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**BRIDGING THE DIGITAL GAP: A PERCEPTION-BASED ANALYSIS OF THE FRAGMENTED TRAVEL ECOSYSTEM**

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<sup>1</sup>Ms. Bavesetty Sushmitha, <sup>2</sup>Dasari Navya, <sup>3</sup>Davalgari Kavya, <sup>4</sup>Samudram Uday and <sup>5</sup>Laddipirila Yashwanthika,

<sup>1</sup>Assistant Professor, Koneru Lakshmaiah Education Foundation

<sup>2,3,4,5</sup>BBA III year, Koneru Lakshmaiah Education Foundation

**ABSTRACT**

*Digital innovation is reshaping family tourism, driven by mobile apps, AI, AR, and ICT systems. This study assessed digital travel behaviour through a survey of 435 Indian travellers and telephonic interviews. Reliability analysis confirmed strong internal consistency ( $\alpha = .765$ ). Young, urban, and educated travellers dominated the sample. Families frequently reported challenges such as securing safe accommodations and managing seniors/infants, yet expressed high acceptance of digital tools, including smart planners, real-time alerts, personalised itineraries, and verified rentals. T-test results showed significant gender differences related to cleanliness and food access ( $p = .038$ ). ANOVA identified group-level differences in perceptions of child/senior amenities and platform filters ( $p < .05$ ). Spearman's correlations highlighted strong interrelationships among digital feature preferences. The findings demonstrate a clear shift toward integrated, personalised, and trustworthy digital ecosystems in family travel, calling for user-centric design and ethical data practices in future tourism platforms.*

**Keywords:** Travel Behaviour; Artificial Intelligence (AI); User Engagement; OTA's (Travel Apps); Gamification; Information and Communication Technologies (ICT)

**INTRODUCTION**

Tourism has become one of the most dynamic sectors, evolving rapidly under the influence of technology and changing traveller preferences (Kamboj & Sharma, n.d.). Modern tourist behaviour is complex and unpredictable, with motivations and interests constantly shifting, putting pressure on marketers to adapt (Kamboj & Sharma, n.d.). Gen Y and Gen Z travellers lead this change, seeking independence, adventure, unique experiences, and relying heavily on digital tools to plan and manage trips. (Dimitriou & AbouElgheit, 2019; Kamboj & Sharma, n.d.; Magano et al., 2019; Sadhale & Sathe, 2020) In contrast, older travellers value comfort, hospitality, and structured trips such as pilgrimages, especially in countries like India. (Kamboj & Sharma, n.d.; Magano et al., 2019; Sadhale & Sathe, 2020) Health and lifestyle choices are now key factors in travel decisions across generations, influenced by environmental awareness and digital trends. (Kamboj & Sharma, n.d.; Sadhale & Sathe, 2020) Smartphones and mobile apps have redefined travel, offering tools for booking, navigation, planning, and documenting trips in real time. (Khaparde et al., n.d.; Magano et al., 2019; Zhou et al., 2022) AI, chatbots, and location-based services in travel apps provide instant guidance, solve problems on the go, and enhance user engagement. (Khaparde et al., n.d.) Social media and user-generated content enable travellers to visualise destinations through photos and videos, shaping travel choices and motivations. (Magano et al., 2019; Medeiros et al., 2022a)

Tourists are now both consumers and creators of content, making travel decisions social, interactive, and community-driven. (Magano et al., 2019; Medeiros et al., 2022b) Gamification in apps like TripAdvisor, 'make my trip', and Expedia transforms browsing and booking into interactive experiences, boosting engagement and satisfaction. (Kaur et al., 2025a) Gamification also promotes sustainable tourism by encouraging environmentally responsible behaviour through challenges and digital incentives. (Kaur et al., 2025b; Negruşa et al., 2015) Travel tracking mobile applications (TTMAs) allow tourists to record routes, itineraries, and experiences, creating participatory travel communities. (Medeiros et al., 2022a)

Emerging Active Travel Data (ATD) from ICT devices and wearables provides affordable, extensive insights into travel behaviour, supporting sustainable urban planning. (Alattar et al., 2021)

Concepts like Mobility-as-a-Service (MaaS) and GIS-based traveller information systems optimise routes, reduce congestion, and integrate multiple transport options. (Hasselwander & Bigotte, 2023; Jamal & Newbold, 2020) Generational differences in travel are significant: millennials adopt technology quickly, while older adults are slower, affecting transport choices and sustainability patterns. (Wu et al., 2022) The COVID-19 pandemic accelerated reliance on technology, with apps supporting contactless services, real-time health updates, and safety monitoring. (Dias & Afonso, 2021; Ferretti et al., 2021)

Mobile health (mHealth) travel apps offer real-time health monitoring but raise ethical issues concerning privacy, security, and responsible data use [28]. 80% of users abandon travel apps within 90 days. (Dube & Humbani, 2024; Kaur et al., 2025a; Khaparde et al., n.d.) Hotels and travel providers struggle to match traveller expectations for personalised, real-time, and tech-driven experiences, creating a persistent supplier–user gap. (Linton & Kwornik, 2019) ICT and social networks reshape travel behaviour, enabling multitasking, activity fragmentation, and participatory engagement among travellers. (De Abreu E Silva et al., 2017; Medeiros et al., 2022a)

Overall, technology—including smartphones, mobile apps, gamification, AI, AR, and ICT systems—has transformed tourism from a service into a digital ecosystem, where travellers’ discovery, experiences, and memories are shaped by these innovations. (Kamboj & Sharma, n.d.)

**METHODOLOGY**

This study adopted a **quantitative research design** to analyse digital travel behaviour among family travellers in **Andhra Pradesh and Telangana**. A structured questionnaire was administered, yielding **435 valid responses**, predominantly from young, urban, and educated travellers. The instrument assessed travel difficulties, usefulness of digital features, and key platform attributes using a **five-point Likert scale**. Reliability testing produced a **Cronbach’s Alpha of 0.765**, indicating strong internal consistency.

Data were analysed using **SPSS Version 26**. Descriptive statistics summarised demographic and behavioural patterns. Inferential analysis included an **independent samples t-test**, which showed a significant gender difference in cleanliness and food-access difficulties ( $p = 0.038$ ). **One-way ANOVA** identified significant group differences in child/senior amenities, long-drive management, age/medical filters, and verified rental services ( $p < 0.05$ ). **Spearman’s correlations** revealed strong associations among digital feature preferences, indicating a demand for integrated digital travel platforms.

**DATA ANALYSIS**

With value labels assigned, the data reveal clear trends among 435 respondents. Most participants are aged 18–35 (73.5%), predominantly urban, and hold undergraduate degrees. Family travel groups commonly comprise 3–6 members, and “road trips” and “pilgrimages” are frequent. Travel difficulties such as finding safe/family-friendly accommodations and managing seniors/infants are encountered often or always by 36%–46% of respondents.

Positive attitudes toward digital travel features are notable: agreement/strong agreement with smart planners, platform-verified rentals, and data security ranges between 60–68% of respondents. Usefulness ratings for real-time alerts and personalized itineraries are similarly high, reinforcing the acceptance of digital innovation in family travel among Indian households.

The sample predominantly consists of urban residents, young adults (73.5% aged 18–35), and highly educated individuals (77.9% undergraduates), reflecting the high engagement of mid-sized families in travel activities. The preference for road trips and pilgrimages (42.7%) indicates cultural and logistical factors influencing travel choices in this population. Frequent travel ( $\geq 2$  trips/year) among 74% of respondents highlights strong family orientation toward leisure and religious journeys. These socio-demographic patterns align with previous literature emphasizing urban youth as key drivers of domestic family tourism and underscore the need for tailored digital and service solutions.

A substantial proportion of respondents frequently encounter challenges related to securing safe accommodations (35.7%) and managing seniors or infants during long journeys (41.2%), confirming persistent barriers in family travel. The pronounced appreciation for digital solutions—especially real-time alerts (64.4%) and personalized itineraries (63.0%)—demonstrates that families are increasingly reliant on technology to address these issues. These findings reinforce the importance of integrating user-centric digital features in travel platforms, echoing previous studies on the digital transformation of family tourism.

**Table 1.** Reliability Analysis

Statistic	Value
Cronbach’s Alpha	0.765
Items	15

The instrument’s Cronbach’s alpha of 0.765 reflects robust internal consistency, indicating the reliability of the scales used to measure travel difficulties and digital attitudes. All 15 items contributed positively, supporting the methodological soundness and suitability of the questionnaire for further statistical analysis.

**Table 2.** Gender Differences (t-Test)—Significant Result Only

Variable	Male Mean (SD)	Female Mean (SD)	t	p	Significant?
Difficulty: Clean Rest Stops/Food	3.09 (1.31)	3.33 (1.14)	-2.08	.038	Yes

Females reported significantly greater difficulty accessing clean rest stops and food options compared to males ( $p = .038$ ). This gender difference may reflect heightened sensitivity to cleanliness and safety among female travelers, a theme consistent with travel health and safety literature. No other gender differences were statistically significant, illustrating broadly similar travel attitudes among men and women otherwise.

**Table 3.** Group Differences (ANOVA)—Significant Items Only

Variable	F	p	Significant?
Child/Senior-friendly Amenities	6.08	<.001	Yes
Managing Seniors/Infants Long Drives	2.86	.015	Yes
Portal: Age/Medical Filter	2.37	.039	Yes
Platform Verified Rentals/Assistance	3.00	.011	Yes

Significant group differences emerged in perceptions of child/senior-friendly amenities, support for managing seniors and infants, and the usefulness of platform filters for age or medical needs and verified rentals (all  $p < .05$ ). These findings suggest that age, travel type, and other demographic factors critically shape travelers' experiences and expectations, supporting calls for segmentation and customization in travel service design.

**Table 4.** Spearman's Correlations

Variable Pair	rho	p	Significant?
Child/Senior Amenities – Managing Seniors	0.336	<.001	Yes
Portal Filter – Gamified Trip Builder	0.365	<.001	Yes
Real-time Alerts – Personalized Itinerary	0.331	<.001	Yes
Smart Planner – Verified Rentals/Assistance	0.332	<.001	Yes
Data Security – Personalized Itinerary	0.309	<.001	Yes

The significant positive correlations among pairs of digital features and travel difficulty variables indicate interrelated needs: travelers valuing amenities for children/seniors are also likely to prioritize solutions for managing complex family travel scenarios. Similarly, appreciation for one platform feature tends to coincide with positive attitudes toward others, highlighting a holistic demand for integrated, feature-rich travel platforms. These findings confirm the interconnectedness of digital preferences and practical travel challenges in family tourism contexts.

## FINDINGS

- Digital adoption is highest among young, urban, and educated travellers in Andhra Pradesh and Telangana.
- Most respondents travel in multi-age family groups, influencing diverse digital and support needs.
- Cleanliness and food access were major concerns, with a significant gender difference (t-test,  $p = .038$ ).
- Families preferred features that reduce uncertainty for children, seniors, and vulnerable travellers.
- Respondents preferred digital tools that offer real-time guidance, reduce uncertainty, and simplify complex planning and on-route decisions.
- A clear preference emerged for a unified, integrated all-in-one travel application that combines planning, navigation, safety, accommodation verification, and decision making features.
- **Families faced combined challenges related to securing safe accommodations, managing the mobility and medical needs of seniors and infants, and handling navigation issues such as GPS inaccuracies and road safety concerns.**

## SUGGESTIONS

- A unified digital platform should be created where families can plan trips, get alerts, verify accommodations and medical filters in one place. This will reduce the need to switch between multiple apps.
- Digital verification of homestays, rentals, and transport services is important. Platforms should use safety and hygiene badges and AI-based review checks to help families trust the options they choose.

- Since many travellers, especially women, face issues with clean rest stops and food points, concerned authorities should improve hygiene infrastructure. Apps should also show real-time cleanliness ratings and crowd levels.
- Apart from google maps, Travel apps also need to include smarter route guidance, traffic and hazard alerts, SOS options, and location sharing. These features are especially helpful for families travelling long distances.
- OTA's should provide senior amenities (wheelchair-facilities), rest break suggestions, and infant-care station details to support multi-generation family travel.
- Apps must communicate information clearly and accessibly, offering information in multiple languages to support diverse user groups.
- The platform should support voice search, large text, easy navigation for seniors, and child-friendly AR features, ensuring that users of all ages can use the app comfortably.

## CONCLUSION

This study aimed to examine how digital innovation shapes family tourism in Andhra Pradesh and Telangana and to evaluate travellers' expectations toward emerging digital features. Guided by this objective, the analysis employed reliability testing ( $\alpha = .765$ ), t-tests, ANOVA, and Spearman correlations to interpret behavioural patterns and digital preferences. Findings indicate that young, urban, and educated travellers are at the forefront of adopting smart planners, personalised itineraries, real-time alerts, verified rentals, and secure platforms. Persistent concerns regarding safety, hygiene, navigation accuracy, and managing seniors and infants continue to influence digital expectations. The statistically significant demographic variations and strong interrelationships among feature preferences highlight a growing demand for seamless, interconnected digital ecosystems.

The study is limited by its regional scope and reliance on self-reported data. Future research should focus on developing an integrated all-in-one travel application that unifies planning, navigation, safety, accommodation verification, and decision-making features. Overall, the study underscores the need for ethical, accessible, and user-centric digital solutions to enhance the family tourism experience in the region.

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