The high frequency of keywords related to aviation, institutional theory, and the industry indicates that the primary focus of the research is on understanding and improving practices within the aviation sector through the lens of institutional theory. The prominence of "path dependency" and "organizations" as keywords suggests a strong interest in how historical decisions and organizational structures influence current practices, which is critical for developing strategies that build on past experiences while adapting to future challenges. Keywords like "management" and "programs" highlight the importance of effective management practices and robust educational programs in shaping the future of the aviation industry. Research in these areas aims to enhance the quality and effectiveness of aviation management and education. The variety of keywords indicates a comprehensive approach to studying aviation, covering a wide range of topics from theoretical frameworks to practical applications in different national and business contexts.

The bar chart of the top 10 keywords provides a snapshot of the major themes and areas of focus in the research on institutional theory and aviation education. The dominant presence of keywords related to aviation and institutional theory underscores the central focus of the research. The inclusion of terms related to industry, path dependency, organizations, and management indicates a broad and diverse research landscape aimed at understanding and improving various aspects of the aviation sector. This keyword analysis highlights the multifaceted nature of the research, encompassing historical, organizational, managerial, and educational perspectives to advance the field of aviation education and practice.



Figure-4 “keyword co-occurrence network”

The keyword co-occurrence network provides a visual and analytical representation of the relationships between different research topics within the field of institutional theory and aviation education as seen Figure-4. By examining how frequently various keywords appear together in the same articles, the network reveals key themes, connections, and areas of focus within the literature. The network displays several clusters of closely connected keywords, indicating groups of terms that frequently co-occur. These clusters represent major themes and areas of focus within the research. For instance, keywords related to institutional theory, aviation, industry, and management form a central cluster, highlighting their interconnectedness and centrality to the field. Certain keywords, such as "institutional theory," "aviation," and "industry," are highly connected, appearing frequently with multiple other keywords. These central keywords serve as core topics that link various sub-themes, demonstrating their fundamental role in the research literature.

The network also includes some isolated keywords or smaller clusters with fewer connections. These isolated keywords may represent niche research topics or emerging areas of study that are not yet widely integrated into the broader research landscape. The central cluster includes keywords such as "institutional theory," "aviation," "industry," and "management." These keywords' close connections suggest a strong focus on applying institutional theory to various aspects of the aviation industry and management practices, representing the core of the research. Another cluster includes keywords like "new institutional theory," "European," and "organizational efficiency," indicating a focus on regional studies (particularly Europe) and the application of institutional theory to understand organizational efficiency. This cluster may represent research that examines how institutional theory is adapted and applied in different regional







focus on institutional theory, suggesting a strong emphasis on understanding how institutional factors influence aviation practices and education. The keyword "industry" also stands out, indicating substantial emphasis on the aviation industry, with research likely exploring industry-specific challenges, regulatory environments, and best practices. "Path dependency" suggests that many studies examine historical choices and their long-term impacts on the aviation industry and education practices, crucial for understanding how past decisions shape current and future organizational behaviors. Other keywords like "paper," "theory," and "purpose" point to the academic nature of the studies, focusing on theoretical frameworks, research objectives, and documentation of findings. The keyword "organizations" highlights research on various entities within the aviation sector, including flight schools, regulatory bodies, and aviation companies, focusing on how these organizations operate, collaborate, and evolve. The presence of "management" suggests a focus on management practices within the aviation industry, including strategies, leadership, and organizational effectiveness. Keywords like "different," "national," and "business" imply a diversity of topics covered in the research, with "different" possibly referring to comparative studies, "national" indicating a focus on national contexts or regulations, and "business" pointing to the intersection of aviation and business practices. The mention of "HROs" (High Reliability Organizations) implies that some studies focus on organizations known for their stringent safety and reliability standards, crucial in the aviation context.

The keyword "programs" suggests a significant portion of the research examines educational programs, including curricula, training methods, and educational outcomes in aviation education, highlighting the importance of robust programs in shaping the future of the aviation industry. The high frequency of keywords related to aviation, institutional theory, and the industry indicates the primary focus of the research is on understanding and improving practices within the aviation sector through the lens of institutional theory. The prominence of "path dependency" and "organizations" suggests a strong interest in how historical decisions and organizational structures influence current practices, critical for developing strategies that build on past experiences while adapting to future challenges. Keywords like "management" and "programs" highlight the importance of effective management practices and robust educational programs in shaping the future of the aviation industry. The variety of keywords indicates a comprehensive approach to studying aviation, covering a wide range of topics from theoretical frameworks to practical applications in different national and business contexts. Overall, the word cloud of keywords provides a snapshot of the major themes and areas of focus in the research on institutional theory and aviation education. The dominant presence of keywords related to aviation and institutional theory underscores the central focus of the research. The inclusion of terms related to industry, path dependency, organizations, and management indicates a broad and diverse research landscape aimed at understanding and improving various aspects of the aviation sector. This keyword analysis highlights the multifaceted nature of the research, encompassing historical, organizational, managerial, and educational perspectives to advance the field of aviation education and practice.

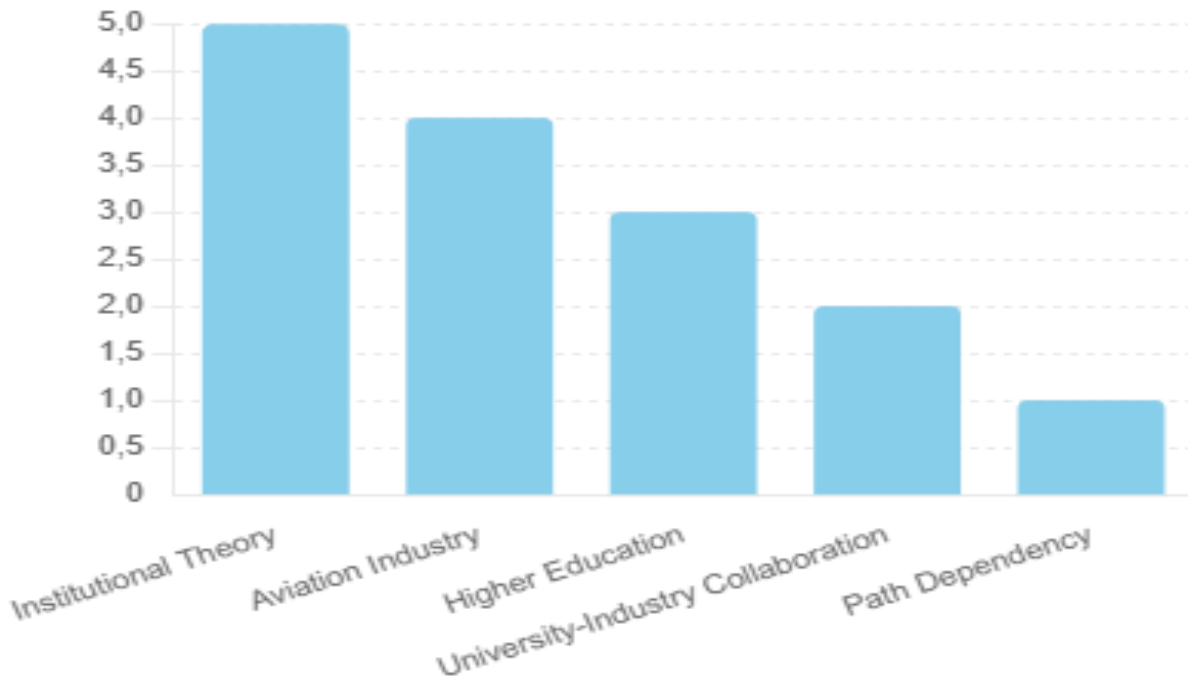


Figure-6 “Major Themes Identified in The Abstracts”

The Figure-6 visualizes the distribution of major themes identified in the abstracts of research articles on institutional theory and aviation education. With "institutional theory" being the most prominent theme, it indicates a significant focus on applying and exploring institutional theory within the context of aviation education and industry practices. This suggests that researchers are keen on understanding how institutional factors and frameworks influence various aspects of aviation. The second most frequent theme, "aviation industry," highlights the substantial emphasis on industry-specific challenges, practices, and developments. A considerable portion of the research is dedicated to examining the dynamics, regulations, and trends within the aviation industry. This indicates that researchers are exploring various facets of the aviation sector to understand its complexities and to propose improvements. "Higher education" appears prominently, indicating that a significant amount of research is focused on higher education in aviation. This could involve studies on curriculum development, educational methodologies, training programs, and the role of higher education institutions in preparing aviation professionals. The emphasis on higher education underscores the importance of developing robust educational frameworks to meet the demands of the aviation industry. The presence of the "university-industry collaboration" theme underscores the importance of partnerships between universities and the aviation industry. Research in this area likely explores how collaborative efforts can enhance educational programs, facilitate knowledge transfer, and improve industry practices. This theme highlights the critical role of synergies between academia and industry in driving innovation and excellence in aviation education.

Although less frequent, the theme of "path dependency" is noteworthy. This theme suggests that some studies focus on the historical choices and institutional legacies that shape current practices and structures within the aviation sector. Understanding path dependency is crucial for developing strategies that consider historical context and institutional inertia. This perspective is essential for designing informed and sustainable strategies for the future. The high frequency of "institutional theory" indicates that it is a foundational concept in the research. Studies under this theme likely explore how institutional frameworks and theories can be applied to understand and improve aviation education and industry practices. The prominence of the "aviation industry" theme suggests a strong focus on

addressing industry-specific issues, such as regulatory challenges, market dynamics, technological advancements, and best practices. The significant presence of "higher education" and "university-industry collaboration" themes highlights the critical role of education and partnerships in the aviation sector. Research in these areas emphasizes the need for robust educational programs and effective collaboration between academia and industry to meet the evolving demands of the aviation field. The inclusion of "path dependency" as a theme indicates that researchers recognize the importance of historical context in shaping current practices. This perspective is essential for understanding the evolution of institutional practices and for designing strategies that account for past decisions and their long-term impacts.

## 5. DISCUSSION AND CONCLUSION

The analysis of the bibliometric and content data reveals several key insights into the research landscape of institutional theory and aviation education. The word cloud and topic modelling results highlight the dominant themes and frequently occurring terms within this domain. The analysis identified several dominant themes, including aviation, organization, institutional theory, industry, path dependency, business, management, safety, and regulation. These themes indicate that the research is heavily centered around the practical and theoretical aspects of aviation, emphasizing the role of organizations and institutions in shaping industry practices and educational frameworks. Institutional theory is a recurrent theme, reflecting its importance in understanding how aviation organizations conform to regulatory, cultural, and normative pressures. The concept of path dependency is particularly significant, suggesting that historical decisions and institutional legacies play a critical role in shaping current practices within the aviation sector. This focus on path dependency underscores the need for a historical perspective when analyzing the evolution of aviation institutions and their impact on current and future practices. The prominence of terms related to organization and management indicates a substantial focus on how aviation entities are structured and managed. Research in this area likely explores best practices for improving organizational efficiency, safety management, and overall performance within aviation contexts. The frequent mention of business aspects suggests that economic and strategic considerations are also central to the research, highlighting the intersection of aviation with broader business practices. Safety is a critical concern in aviation, as evidenced by its frequent occurrence in the analysis. Research on safety likely addresses regulatory compliance, risk management, and the development of safety protocols to ensure the well-being of passengers and personnel. The emphasis on regulation reflects the complex regulatory environment in which aviation operates, with studies examining the impact of national and international regulations on aviation practices and education.

The bibliometric and content analysis provides a comprehensive overview of the key themes and research focuses within the field of institutional theory and aviation education. The findings highlight the critical role of institutional pressures and historical legacies in shaping aviation practices, the importance of effective organizational and management strategies, and the ongoing emphasis on safety and regulatory compliance. Given the significance of path dependency, future research should continue to integrate historical analyses to better understand the evolution of aviation institutions and their current practices. There is a need for further exploration of innovative organizational structures and management practices that can enhance efficiency and safety in aviation. As regulation remains a crucial aspect of aviation, more studies are needed to assess the effectiveness of existing regulations and to propose improvements that balance safety and operational efficiency. The intersection of aviation with business, management, and institutional theory suggests that cross-disciplinary approaches can provide deeper insights and more holistic

solutions to the challenges faced by the aviation sector. This study has several limitations that should be considered. Firstly, the dataset used for analysis is limited to publications indexed in the Web of Science, which may not represent the entire body of research on institutional theory and aviation education. Additionally, the text preprocessing and analysis were conducted using basic NLP tools, which might not capture the full complexity of the textual data. Further, the topic modelling approach used here is relatively simple and may not fully reflect the nuances of the research topics. Future research could benefit from using more advanced NLP techniques and machine learning models to analyze the textual data. Techniques such as deep learning-based text analysis could provide more sophisticated insights into the underlying themes and trends. Additionally, expanding the dataset to include publications from other databases and sources would provide a more comprehensive view of the research landscape. Longitudinal studies examining how themes and research focuses have evolved over time would also be valuable. Moreover, exploring the impact of emerging technologies, such as artificial intelligence and machine learning, on aviation practices and education could be a promising area of future research. The field of institutional theory and aviation education is rich with complex and interrelated themes that require ongoing research and analysis. By continuing to explore these themes, researchers can contribute to the development of more robust, efficient, and safe aviation practices that are well-equipped to meet the demands of an ever-evolving industry.

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