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Generational diversity in airlines: A systematic review with framework synthesis

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ABSTRACT

In response to the growing recognition of generational diversity in the aviation workforce, we conducted a systematic review of airline research. This review advances air transport scholarship in four ways. Empirically, it offers novel evidence from 31 English-language studies published between May 2003 and November 2024 by 39 authors. Methodologically, it follows an innovative reporting design that integrates framework synthesis—familiarisation, thematic framework, indexing, charting, and synthesis—with PRISMA guidelines. Conceptually, it develops a unique two-dimensional thematic framework for synthesising empirical evidence in the topic. The first dimension, *generational identity*, links airline and pilot association practices with theories of organisational demography and social constructionism. The second, *research focus*, distinguishes studies of cross-generational differences from those examining intra-generational attitudes and behaviours. Practically, the review highlights differences between Baby Boomers and Millennials in risk orientation, learning styles, and organisational commitment. It also identifies intra-generational profiles across the four generations currently employed in airlines. Finally, it proposes three directions for future research: first, examining potential heterogeneity within a generation (*contextual*); second, developing culture-specific generational compositions (*conceptual*); and third, applying the repertory grid technique to capture generational perspectives (*methodological*).

1. Introduction

The rationale for this study builds on Wandelt and Wang (2024), who contend that generational diversity has been "largely underrepresented in the extant literature and deserves much more attention from researchers and other aviation stakeholders" (p. 10). We argue instead that substantial literature exists but remains underexplored. To strengthen this claim, we conduct a systematic review with two objectives: first, to identify relevant studies and synthesise empirical evidence; and second, to map trends, highlight gaps, and propose directions for future research. In doing so, we offer the following interdisciplinary contributions to the literature.

From an empirical perspective, this study provides rare evidence of multigenerational inclusion in the airline workforce. The review synthesises findings on generational differences and profiles in attitudes, behaviours, and skills across 31 studies published between May 2003 and November 2024. In doing so, it responds to the recent call by Papavasileiou et al. (2025a), who's meta-review of human operators in air transport research emphasises the need to better understand generational differences.

From a methodological perspective, this study addresses the tendency of prior systematic reviews to rely on bespoke reporting and synthesis approaches. For instance, Ashraf et al. (2021) noted that key elements of the review process were often omitted in psychology and behaviour management studies on blended learning, while Pahlevan-Sharif et al. (2019) reported similar shortcomings in tourism and hospitality research. To overcome these limitations, we adopt an innovative design that integrates the five stages of framework synthesis—familiarisation, thematic framework, indexing, charting, and synthesis (Papavasileiou & Stergiou, 2025)—with the PRISMA 2020 guidelines (Page et al., 2021). In doing so, we respond directly to Simsek et al. (2023, p. 292), who call for greater systematicity and methodological rigour in literature reviews.

From a conceptual perspective, we develop a comprehensive two-

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dimensional thematic framework to synthesise the empirical evidence. The first dimension, *generational identity*, aligns practices from pilot associations and airlines with theories of organisational demography and social constructionism. The second, *research focus*, differentiates studies that examine cross-generational differences from those exploring intra-generational attitudes and behaviours. This framework demonstrates novel applications of contemporary theories that extend beyond their sectoral origins. In doing so, we respond to Ladkin et al. (2023, p. 12), who urge workforce scholars to treat sectoral contexts as "a test bed for new concepts or the development of new theories."

The practical implications of this review are particularly relevant for airline human resource managers, who can benchmark their multigenerational inclusion practices against our findings. Beyond aviation, the results have interdisciplinary applicability, responding to Suel et al. (2024, p. 1248), who call for "serious impact to be made beyond the traditional narrow focus of traffic and transportation, as transportation modelling sits at the centre of urban and regional decision-making and socio-economic progress."

The remainder of the paper follows the phases of framework synthesis. Section 2 (familiarisation) reviews generational diversity practices and prior studies, identifying the research gap, objectives, and review questions. Section 3 (framework) develops the thematic space for synthesising findings. Section 4 (indexing) outlines the systematic review process. Section 5 (charting) presents the main characteristics of the included studies. Section 6 (synthesis) maps the empirical evidence within the thematic framework. Section 7 highlights contextual, methodological, and conceptual trends and proposes future directions. Section 8 concludes by summarising the findings and acknowledging the review's limitations.

2. Familiarisation with airline practices and prior reviews of generational diversity

The airline sector connects people while driving economic growth and employment. In 2023, 1138 airlines worldwide transported 4.4 billion passengers through 4072 commercial airports and handled 61.4 million tonnes of freight (ATAG, 2024). The industry generated 3.1 million direct jobs—including flight crews, cabin crews, executives, and ground staff—with total wages amounting to $211 billion (ATAG, 2024). In leading American airlines, this workforce spans four generations: Baby Boomers (1946–1964), Generation X (1965–1980), Millennials (1981–1996), and Generation Z (1997–2012) (see Fig. 1). According to Sonal Chugani, Diversity & Inclusion Lead at Cathay Airways, each generation has distinct expectations regarding benefits, financial rewards, caregiving support, and opportunities for career and personal development. Meeting these diverse expectations poses a significant challenge for airlines (HR Journal, 2024).

Within this context, leading airlines have embedded multigenerational inclusion into their Diversity, Equality, and Inclusion (DEI) initiatives by establishing Business Resource Groups (BRGs). These groups provide employees from different generations with an official platform for collective action, fostering understanding and acceptance of social identity groups through shared expectations and experiences (Beaver, 2023). For example, GENGAGE enables Delta's multigenerational workforce to collaborate and preserve the airline's legacy for future generations. Generation Now at American Airlines promotes awareness of the roles and contributions of all generations. Similarly, Alaska Airlines launched the Young Airgroup Professionals (YAP) programme to strengthen belonging and offer development opportunities for employees in their early to mid-career stages.

From an academic perspective, the topic has attracted considerable attention. As shown in Fig. 2, nearly every year over the past 15 years a relevant review has been published. Yet, despite this interdisciplinary coverage and the substantial volume of articles, empirical evidence from the airline sector remains scarce. Indeed, airlines are represented only as small subsets within broader tourism samples—for example, 9% in Huang (2022) and 14.6% in Tsaur and Yen (2018). The sole sector-specific empirical study identified is Murphy et al. (2004), which examined cross-cultural generational values among pilots in the United States and Japan and was later included in Parry and Urwin's (2011) review.

This narrow focus overlooks the sector's global importance and its commitment to multigenerational inclusion. We address this limitation by conducting a systematic literature review on the topic guided by the following review questions:

RQ1. *How does the empirical literature characterise and analyse generational diversity within different organisational and cultural contexts of airline workforces?"*

"**RQ2**. *What methodological approaches have been employed to investigate generational diversity in airline workforces, and what are their implications for understanding this phenomenon?"*

"**RQ3**. *What patterns and variations emerge in the empirical findings regarding generational diversity in airline workforces?*

3. Thematic framework

This section presents a thematic framework for synthesising the evidence obtained from the systematic literature review (research objective 1). It depicts a two-dimensional space categorising the literature by analytical focus and identity perspective (Fig. 3). The *analytical focus*

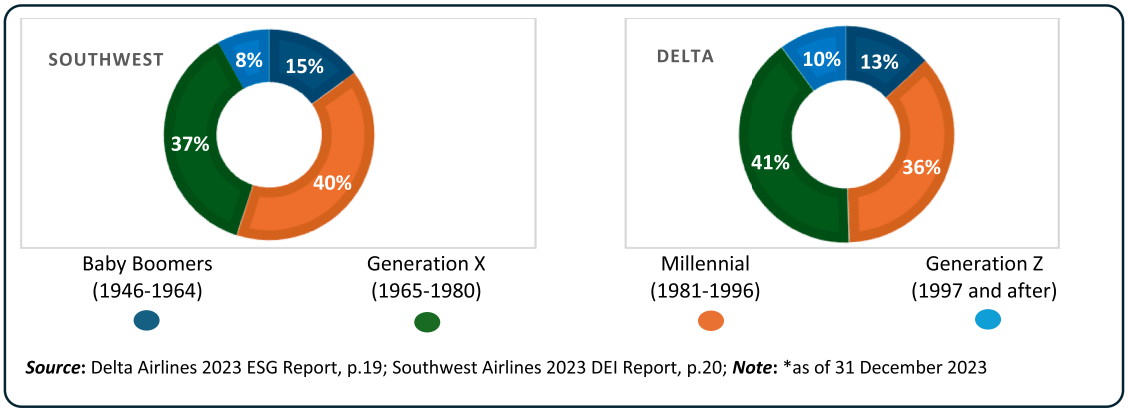

Fig. 1. Workforce diversity in leadings airlines by generation (2023*).
Source: Delta Airlines 2023 ESG Report, p.19; Southwest Airlines 2023 DEI Report, p.20.
Note: *as of 31 December 2023.

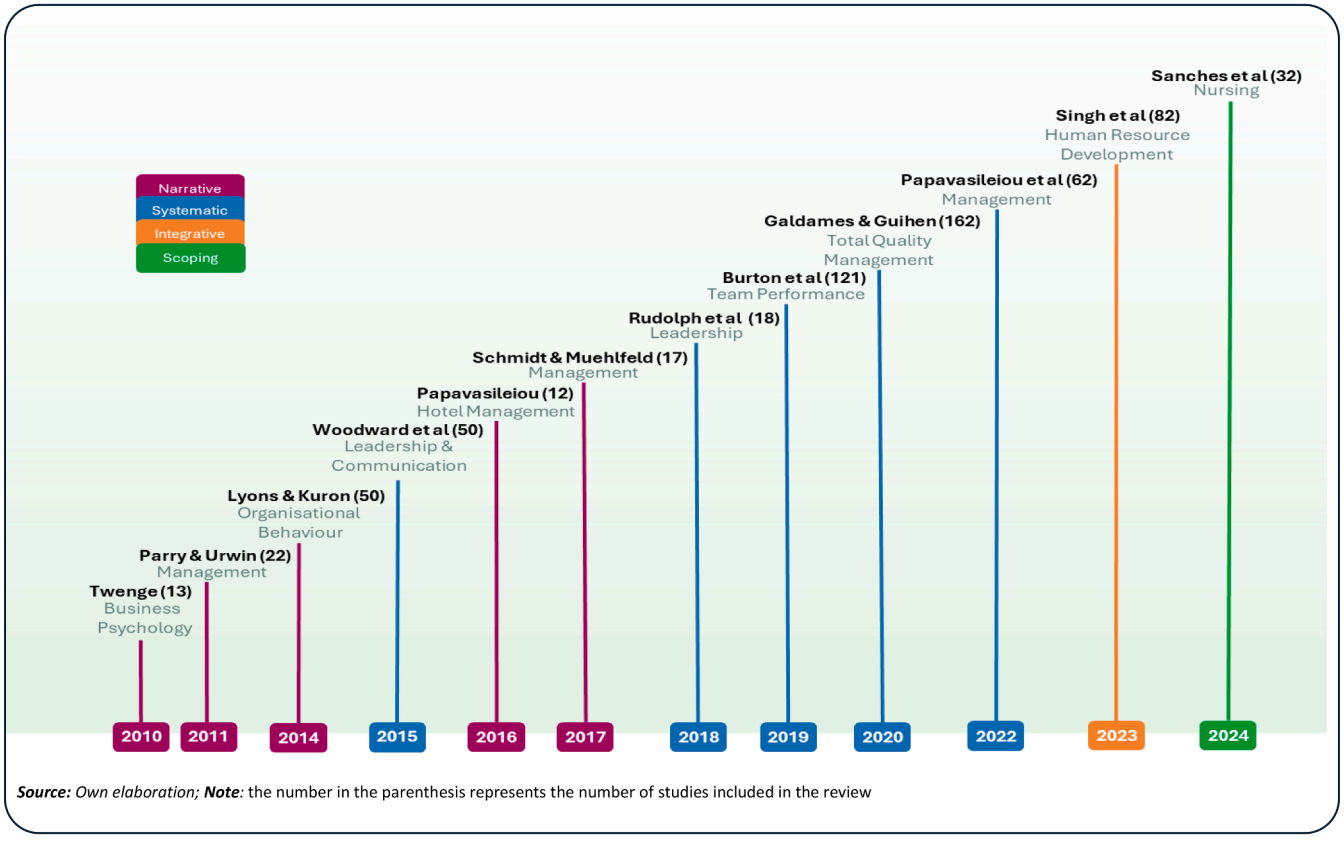

Fig. 2. The evolution of literature reviews regarding generational diversity in the workplace (2000–2024) (Twenge, 2010; Parry and Urwin, 2011; Lyons and Kuron, 2014; Woodward et al., 2015; Papavasileiou, 2016; Schmidt and Muehlfeld, 2017; Rudolph et al., 2018; Burton et al., 2019;.Galdames and Guihen, 2022; Papavasileiou et al., 2022; Singh et al., 2023; Sanches et al., 2024).
Source: Own elaboration.

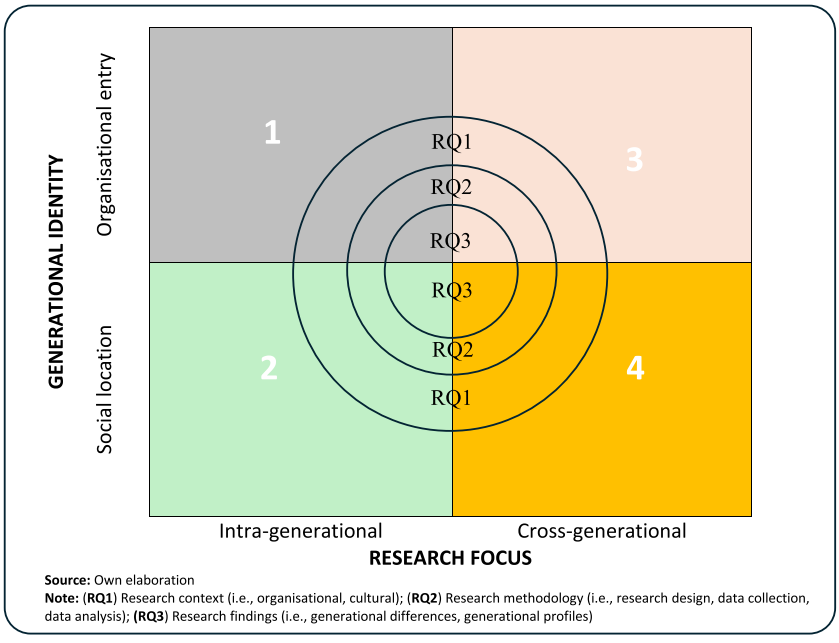

Fig. 3. Two-dimensional space for synthesising generational research in the workforce.
Source: Own elaboration
Note: (RQ1) Research context (i.e., organisational, cultural); (RQ2) Research methodology (i.e., research design, data collection, data analysis); (RQ3) Research findings (i.e., generational differences, generational profiles).

distinguishes studies of cross-generational differences from those examining intra-generational attitudes and behaviours. The *identity perspective* links generational practices in airlines and pilot associations with theoretical perspectives on identity formation, grounded in organisational demography and social constructionism (Joshi et al., 2010, 2011; North, 2019).

From an organisational demography perspective, generational identity is shaped by entry into the airline context, creating a shared set of skills and experiences among members of the same cohort (North, 2019). Individuals who join an organisation simultaneously undergo similar training, socialisation, and contractual arrangements (Joshi et al., 2011). For example, new cohorts such as Alaska Airlines' YAPs develop distinct skills and experiences influenced by their training, socialisation, and external environment at the point of entry. In this context, the attitudes, behaviours, and skills of senior cohorts (preceding generations) and junior cohorts (succeeding generations such as YAPs) emerge through successive organisational entry. Consequently, interaction, learning, knowledge sharing, and employee engagement across generations depend on factors such as "access to or control over a set of skills or valued resources, or a unique set of experiences that one generation acquires by virtue of its location in a chronological order" (Joshi et al., 2010, p. 396).

From a social constructivist perspective, generational identity is understood as a phenomenon tied to social location. As Pilcher (1994, p. 490) explains, "in order to share generational location in a sociologically meaningful sense, individuals must be born within the same historical and cultural context and be exposed to experiences that occur during their formative adult years." In this view, birth dates and formative historical events position each generation within broader social structures (Papavasileiou, 2017). For instance, the Air Line Pilots Association, International (ALPA) recognises four generational locations within the Canadian and U.S. workforce: Baby Boomers, Generation X, Millennials,

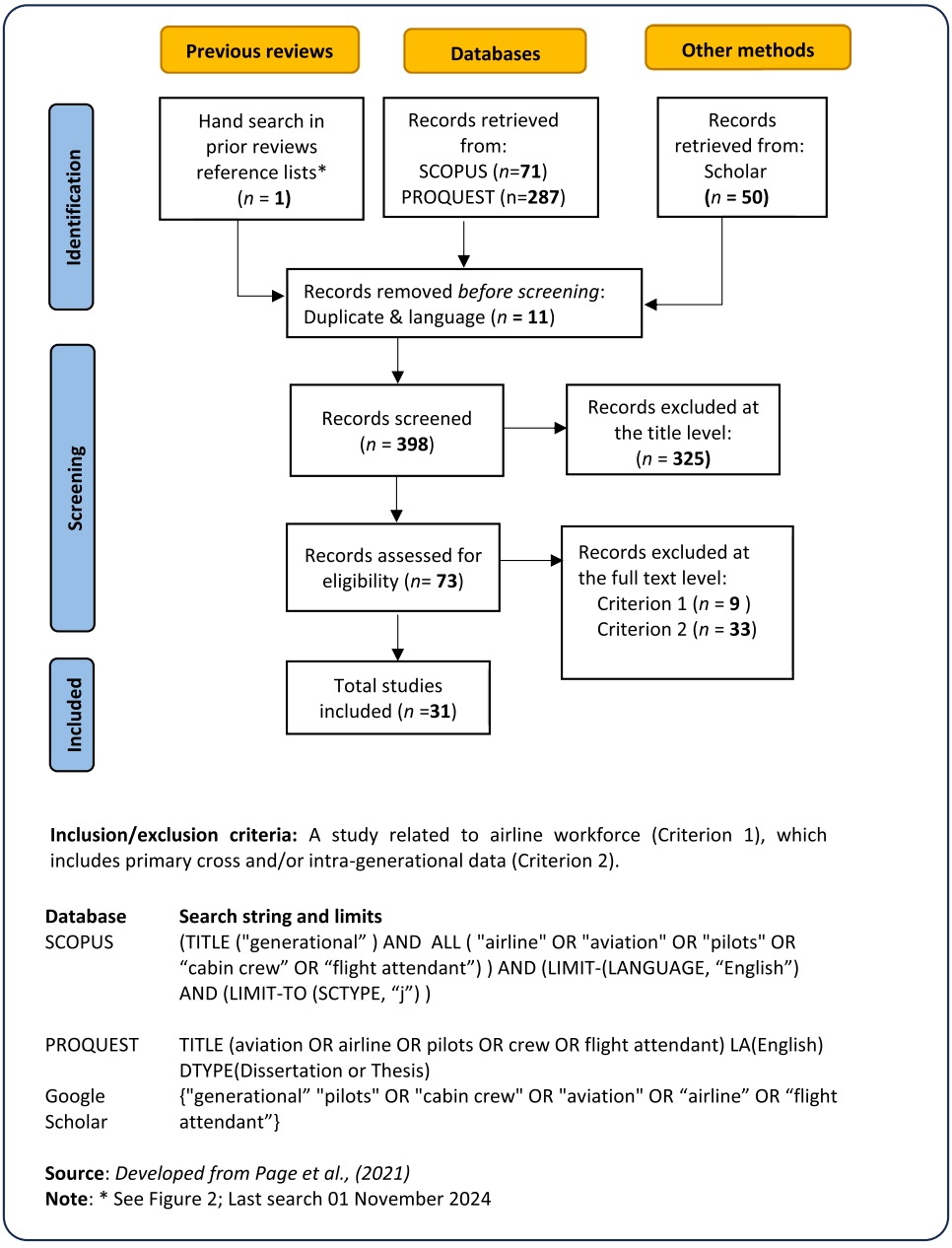

Fig. 4. PRISMA 2020 flow diagram and search strategy for capturing the generational research on airline workforce.
Source: Developed from Page et al., (2021)
Note: * See Figure 2; Last search 01 November 2024).

and Generation Z (Air Line Pilot Magazine, 2023). Each generation, situated in its specific social location, exhibits "certain definite modes of behaviour, feeling and thought" (Mannheim, 1952, p. 291), preserved through a "distinct consciousness" that shapes future work-related attitudes and behaviours (Joshi et al., 2010).

Overall, this produces a 2 × 2 thematic framework: (1) intra-generational literature based on organisational entry (quadrant 1) and social location (quadrant 2); and (2) cross-generational literature based on organisational entry (quadrant 3) and social location (quadrant 4). Once each study is positioned within the appropriate quadrant, data are extracted according to the three review questions.

4. Indexing literature of generational diversity in airlines

The identification, screening, and inclusion of literature were conducted using a rigorous, transparent, and replicable reporting approach. This process encompassed key components such as eligibility criteria, search strategy, selection procedures, and data extraction. It followed the PRISMA 2020 guidelines (Page et al., 2021), as documented in the flowchart (Fig. 4), eligibility table (Appendix A), and 25-item checklist (Appendix B). This approach ensures that the review remains transparent, comprehensive, trustworthy, reproducible, and unbiased.

4.1. Eligibility principle

Eligible publications must meet two criteria (Fig. 4- middle). First, they must study the airline workforce (Criterion A). Second, they must report primary cross and/or intra-generational data (Criterion B).

4.2. Search strategy

Based on this principle, we searched for eligible publications across three sources: (a) prior literature reviews on the topic, (b) multidisciplinary databases of peer-reviewed articles and dissertations (e.g., Scopus and ProQuest), and (c) a web search engine indexing scholarly literature across formats and disciplines (e.g., Google Scholar). This multisource strategy aligns with recent paradigms in systematic reviews of air transportation research (Papavasileiou et al., 2025a, 2025b).

4.3. Identification

The identification of eligible publications began with a hand search of reference lists from prior reviews, as outlined in Section 2. We then searched for peer-reviewed studies published in English and indexed in the Scopus database. Scopus was selected because recent systematic reviews have shown that it provides broader coverage across multiple disciplines (Nounou et al., 2025), which is essential for capturing topics with interdisciplinary nuances (Basiyd-Fellahi et al., 2025). The search string combined keywords such as *generational, airline, aviation, pilots, cabin crew*, and *flight attendant* with Boolean operators (Fig. 4, bottom), yielding 71 records.

To minimise publication bias, we also searched for unpublished studies in the ProQuest Dissertations and Theses database (Papavasileiou et al., 2025a), which returned 287 records using a similar English-language search string. Finally, Google Scholar was included to further reduce the risk of overlooking relevant research (Sun et al., 2024). The first 100 results from a comparable search string were screened (Papavasileiou et al., 2025b). Altogether, the four sources produced 410 records.

4.4. Screening and selection

The first author screened 398 publications (after removing 11 duplicates) at the title and abstract level, excluding 325. The third author then assessed the remaining 73 in full against the eligibility criteria, with any disagreements resolved by the second author. This process excluded 42 studies that did not meet the criteria (Fig. 4). For instance, Omberg's (2009) thesis on multigenerational attitudes toward diversity focused on the aerospace sector, while Bush's (2021) phenomenological study of North American pilots' communication experiences did not address intra- or cross-generational issues. Ultimately, 31 publications were deemed eligible for inclusion in the review.

5. Charting literature of generational diversity in airlines

Data from the eligible publications were extracted into a Microsoft Excel file using a standardised matrix comprising four spreadsheets (Appendix C – Key characteristics). The first captured study details, including author, year, publication type, scope, generational identity facet, and topic. The second recorded organisational and cultural context. The third focused on methodological aspects, covering research design, data collection, and data analysis. The fourth categorised the findings.

The identified literature ($n = 31$) spans 20 years, from 2003 to 2023, comprising 11 peer-reviewed articles and 22 dissertations authored by 39 scholars. Fig. 5 charts this body of research into the four quadrants of the thematic framework. The intra-generational literature includes six publications (20%), all based on organisational entry (quadrant 2). The remaining cross-generational literature (80%) is almost evenly divided between studies grounded in social location (12 publications, quadrant 3) and organisational entry (11 publications, quadrant 4).

Two studies adopted a hybrid cross-generational approach. Rampal-Harrod (2006) examined generational differences in leadership styles and turnover intentions among airline employees, focusing on Generation X and an older cohort—Baby Boomers and members of the Silent Generation–defined by organisational entry. Similarly, Kleinfehn (2016) explored differences between Millennial pilots and an older cohort combining Baby Boomers and Generation X, also framed by organisational entry.

6. Synthesising literature of generational diversity in airlines

6.1. Cross-generational synthesis

Table 1 synthesises evidence from quadrant 4, the cross-generational literature reporting empirical findings rooted in the social location approach. Contextually, half of these studies examined generational differences among pilots and/or within U.S. cultural settings. Findings from this stream of research indicate that U.S. Baby Boomer pilots scored significantly higher than Millennials in risk and safety orientation (Gashgari, 2013). Reesman (2022) further identified that Generation Z pilots in the U.S. rated significantly higher than Generation X in learning styles related to the sensing–intuitive and sequential–global scales.

By contrast, studies conducted in different organisational and cultural contexts reported contradictory results. Zorlu and Nebol (2022) found that Turkish Baby Boomer flight attendants scored significantly higher than Millennials in affective commitment. Govender and Grobler (2017) reported that South African Baby Boomer airline. technicians scored significantly higher than Millennials in continuance commitment, yet significantly lower in affective commitment.

From a methodological perspective, Stelling (2023) is the only study that did not employ a cross-sectional design. This time-lag study found that German pilot trainees' aggressiveness decreased from Generation X to Generation Z, while rigidity (a facet of conscientiousness) increased. Most studies, however, relied on surveys and analysed data using analysis of variance (ANOVA). Leadens (2020), for example, reported clear generational differences in U.S. pilots' training method preferences through a one-way ANOVA: Millennial pilots performed significantly better than Baby Boomers in live classroom Q&A sessions and rated classroom training more highly.

Other studies used interviews and thematic analysis to explore generational differences. Sour (2019) found that U.S. Millennial pilots

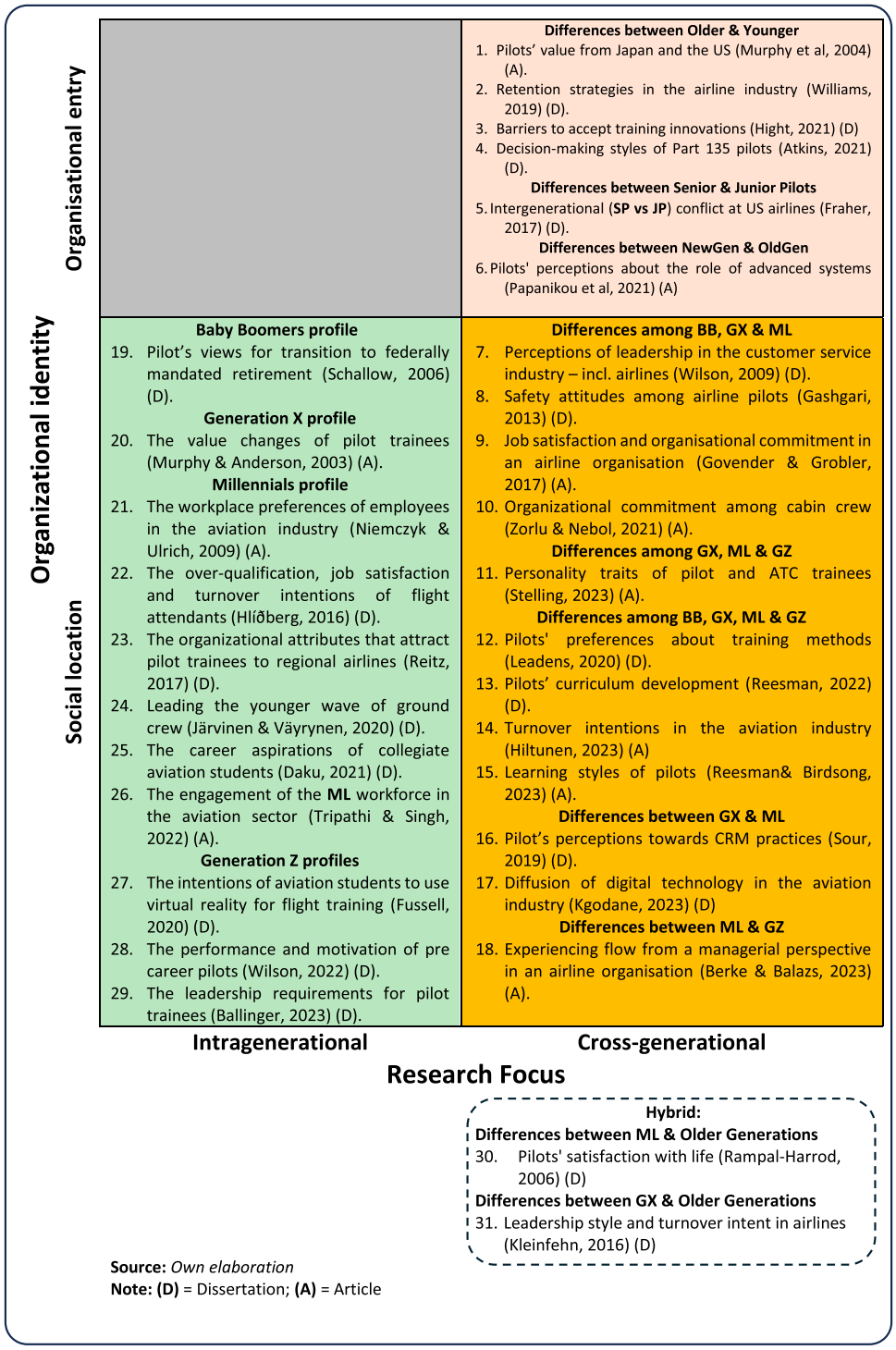

Fig. 5. Charting generational diversity research in the airline workforce ($n = 31$).
Source: Own elaboration.
Note: (D) = Dissertation; (A) = Article.

were more likely to "shut down" in challenging situations compared to Generation X pilots. Wilson (2009) revealed that U.S. Baby Boomer airline employees prioritised communication and courage as the most critical leadership traits for achieving organisational goals, whereas Generation X valued charisma and intelligence, and Millennials emphasised people management and communication skills. By contrast, Berke and Balazs (2023), through thematic analysis of interviews with airline managers in Hungary, identified no significant differences between Millennials and Generation X in their experience of flow or its frequency.

Table 2 synthesises evidence from quadrant 3, the cross-generational literature providing empirical findings based on organisational entry. Contextually, most studies focused on pilots, with the exception of Williams (2019), who examined airline change managers in the U.S. and Canada. This study underscored the importance of retention strategies that harness the expertise of older, skilled generations to facilitate knowledge transfer to younger cohorts.

Papanikou et al. (2021) is the only study situated outside a U.S.

Table 1
Evidence synthesis of cross-generational literature in airline workforce based on social location.

Study	Context (RQ1)		Methodology (RQ2)		Findings (RQ3)
	Organisational	Cultural	Collection	Analysis	Differences
Wilson (2009)	Airlines	US	Interviews	Thematic	The most important elements for a leader in achieving organizational goals are: **BB** (communicate and courage), **GX** (charisma and intelligence) and **ML** (People manager and communicate) (p.94).
Gashgari (2013)	Pilots	US	Survey	ANOVA	Risk and safety orientation **BB>ML** (p.37).
Govender and Grobler (2017)	Airlines (Technicians)	South Africa	Survey	ANOVA	(1) Affective (**ML>BB**); (2) Normative (**ML>BB**); (3) Continuance (**BB> ML**) (p.12)
Sour (2019)	Pilots	US	Interviews	Thematic	**ML** tended to "shut down" more than **GX** (p.147); **GX** were less able than **ML** to adapt with interpersonal conflict (p.148)
Leadens (2020)	Pilots	US	Survey	ANOVA	Classroom as training delivery method (**ML > BB**) (p.45).
Zorlu and Nebol (2022)	Flight attendants	Turkey	Survey	ANOVA	Organisational commitment (**BB>ML)** (p.361).
Reesman (2022)	Pilots	US	Survey	MANOVA	(**GX<GZ**) in Sensing-Intuitive and Sequential-Global learning styles (p.137)
Berke and Balazs (2023)	Airlines (managers)	Hungary	Interviews	Thematic	There is no significant difference between **ML** and **GZ** in terms of the experience of flow and the frequency with which it is achieved (abstract).
Hiltunen (2023)	Aviation	Finland	Survey	Descriptive	The majority who have considered changing their job were **ML** (71,9%) compared to **BB,** whom only 27,5% have considered the change (p.26).
Kgodane (2023)	Airlines (IT)	South Africa	Interviews	Thematic	Challenges in the diffusion of digital technology: **ML** (weak connectivity, poor network speeds, poor network access, poor internet coverage) (p.85). **GX** (poor infrastructure, high cost of data bundles, information security concerns and the cost of using technologies making travel more expensive) (p.86).
Reesman and Birdsong (2023)	Pilots	US	Survey	MANOVA	(**GX<GZ**) Sensing-Intuitive and Sequential-Global learning styles (p.159).
Stelling (2023)	Pilot trainees	Germany	Survey	ANCOVA	Aggressiveness decreased from **GX to GZ;** Rigidity (as a facet of conscientiousness) increased from **GX to GZ** (p.6).

Source: Own elaboration.
Note: IT=Information Technology; **SG**=Silent generation; **BB**=Baby Boomers; **GX**=Generation X; **ML**=Millennials; **GZ**=Generation Z;

Table 2
Evidence synthesis of cross-generational literature in airline workforce based on organisational entry.

Studies	Context (RQ1)		Methodology (RQ2)		Findings (RQ3)
	Organisational	Cultural	Collection	Analysis	Differences
Murphy et al. (2004)	Pilots	Japan & US	Survey	ANCOVA	(**OG vs YG**): Terminal values had significant differences (an exciting life, a sense of accomplishment, a world at peace, a word of beaty, family security, freedom, happiness, national security, pleasure, salvation, social recognition, true friendship and wisdom) (p.30); Instrumental values (ambitious, broadminded, clean, forgiving, honest, independent, logical, loving, obedient and self-controlled) (p.30)
Fraher (2017)	Pilots	US	Interviews	Thematic	Retirement age policy changes created an "ethos of survivalism" between **SP** and **JP** (p.8); an antagonistic environment, pitting cohorts against each other in competition over scarce resources (p.83).
Williams (2019)	Airlines (Change managers)	Canada & US	Interviews	Thematic	The retention strategies of airlines need to utilize the experience of the **OG** skilled and help the **YG** to reach out to the experience for knowledge (p.81).
Atkins (2021)	Pilots	US	Interviews	Thematic	(**OG vs YG**): No significant differences for pilots decision-making styles (p.121).
Hight (2021)	Pilots	US	Interviews	Thematic	Innovations in pilots training were related to gaming and immersive software, but these types of innovation were acceptable to the **YG** of pilots than to the **OG**, which was a barrier to accepting innovations (p.128).
Papanikou et al. (2021)	Pilots	Various	Focus groups	Thematic	**OldGen:** manual knowledge of systems; low acceptability of new systems; under-relies on automation; **NewGen:** advanced knowledge of systems; decreased cognitive capabilities in handling unusual circumstances; dependent on systems; over-relies on automation (p.1696)
Rampal-Harrod (2006)*	Airlines	US	Survey	Logistic regression	**GX vs older (SG+BB):** No significant differences in leadership style and turnover intention (p.81).
Kleinfehn (2016)*	Pilots	US	Survey	T-test	**ML vs older (BB+GX):** No significant differences in satisfaction with life (p.33).

Source: Own elaboration.
Note: Data are presented in chronological order; * Hybrid studies; SG=Silent generation; BB=Baby Boomers; GX=Generation X; ML=Millennials; GZ=Generation Z; OG=Older generation; YG=Younger generation; SP=Senior Pilots; JP=Junior Pilots.

cultural context. It categorised pilots from multiple countries into two groups: the *Old Generation* (OldGen) and the *New Generation* (NewGen), reflecting differences in skills, knowledge gaps, and work mentality. OldGen pilots demonstrated greater manual system knowledge, lower acceptance of new technologies, and an under-reliance on automation. By contrast, NewGen pilots exhibited advanced system knowledge but showed reduced cognitive capabilities in handling unusual circumstances, alongside dependency on systems and over-reliance on automation.

From a methodological perspective, nearly all studies relied on interviews, with the exception of Murphy et al. (2004), who collected survey data. Their analysis of covariance revealed significant differences between older and younger generations of pilots in the U.S. and Japan across 13 terminal values and 10 instrumental values. The remaining studies employed interviews and thematic analysis. This stream of research found that changes in retirement age policies for U.S. pilots fostered an antagonistic environment and an "ethos of survivalism," generating conflict between senior and junior cohorts competing for limited resources (Fraher, 2017). Hight (2021) further showed that training innovations involving gaming and immersive software were more acceptable to younger pilots (YG) than older pilots (OG), creating barriers to innovation adoption. By contrast, Atkins (2021) identified no

significant generational differences in decision-making styles among U. S. pilots. Similarly, Rampal-Harrod (2006) and Kleinfehn (2016)—the two hybrid studies—found no significant differences in leadership styles, turnover intentions, or life satisfaction across generational cohorts.

6.2. Intra-generational synthesis

Table 3 synthesises evidence from quadrant 2, the intra-generational literature offering empirical findings based on social location. Contextually, most generational profiles focused on pilot trainees in the U.S. Within this stream of research, U.S. Millennial pilot trainees reported that their primary reasons for selecting a regional airline were crew base location and hourly pay (Wilson, 2021).

In the Nordic cultural context, Hlíðberg (2016) found that Icelandic Millennial flight attendants' top five reasons for choosing their profession were wages, working conditions, fringe benefits, travel opportunities, and a change from their previous job. Notably, three-quarters of participants were overqualified for their positions and indicated an intention to leave within two years. Järvinen and Väyrynen (2020) profiled Finnish Millennial ground crew, identifying the following characteristics: (a) highly tech-savvy and independent in information seeking, (b) requiring managerial presence during onboarding and disruption situations, (c) eager to receive feedback and improve performance, (d) preferring speed in all aspects of work, and (e) valuing transparency in communication and disclosure of airline values.

Generational profiles were also reported for samples spanning multiple aviation roles. For instance, Niemczyk and Ulrich (2009) examined U.S. Millennials across pilot trainees, pilots, flight attendants, air traffic controllers, aviation administrators, and technicians. Their study found that Millennials' top work preferences included clear task orientation, involvement in decision-making, and peer cohesion. Tripathi and Singh (2022) analysed Indian Millennials comprising pilots, flight attendants, and ground crew. Their findings revealed gender-based differences: women scored significantly higher in affective employee engagement, whereas men scored significantly higher in psychological employee engagement.

From a methodological perspective, most profiles in this stream of research were constructed using quantitative survey data. Fussell (2020) and Wilson (2021) employed structural equation modelling to examine U.S. Generation Z pilot trainee profiles. Wilson (2021) identified a strong positive relationship between self-efficacy and academic outcomes, while Fussell (2020) found that perceived enjoyment, ease of use, and usefulness positively influenced attitudes toward adopting virtual reality technology for flight training.

The remaining studies reported generational profiles based on qualitative data collected through interviews and focus group discussions. Schallow (2008) conducted interviews with U.S. Baby Boomer pilots, providing deep insights into their perspectives on mandatory retirement (Table 3). Reitz (2017) used focus groups with U.S. Millennial pilot trainees, revealing that reputation, location, and pay were the primary factors attracting them to regional airlines. Ballinger (2023), through content analysis of interviews with U.S. Generation Z pilot trainees, concluded that a significant deficiency exists in their leadership skills.

Notably, all generational profiles in this stream of research were derived from cross-sectional designs. Murphy and Anderson (2003) stand out as the only study employing a longitudinal approach, tracing the values change of Japanese Generation X pilot trainees upon arrival in the U.S., after one and two years of training, and following their return to Japan (Table 3).

7. Current trends/gaps and future direction for research

Fig. 6 illustrates the trends and gaps emerging from the synthesis of empirical evidence. It also highlights future research directions, framed

Table 3
Evidence synthesis of intra-generational literature in airline workforce based on social location.

Studies	Context (RQ1)		Methodology (RQ2)		Findings (RQ3)
	Organisational	Cultural	Collection	Analysis	Generational profiles
Murphy and Anderson (2003)	Pilot trainees	Japan	Survey	ANOVA	**(GX)** The top 5 **IV** *upon arrival* in the U.S. were Responsible, Honest, Loving, Loyal, and Self-controlled (5). *After one year*, these had changed to Honest, Broadminded, Responsible, Forgiving, and Self-controlled. *After two years*, these values had changed to Honest, Responsible, Broadminded, Forgiving, and Self-controlled (5). ***After returning*** to Japan those values were Honest, Responsible, Broadminded, Loving, and Self-controlled (5) (p.123).
Schallow (2008)	Pilots	US	Interviews	Thematic	**(BB)** Perceptions of federally mandated retirement represents (p.135): Theme 1. Retirement planning; Theme 2. Fear of the unknown; Theme 3. Post-airline employment decision; Theme 4. I'm not an airline pilot anymore; Theme 5. Pre-retirement vision versus retirement reality.
Niemczyk and Ulrich (2009)	Various*	US	Survey	Descriptive	**(ML)** Top 3 work preferences: 1. Task orientation, 2. Involvement and 3. Peer cohesion (p.212).
Hlíðberg (2016)	Flight attendants	Iceland	Survey	Descriptive	**(ML)** Top 5 reasons to become flight attendants: 1. Wages, 2. Working hours, 3. Fringe benefits, 4. Travel and 5. Change from previous job (p.37) Overqualification: Three in four flight attendants were qualified beyond the requirements of the job (p.36) and over-qualified participants clearly had intentions to leave the job within two years (p38).
Reitz (2017)	Pilot trainees	US	Focus groups	Thematic	**(ML)** Organisational attributes that attract pilot trainees to regional airlines: Theme 1. Reputation; Theme 2. Location; Theme 3. Security; and Theme 4. Pay
Fussell (2020)	Pilot trainees	US	Survey	SEM	**(GZ)** Perceived enjoyment, perceived ease of use and perceived usefulness positively influence attitudes to use VR technology for flight training (p.162).
Järvinen and Väyrynen (2020)	Ground crew	Finland	Interviews	Thematic	Managers' perceptions of **ML**s (a) very tech-savvy and independent when seeking for information (p.83); (b) require the manager's presence especially when on-boarding them to work life and in disruption situations (p.87);(c) eager to receive feedback and to learn how to develop their own performance further (p.79); (d) prefer fastness in every everything they do; (e) value transparency regarding communication and disclosing the airlines' values (p.84).
Daku (2021)	Pilot trainees	US	Survey	Descriptive	**(ML)** The most important reason for choosing a particular regional airline were (a) crew base location and hourly pay (p.19).
Wilson (2021)	Pilot trainees	US	Survey	T-Test & SEM	**(GZ)** Self efficacy showed a strong positive relationship to academic outcome (p.71).
Tripathi and Singh (2022)	Various**	India	Survey	ANOVA	**(ML)** Women scored significantly higher than men in affective employee engagement whereas men scored significantly higher psychological employee engagement (p.3085)
Ballinger (2023)	Pilot trainees	US	Interviews	Thematic	**(GZ)** A significant deficiency in the leadership skills exists (p.107)

Note: Data are presented in chronological order; * Pilot trainees, pilots, flight attendants, Air traffic controllers, aviation administrators and technicians; ** Pilots, flight attendants, and ground crew; **BB**=Baby Boomers; **GX**=Generation X; **ML**=Millennials; **GZ**=Generation Z; **IV**=Instrumental Values.

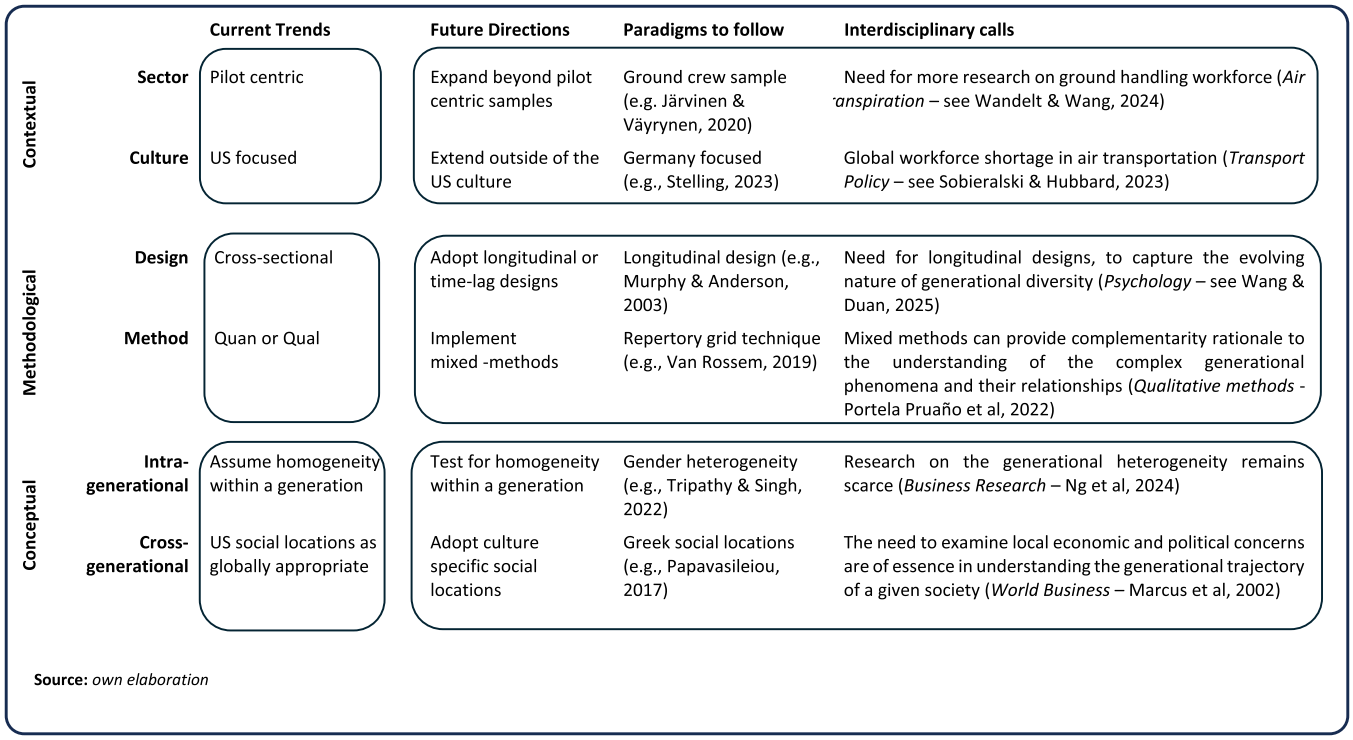

Fig. 6. Current contextual, methodological and conceptual trends, future directions, paradigms and interdisciplinary calls.

through relevant paradigms and interdisciplinary calls, thereby addressing research objective 2.

7.1. Extension of the pilot-centric organisational context

The evidence synthesis reveals that most studies examined generational diversity among pilots (55%). This emphasis is understandable, as pilots represent one of the most valuable assets of an airline (Cankaya et al., 2024). However, the ground handling workforce also constitutes a critical component of the aviation system, intersecting three major stakeholders: airports, airlines, and ground handling service providers (Wandelt & Wang, 2024). Our analysis identified only one study focused on ground crew. Järvinen and Väyrynen (2020) explored managers' perceptions of Millennial ground crew employees in Finland. Extending this work with more cross-generational research, including pairwise comparisons with Generation Z, would be a fruitful avenue for future inquiry. Such a paradigm would allow scholars to respond to recent calls from airport management research, which emphasise that "…a major challenge of the airport ground service industry will be to attract talents from the so-called Generation Z, i.e., born around the years 1995–2005″ (Wandelt & Wang, 2024, p. 10).

7.2. Expansion outside of the United States cultural context

The United States remains the most extensively studied cultural context, accounting for 65% of the literature. Nonetheless, valuable contributions have emerged from other countries, including South Africa (Kgodane, 2023), India (Tripathi & Singh, 2022), Iceland (Hlíðberg, 2016), Japan (Murphy et al., 2004), Hungary (Berke & Balasz, 2023), Germany (Stelling, 2023), Finland (Hiltunen, 2023), and Turkey (Zorlu & Nebol, 2022). Expanding research beyond the U.S. is particularly critical in light of the global workforce shortage in airlines. This aligns with recent calls from transportation policy scholars, who emphasise that "as air travel demand continues to recover toward pre-pandemic levels, the recent disruptions in air travel, to include cancellations and delays, has sparked concerns of the severe consequences of a personnel shortage at the airlines" (Sobieralski & Hubbard, 2023, p. 84).

7.3. Adoption of time-lag and longitudinal research designs

The reviewed literature predominantly relied on cross-sectional designs. Notable exceptions include the seminal longitudinal study by Murphy and Anderson (2003) and the recent time-lag study by Stelling (2023), both of which provided empirical evidence across time. Time-lag studies are particularly valuable as they establish temporal sequences, a prerequisite for determining causal relationships. Longitudinal designs are equally critical for capturing the evolving nature of generational diversity. By following participants over time, such studies can offer more convincing evidence of generational change (Rahman et al., 2025). This aligns with recent calls from psychology scholars, who emphasise that "future studies should employ more robust methodologies, like longitudinal designs, to capture the evolving nature of generational diversity" (Wang & Duan, 2025, p. 13).

7.4. Implementation of mixed methods (Repertory grid technique)

Our analysis indicates that empirical findings were derived from either qualitative data (42%), collected through interviews and focus group discussions, or quantitative data (58%), gathered through surveys. However, Wandelt and Wang (2024) recently noted a significant trend toward mixed-method approaches in aviation workforce studies. In alignment with this trend, the cognitive mapping methodology—specifically the repertory grid technique (RGT)—offers a promising avenue. For example, Van Rossem (2021) employed RGT to construct and analyse mental models based on participants' own frames of reference regarding motivators perceived by Baby Boomers, Generation X, and Millennials in Belgium.

Scholars pursuing this direction would also respond to recent calls from qualitative research experts (e.g., Portela Pruaño et al., 2022), who argue that integrating qualitative and quantitative methods enhances both the breadth and depth of understanding generational diversity and intergenerational collaboration. This "complementarity rationale"

underscores the value of methodological pluralism in capturing the complexity of these phenomena and their interrelationships.

7.5. Testing of heterogeneity within a generation

A closer examination of the literature's findings reveals a frequent neglect in the conceptualisation phase: the possibility of heterogeneity within a generation. Tripathi and Singh (2022) remain the sole study exploring gender's impact on Millennial engagement. This gap is significant, as generalisations about a generation must account for variations that may be linked to factors spanning across generational boundaries. Denker et al. (2008, p. 182), in their theoretical framework connecting generational memories to workplace attitudes and behaviours, caution that "…failure to account for potential heterogeneity in identities among individuals who experience the same event at the same life course stage increases the likelihood that scholars will find no link between generational identities and later behaviours."

Future research should therefore incorporate contextual factors—such as demographic, cultural, occupational, and organisational influences—in line with recent calls from human resource management scholars. Ng et al. (2024) concluded that "…we investigate the heterogeneity among Millennials on the basis of age, gender, relationship status, and nationality, and although significant differences were found, little variance was explained. We encourage future research to identify additional factors."

7.6. Develop culture-specific social locations

Generations based on social locations can be understood as an index that situates individuals within a socio-historical structure (Pilcher, 1994, p. 489). The post-World War II socio-historical context of the United States differs markedly from that of South Africa, India, Iceland, Japan, Hungary, Germany, Finland, and Turkey. Nevertheless, much of the literature outside the U.S. has adopted American generational categories—Baby Boomers, Generation X, Millennials, and Generation Z—as if universally applicable. Yet, social locations rooted in U.S. experiences cannot simply be mapped onto other national contexts (Parry & Urwin, 2011; Ng et al., 2024).

As outlined in our thematic framework, sharing a generational location in a sociologically meaningful way requires individuals to be born within the same historical and cultural context. Scholars investigating generational diversity through social locations should therefore develop conceptualisations based on events that gained significance within specific cultural settings (Parry & Urwin, 2011). For example, Papavasileiou (2017) proposed three social locations for the Greek workforce: the *Divided Generation* (1949–1966), the *Metapolitefsi Generation* (1967–1981), and the *Europeanised Generation* (1982–1996). Future research can adopt this rationale to empirically establish social locations unique to the historical and cultural context of each country. Scholars pursuing this direction will also respond to recent calls in world business research, which emphasise that "local economic and political concerns are of essence in understanding the generational trajectory of a given society" (Marcus et al., 2022, p. 4).

8. Conclusion

Building on prior systematic reviews across interdisciplinary fields—from psychology (e.g., Twenge et al., 2010) and management (Schmidt & Muehlfeld, 2017) to tourism (Papavasileiou et al., 2025c) and nursing (e.g., Sanches et al., 2024)—we focus on transportation, and specifically the airline industry, where such research remains novel. We provide an up-to-date synthesis of evidence on generational diversity across workforce categories ranging from pilot trainees and pilots to flight attendants and ground crew, as well as technicians, trainers, and change managers.

Our findings reveal significant cross-generational differences between Baby Boomers and Millennials in risk and safety orientation, learning styles, and organisational commitment. In addition, we offer intra-generational insights into the profiles of all four generations currently employed in airlines: Baby Boomers' perceptions of federally mandated retirement, Generation X's values change during flight training, Millennials' work preferences, career choices, and job attitudes, and Generation Z's leadership skills and self-efficacy.

From a reflexivity perspective, our review—consistent with the recommendations of Krlev et al. (2025)—extends beyond the narrow boundaries of prior literature and illuminates overlooked blind spots. Our timely guidance on research needs can support scholars, both within and beyond the transportation field, in engaging with generational diversity in the workplace in a more dynamic and impactful manner. Moreover, those only mildly interested in the topic, but deterred by the burgeoning literature, may benefit from our two-dimensional conceptualisation as an accessible entry point.

From a substantiveness perspective, our findings provide a more nuanced understanding of the challenges that arise when the airline sector manages its multi-generational workforce composition. As the workforce continues to evolve—with senior employees retiring and new hires joining—the needs and priorities of airlines shift accordingly. Our findings can serve as valuable resources for seminars and training, offering insights into how generational diversity influences learning, employee engagement, interaction, knowledge sharing, and information processing.

However, our review is not without limitations. First, records not indexed in the Scopus and ProQuest databases may have been excluded, potentially introducing selection bias into the number of studies ($n = 31$) included. Nevertheless, this figure compares favourably with recent reviews of generational diversity, such as Papavasileiou et al. (2025c) with 30 studies, and transportation research reviews by Gentilucci et al. (2025), Musau et al. (2023), and Samu et al. (2025), which included 24, 22, and 18 studies, respectively. Second, the emphasis on English-language studies may limit the generalisability of our findings. Future research can address this gap by adopting multilingual approaches. A strong example is Marqueze et al. (2023), whose systematic review of organisational risk factors for aircrew health incorporated studies published in English, Spanish, and Portuguese. This approach aligns with Papavasileiou and Stergiou's (2025, p. 114) call for generational diversity literature to benefit from bringing non-English studies out of the "shadows."

Third, the imbalance created by the inclusion of 22 dissertations in our synthesis may weaken the findings, as peer review is widely regarded as a safeguard for ensuring quality scholarship. Nevertheless, we view this as an opportunity to underscore the scarcity of peer-reviewed work on generational diversity in airlines. Despite the rise of publications on generational diversity in the workplace outlined in Section 2, our study identified only 11 peer-reviewed articles. This echoes du Plessis et al. (2024), who reported a similar scarcity of peer-reviewed academic work on climate change's impact on marine cargo insurance in cold chains. Likewise, despite the growth of climate change research, only 20 peer-reviewed studies were found between 1985 and 2021, with half of the evidence originating from dissertations, conference papers, and book chapters—forms of "grey literature" (Adams et al., 2017). Accordingly, we support Papavasileiou et al.'s (2025c, p. 130) call to incorporate grey literature into the study of generational identity to enrich understanding of generational diversity in the workplace. Adams et al. (2017) guidelines provide a solid foundation for systematically integrating grey literature into reviews.

CRediT authorship contribution statement

Emmanouil F. Papavasileiou: Writing – review & editing, Writing – original draft, Visualization, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **James Edmunds:** Writing – review & editing, Validation,

Supervision. **Dimitrios P. Stergiou:** Writing – review & editing, Validation, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jatrs.2025.100098.

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