

Facility Factors for Thai Elderly Affecting Service Quality in Passenger Terminals of International Airports in Northern Thailand

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Received February 26, 2026; **Revised** April 8, 2026; **Accepted** April 18, 2026

Abstract

As Thailand rapidly transitions into a super-aged society, adapting public transportation infrastructure to accommodate the biological and psychological realities of older adults has become a strategic necessity. This study aims to investigate the specific behaviors and facility requirements of Thai elderly passengers, examine how these physical needs correlate with perceived service quality, and propose guidelines for the development of age-friendly facilities in international passenger terminals in Northern Thailand.

Employing a quantitative, cross-sectional survey design, data were collected from a purposive sample of 400 Thai elderly passengers (aged 60 and above) who actively utilized these aviation hubs. A structured questionnaire was utilized to assess demographic profiles, the prioritization of nine specific facility factors, and perceived service quality across five dimensions. Data were analyzed using descriptive statistics, independent *t*-tests, One-way ANOVA, and Pearson's Product-Moment Correlation.

The findings revealed that elderly passengers rated their requirement for age-friendly facilities at the "Highest" level. The three most critical infrastructural priorities were elderly-accessible restrooms ($\bar{x} = 4.52$), continuous anti-slip walkways ($\bar{x} = 4.47$), and strategically distributed seating and waiting areas ($\bar{x} = 4.41$). Overall perceived service quality was also rated highly, predominantly driven by the *Tangibles* and *Empathy* dimensions. Hypothesis testing demonstrated that while gender had no significant effect, age, educational level, and crucially, the severity of physical limitations significantly altered service quality perceptions. Furthermore, a strong, statistically significant positive correlation ($r = 0.683, p < .001$) was identified between the provision of required facility factors and overall perceived service quality.

The study concludes that for the elderly demographic, physical infrastructure transcends mere convenience; it is a fundamental determinant of safety, dignity, and passenger experience. In an aviation context, tangible facilities functionally operationalize empathy and assurance. To prepare for the silver economy, the research recommends that airport authorities prioritize implementing universal design in sanitary facilities, optimize spatial mobility by using high-friction flooring, deploy ergonomic seating at high-stress bottlenecks, and mandate gerontological sensitivity training for ground personnel. Theoretically, this study contributes to aviation management literature by demonstrating that for vulnerable demographic groups, physical infrastructure strongly shapes the perception of empathy and assurance.

Keywords: elderly passengers; airport facilities; service quality; SERVQUAL; universal design

Introduction

The global demographic landscape is undergoing an unprecedented shift, marked by rapid population aging. Thailand, in particular, is currently at the forefront of this transition in Southeast Asia, having entered the status of a “super-aged society.” According to data from the *Statistical Yearbook Thailand 2024* (National Statistical Office, 2024), the proportion of the Thai population aged 60 and above has reached 20.8%, encompassing approximately 14.16 million individuals. This structural transformation in age demographics profoundly affects the country’s socioeconomic fabric, directly influencing demand for and utilization of public services. Consequently, public infrastructure—especially in the transportation and mobility sectors—must urgently shift from conventional designs to more inclusive models that accommodate the biological, psychological, and ergonomic realities of older adults.

Mobility is a fundamental component of “active aging,” contributing significantly to the physical and mental well-being of the elderly. In recent years, there has been a notable shift in the travel behaviors of older adults. The “silver economy” has become a major driver of domestic and international tourism. Specifically, an increasing number of elderly passengers are choosing air travel over ground transportation for tourism, visiting hometowns, and seeking specialized medical care. Air travel offers distinct advantages, primarily significantly shorter travel times, which effectively minimize the prolonged physical exertion, fatigue, and muscular strain associated with long-haul bus or train journeys (Graham et al., 2020). However, the aviation environment presents unique challenges that must be navigated.

Despite modern airports adhering to basic architectural standards and mandatory disability rights regulations (such as wheelchair ramps and accessible toilets), compliance does not always translate into a high-quality “passenger experience.” Airports are inherently complex, fast-paced, and high-stress environments. Elderly passengers frequently encounter severe operational and environmental barriers that induce both physical fatigue and cognitive overload (Graham et al., 2019).

Common obstacles include complex, highly digitized pre-flight procedures, prolonged standing times at critical touchpoints (e.g., check-in counters, immigration, and security screening), long walking distances to departure gates, and a lack of strategically placed seating or rest areas. Furthermore, age-related declines in visual and auditory acuity make navigating large terminals difficult when wayfinding signage is unclear or auditory announcements are distorted. As a result, the physical environment of an airport can shift from being a mere “facility” to a source of significant anxiety, ultimately diminishing the overall perceived service quality.

In Thailand, the Northern region is a premier destination for cultural tourism, wellness retreats, and retirement living, attracting large numbers of both domestic and international senior travelers. Chiang Mai International Airport (CNX) and Mae Fah Luang Chiang Rai International Airport (CEI) serve as the primary aviation gateways to this region. These regional hubs play a critical role in handling diverse passenger demographics. Upgrading and tailoring airport facilities to become truly “age-friendly” is no longer a peripheral corporate social responsibility (CSR) initiative, but a strategic necessity. Developing these facilities has direct implications for three key areas: (1) ensuring the uncompromising safety and quality of life of vulnerable users; (2) elevating the airport’s brand image and passenger satisfaction metrics; and (3) maintaining operational efficiency and competitiveness in the post-pandemic tourism boom.

While existing literature extensively covers general airport service quality, there remains a critical research gap regarding the micro-level physical infrastructure (e.g., anti-slip flooring, targeted seating distribution). Specifically, empirical research that systematically links these physical factors to the psychological dimensions of service quality among Thai elderly passengers in regional hubs is scarce. Airport authorities often lack localized, evidence-based data to determine which specific facility upgrades will yield the highest return in terms of passenger satisfaction.

Therefore, this study aims to bridge this gap by investigating the specific facility factors prioritized by Thai elderly passengers utilizing international airports in Northern Thailand. By examining how these physical needs correlate with perceived service quality, this research seeks to provide actionable, prioritized guidelines for airport management and policymakers to design inclusive, efficient, and empathetic passenger terminals ready for the super-aged era.

Research Objectives

1. To investigate the behaviors and facility needs of Thai elderly passengers utilizing the passenger terminals of international airports in Northern Thailand (Chiang Mai International Airport and Mae Fah Luang Chiang Rai International Airport).

2. To examine the relationship between the facility needs of Thai elderly passengers and their perceived service quality at these airports.

2. To propose guidelines for the development and design of age-friendly facilities to enhance service quality for elderly passengers.

Literature Review

The Implications of an Aging Society on Public Transportation Services

The transition into a super-aged society fundamentally alters the demands placed on public infrastructure. As the human body ages, it naturally experiences declines in sensory perception, motor function, and cognitive processing speed. In the context of public transportation, particularly aviation, these biological realities manifest as specific vulnerabilities. Airports are inherently vast, complex, and time-sensitive environments that can induce significant physical fatigue and psychological stress. For elderly passengers, navigating these spaces requires greater physical exertion and cognitive effort than for younger passengers (Graham et al., 2020; Chang & Chen, 2011).

Consequently, the concept of “Universal Design” in terminal architecture is no longer merely an aesthetic choice but a functional necessity. To accommodate the projected 14.16 million elderly individuals in Thailand, transportation hubs must proactively mitigate travel-related anxieties by designing environments that accommodate visual impairments, mobility restrictions, and a higher propensity for physical exhaustion. Infrastructure must shift from being a barrier to becoming a facilitator of independent, dignified travel.

Facility Requirements for Elderly Passengers in Airport Terminals

Based on universal design principles and gerontological studies, age-friendly facilities within airport terminals can be synthesized into four primary physical dimensions, which heavily influence passenger behavior and spatial movement:

Accessibility and Mobility: This dimension focuses on seamless movement from the curbside to the aircraft. It includes automated entrances, low-gradient ramps, appropriately sized elevators, and the elimination of physical thresholds that hinder wheelchair or walker use.

Information and Wayfinding: Cognitive decline and visual impairments necessitate intuitive navigation systems. This requires high-contrast, large-font signage, universally recognized pictograms, glare-free digital displays, and clear auditory public address systems that cut through terminal ambient noise.

Safety: Fall prevention is paramount for the elderly. Key elements include anti-slip flooring materials, continuous handrails along extended walkways, adequate and uniform lighting to eliminate blind spots, and the removal of tripping hazards in high-traffic zones.

Comfort and Waiting: Elderly passengers typically arrive at airports earlier than other demographic groups but possess lower physical stamina. Therefore, the strategic placement of ergonomic seating areas (particularly near security checkpoints and boarding gates), minimizing walking distances, and the frequent distribution of fully accessible restrooms equipped with grab bars are critical necessities (Graham et al., 2019).

To operationalize these concepts for this study, these dimensions were categorized into nine specific facility factors: (1) Entrances, (2) Information Systems, (3) Parking, (4) Elevators/Escalators, (5) Check-in Points, (6) Walkways/Flooring, (7) Restrooms, (8) Seating/Waiting Areas, and (9) Service Counters.

Service Quality (SERVQUAL) in the Aviation Context

Service quality in the aviation and hospitality sectors is predominantly measured through consumer perceptions. The SERVQUAL model, developed by Parasuraman et al. (1990), remains the gold standard for evaluating this metric. The model deconstructs service quality into five multidimensional constructs:

Reliability: The ability of the airport to perform the promised service dependably and accurately (e.g., functional elevators, accurate flight displays).

Responsiveness: The willingness of airport staff to assist passengers and provide prompt service, particularly crucial for elderly individuals requiring wheelchair or directional assistance.

Assurance: The knowledge and courtesy of employees and their ability to inspire trust and confidence, creating a feeling of safety for vulnerable travelers.

Empathy: The provision of caring, individualized attention. For the elderly, this often translates to recognizing their physical limitations and providing proactive, compassionate care.

Tangibles: The appearance of physical facilities, equipment, personnel, and communication materials.

The Nexus Between Physical Facilities and Perceived Service Quality

While *Tangibles* represent only one of the five SERVQUAL dimensions, empirical research indicates that in highly physical environments like airports, infrastructural tangibles act as a powerful catalyst—or “halo effect”—that significantly influences the perception of the other four intangible dimensions (Bezerra & Gomes, 2016; Bogicevic et al., 2013).

For example, a strategically placed, well-maintained accessible restroom (a Tangible factor) directly reduces a senior passenger’s physical distress, leading them to perceive the airport management as highly considerate and caring (Empathy). Similarly, clear and unambiguous wayfinding signage reduces spatial confusion, thereby increasing the passenger’s confidence and sense of security (Assurance). Conversely, long walking distances without rest areas can lead to exhaustion, causing the passenger to perceive the overall airport service as unreliable and unresponsive to their needs (Fodness & Murray, 2007; Halpern & Mwesiumo, 2021). Therefore, physical facilities are not merely structural components; they are the foundational drivers of holistic service-quality perceptions among the elderly.

The selection of the nine specific facility factors for this study is grounded in the synthesis of universal design principles and prior aviation mobility research. These nine touchpoints represent the complete continuum of an elderly passenger’s journey—from arrival (Parking, Entrances) to processing (Check-in, Information Systems) and waiting (Walkways, Restrooms, Seating). By systematically isolating these nine factors, this study can directly map concrete architectural elements to the abstract dimensions of SERVQUAL, thereby bridging the gap between physical design and psychological service perception.

Conceptual Framework and Research Hypotheses

Based on the literature synthesis, this study proposes a conceptual framework that examines the causal and correlational pathways between passenger characteristics, physical facility needs, and the resulting perception of service quality. The framework is structured as follows:

Independent Variables (IV):

Demographic Characteristics: Gender, Age, Education Level, and Physical Limitations.

Facility Factors (Needs): The level of requirement across 9 physical dimensions (Entrances, Information Systems, Parking, Elevators/Escalators, Check-in Points, Walkways/Flooring, Restrooms, Seating/Waiting Areas, and Service Counters).

Dependent Variable (DV):

Perceived Service Quality: Measured across the 5 dimensions of the SERVQUAL model (Tangibles, Empathy, Assurance, Responsiveness, and Reliability).

The Conceptual Framework was shown as Figure 1.

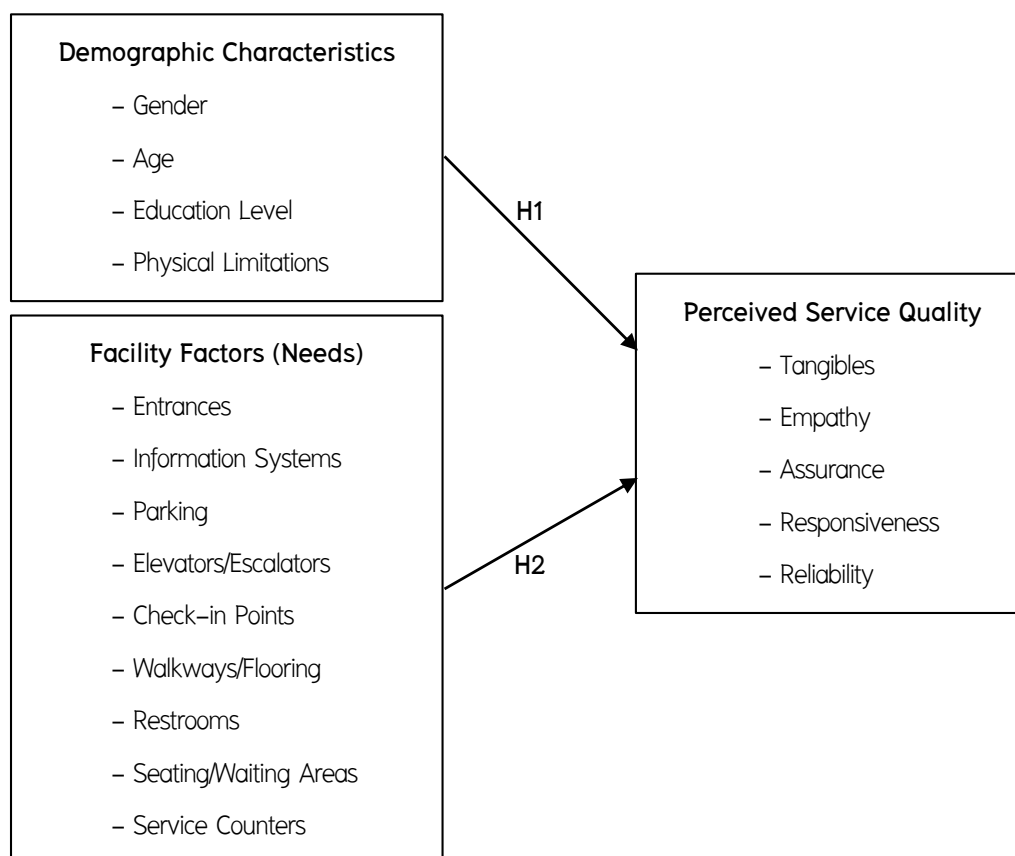


Figure 1 Conceptual Research Framework

Research Hypotheses

To empirically test the relationships proposed in the conceptual framework within the context of Northern Thailand's international airports, the following hypotheses were formulated:

Hypothesis 1 (H1): Demographic characteristics (specifically age, education level, and the extent of physical limitations) have a statistically significant relationship with the perceived service quality within the passenger terminal.

Hypothesis 2 (H2): There is a significant positive relationship between the required facility factors for elderly passengers and their overall perceived service quality.

Research Methodology

This study employed a quantitative, cross-sectional survey research design. This approach was selected as the most appropriate method to systematically measure the prevalence of specific facility needs, quantify perceived service quality, and statistically test the correlational relationships between these variables among a large sample of elderly passengers.

Population and Sample

Population: The target population consisted of Thai senior citizens, defined as individuals aged 60 years and above, who have direct experience utilizing the domestic or international passenger terminals of either Chiang Mai International Airport (CNX) or Mae Fah Luang Chiang Rai International Airport (CEI). To establish a demographic context, the national elderly population of Thailand in 2024 was utilized as a macro-reference (approximately 14.16 million individuals).

Sample Size: The sample size was calculated using the Taro Yamane formula with a confidence level of 95% and a maximum tolerable error margin of 0.05 ($e = 0.05$). This calculation yielded a minimum required sample of 399.9, which was rounded to 400 participants to ensure statistical robustness.

Sampling Technique: A purposive sampling (judgmental sampling) method was employed. The primary inclusion criteria required that participants (1) were Thai nationals aged 60 or older, (2) had actively used the specific airport terminals within the recent past or on the day of data collection, and (3) voluntarily consented to participate in the study. This purposive approach was chosen to ensure that data were collected strictly from elderly individuals who had authentic, real-time spatial experience navigating these specific airport environments, rather than the general elderly population.

Research Instruments

The primary instrument for data collection was a structured, self-administered questionnaire developed from the literature review and adapted specifically for the aviation context. The instrument was divided into four distinct sections:

Part 1: Demographic Profile. Included questions on gender, age group, education level, physical limitations (none, minor, significant), and previous airport usage experience.

Part 2: Facility Needs. Assessed the respondents' level of requirement across 9 specific physical facility dimensions (e.g., restrooms, walkways, seating, elevators, signage).

Part 3: Perceived Service Quality (SERVQUAL). Evaluated the airport's service quality across the five standard dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy.

Part 4: Open-ended Suggestions. A qualitative section that allows respondents to provide specific, unstructured feedback on facility improvements.

Parts 2 and 3 utilized a 5-point Likert scale ranging from 1 (Lowest/Strongly Disagree) to 5 (Highest/Strongly Agree). The class interval interpretation was standardized as follows: 4.21–5.00 (Highest), 3.41–4.20 (High), 2.61–3.40 (Moderate), 1.81–2.60 (Low), and 1.00–1.80 (Lowest).

Validity and Reliability

To ensure the psychometric properties of the instrument:

Content Validity: The preliminary questionnaire was reviewed by a panel of three academic and industry experts. The Index of Item-Objective Congruence (IOC) was calculated. All retained items achieved an IOC score ranging from 0.67 to 1.00, indicating acceptable alignment with the research objectives.

Reliability: A pilot study was conducted with 30 elderly participants possessing similar characteristics to the target sample but excluded from the final data set. Internal consistency was measured using Cronbach's Alpha coefficient. The instrument yielded an overall Cronbach's Alpha score of 0.92, indicating high reliability and confirming that the elderly population consistently understood the questions.

Data Collection Procedures

Primary data collection (fieldwork) was conducted over 8 months, strategically planned from March 2025 to October 2025 to capture variations in passenger volume (peak and off-peak

travel seasons). Data was gathered directly within the departure and arrival halls of the specified airports.

Fieldwork Protocol for the Elderly: Recognizing the physical and cognitive limitations inherent to the elderly (e.g., presbyopia, rapid visual fatigue, or difficulty comprehending complex academic phrasing), the researchers actively assisted in the process. Where necessary, the survey was administered as a structured, face-to-face interview. Researchers read the questions aloud clearly and recorded the respondents' answers objectively and neutrally, ensuring data integrity was not compromised by the respondents' physical constraints. To minimize interviewer bias during this process, researchers were rigorously trained to use a neutral tone, avoid leading questions, and record responses exactly as stated by the participants without offering personal interpretations.

Data Analysis

Data were processed using SPSS. The significance level (α) was set a priori at 0.05.

Descriptive Statistics: Frequencies and percentages were used to analyze the demographic data (Part 1). Means ($\bar{x}$) and Standard Deviations (SD) were utilized to analyze the levels of facility needs and perceived service quality (Parts 2 and 3).

Inferential Statistics (Hypothesis Testing):

Independent Samples t-test and *One-way ANOVA* were employed to test Hypothesis 1 (H_1), comparing mean differences in perceived service quality across different demographic groups (e.g., varying age brackets or levels of physical limitation).

Pearson's Product-Moment Correlation was used to test Hypothesis 2 (H_2), which examined the strength and direction of the linear relationship between the required facility factors and overall perceived service quality.

Ethical Considerations

Recognizing that the elderly are a vulnerable demographic, this study strictly adhered to comprehensive ethical protocols throughout data collection. Participation was entirely voluntary, with informed consent obtained after the researchers clearly explained the study's purpose, the estimated time required, and participants' absolute right to decline or withdraw at any time without consequence. To ensure privacy and confidentiality, the questionnaire was designed to be completely anonymous, collecting no personally identifiable information (PII), and all aggregated data was securely stored for academic purposes only. Furthermore, to minimize physical fatigue

and avoid exacerbating travel-related anxiety, data collection was strategically conducted only while participants were resting in comfortable, seated waiting areas, and researchers proactively provided reading or writing assistance to accommodate any visual, cognitive, or motor limitations.

Limitations of the Study

While this research provides robust empirical insights into age-friendly airport facilities, several limitations must be acknowledged when interpreting the findings. Geographically, the scope was restricted to Chiang Mai and Mae Fah Luang Chiang Rai International Airports; therefore, the results may not be entirely generalizable to mega-hub airports with vastly larger footprints and higher passenger densities, such as Suvarnabhumi Airport. Demographically, the sample was exclusively Thai nationals, meaning the study does not capture the distinct cultural expectations, physical requirements, or language barrier challenges faced by international senior tourists, which heavily influence their reliance on wayfinding and information systems. Methodologically, as a cross-sectional study relying on self-reported survey data collected within a specific timeframe (March–October 2025), the findings reflect a snapshot of current perceptions and may be subject to inherent response biases, highlighting the need for future longitudinal or qualitative observational research to capture the evolving nuances of senior travel behaviors.

Research Results

The data analysis was conducted based on responses from 400 Thai elderly passengers who used the passenger terminals at Chiang Mai International Airport and Mae Fah Luang Chiang Rai International Airport. The findings are categorized into descriptive statistics regarding demographics, facility needs, and perceived service quality, followed by inferential statistics for hypothesis testing.

Demographic Profile of Respondents

The demographic composition of the sample ($N = 400$) indicates that the majority of the respondents were female, accounting for 54.50% ($n = 218$), while males constituted 45.50% ($n = 182$). Regarding age distribution, the largest segment fell into the “young-old” category, with 61.50% ($n = 246$) aged between 60–69 years. This was followed by those aged 70–79 years (29.50%, $n = 118$), and those aged 80 years and above (9.00%, $n = 36$).

In terms of educational attainment, over half of the respondents (53.50%, $n = 214$) held qualifications below a bachelor’s degree, 35.50% ($n = 142$) held a bachelor’s degree, and 11.00% ($n = 44$) possessed postgraduate degrees. Crucially for this study, when assessing

physical limitations, the majority reported having no significant physical constraints (59.50%, $n = 238$). However, a substantial portion (31.00%, $n = 124$) reported having minor physical limitations, and nearly one-tenth of the sample (9.50%, $n = 38$) reported having significant physical limitations requiring assistance.

Analysis of Behaviors and Facility Needs for Elderly Passengers

Respondents were asked to rate the importance of 9 specific physical facility factors within the airport terminals. Overall, the requirement for age-friendly facilities was rated at the “Highest” level ($\bar{x} = 4.31$, $SD = 0.47$).

When analyzing individual factors, seven specific facilities were prioritized at the “Highest” interpretative level, indicating critical importance to the elderly demographic. These were:

Elderly-accessible Restrooms: Ranked first ($\bar{x} = 4.52$, $SD = 0.48$).

Walkways and Anti-slip Flooring: Ranked second ($\bar{x} = 4.47$, $SD = 0.51$).

Seating and Waiting Areas: Ranked third ($\bar{x} = 4.41$, $SD = 0.55$).

Elevators and Escalators ($\bar{x} = 4.38$, $SD = 0.57$)

Information and Wayfinding Systems ($\bar{x} = 4.32$, $SD = 0.59$)

Check-in Points ($\bar{x} = 4.28$, $SD = 0.60$)

Service Counters ($\bar{x} = 4.25$, $SD = 0.62$)

The remaining two factors were all rated “High” in importance. In descending order, these included: Terminal Entrances ($\bar{x} = 4.18$, $SD = 0.63$), and finally, Parking Facilities ($\bar{x} = 4.02$, $SD = 0.71$).

The information details of Facility Needs for Elderly Passengers are shown in Table 1.

Table 1 The Information of Facility Needs for Elderly Passengers

Facility Factors (Needs)	Mean ($\bar{x}$)	SD	Rate
Elderly-accessible Restrooms	4.52	0.48	Highest
Walkways and Anti-slip Flooring	4.47	0.51	Highest
Seating and Waiting Areas	4.41	0.55	Highest
Elevators and Escalators	4.38	0.57	Highest
Information and Wayfinding Systems	4.32	0.59	Highest
Check-in Points	4.28	0.60	Highest
Service Counters	4.25	0.62	Highest
Terminal Entrances	4.18	0.63	High
Parking Facilities	4.02	0.71	High
Overall	4.31	0.47	Highest

Perceived Service Quality (SERVQUAL)

The overall perceived service quality of the airport terminals, as evaluated by the elderly passengers, was rated at a “Highest” level ($\bar{x} = 4.28$, $SD = 0.49$). (Details are shown in Table 2)

Breaking down the SERVQUAL model into its five dimensions, four dimensions fell into the “Highest” category. Notably, Tangibles (the physical appearance of facilities, equipment, and personnel) received the highest score ($\bar{x} = 4.39$, $SD = 0.50$). Empathy followed this ($\bar{x} = 4.33$, $SD = 0.54$), Assurance ($\bar{x} = 4.29$, $SD = 0.56$), Responsiveness ($\bar{x} = 4.21$, $SD = 0.58$), and Reliability ($\bar{x} = 4.17$, $SD = 0.61$) as a factor was rated at a “High” level. The prominence of Tangibles and Empathy aligns closely with the physical nature of airport environments for senior travelers.

The information details of Perceived Service Quality (SERVQUAL) are shown in Table 2.

Table 2 Information on Perceived Service Quality (SERVQUAL)

Perceived Service Quality (SERVQUAL)	Mean ($\bar{x}$)	<i>SD</i>	Rate
Tangibles	4.39	0.50	Highest
Empathy	4.33	0.54	Highest
Assurance	4.29	0.56	Highest
Responsiveness	4.21	0.58	Highest
Reliability	4.17	0.61	High
Overall	4.28	0.49	Highest

Hypothesis Testing

Inferential statistics were utilized to test the two primary research hypotheses, with the significance level set at $p < 0.05$.

Testing Hypothesis 1 (H1): Demographic characteristics have a statistically significant relationship with perceived service quality.

Independent-samples t-tests and a One-Way ANOVA were conducted to compare means across demographic groups. The results indicated that Gender had no statistically significant effect on perceived service quality ($t = 1.21$, $p = .227$). (Details are shown in Table 3)

However, significant differences were found in the other three demographic variables. Age significantly affected perceptions ($F = 4.36$, $p = .013^*$), as did Education Level ($F = 3.89$, $p = .021^*$). Most notably, the presence of Physical Limitations demonstrated a highly significant relationship with perceived service quality ($F = 9.74$, $p = .000^*$). This indicates that passengers with differing

levels of physical mobility (e.g., independent vs. requiring assistance) perceive and experience the airport's service quality in significantly different ways. Therefore, Hypothesis 1 is *partially accepted*.

Table 3 Statistics of Testing Hypothesis 1 (H1)

Independent Variables	F / t-value	Sig. (p-value)
Gender	$t = 1.21$	.227
Age	$F = 4.36$	.013*
Education Level	$F = 3.89$	.021*
Physical Limitations	$F = 9.74$	.000*

Note: * $p < 0.05$

Testing Hypothesis 2 (H2): There is a significant positive relationship between the required facility factors for elderly passengers and their overall perceived service quality.

Pearson's Product-Moment Correlation coefficient was utilized to test this relationship. The analysis revealed a strong, positive, and statistically significant correlation between the independent variable (facility needs) and the dependent variable (SERVQUAL) at the 0.01 level ($r = 0.683, p = .000^*$).

This finding indicates that as the airport environment meets the specific physical facility requirements of elderly passengers (such as providing adequate restrooms and anti-slip floors), their overall perception of service quality increases proportionally. Therefore, Hypothesis 2 is *fully accepted*.

Discussion

The primary objective of this study was to investigate the facility requirements of Thai elderly passengers and determine how these physical needs correlate with perceived service quality in regional international airports. The empirical findings robustly demonstrate that physical infrastructure is not merely a backdrop for travel; rather, it is the fundamental determinant of the elderly passenger experience.

The Biological Imperative of Prioritized Facilities

The descriptive results revealed that elderly passengers placed the absolute highest priority on three specific facilities: accessible restrooms ($\bar{x} = 4.52$), continuous anti-slip walkways ($\bar{x} = 4.47$), and strategically placed seating/waiting areas ($\bar{x} = 4.41$). This prioritization is not arbitrary; it directly mirrors the biological realities and physiological declines associated with aging.

As noted by Chang and Chen (2011) and Graham et al. (2019), the aging process inevitably involves diminished musculoskeletal strength, reduced stamina, a heightened fear of fatal falls, and decreased bladder capacity.

In a massive, high-stress environment like an airport terminal, long walking distances without adequate resting points induce severe physical exhaustion and anxiety. Similarly, slippery floors present a critical safety hazard. Therefore, for the elderly demographic, restrooms, anti-slip floors, and seats are not viewed as mere “amenities” or conveniences—they are non-negotiable requirements for safety, dignity, and independent mobility. This explains why these fundamental physical factors ranked higher in importance than procedural touchpoints like check-in counters or digital information systems.

The Heterogeneity of the Elderly Demographic

The partial acceptance of Hypothesis 1—which found that Age, Education, and crucially, Physical Limitations significantly alter the perception of service quality—highlights a vital gerontological concept: the elderly are not a homogenous group. The data indicate that a “young-old” passenger (aged 60–69) without physical constraints navigates and perceives the airport environment very differently from an “old-old” passenger (aged 80+) who requires mobility assistance.

The terminal’s physical environment acts as an experiential filter. When an airport is designed with long corridors and insufficient seating, it disproportionately penalizes passengers with significant physical limitations, resulting in sharply lower service quality scores among this vulnerable subsegment. This finding aligns with Halpern and Mwesiumo (2021), who argue that service failures (in this case, infrastructural failures) severely impact the satisfaction of passengers who require the most support.

The “Tangibles–Empathy” Nexus in Service Quality

The most significant theoretical contribution of this study stems from testing Hypothesis 2, which revealed a strong positive correlation ($r = 0.683$) between the provision of required facilities and overall SERVQUAL scores. This correlation is further elucidated by the finding that *Tangibles* and *Empathy* were the two highest-rated dimensions of service quality.

Typically, *Tangibles* (physical infrastructure) and *Empathy* (individualized, caring attention) are viewed as distinct constructs in the SERVQUAL model. However, the findings of this study confirm the premise proposed by Bezerra and Gomes (2016): for elderly passengers, these two

dimensions are deeply intertwined. Physical structures act as the primary medium through which elderly passengers experience emotional care.

When an elderly passenger, who is experiencing knee pain and fatigue after passing through a rigorous security checkpoint, immediately finds a comfortable, designated seating area, or when they encounter a dry, heavily continually cleaned restroom equipped with sturdy grab bars, they do not just perceive a “good facility.” They perceive that the airport management understands their specific vulnerabilities and actively cares for their well-being. In this context, the Tangible provision is not merely an architectural feature; it is perceived as a direct form of institutional care. Physical facilities functionally operationalize Empathy.

Broader Implications for Airport Management

Ultimately, the strong relationship between physical facilities and service quality demonstrates that investing in universal design and age-friendly architecture goes far beyond regulatory compliance. Appropriately designed infrastructure serves as a strategic psychological tool. By mitigating physical exhaustion and environmental barriers, airports cultivate passenger confidence (*Assurance*), reduce travel-induced stress, and foster a deep sense of overall satisfaction. As Thailand and the global community move deeper into the super-aged era, prioritizing these micro-level facility adjustments will be the defining factor in an airport's operational excellence and brand reputation.

New Knowledge from Research

This research contributes a refined empirical framework connecting micro-level physical infrastructure (e.g., floor textures, ergonomic seat placements) to the psychological dimensions of service quality. It challenges the traditional aviation paradigm by demonstrating that for elderly demographics, Tangibles (facilities) do not merely support service delivery; they strongly shape the perception of Empathy and Assurance.

In practical terms, this new knowledge implies that airport administrators must view infrastructural upgrades as core customer-service interventions. Concrete applications include: (1) mapping "rest zones" strategically along long walking corridors rather than just at gates, and (2) implementing continuous high-friction flooring as a proactive measure of "passenger care." Designing for the elderly goes beyond regulatory compliance; it is a critical, actionable strategy to build passenger trust and service excellence in a super-aged society.

Conclusion and Recommendations

This study provides critical empirical evidence on the intersection of physical infrastructure and service quality in Thailand's transition to a super-aged society. The findings conclusively show that for elderly passengers navigating regional international airports in Northern Thailand, physical facilities are not peripheral amenities but the absolute core of their passenger experience.

Thai elderly passengers placed the highest prioritization on fundamental, biologically necessary infrastructure—specifically, accessible restrooms, continuous anti-slip walkways, and strategically distributed seating areas. Furthermore, the study concludes that the elderly demographic is highly heterogeneous; variables such as specific age brackets and the severity of physical limitations significantly alter how airport service quality is perceived. Most importantly, a strong positive correlation exists between the adequacy of physical facilities and overall service quality. In the aviation environment, *Tangibles* act as the primary catalyst for *Empathy* and *Assurance*. When an airport proactively minimizes physical exhaustion and environmental hazards, elderly passengers perceive a higher level of institutional care, trust, and overall satisfaction.

Practical Recommendations for Airport Management

Based on the empirical findings and the prioritized needs of the elderly demographic, the following actionable guidelines are proposed for airport authorities and policymakers to enhance terminal infrastructure:

Implementation of Universal Design Sanitary Facilities: As the highest-rated need, airport management must urgently audit and upgrade existing restrooms. Recommendations include increasing the ratio of dedicated elderly/accessible restrooms, ensuring they are equitably distributed across all terminal zones (not just centralized locations). These facilities must strictly adhere to Universal Design standards, including ergonomic grab bars, emergency pull cords/alarms, automatic doors, and rigorous maintenance schedules to ensure floors remain entirely dry and prevent catastrophic falls.

Optimization of Walkways and Spatial Flow: To address the critical need for safe mobility, terminal flooring must be upgraded to high-friction, anti-slip materials, particularly in high-traffic and transition zones. Furthermore, airport planners should strive to minimize the distance required to walk. Where architectural constraints prevent this, the deployment of continuous moving walkways (travelators) or the provision of complimentary, easily accessible electric buggy services from check-in to departure gates should be prioritized.

Strategic Deployment of Ergonomic Seating: The traditional model of clustering seats only at the boarding gates is insufficient for the elderly. Seating and dedicated “rest zones” must be strategically interspersed along long corridors and immediately following high-stress bottlenecks, such as directly after security screening and immigration checkpoints. These seats should be ergonomically designed, with sturdy armrests to assist the elderly in rising and lowering independently.

Gerontological Sensitivity Training for Human Capital: While physical facilities are paramount, they must be complemented by responsive staff. Airport personnel (including security officers, check-in agents, and information desk staff) should undergo specialized training in gerontological care. This includes recognizing signs of physical distress or cognitive confusion, utilizing clear, unhurried, and empathetic communication techniques, and offering proactive mobility assistance without prompting.

Recommendations for Future Research

To build upon the foundational framework established in this study, future academic inquiries should consider the following directions:

Qualitative and Phenomenological Approaches: While this quantitative study successfully mapped the *correlations* of facility needs, future research should employ in-depth interviews, focus groups, and participant observation. A qualitative approach is necessary to deeply understand the emotional nuances, travel-induced anxieties, and cognitive burdens experienced by the elderly throughout the passenger journey.

Comparative Spatial Analysis: Future studies should compare regional aviation hubs (e.g., Chiang Mai, Phuket) with mega-hub airports with vastly larger floor plans and passenger volumes (e.g., Suvarnabhumi International Airport). Investigating how the *scale* of the physical environment exacerbates mobility challenges will yield critical insights for national infrastructure planning.

Cross-Cultural and International Scopes: Given Thailand’s status as a premier global destination for medical tourism and retirement living, future research must expand its sample to include foreign elderly passengers. Investigating cross-cultural differences in facility expectations, physical statures, and the profound impact of language barriers on wayfinding systems will be essential for developing truly international, age-friendly aviation hubs.

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