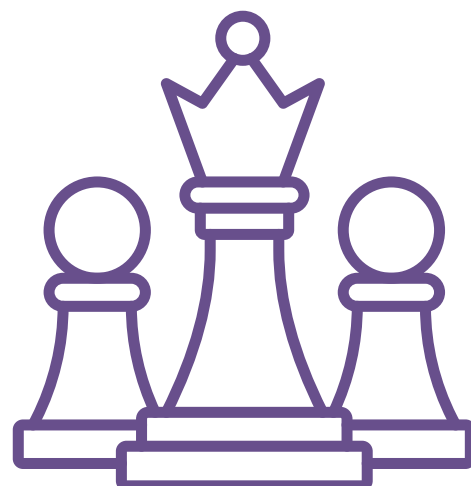


WeSchool MANAGEMENT REVIEW

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June 2026
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A National, Peer Reviewed (Bi-Annual)
Research Journal



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A National, Peer Reviewed (Bi-Annual)
Research Journal



Vol. 2, Issue 1
June 2026

Editor-in-Chief

Prof. (Dr.) Uday Salunkhe

Executive Editors

Prof. (Dr.) Madhavi Lokhande

Prof. (Dr.) D.N. Murthy



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WeSchool Management Review (WMR)

The *WeSchool Management Review (WMR)* is a national, peer reviewed (Bi-Annual) research journal published by S.P. Mandali's Prin. L. N. Welingkar Institute of Management Development & Research. It uses a double-blind review process for evaluation and selection of all submitted material. It Publishes biannually in June and December, WMR cover an extensive range of topics, drawing insights from various academic disciplines, research methodologies and theoretical frameworks.

The Aims of WMR are to:

- Discover and share original theoretical and applied research in management and related fields.
- Provide a platform for publishing high-quality research and case studies from academicians, industry professionals and researchers.
- Bridge the gap between academia and industry by promoting the publication of innovative, relevant and practical research.

• **Scope of the Journal** •

The WMR Journal Research invites submissions in the following areas of management:

- Business Strategy
- Finance
- Marketing
- Human resources
- Operations

• **Aims and Objectives** •

Aims

The *WeSchool Management Review* is dedicated to publishing high-impact research that significantly contributes to the advancement of the management field. The journal fosters innovative ideas and fresh perspectives on existing research, promoting scholarly discussions that shape the future of management studies. The journal provides a platform for scholars, researchers and industry professionals to share insights, foster innovation and address emerging challenges in the dynamic business environment.

• **Objectives** •

Objectives

WMR is a comprehensive journal committed to publishing top-tier articles in the field of management. Accepted articles should offer a meaningful contribution to the management discipline, inspire further research and uphold exceptional standards of academic excellence. The journal encourages innovative ideas and fresh perspectives on existing research, fostering scholarly discussions that shape the future of management studies. It seeks to publish cutting-edge studies that provide new insights into diverse management topics, while supporting interdisciplinary approaches across areas such as business strategy, finance, marketing, human resources, and operations. The journal also aims to provide a platform for thought-provoking research that challenges existing paradigms, linking theoretical frameworks with real-world business practices and sustainability.

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WMR welcomes original research contributions in the field of management and allied areas, publishing conceptual and empirical research papers and case studies. Authors wishing to submit their manuscripts must ensure that their papers, case studies are not simultaneously submitted for evaluation to any other journal or publication. Once a manuscript is submitted to WMR authors are expected to refrain from submitting it to any other outlet until they receive a final decision from the Editorial Team regarding its acceptance or rejection.

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2. **Abstract and Keywords**

A separate sheet must be provided, containing the manuscript title, an abstract of approximately 150-250 words, and up to six key words (in alphabetical order).

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The manuscript itself should contain the title, abstract and content, including all text, tables, figures and references, but without any identifying information about the authors. To submit, authors should attach three separate files: one for the cover page, one for the abstract and one for the manuscript content.

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The recommended length for manuscripts is between 7,000-8,000 words, inclusive of tables, figures, and references, for both research papers and case studies.

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The manuscript text must be in Times New Roman font, size 12, with one-and-a-half line spacing and 1-inch margins on all sides. Page numbers should be centered at the bottom of each page in Times New Roman font, size 10. All tables and figures must be numbered serially, and each should include explanatory notes or legends. The source of each table or figure should be clearly indicated. All abbreviations should be expanded upon first use, and all exhibits should be in black and white only.

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Editorial

Group Director

Dear Readers,

In an era defined by rapid technological advancement and evolving consumer expectations, the role of research in shaping responsible, innovative, and sustainable ecosystems has never been more critical. It gives me immense pleasure to present this edition of the WMR Journal, which brings together a diverse set of scholarly contributions addressing some of the most pressing challenges and opportunities across digital transformation, sustainability, and service industries.

The collection of articles in this issue reflects a strong interdisciplinary orientation, blending perspectives from technology, management, and societal development. From understanding continuance intention in wellness applications to examining trust dynamics in fintech ecosystems, the research underscores a fundamental shift – from mere adoption of technology to sustained engagement and value creation. This transition is particularly relevant in today's digital economy, where long-term user retention defines the success of platforms. Similarly, the study on recommerce applications reinforces the growing importance of circular economy principles, demonstrating how economic incentives and sustainability goals can coexist to drive consumer behavior.

The issue also explores critical operational and strategic challenges in established industries. The analysis of IndiGo Airlines provides valuable insights into how even market leaders must continuously adapt to external disruptions, cost pressures, and competitive dynamics. Such studies remind us that resilience and strategic agility are essential in navigating an increasingly volatile global environment.

Another notable dimension of this issue is its emphasis on human and social factors. Whether it is the role of resident hospitality in shaping tourist citizenship behavior or the impact of cybersecurity concerns on user trust in online food delivery platforms, the research highlights the centrality of trust, experience, and human interaction in determining success in digital and service ecosystems.

I extend my sincere appreciation to the authors, faculty members, and student researchers whose dedication and intellectual rigor have made this publication possible. Their work exemplifies the spirit of inquiry and innovation that we strive to nurture.

I am confident that this edition of the WMR Journal will serve as a valuable resource for researchers, practitioners, and decision-makers, inspiring further exploration and meaningful impact in the years to come.

With best regards,

Dr. Uday Salunkhe

Group Director

Prin L N Welingkar Institute of Management Development and Research

Editorial

Director

Dear Readers,

It is a matter of great pride to present this Second Edition of the WeSchool Management Review (WMR) Journal, which reflects our institution's continued commitment to fostering a culture of academic excellence, critical thinking, and meaningful research.

In today's rapidly evolving world, the role of higher education extends far beyond the dissemination of knowledge. It lies in nurturing inquisitive minds, encouraging interdisciplinary exploration, and equipping individuals with the ability to question, analyse, and contribute to society in a responsible and impactful manner. Research, in this context, becomes a powerful tool – not only for intellectual advancement but also for addressing real-world challenges.

At our institution, we strongly believe that academic inquiry must be both rigorous and relevant. We strive to create an ecosystem where ideas are encouraged, perspectives are challenged, and innovation is nurtured. The WMR Journal stands as a testament to this philosophy, providing a platform for scholars and students to articulate their insights and engage with contemporary issues across domains.

A key focus of our academic approach is to bridge the gap between theory and practice. By fostering industry interaction, experiential learning, and research-driven thinking, we aim to prepare individuals who are not only competent professionals but also thoughtful leaders. In an increasingly complex and interconnected global environment, such capabilities are essential for sustainable growth and progress.

Equally important is our emphasis on ethical responsibility and social consciousness. As educators and researchers, we recognize our role in shaping individuals who are aware of the broader implications of their actions and decisions. We encourage research that contributes to societal well-being, promotes sustainability, and supports inclusive development.

The journey of knowledge creation is a collaborative one. I would like to acknowledge the dedication and efforts of our faculty, students, and the editorial team who have worked diligently to bring out this publication. Their commitment reflects the vibrant intellectual environment that defines our institution.

As we move forward, we remain committed to strengthening our research initiatives, encouraging innovation, and fostering a spirit of continuous learning. I hope that this journal inspires readers to explore new ideas, engage in meaningful dialogue, and contribute to the advancement of knowledge.

With best regards,

Dr. Madhavi Lokhande

Director – Bengaluru Campus

Prin L N Welingkar Institute of Management Development and Research

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Determinants of User Adoption of Recommerce Applications

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¹Satish Venkata, ²Abhishek Mahanta, Aditya Goel, Sanup Patel,
Tanisha Malvi, Tanya Gurani & Vivek Kumar

KEYWORDS

*Recommerce, Goal Framing,
Technology Acceptance,
Adoption*

ABSTRACT

Recommerce applications now hold significant digital space in fostering sustainable consumption and other circular economy objectives through extending the longevity of products and minimizing waste. This paper will seek to examine consumer adoption of recommerce applications by examining the impact of motivational goal frames and technology-related perceptions on adoption behaviour. The proposed study is based on the Goal Framing Theory (GFT) and the Technology Acceptance Model (TAM) in order to give a more detailed perspective of adoption through a consumer qualitative approach. The research design of the study is qualitative and theory driven. The data was gathered using a structured survey that was administered to the users and the potential users of the recommerce applications. Measurement scales were created to include gain, hedonic and normative goal frame with context specific, goal congruent statements, rather than abstract measure of value. They assessed the constructs of technology acceptance like perceived usefulness and perceived ease of use, and adoption intention through validated scales based on the recommerce setting. The results indicate that motivational factors, and not technology are the primary drivers of the use of recommerce apps. Among the constructs of Goal Framing Theory, gain oriented motivations, such as perceived economic value and perceived cost savings, were found to be the most persistent and most significant predictors of adoption intention. The intention is also positively influenced by normative motivations connected with sustainability and social responsibility, but they are under a second influence. Here is a huge discrepancy between action and value. The impact of hedonic motivation is diminutive meaning that selection of recommerce is primarily utilitarian rather than experience-based. In general, the integrated GFT-TAM framework has a high explanatory ability and proves that the perception of economic value through supportive usability is the key to encouraging the adoption of recommerce. This research boosts the recommerce and sustainable consumption literature in that it gives a survey-based examination of how customers embrace such practices using a combined Goal Framing Theory and Technology Acceptance Model conceptualization. The study provides specific information about the way consumers evaluate, accept, and know recommerce applications. The results are applicable to the platform developers and policymakers. They highlight the role of connecting sustainability messages to economic gains, usability and positive user experiences as a way of ensuring larger adoption and sustained interaction.

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²Student, Prin. L. N. Welingkar Institute of Management Development and Research, Bangalore.

INTRODUCTION

The rapid growth of re-commerce and concerns about environmental sustainability have made recommerce an important way for consumers to engage in sustainable practices [1][2][3]. This incorporates re-using, re-selling and restoration of second-hand products.

The recommerce business has provided consumers with an opportunity to purchase used and refurbished products, such as electronics, clothing, and accessories, at a discounted price. This will increase the product life cycle and waste minimization. Because recommerce keeps rising in the world market, before buying goods, consumers expect quality and satisfaction after buying, consumer acceptance is determined [4][5]. Quality of the product is one of the factors consideration of consumer perception of recommerce in the long run.

Recommerce is much more oriented towards the concepts of a circular economy. It reduces consumption of the natural resources and encourages sustainable consumption. Nevertheless, the assimilation of recommerce is not uniform in all consumers regardless of its economic and environmental advantages. This is primarily owed to the fact that consumers have concerns over the quality of the products and whether these platforms can be trusted [6][7]. The assurance of quality by the consumers has the overall effect of creating more satisfaction and more frequent use by the consumer which can help sustain a sustainable model of these platforms.

In the current studies, the primary emphasis is on the factors affecting adoption, which are environmental concerns, economic value, trust, perceived risk, and sensitivity to price [8][9]. A critical factor to note is that the role of social networks and peer influence has also become one of the important elements in influencing

sustainable adoption behaviour [10][11]. Although well-being and environmental motivation will be the driving force of the initial adoption of recommerce systems, research demonstrates that the level of uncertainty concerning product quality affects satisfaction and future intentions considerably.

In addition, numerous researches have revealed that positive after sale experiences do not necessarily correlate with positive recommerce attitudes. Despite the significant progress made in research in determining consumer satisfaction in the context of second-hand and refurbished markets, very little has been done to establish the impact of technology on consumer satisfaction within the recommerce systems. In order to bridge this research gap, the present research will address this gap by offering insights into the aim of the current study which will address the question of adopting the consumer recommerce apps through the Goal Framing Theory (GFT) and Technology Acceptance Model (TAM). The study will give an overview of the variables of technology acceptance, hedonic and gain goal frames as well as the hedonic/normative goal frame. In doing so, it will help us understand better the concept of sustainable digital consumption and provide useful ideas to recommerce applications.

LITERATURE REVIEW

Adoption of Recommerce and Motivational and Cognitive Factor.

Through the use of re-commerce, there is a reduced amount of waste and a practice of a circular economy due to the product life extension and reuse [12][13]. Although there is an on-the-rise awareness of environmental concerns and a greater number of re-commerce applications exist, consumers are still adopting these applications in moderate amounts. This

availability-participation gap has led researchers to examine the role of motivational and cognitive determinants in the intention to adopt re-commerce platforms by consumers. The studies on sustainable consumption have indicated that low adoption does not always imply the negative attitude to sustainability. Rather, adoption decisions rely on the compatibility of sustainable alternatives with the habits, quality annotations, convenience and emotional responses of consumers [14][15]. Re-commerce has broken the stereotype that new goods are better and have high status. This implies that the level of adoption is based on the ability of the consumers to reconcile their environmental, personal, emotional, and practical interests. The attitude to the adoption is influenced by the perceived risk, effort required, social image concerns, hygiene concepts, and confidence in the platform [16][17]. As a way to describe these diverse effects, the adoption of frameworks that can combine technology-oriented and motivational perspectives is more and more encouraged by scholars to avoid the perspective of rational or normative frameworks only [18].

Economic Drivers of Adoption and Gain Goal Frame.

Goal Framing Theory (GFT) is proposed by Lindenberg and Steg in 2007 [18] to explain the motivation of behaviour in three key motivations which include gain, hedonic, and normative goals. The gain goal frame emphasizes on the control of the personal resources such as money, time and effort. This is more so when making decisions regarding the use of digital marketplaces. The re-commerce sites are offering obvious monetary advantages, including reduced prices, resale value, and discounts. When these incentives are simple and trustworthy, they may be encouraged to be adopted. Adoption however declines when the

consumers fear of the hidden expenses such as the time to examine the product state, the misapprehension about the genuineness, or the consideration about the retail worth. Past studies of environmental behaviour demonstrate that the gain-relevant benefits are less likely to be purchased in cases of uncertainty or cognitive load and, thus, less likely to be purchased in favor of sustainable alternatives [19][20]. There have been indications in emerging markets that financial incentives would not work alone unless the complexity and uncertainty is low. Under such circumstances, enhancing perceived economic value by quality assurances, warranties and definite pricing is essential in promoting adoption.

Experiential Adoption Factors and Hedonic Goal Frame.

Hedonic goals revolve around the need to find instant pleasure, comfort, and the emotional gratification [19]. Individuals will just embrace the use of re-commerce applications when they experience the joy, convenience, and emotional satisfaction. Re-commerce sites can struggle in the area of adoption when the products in the second hand are considered less attractive, dirty or even socially unacceptable. Environmental consumption studies indicate that hedonic motivations may be encouraging of or decelerating of sustainable adoption. This would be based on the emotional experience associated with the behaviour [21]. Hedonic goals can help in adoption when re-commerce applications with easy user interfaces, interactive browsing, and positive emotional response, like social acceptance or novelty. Nevertheless, cleanliness, effort, and status feelings can be negative and can discourage the adoption of the same even among consumers who may hold a positive economic or environmental opinion.

Value-Driven Adoption and Normative Goal Frame.

Normative goals indicate moral duties, values, and those social expectations that are held [22][23]. The normative motivations resonate with the re-commerce because it promotes sustainability, reducing waste, and sustainable consumption [24]. Re-commerce adoption will be more ethical and socially appropriate to consumers who have high environmental values. However, studies indicate that normative motivations can not guarantee adoption in case gain or hedonic factors are not adequately considered. Even green consumers may postpone or refuse to adopt the sustainable options that may appear inconvenient, risky or socially ambiguous. This communication demonstrates that normative motivations should be reinforced using supportive financial incentives and positive user experiences to transform pro- environmental values into real adoption behaviour.

Technology Acceptance Model (TAM) and Cognitive Evaluation of Recommerce Apps.

Whereas GFT dwells on motivational aspects, the Technology Acceptance Model (TAM) elucidates the role of cognitive appraisals in the adoption decisions [11]. TAM suggests that the two characteristics of technology adoption are perceived usefulness (PU) and perceived ease of use (PEOU).

Perceived Adoption Value and Perceived Usefulness

Perceived usefulness: This is the degree to which the users think re-commerce apps help them become more efficient in their shopping. The adoption increases when the consumers observe the platforms that can provide reliable value by conducting quality checks, providing secure

transactions, logistics, and referral services. Conversely, perceived usefulness lessens when consumers are skeptical about quality of products or platforms that are trustworthy leading to reduction in adoption intentions, even among sustainability-conscious consumers.

Perceived Ease of use and Effort Perception

Perceived ease of use deals with the effort required to search, evaluate and conduct business on the re commerce websites. Interfaces that are easy to use, product information, easy-to- follow returns policies, and easy payment decreases cognitive load and increases adoption. The studies that applied TAM with sustainability backgrounds demonstrate that the perceived effort that is low increases perceived usefulness and the intention to use sustainable digital platforms.

GFT-TAM Integrated Perspective on Adoption of Recommerce

The recent sustainability studies also tend to endorse the integrated frameworks, which are the combination of motivational and cognitive theories to explain the adoption behaviour. Goal Framing Theory helps in understanding the reasons of embracing re-commerce, and TAM describes how such reasons result into acceptance of the technology. Research on green mobility, the use of renewable energy, and electric vehicles adoption reveals that gain, hedonic, and normative objectives indirectly influence the adoption via perceived usefulness and ease of use. Using this combined GFT-TAM method of re-commerce adoption, it can be indicated that the use of re-commerce is not primarily motivated by one factor. Rather, it is adopted due to the coincidence of incentive objectives and positive ratings of platform

functions and usability. Although the literature on sustainable consumption and uptake of green technology is on the rise, there is a deficit on research that integrates an adopted GFT-TAM framework in determining consumer uptake of re-commerce platforms, particularly in the emerging markets. Majority of the past researches concentrate on the intention of adoption without properly covering the motivational and cognitive systems that facilitate or inhibit actual adoption. Addressing this gap will help to understand the re-commerce adoption better and contribute to the useful insights to the platforms design and policy efforts.

METHODOLOGY

Our study adopts quantitative research approach with integrating two theories to investigate consumer resistance towards adoption of re-commerce apps and intentions of future usage. The study integrates Goal Framing Theory (GFT) and Technology Acceptance Model (TAM), which together explores how cognitive assessment and motivational inclination influences consumer behaviour in digital sustainability concept. TAM explains technology related perception such as perceived usefulness and perceived ease of use. Whereas GFT explains gain, hedonic and normative motivations that influences consumer decision making. This integrated method enables an extensive understanding of why consumers may resist or choose re-commerce apps irrespective of their economic and environmental benefits.

For our study the primary data was collected using a structured questionnaire which was being circulated online through google forms. The survey targeted both individuals who have previous experience with re-commerce apps such as OLX, Quikr, Cashify and Flipkart Refurbished as well as who do not. The online

questionnaire was conducted due to its cost-effectiveness and wider reach. Survey participation was voluntary, and the respondents were promised the anonymity and use of survey for the academic research purpose only. Therefore, ensuring ethical compliance and minimizing bias.

The sample includes respondents from different age groups and gender categories to gather technology usage patterns among different categories. The questionnaire was developed based on detailed review of existing research papers based on sustainable consumption and adoption of technology. The items of the questionnaire were aligned with the adopted GFT-TAM Framework. Gain goal framing was tested using perceived money savings, smart purchasing decisions and expense management. Hedonic goal framing was calculated through items related to emotional assurance and overall user experience and convenience. Normative goal framing was assessed using items showing environmental and sustainability concerns. TAM items such as perceived ease of use and perceived usefulness were measured through calculating effectiveness, process clarity and efforts to complete the purchasing process. Behavioural intentions were measured on respondent's willingness to continue using re-commerce apps.

All questions were measured using five-point Likert scale ranging from Strongly Agree to Strongly Disagree, which enables standardised responses and conduct quantitative analysis. Descriptive Statistical technique was used to summarize respondents' patterns. Inferential Statistical methods which include correlation and regression analysis were used to examine variables.

Ethical considerations were recognised in the research process. Respondents were not required to disclose any personal identifiable information, and consent was priorly obtained. The data was strictly stored securely and used solely for the

academic purpose. By adopting structured approach and integrated theory driven methodology, this study aims to achieve reliable insights into cognitive and motivational factors that shapes the consumer's decision to resist or accept re-commerce apps.

RESULTS AND ANALYSIS

Linear Regression

Model Summary - INT

Model	R	R ²	Adjusted R ²	RMSE
M ₀	0.000	0.000	0.000	0.971
M ₁	0.835	0.698	0.683	0.547

Note: M₁ includes GF, HF, NF, PU, PEOU

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	69.14	5	13.829	46.19	< .001
	Residual	29.94	100	0.299		
	Total	99.09	105			

Note: M₁ includes GF, HF, NF, PU, PEOU

Note: The intercept model is omitted, as no meaningful information can be shown.

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
M ₀	(Intercept)	3.447	0.094		36.528	< .001
M ₁	(Intercept)	-0.486	0.285		-1.707	.091
	GF	0.355	0.100	0.338	3.534	< .001
	HF	0.242	0.132	0.158	1.826	.071
	NF	0.290	0.103	0.237	2.811	.006
	PU	0.116	0.118	0.098	0.981	.329
	PEOU	0.159	0.102	0.130	1.561	.122

As an attempt to study the factors influencing Intention to Use (INT) of recommerce applications, multiple linear regression was taken into consideration. The proposed model (M₁) has been utilizing Gain Goal Frame (GF), Hedonic Goal Frame (HF) and Normative Goal Frame (NF), Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as the independent variables.

In general, this model was an excellent fit, and the multiple correlation coefficient $R = 0.835$. This indicates that the predictors have a strong relationship with intention to use. The estimation of the coefficient of determination ($R^2 = 0.698$) shows that the model is capable of explaining the changes in adoption intention of about 69.8 per cent. The adjusted R^2 of 0.683 also attests to the power of the model after the

complexity of the model has been put into consideration. The value of the root mean square error also shows that it has a great predictive value and the value of the RMSE is = 0.547.

Model Significance

According to the ANOVA findings, the regression model is significantly different ($F(5,100) = 46.19$, $p < .001$). This validates the assumption that the combination of the predictors are much more effective in explaining intention to use recommerce application, as compared to a predictor-free model.

These results confirm the theoretical amalgamation of motivation drivers (Why) as obtained through Goal Framing Theory and technology-related perception (How) as obtained through the Technology Acceptance Model.

Predictor-Level Results

Gain Goal Frame (GF)

The Gain Goal Frame significantly and positively determined the intention to use (0.338 , $t = 3.534$, $p < .001$). It implies that the intention to adopt recommerce is the most determined by motivations associated with gain, including perceived economic value, cost savings and rational decision-making. This observation promotes Goal Framing Theory, which holds that gain objectives influence consumer behaviour, particularly where there is perceived risk, uncertainty as well as trade-offs, such as those experienced at recommerce platforms.

Normative Goal Frame (NF)

The intention to use was also affected significantly positively by the Normative Goal Frame ($\beta = 0.237$, $t = 2.811$, $p = .006$). It demonstrates that the issue of environmental

responsibility and perceived social approval have a beneficial influence on adoption intentions, but the influence they have is not so significant as that of gain-oriented motives. This finding underscores the fact that the sustainability issues can be effective in the intentions, but not sufficient enough to motivate adoption alone unless there are obvious economic or functional advantages to it. This is in line with the premise of the study and the available literature on value action gap in sustainable consumption.

Hedonic Goal Frame (HF)

The Hedonic Goal Frame showed that the intention to use had a positive, yet statistically insignificant relationship ($\beta = 0.158$, $t = 1.826$, $p = .071$). This implies that hedonic variables, including convenience, comfort, and emotional assurance, do not have a minor impact on the adoption intentions. These results suggest that hedonic reasons have a greater role in continued engagement or behaviour following adoption than in promoting the initial adoption of recommerce applications.

Perceived Usefulness (PU)

With motivation goal frames in place, Perceived Usefulness no longer had a significant direct impact on intention to use ($\beta = 0.098$, $t = 0.981$, $p = .329$) as compared to traditional Technology Acceptance Model (TAM) expectations. It means that the usefulness is not a determining factor of the adoption decisions when it comes to recommerce. Alternatively, the perceived usefulness can be a supportive variable that transforms motivational drivers to intention instead of a predictor of intention. This observation highlights the shortcomings of applying TAM singularly in digital platforms that are sustainability-driven.

Perceived Ease of Use (PEOU)

Similarly, no statistically significant direct impact on intention to use was observed in Perceived Ease of Use ($\beta = 0.130$, $t = 1.561$, $p = .122$). Although users can normally anticipate that digital platforms would be user friendly, usability appears to be a minimum condition but not a good motivator to use the tools. This supports the fact that practically and experientially adequate is required but not sufficient to achieve user motivation into real adoption behavior.

Intercept Interpretation

The intercept was not significant ($p = .091$) and this implies that the intention to adopt recommerce applications is not independent. Rather, the motivational and cognitive factors that are part of the model greatly influence this intention. The findings have solid empirical evidence of the integrated GFT-TAM. Three key insights emerge:

1. The motivational drivers (Why) rather than technological perceptions (How) have more power in shaping the intention to adoption.
2. The economic justifications prevail over normative sustainability issues even in the areas of environmental protection.
3. Constructs of TAM have a supportive effect and do not substitute the motivational goal frames.

Descriptive Statistics Analysis

	N	Mean	SD	SE
INT	106	3.447	0.971	0.094
GF	106	3.481	0.925	0.090
HF	106	2.762	0.637	0.062
NF	106	3.560	0.794	0.077
PU	106	3.604	0.824	0.080
PEOU	106	3.664	0.795	0.077

The descriptive statistics were done to investigate how respondents perceive motivational goal frames, technology acceptance factors, and their intention to use recommerce application. The

analysis contains 106 valid answers and provides preliminary information on the attitude of respondents before further research.

Intention to Use (INT)

Intention to Use had a moderate positive tendency with the average score of 3.447 (SD = 0.971) indicating its adoption of recommerce applications. Though the respondents were mostly willing to use these platforms, the standard deviation was large, which means that there are large discrepancies regarding the level of preparedness to use them. This inconsistency implies that there is intention, but not entirely formed. There are still mixed levels of confidence and issues related to the product like trust, perceived risk and uncertainty of the results, which influences the commitment of users to adopt recommerce.

Gain Goal Frame (GF)

The average of Gain Goal Frame (3.481 SD = 0.925) was moderate support of gain oriented motivation such as cost savings, perceived economic value and rational decision making. The difference in the answers indicates a difference in the perception of financial gains of recommerce. Although it is evident that there are benefits that are apparent in economic terms, there are people who are not sure that prices are fair, their resale values, and the risks that could occur during the transactions.

Hedonic Goal Frame (HF)

The lowest average score of all constructs was the Hedonic Goal Frame (Mean = 2.762, SD = 0.637),

which indicated rather low concurrence with the elements related to enjoyment, emotional comfort, and experience of pleasure. This implies that hedonic influence is not the primary reason why there is the desire to embrace recommerce. Instead, respondents appear to take it as a more practical and rational decision, rather than a form of activity that appeals to the emotions. This is in tandem with the fact that users demand recommerce platforms on their usefulness and value, rather than their entertaining potential.

Normative Goal Frame (NF)

The Normative Goal Frame indicated a higher average score (Mean = 3.560, SD = 0.794) meaning that the respondents are aware of the role of environmental responsibility, sustainability, and social approval in the adoption of recommerce. These findings indicate an embedded sustainability-motivations. Nonetheless, as subsequent analyses would reveal, normative motives by themselves might not be sufficient to make people actually adopt, unless there are other economic or functional rewards.

Perceived Usefulness (PU)

The mean of Perceived Usefulness was found to be 3.604 (SD = 0.824), which is indicative of the fact that overall, recommerce applications are perceived as helpful and useful by the respondents in the purchase and sale of products. This observation implies that users value the practical use of such sites and consider them as having the potential to enable effective transactions. Thus, the usefulness perceived does not appear to be a significant obstacle to adoption; it is rather a bare minimum expectation than driving force.

Perceived Ease of Use (PEOU)

One of the highest averages was given to

Perceived Ease of Use (Mean = 3.664, SD = 0.795), as it reveals that respondents consider recommence applications to be quite easy to use and learn. This positive evaluation indicates that the problems of usability have been addressed generally. Nevertheless, high perceived ease of use does not support a high intention to adopt and thus the notion of the need to ensure that usability is necessary but not sufficient enough to facilitate adoption.

Cross-Construct Insights

Comparative analysis of constructs shows a number of prominent trends. To start with, the attitude of technology acceptance (PU and PEOU) was rated better than intention to adopt, which suggests that though users are aware of the platform functionality and usability, they are too scared to fully embrace recommence. Second, the hedonic motivation value is much lower than gain and normative one, implying that a recommence adoption decision is largely value-based and rational, and not emotional. Third, the concern on sustainability is relatively high and combined with moderate adoption intention, there is a gap between the values and the actions, which is a frequent challenge in sustainable consumption.

Theoretical Implications

Considering the Goal Framing Theory, the results show that:

- The most influential goals in consumer perceptions are the gain goals.
- Normative goals are recognized but taken as a second place, and
- The impact of hedonic goals in the recommence setting is minimal.

Out of the Technology Acceptance Model, the

perceived usefulness and perceived ease of use are identified by the respondents. But their role appears to be supportive instead of decisive which gives an initial reason as to why these aspects might not prove as strong predictors of adoption intention in subsequent regression analysis.

In general, the results of the descriptive analysis indicate that the respondents tend to consider recommence applications as user-friendly, valuable, and sustainable, although the adoption intention is average. This underscores the importance of motivational framing especially on the aspect of economic value to bridge positive perceptions to actual adoption behaviour.

Reliability Analysis

Unidimensional Reliability Analysis - Gain Goal Frame (GF)

Frequentist Scale Reliability Statistics

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α	0.863	0.033	0.798	0.928

Internal consistency of Gain Goal Frame (GF) construct was assessed using a scale reliability test with Cronbach alpha value. The aim of this analysis was to establish whether the items that are supposed to measure gain-oriented motivations are always indicative of one underlying construct as previously argued by Goal Framing Theory. The results of the reliability analysis showed that Cronbach's alpha was 0.863, the standard error was 0.033, and the 95 per cent interval was between 0.798 and 0.928, which indicated that the study had a high measure of stabilization.

Using the set reliability norms, alpha values above the 0.80 point are considered signs of good

internal consistency, and those above 0.90 can be considered signs of great reliability. The alpha obtained, thus, shows that the GF scale has a high level of internal consistency. The high coefficient supports the fact that those items which measure gain-oriented motivations like the perceived economic value, cost savings and rational decision-making are coherent and respondents can consistently understand them. Moreover, the close and high confidence interval also improves the reliability of the scale, which simply means that even in case of conservative estimating, the GF construct is reliable enough.

These results support a one-dimensional design of the Gain Goal Frame, and it is being acknowledged that all the items are related to one aspect of motivation. This consistency supports the concept of gain goals in the Goal Framing Theory, which argues that economic and self-interest variables are integrated motivational frame in the decision-making situation.

Unidimensional Reliability Analysis - Hedonic Goal Frame (HF)

Frequentist Scale Reliability Statistics

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α	0.725	0.046	0.635	0.815

Cronbach alpha was applied to measure internal consistency of the Hedonic Goal Frame (HF) by performing a reliability analysis. The article reviewed the question of whether the items related to the emotional comfort, enjoyment, and the experiential reassurance are one underlying construct.

The obtained result provided a Cronbach alpha of 0.725, standard error of 0.046, and a 95 per cent confidence interval of 0.635 to 0.815. A value of alpha over 0.70 is rated as good internal

consistency, especially in exploratory and context-specific behaviour study.

Such results indicate that the HF construct is reliable enough, though not as high in the internal consistency as gain- and norm-based motivations. The fact that the wider confidence interval represents a difference in how respondents perceive their experiences is also in line with the subjective nature of hedonic judgments in recommerce settings.

All in all, the findings support the unidimensional nature of the Hedonic Goal Frame, which justifies its application as a unique composed construct in future studies.

Unidimensional Reliability Analysis - Normative Goal Frame (NF)

Frequentist Scale Reliability Statistics

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α	0.833	0.035	0.764	0.901

Cronbach alpha was used to evaluate the normative goal frame (NF) construct in terms of internal consistency. This construct indicates inspirations of environmental responsibility, moral obligation and social approval. The analysis revealed a Cronbachs alpha of 0.833 with a standard error of 0.035 which had a 95% confidence interval of between 0.764 to 0.901. This alpha value exceeds the recommended level of 0.80, which means that the internal consistency is good.

The confidence interval is relatively narrow and high, which implies that the NF scale is stable and reliable, and it does not have much measurement error. These findings help to prove that the items are consistent measures of a single dimension of normative motivation, which serves as the evidence of the concepts of Goal

Framing Theory.

The reliability of the NF construct is quite high therefore it is reasonable to consider it as a single composite variable. This strengthens the faith in future explanations of its impact on adoption intention

Unidimensional Reliability Analysis - Perceived Usefulness (PU)

Frequentist Scale Reliability Statistics

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α	0.736	0.060	0.618	0.853

The internal consistency of Perceived Usefulness (PU) was assessed using Cronbach's alpha (α) to see if items measuring functional and performance-related benefits reliably represent a single idea. The PU scale showed a Cronbach's alpha of 0.736, with a S.E. of 0.060. The 95% confidence interval lies between 0.618 to 0.853. This alpha value meets the acceptable reliability standard for research on recommerce technology adoption.

While the upper limit of the confidence interval indicates good reliability, the lower limit suggests moderate differences in perceived usefulness among respondents. This variation might reflect differences in individual experiences, transaction outcomes, and levels of trust in recommerce platforms.

Still, the results support measuring PU as one dimension and justify including it as a single idea within the integrated GFT-TAM framework.

Unidimensional Reliability Analysis - Perceived Ease of Use (PEOU)

Frequentist Scale Reliability Statistics

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α	0.804	0.038	0.730	0.877

In calculating the Perceived Ease of Use (PEOU), Cronbach alpha () was employed as a tool of assessing the consistency of items that can be applied to the use, difficulty and processes involved in the recommerce application. The alpha of Cronbach was also estimated as 0.804, standard error = 0.038, and confidence interval of 0.730-0.877 which is greater than the standard alpha of 0.80.

The value of the result showed that the confidence interval is narrow, and this means that the measurements were consistent, meaning that users answered the questions related to usability through the prism of the PEOU variable in a homogenous manner. These findings affirmed that PEOU variable had a dimensionality of one

Unidimensional Reliability Analysis - Intention to Use (INT)

Frequentist Scale Reliability Statistics

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α	0.905	0.019	0.867	0.942

Cronbach alpha was used to measure the internal uniformity of the Intention to Use (INT) measure. This will ensure that there is a consistent variable in determining the proposed adoption intentions in regard to recommerce applications. The Cronbachs alpha of the INT measure was 0.905 and the standard error is 0.019 and the 95% confidence interval was 0.867- 0.942. This value is larger than the target of 0.90 which

guarantees the high internal consistency. The fact that the alpha value and the low confidence interval also indicate high consistency and accuracy with which the adoption intention items were selected and hence the accuracy of the modelling of the unidimensional concept measured by the INT.

DISCUSSION

The study demonstrates that consumers engage periodically with recommerce apps rather than it being a habit. The sample is dominated by respondents aged 21-30 which is the age group generally associated more with technology adoption. The awareness for recommerce apps is high as found in the study but the actual selling or buying through recommerce apps is low which confirms that there is a huge gap between intention v / s actual buying and selling through these platforms and there is awareness-adoption inconsistency. This supports that availability of recommerce apps doesn't directly translate to engagement of users.

Gain oriented drivers have significant role to play in shaping adoption intention of recommerce apps as respondents that use recommerce apps, strongly associate it with being highly cost- effective, affordable and helping in monetary savings. A major section of respondents also felt that these apps have trust deficits, bad quality and have risks which suggest that economic value alone doesn't ensure that people will buy again from these platforms. It can be inferred that consumers are often faced with high levels of cognitive effort when they are tasked with physically verifying the condition of products, making sense of inconsistent product quality information, or determining the credibility of the seller without any trustworthy signs from the platform. The lack of standardized signs of product quality and trust increases the overall resistance to buy from

recommerce apps.

CONCLUSION

In the case of applying recommerce apps, people are convinced by the prospect of earning money to use them. The reason is that social rules reinforced this and that technology has facilitated this in addition to the fact that technology is not the primary motivator as to why people have jumped on board. Consumers are more likely to adopt these apps when they perceive the apparent economic value, when feeling less risky and when believing they are making a smart offer. Such aspects as sustainability and usability are more of the supporting factors behind their decisions rather than the driving force.

As we have seen, much of the variation in the likelihood of the use of these apps can be attributed to a combined GFT-TAM model, which indicates that both cognitive and motivational elements play a significant role in this case. Interestingly, the factors which are generally perceived as important such as perceived usefulness and ease of use do not have much direct effect when we introduce the goal frames. Rather, the influence of gain goal frames is exposed as the best predictor of intention to use such apps, with normative goal frames in the close. Hedonic frames, in their turn, barely leave an impact. As it happens, individuals view recommerce as a more convenient option that is more about money saving instead of an attraction and entertaining choice. This is evident in the high impact of gain goals in which the value and saving benefits are of the greatest concern.

On the one hand, there is somewhat of a disconnect as having pro-sustainability perceptions does not necessarily result in the utilization of these apps without economic

incentive. Normative goals, such as becoming environmentally responsible or getting social approval, have a positive effect on intention, but not to an extent as much as gain goals. Finally, hedonic goals are the least influential ones and are somewhat predictable. Apparently, pleasure is not so much of an issue with first time adoption, but comfort, and continued use following the initial consumption is. Technologically, the apps are deemed useful and easy to use by most users, which is seen through reasonable reliability and high ratings of perceived usefulness and ease of use. Nevertheless, motivational goals undermine the predictive power of those aspects. This implies that usefulness and ease of use may simply be very simple needs that may assist motivations to become actual usage rather than motivators themselves. There are theoretical and practical implications of the findings.

They substantiate a GFT-TAM framework that demonstrates that intention to adopt is reached through the alignment of these aims as opposed to simply perceptions towards technology. Practically, recommerce platforms need to be in the front as far as good value propositions, such as savings, guarantees, and unambiguous quality checks are concerned, and combine their sustainability messages with actual advantages. They should also ensure that they think about design, and usability as the necessary, yet inadequate components of the adoption and long-term engagement equation

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An In-Depth Analysis on Cyber Security Issues in Online Food Delivery Applications and its Impact

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ABSTRACT

The internet-based food delivery apps have transformed the food service sector to be convenient and efficient to millions of users across the globe. Nevertheless, this transition to online platforms has also come with diverse cybersecurity risks that may undermine the confidence of users, their data privacy, and the general platform functionality. This paper explores the significant online food delivery application cybersecurity threats, which comprise data breaches, weak authentication systems, insecure payment systems, privacy invasions, and insider threats. The research employs secondary qualitative research to analyze available literature, case studies, and industry reports to determine how such security problems affect the users and service providers. The results indicate that application design, insecure APIs, and absence of advanced security measures have vulnerabilities that expose the platforms to different types of cyberattacks, which may cause severe financial and reputational losses. Also, the study examines the impact of such cybersecurity threats on user experience with the focus on the loss of trust and the possibility of business disruption. The research further explains effective suggestions on how to enhance cybersecurity practice in the sector. The study offers meaningful information about the very fact that the online delivery of food requires strong security practices despite such limitations, as the research was based on secondary data and lacked primary case studies. More studies are also advised to investigate platform-specific weaknesses and the performance of new security technology.

INTRODUCTION:

The digital technology that has been developed in the recent past has caused deep transformations in many sectors, and the food service industry is not an exception. The introduction and popularization of online food delivery applications is one of the most

prominent changes in this industry. These online platforms have transformed the manner in which consumers engage with restaurants and food vendors through a smooth and effective experience in ordering. Using the capacity to order, view menus, settlement, and track delivery in real-time, the users can now consume their preferred dishes without stepping foot out

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of their houses (Singh & Puri, 2024). These applications utilize smartphone and mobile internet, cloud computing and user-friendly interface to make customers more comfortable. This has not only increased the accessibility of the food delivery services, but it has also helped to respond to the hectic lifestyle of today. Consequently, these applications have quickly become an indispensable part of modern urban living, particularly in large cities where time and work-related schedules tend to restrict the possibility of having a restaurant experience in the first place (Natarajan et al., 2019).

What is more, the COVID-19 pandemic contributed to the further spread of online food delivery systems as it focused more on contactless services. Food delivery apps, in this regard, came out as a crucial solution to the safety of consumers and the survival of businesses in the food sector. Their contribution in closing the gap existing between consumers and food providers has grown to be of a higher priority, and digital food delivery is now considered an ordinary service instead of a convenience or luxury (Tayal, 2023). As much as the advantages of such applications are obvious, their increased use are also associated with increasing challenges, especially in the area of cybersecurity. Because they get increasingly ingrained into daily life, it is important to consider and deal with the multiple digital threats that might jeopardize their level of safety and reliability. Although online food delivery applications are increasingly becoming popular and efficient in their operation, they are also exposed to various cybersecurity threats that create significant threats to the users, service providers, and the general digital ecosystem (Visconti & Cesaretti, 2023). Such platforms handle and store extensive amounts of sensitive data, including personal data, real-time location data and financial details. These data are extremely desirable to cybercriminals and in the

case of lack of proper protection, they cause major security breaches. Some of the cybersecurity threats in these platforms include data breach, weak user authentication, insecure payment gateway, and vulnerability to phishing (Oguta, 2024). Moreover, attackers can make use of vulnerabilities in the application code and weak API security to obtain unauthorized access or cause disruption. To a certain extent, it is also possible that delivery partners will abuse the app by hacking into software or spoofing locations, which makes the issue of system integrity even more significant (Gupta, 2024). The study focuses on identifying and examining the key cyberattacks affecting food delivery apps over the Internet. It will also look at the implications they have on the trust of users, privacy of data and reliability of the operation. These issues are not only important to protect the information of the user but also to make digital food delivery platforms sustainable and credible over time in the world that continues to become more connected.

LITERATURE REVIEW:

The development of online food delivery application has caused a dramatic shift in the manner through which individuals obtain and utilize food services. Convenience and speed have made these platforms an inseparable part of the daily life, particularly in the city. But, as they begin to be used more often, scholars and authorities began to look at the online security problems associated with such platforms. The problem of cybersecurity threats in online food delivery systems has attracted the attention of numerous research studies where both users and service providers of the system are involved (Candra et al., 2023). The problem of data protection is one of the most widespread ones that have been discussed in preceding research. These applications shall gather a lot of personal data of the user, such as names, phone numbers,

delivery addresses, email IDs and cash details. This information is imperative to the proper functioning of services although when not adequately processed, it can be a significant point of attack to cybercriminals. The lack of adequate direct encryption, weak data storage systems, or lack thereof, may result in the leakage of data or hacking, when sensitive user information is exposed, or misused. The absence of effective user authentication is another significant field of research that has been examined in the past. A lot of food delivery applications permit users to use simple login permissions (like a username and a password), and in a situation where the used passwords are simple to guess or reuse across multiple accounts, attackers can easily infiltrate them (Tang et al., 2024). The personal and financial information of users can be stolen unless they use some sophisticated security measures such as two-step authentication or biometrical authentication. Such a takeover of an account may result in unauthorized purchases and use of user accounts. The security of payment was also the issue raised in previous studies. Such programs are handling thousands of transactions per day, and it implies that they must be secure in terms of payment systems. Nevertheless, when the payment gateway of the app is not secured appropriately or when it is equipped with the dated technology, the chances of cyberattacks occurring in the process of payment processing are high. When transferring the data, the hackers can intercept the data and end up committing credit card frauds or illegally withdrawing funds (Gaw & Felten, 2006).

Other literature of the past has also indicated that the various applications have areas of weaknesses in their coding and design. The bugs in the software or the bad code can serve as an entry point to the attackers. As an example, the vulnerabilities in the manner of communication between an app and its servers may enable

hackers to send fraudulent instructions, receive access to confidential information, or even to tamper with the system in order to make fake orders. Such weaknesses are commonly caused by the absence of regular security testing or the absence of best practice at the development stage. The issue of privacy is also extensively referred to in past discourses (Jalbani et al., 2021). Food delivery applications tend to request permission to access the places, contacts, or any other personal functions of a smartphone. When the application gathers or shares more information than the user requires, or even when this information is collected and shared with third parties without their explicit consent, it may result in severe privacy breaches. Not all platforms can tell users the ways their data is being used, stored, or shared in full, which prevents transparency and trust (Peruma et al., 2024). The other issue that has been raised in the literature is that of internal misuse. Users or delivery agents who have access to the system can use their office to alter the data, modify the delivery status, or abuse the customer information. The application has also seen some of its delivery workers cheat the system by using modified or hacked versions of the application, such as by tricking the system into thinking they had been in a certain place or marking an order as delivered when it was not (Arora et al., 2024). Such acts not only prove to be a compromise to the credibility of the service, but also reveal weaknesses of the internal security configuration. Moreover, there are increasing phishing attacks and social engineering within the digital food delivery arena (Leonov et al., 2021). Fraudulent emails, websites, or text messages mimicking a real app can force the user to give his/her login or financial details (Trisolvena & Saputra, 2024). Since most of the users have not been trained to detect such tricks, such attacks can be very effective resulting in identity theft or loss of money. On the whole, the

current literature demonstrates clearly that, although online food delivery applications can help to save time and effort, they also bring with them a variety of cybersecurity threats. These are data breaches, ineffective authentication, unsecure payment, ineffective privacy practices, insider attacks and phishing prone. It is obvious that they should pay more attention to the development of more powerful security systems as well as raise awareness both of users and developers. With the rise and sophistication in the use of these applications, cybersecurity should always be a priority in order to provide confidence, protection and further success.

OBJECTIVES OF THE RESEARCH:

1. To identify and analyse the major cybersecurity threats affecting online food delivery applications.
2. To examine the impact of cybersecurity threats on user trust, data privacy, and overall application performance.

RESEARCH METHODOLOGY:

The study is a secondary qualitative research that is based on the available literature including scholarly articles, industry reports and reliable online materials to delve into cybersecurity challenges in online food delivery applications. The paper will examine qualitative data by the use of the thematic analysis, which allows consideration of such essential topics as data privacy, payment security, vulnerabilities of authentication, and vulnerabilities of the software application. The review and the interpretation of the patterns through a variety of sources will help the research to gain an insight into the primary cybersecurity issues and their effects on the users and service providers. Although this method can only access the secondary data and is limited by the presence and the latest of published data, it gives an

excellent overview of the present cybersecurity environment within food delivery platforms.

RESEARCH DESIGN:

The study design is descriptive and exploratory because the research aims to learn about the cybersecurity problems in online food delivery applications by conducting a second qualitative analysis of data. It includes the systematic gathering and examination of the literature of the existing works, such as educational papers, industry reports, and other reliable sources of digital security publications. The design focuses on thematic analysis in order to determine the most relevant cybersecurity issues including data breaches and authentication, vulnerabilities in payments, and privacy. In this way, one can thoroughly analyze the reported security incidents and professional opinion, which gives a deep-seated knowledge on the topic without primary data collection. The design of the study is appropriate in producing in-depth qualitative information and providing a basis of further empirical investigations.

D A T A A N A L Y S I S A N D INTERPRETATION:

The secondary sources, articles, reports, and case studies analyzed, reveal some of the most important cybersecurity concerns online food delivery applications are prone to very often. The threats to the security, privacy, and reliability of these platforms are specific to each issue. The initial major problem is Data breaches; it happens when personal information stored by food delivery applications is accessed by an unauthorized person. Such information usually contains the personal information of the users like names, addresses, phone numbers, and card details of payment. The exposure of this data may cause identity theft, financial fraud, and other ill practices. Lots of crimes occur due to the

weak security practices such as unsuitable encryption or the security flaws in the app background systems. The consequences of the data breaches are dramatic since they not only cause harm to users but also a reputation of the company, which results in the loss of customer trust. The second one is Weak Authentication and Authorization. Authentication is the process of checking the identity of a user by making sure he has been who he says before he can access the app and authorization is what the user can do. Most food delivery applications use easy username and passwords which are easily hackable in case individuals use weak passwords or share them with other applications. There are no other security features like two-factor authentication or biometric verification, which simplifies the work of attackers to obtain unauthorized access to accounts. The second primary problem is Privacy concerns that is associated with the fact that food delivery apps are collecting, storing, or sharing, more information about people that would not be disclosed, completely hiding the fact.

Numerous applications will access their location, contacts, and device details to enhance service, and when this information is misused or transferred to third parties without the explicit consent, it will infringe on the privacy rights of users. Another major problem in this study is the issue of Insecure Payment Gateways. Daily food delivery service involves a number of financial transactions that are processed online and hence security of payments is a priority. Nevertheless, most apps operate payment gateway systems which are not well-secured using the most recent encryption systems. This vulnerability enables the attackers to steal or alter payment information in transit resulting in credit card fraud, illegal purchases, and loss of money to the user and business organizations. Mobile applications help delivery partners to manage

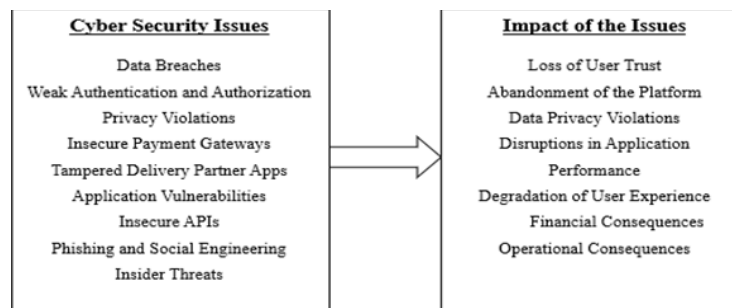
deliveries and orders. These apps are also hacked or altered in order to defraud the system. This is the problem that is called Tampered Delivery Partner Apps. To illustrate, the delivery agents could falsify their GPS position to depict that a delivery has been made when none has been made or abuse the application to receive fraudulent payments. Application Vulnerabilities is the next problem of great importance. Hacking E. coli Software bugs, coding mistakes, and bad design of application may provide the gaps through which hackers may compromise access to unauthorized access or service disruption. Some of the weaknesses that are commonly linked are SQL injection, cross-site scripting, and buffer overflows. Such vulnerabilities enable an attacker to compromise the application in a manner that compromises confidential data or even overtake the systems at the back end. These vulnerabilities should be identified through regular security testing and secure coding to be fixed before they are exploited. Then there is another problem which is Insecure APIs. Application Programming Interfaces facilitate the interaction of various software components to interact. Food delivery applications have been majorly based on API to interlink the mobile app, payment system, restaurant partner, and delivery tracking. Nevertheless, improperly secured APIs are vulnerabilities to attackers. Weak APIs can be poorly authenticated, validated, or encrypted, exposing sensitive data, manipulating orders, or disruption of the service by hackers.

Use of phishing attacks which entails luring users to share sensitive information, including usernames and passwords, by impersonating a trusted organization is one more concern. The attackers develop false websites, emails or messages that resemble legitimate food delivery sites. Users who unknowingly succumb to such scams end up giving their personal information to cybercriminals accidentally. Social

engineering takes advantage of human psychology and is, therefore, a very beneficial tool of cyberattack. Most users are unaware of such threats and this makes them more vulnerable. Lastly, there is the problem of Insider threats. These come about when the employees, delivery agents or the contractors abuse their access privileges to inflict damages. This can be stealing customer data, hacking order information or evading security protocols in order to gain personal benefits or sabotage. The security of the network and its effects on the online food delivery application are very severe in terms of performance and reputation. Having users report instances of data breach or security breaches makes their trust in the platform highly compromised. Attack causing exposure to sensitive data including personal information, payment or delivery history does not only

endanger users but also destroys their trust in the capacity of the app to safeguard their confidential information. With reduced trust, users will have a higher tendency to leave the platform in favor of competitors hence the loss of users which will affect the long-term viability of business. In cases of data privacy breaches, including the distribution of personal data of users without their authority or the insufficient safeguard of this data, legal implications may be observed, not to mention the reputational harm that may be committed by the platform. Besides trust and privacy issues, the cybersecurity threats will also interfere with the general functionality of the application. Unsecure APIs, vulnerabilities of the application, and altered partner applications may result in service interruptions, delays and wrong order fulfilment.

Conceptual Diagram:



FINDINGS:

The research shows that there are some significant findings on the cybersecurity problem of online food delivery applications. The major problems are the frequent data breach that exposes sensitive information about the users, resulting in identity theft and loss of money. Most of the sites are poorly authenticated making them easy to access user accounts, further jeopardizing security. Invasion of privacy is common where sites tend to gather and share a lot of personal information than is required which can compromise user

confidence. The paper also points out the weakness of payment gateways that may be hacked resulting to fraud. A second important observation is that there are tampered delivery partner apps that may cause delivery falsification and a reduction in the integrity of the service. Weaknesses in application and insecure APIs have continued to be the target of attackers who aim at manipulating or stealing information. In addition to this, phishing and social engineering schemes are still used to trick users to reveal confidential information. Finally, the study identifies threats of insiders, in which employees or agents abuse their privileges to

gain financial benefits or steal data. The findings also indicate the paramount importance of the increased cybersecurity levels to safeguard users and guarantee the stability of food delivery platforms.

LIMITATIONS AND SCOPE FOR FURTHER RESEARCH:

Although the current research offers significant information about the cybersecurity problems associated with online food delivery applications, it should also be noted that there are some limitations. To start with, this study is entirely relying on secondary data, thus its results are limited by the accessibility, reliability and the topicality of the analyzed sources. It can lead to the lack of knowledge concerning the new threats or the latest changes in the sphere of food delivery platform cybersecurity. Also, the research fails to consider the technical specifics of the infrastructure of specific platforms since many of them are usually proprietary and remain undisclosed. Hence, conclusions made might not be representative enough of the individual problems that companies in the industry have. These limitations could be overcome in future research through a primary data collection, including surveys or interviews with industry professionals and users, to gain a first-hand experience of cybersecurity practices and challenges. In addition, it would be possible to take a more technical and analytical approach to security measures and mechanisms applied by various food delivery systems to learn about the platform-specific security gaps and mitigation strategies. It would also be beneficial to expand the study by incorporating the comparative analysis of various industries or countries to gain a larger scope on the differences among food delivery applications in their approach to cybersecurity.

CONCLUSION:

To sum up, this study has demonstrated that online food delivery applications have critical cybersecurity issues that put user data, privacy, and the integrity of the platform as a whole at high risk. Examples of those issues include data breaches, weak authentication, insecure payment systems, and insider threats, which compromise the credibility of users and the functionality of these platforms. The results emphasize the importance of effective security controls that can be used to store sensitive information and guarantee the credibility of services. Although the present study presents a more or less holistic picture of the current cybersecurity situation concerning the food delivery industry, additional research is also required in order to examine vulnerabilities that are unique to specific platforms and the strengths of various security measures. With the ever-changing digital environment, these cybersecurity threats will be critical in ensuring the business retains customer confidence and the sustainability of the online food delivery service.

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Battery Smart: Navigating Growth in the Battery Swapping Market

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Electric Vehicles, Battery Smart, Battery swapping, Servitization model, Battery as a Service, Sustainability & Social Entrepreneurship

ABSTRACT

This case highlights the growth of Battery Smart, founded by Pulkit Khurana and Siddharth Sikka, the two IIT- Kanpur graduates, who have been constantly researching about India's mobility ecosystem. It focuses on their entrepreneurial journey and how establishment of Battery Smart, a decentralized battery swapping network in 2019 revolutionized the adoption of electric vehicles in India. The case will be useful for understanding the benefits of this servitization model and its challenges. It also provides the key trends in the electric vehicle market in India and how well is Battery Smart is positioned to take the advantage of future trends in the industry.

On 17 December 2025, the thick black clouds covered the evening skies outside the headquarters of Battery Smart in Gurgaon, India. With hearts brimming with hope and visions of clearer skies, Pulkit Khurana, co-founder of Battery Smart was celebrating a momentous milestone Battery Smart had achieved. Everywhere, the social media posts, press articles and tweets talked about Battery Smart. This was the first company to hit the mark of 100 million battery swaps in December 2025 with its electric two-wheelers (E2W) and three-wheelers

(E3W) network. Will the company be able to ensure consistent growth going forward, given the challenges of higher GST rates (18% vs. 5% on battery in-vehicle batteries)— and the high inventory load requirement of maintaining 2-3x batteries per vehicle on the road? Also, will risks related to brand image, visibility, longevity, quality, and trust arise due to the homologation challenge— particularly the safety concerns around crash performance when batteries are owned, maintained, and charged by different parties but used by multiple users?

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Beginnings of Entrepreneurial Journey

Pulkit Khurana and Siddharth Sikka, the two IIT-Kanpur graduates, with more than a decade experience in mobility and logistics sector, have been constantly researching about India's mobility ecosystem. The eureka moment came when they noticed that over 2.5 million² electric rickshaws that serves around 70 million² people for first and last-mile commutes in India are powered by lead-acid batteries. Lead acid batteries have short six months lifespan that require frequent replacements, creating a continuous financial strain for the users.

Moreover, it often requires 10 to 12 hours every night to charge their batteries and another 3 to 4 hours during the day to top up these batteries that severely affects their earning potential. They learnt the limitations of India's electric vehicle (EV) landscape and decided to address some key challenges including high-cost batteries, unreliable charging infrastructure, charging downtime and high cost of batteries rather than entering the lucrative business of manufacturing EV chargers and electric vehicles.

Their dreams took flight, and their entrepreneurial voyage finally began in 2019.³ They established Battery Smart, in November 2019, with the aim to make a significant impact in the adoption of electric vehicle in India, by implementing a partner-led model that was not only cost-efficient and economically viable but also accessible to the owners of two and three-wheeler electric vehicles. The electric vehicles could be purchased without the battery, which generally accounts for 30%-40%³ of the vehicles cost, and the depleted batteries are exchanged for fully charged ones at the swap stations in just two minutes. Ownership was made up to 40%⁴ more affordable by separating the battery from the vehicle.

The company launched its first swap station in June 2020 in Delhi, India. Currently, Battery Smart is India's largest network of battery swapping stations and boasts of 1,569+ battery swapping stations across 50+ cities⁵. It has helped more than 88,149+ EV drivers through a 2-min battery swap, resulting in their increased daily earnings up to as well. A 43% rise in income has been recorded by two-wheeler operators working nine hours, while three-wheeler drivers have seen a 19% increase.

Business Model

At Battery Smart, it wasn't just only about recharging batteries, but it was about recharging lives. Battery Smart was instrumental in adopting Battery-as-a-Service (BaaS) model. Rather than requiring electric two - and three-wheeler owners to invest heavily in batteries upfront, a wide network of battery swapping stations are being established where exhausted batteries might be swapped for fully charged ones. The entry barrier to electric vehicle ownership was dramatically reduced by this model, and two critical aspects – range anxiety and long charging times - were addressed, giving users a fast, familiar refuelling experience like petrol station. Payment-per-swap or subscription-based schemes are also available. The cost per swap is usually priced between \$100 and \$150, with a travel range ranging from 60 to 75 kilometres depending on the vehicle and usage patterns⁷.

Battery Smart's blueprint is based on a dense, decentralized battery swapping network. The company has deployed an asset-light, partner-led expansion strategy to develop swap stations at a rapid pace. They partner with existing local businesses - corner shops, garages and other small businesses, to leverage their existing infrastructure, without the necessity of acquiring new real estate space. This way Battery Smart can

open three to four swap stations every day. The partners must pay a license fee only. Battery Smart will take care of the investments in chargers and batteries.

Under the standard agreement, this model allows partners to recoup their initial payment within a year with three-year operating period. For a swap station to go live, it usually requires six weeks' time. An extensive network of swap stations is continuously being established to ensure that drivers are never far from their next battery. The stations are available within one kilometre radius for drivers. The aim is set to recreate traditional fuel stations accessibility and convenience. Both swaps were completed in less than two minutes, minimizing downtime for drivers.

Additionally, the company has mandated training programs for all station partners and drivers on board for proper battery storage, battery management, emergency responses and handling issues. The partners are trained about the procedures to secure batteries, how to charge the docks and how to respond to emergencies. The physical integrity of batteries is of utmost importance as a minor damage can impact safety and lifespan of batteries. The drivers were trained how to protect this.

The critical real-time parameters of the batteries are tracked with the help of battery management software (BMS). The safety of the station operators and drivers is at the top list of Battery Smart with the help of rigid protocols. All batteries are built with IoT devices within the Battery Smart network which enables real-time monitoring of adverse parameters such as voltage, temperature, and current. In addition, 24x7 on-call service is offered to support partners and drivers whenever needed.

Battery Smarts success was also linked to its

approach towards battery procurement and standardization. Recognizing the need for interoperability across a fragmented EV industry, the company has collaborated with over 10 leading Original Equipment Manufacturers (OEMs) to produce interoperable lithium-ion batteries⁸. Although these batteries were manufactured by different manufacturers, identical specifications and dimensions were retained in these batteries, enabling a single type of battery to be used conveniently by over 200 different EV models.

Each battery was assumed to weigh between 12 and 15 kilograms, with a capacity of 2 to 2.5 kWh and was designed for ease of handling and improved energy efficiency in electric two-wheelers and e-rickshaws. Two-wheelers are enabled to run with one or two batteries, while electric three-wheelers and electric loaders are available with up to four batteries, depending on range requirements.

The company works with asset leasing companies and OEMs to create a battery-light system rather than owning the batteries themselves, further preserving an asset-light structure. Although, the warranty, performance, and safety on the products is to be provided by partner OEMs, Battery Smart performs quality control on them before bringing it out to the market. Battery Monitoring System (BMS) have been used significantly for handling swappable batteries in a proper way. The gross margin of 30% is the result of scalable tech-enabled business approach that is used by Battery Smart.

For streamlining the battery-swapping operations of electric vehicles and to support drivers and partners, mobile apps have also been devised by Battery Smart. The Driver App, not only enhances the user experience, but also helps in operational efficiency through its distinct features. To monitor the battery health, smart

meters are used in vehicles and they are integrated with the app. Battery's health is monitored easily, regular updates are available regarding the current charge level and timely alerts are issued for the uninterrupted and smooth travel of the battery swap. The swap history can also be analysed easily through the mobile app using the previous battery swaps and related transactions. The mobile apps facilitate easy transaction management and the smooth processing of payments through digital wallet deposits and withdrawals. The nearest battery swapping stations can be easily identified by the app users via station location feature which also determines the completely charged batteries at every site.

The Partner App, on the other hand, is effectively designed for intense station monitoring and financial administration. The station administration feature can track the station assets of the partners and oversee the daily operations. The app gives complete overview of all battery swaps to the partners and offers comprehensive information on financial transaction, besides the Smart balance feature that act as a digital wallet, which reports the income and withdrawals effectively. In terms of Battery Smart's experience in India, innovation alone will not help in building a scalable EV solution. The challenges related to infrastructure gaps, operational safety and technological shifts are consistently addressed by the company. Constantly, a deep, long-term commitment along with hands-on execution required for company growth is addressed and continuously adhered by the company.

Industry Overview

In India, the adoption rate of electric vehicles has been increasing; however, the pace of adoption is lower in comparison to leading countries such as

China, the US, and the EU. In 2020, EV penetration in India was only 20% of the global penetration which increased to over 40% in 2024. EV sales in India increased to 2.08 million in 2024 from only 50,000 in 2016, compared to global EV sales, which rose to 18.78 million in 2024 from 918,000 in 2016⁹. In 2024, the electric vehicle market globally was worth US\$755 billion and is projected to grow at a CAGR of 21.5% (2024-2033) and reach US\$4,360 billion by 2033. In India, this electric vehicle market is expected to grow at a healthy CAGR of 57.23% (2024-2033) thereby increasing from US\$2.36 billion in 2024 to US\$164.42 billion¹⁰.

In the last few years, India has witnessed a commendable growth of electric vehicle (EV) sector. The count of EVs is expected to achieve target of 80 million by 2030 on Indian roads. This will include 30% of private cars and 70% of commercial vehicles including one-fourth of buses, and remaining will be two- and three-wheelers. The objectives of number of government initiatives, increased environmental concerns, expanded EV charging network, and technological advancements will be achieved through the 'Make in India' initiative by the production of EV production domestically. It is worth noting that the Indian EV battery market is anticipated to witness steady growth with a CAGR of 22.6% and is expected to rise by US\$11.67 billion by 2033 from US\$2.22 billion in 2024¹¹.

Two important charging methods available in India are conductive charging and battery swapping. Conductive charging involves the transfer of direct electricity to the vehicle from a charging station, while in battery swapping, the EV driver only needs to replace a depleted EV battery at designated battery swapping stations with a fully charged one.

Business Models in Battery Swapping

Currently, the concept of the battery swapping is in its infancy stage and has yet to establish a strong foothold in the electric vehicle market.

The two prominent business models adopted by key players are operating in the battery swapping industry are Battery as a Service (BaaS) and Mobility as a Service (MaaS).

Exhibit 1: Types of Business Models in Battery Swapping

Parameters	Battery as a Service (BaaS)	Mobility as a Service (MaaS)
Definition	BaaS offers users' access to a battery on a subscription or pay-per-use/charge basis. Customers pay for the energy used by them	MaaS provides both the vehicle and battery, along with additional services such as insurance and maintenance, all bundled under a subscription model
Segments	Common in B2C (business-to-consumer)	Common in B2B (business-to-business)
Pros	- Customers end up paying as per the usage. Users can switch to different battery types or capacities based on their needs, offering flexibility in vehicle range and performance - Lower CAPEX for the Battery Swapping Operator (BSO) compared to MaaS as vehicle ownership is on the user	- MaaS offers businesses like Zomato several advantages, particularly when the entire vehicle ecosystem is managed by a Battery Swapping Operator (BSO) - MaaS eliminates the need for businesses to invest in fleet ownership, maintenance, and management
Cons	- Might be uneconomical for users that resort to charging of batteries at home - Smaller B2B base	- As MaaS players take ownership of vehicles, their capital expenditure (CAPEX) and inventories increase - Requires high vehicle utilization to ensure Return On Investment (ROI)
Players		

source: jmk research & analytics report, october 2024

Pricing Models

Two major pricing strategies are adopted by Battery swapping in India

- **Pay-Per-Use** – They swap and they pay each time they swap. This model offers flexibility but limited infrastructure provides inconsistent access and there are some OEM compatibility issues also.
- **Subscription Model** – Users can have unlimited swaps by paying a fixed monthly fee. This model is popular among B2B logistics and fleet operators. The benefits of affordability and convenience helped JMK notes with a 34% growth in subscription-

based models.

Competitive Landscape

India's electric vehicle (EV) journey has turned into transformation. It is not just an adoption journey. The presence of large number of domestic players with intense competition are trying to establish a strong foothold in the India's highly fragmented electric vehicle market industry.

The Indian EV market has been despoiled by some international companies such as Gogoro who have entered partnerships with traditional energy companies like Tata Power and BPCL. Some global players like NIO (China) and

Gogoro (Taiwan), are dominating the battery swapping competitive landscape alongside large battery manufacturers like CATL (China). Several Indian startups and operators like Sun Mobility, Battery Smart, VoltUp, Yuma Energy, ChargeUp, and Race Energy are leading the charge with active operations across India. Modular battery technology, building extensive

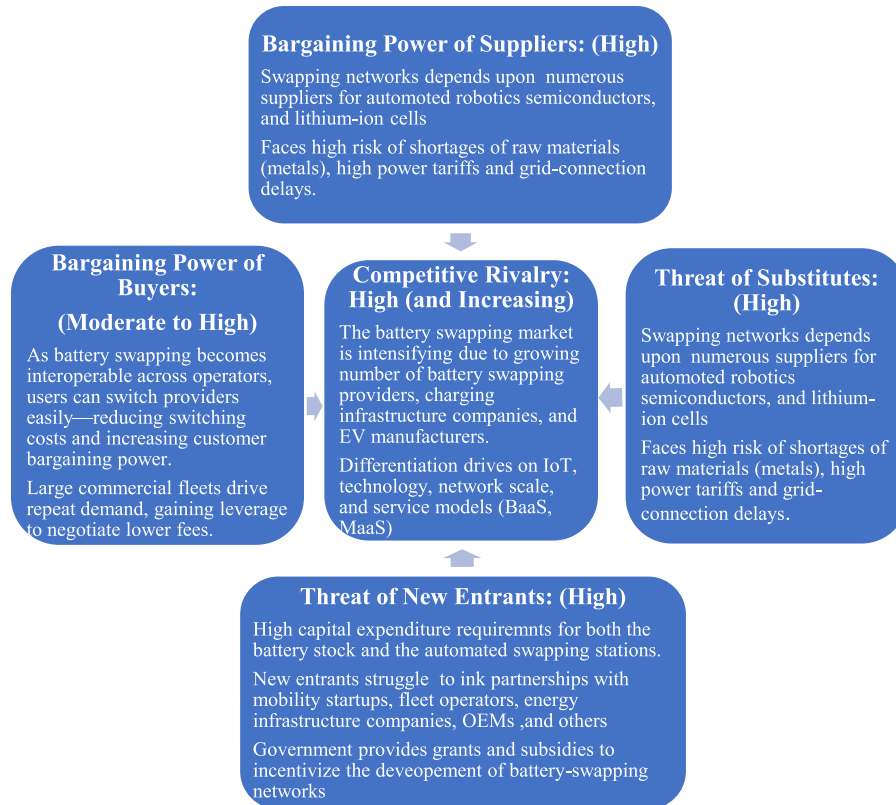
swapping station networks, strategic partnerships and flexible payment models like pay-per-swap are some of their key competitive strategies. Government support for battery swapping infrastructure, partnerships between swapping operators and EV makers, and a growing EV market are providing a competitive environment all over.

Exhibit 2: Mapping of Key Players

Company Name	# of Swapping Station	Business Model	Vehicles Segments catered to	Select Partners
Battery Smart	1500+ in 2006	BaaS	E2Ws / E3Ws	Select partners include Zomato, Eveez, Hala Mobility partners, Voltium, Wardwizard Innovations and others
Sun Mobility	630+ in 2006	BaaS / MaaS	E2Ws / E3Ws/ LCVs	Select partners include Uber, Zomato, Swiggy, Zipp Electric, Blumee and others
ChargeUp	300 stations in 2023	BaaS	E2Ws / E3Ws	Select partners include PeakAmp, Eleven Group, Zomato, Microgrid Labs and others
VoltUp	110 stations in 2023 with plans to increase 2,000 stations by 2024	MaaS	E2Ws / E3Ws	Select partners include Revamp Moto, Hindustan Petroleum Corporation Limited, BSNL, Xero EV, and others
Yuma Energy	2,000+ stations (in 2026)	BaaS	E2Ws / E3Ws and last-mile delivery vehicles	Select partners include e-e-Sprinto, Hindustan Petroleum Corporation Limited and others
RACE Energy	30 stations (in 2024)	BaaS	E2Ws / E3Ws	Select partners include LOHUM, Hindustan Petroleum Corporation Limited (HPCL), Lanka E-Mobility Solutions (LeMS)

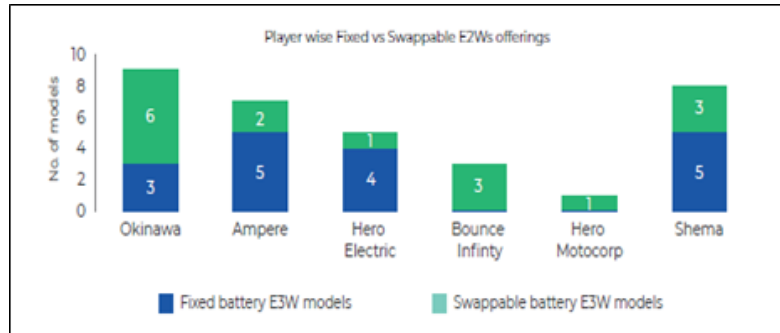
Source: Company Websites & Company News

Exhibit 3: Porter Five Forces Model



Recent Trends in Indian EV battery market

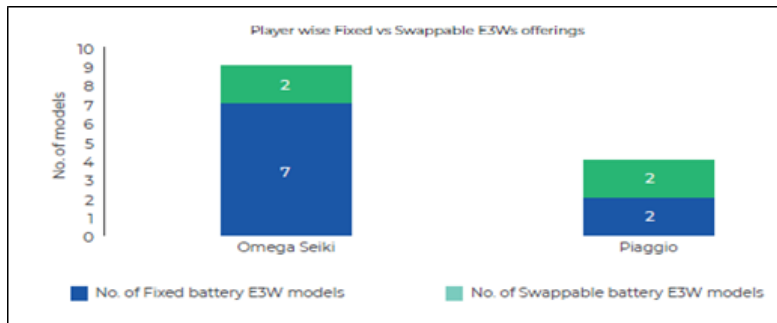
- Electric Swappable models to be retrofitted by ICE Vehicles: Now-a-days, companies like RACE Energy and SUN Mobility are retrofitting internal combustion engine (ICE) of two- and three-wheelers into electric vehicles by adopting battery swapping. This is because it allows fleet drivers to reduce upfront costs, improve efficiency and change their operating vehicles to Electric Vehicles without purchasing the new ones. For example, SUN Mobility has associated with BluWheelz to make the swappable models more accessible and cost-effective. This led to the conversion of Tata ACE vehicles from ICE to EV through retrofit kits¹².
- Battery Swapping to be adopted by Commercial players in E2W and E3W segment influenced by Operational Efficiency: The increasing trend shows that manufacturers are introducing new designed models for battery swapping while E2Ws personally used are primarily charged at home. Businesses involved in last-mile delivery services as well as fleet owners prefer swapping for commercial E2W applications, because fixed charging reduces vehicle downtime caused by it. Operational efficiency is improved and profitability is enhanced by using this approach. This optimization allows vehicles to be on the road without interruptions for a longer period.

Exhibit 4: Player wise Fixed v/s Swappable E3W Models

Source: JMK Research & Analytics Report, October 2024

Primarily, fixed charging method is adopted by the E3W passenger segment. However, swappable battery option is increasingly adopted by the E3W cargo market as this will reduce the downtime for fleets and

businesses significantly. Also, products with swappable batteries are offered by only Piaggio and Omega Seiki among the top players in the E3W segment.

Exhibit 5: Number of Fixed v/s Swappable E3W Models

Source: JMK Research & Analytics Report, October 2024

- **Strategic Focus on Tier 1 Cities:** Initially, the focus of major battery swapping companies was to establish swapping stations in Tier 1 cities only. These include Mumbai, Delhi, Chennai, Bangalore, and Pune. The reason being dense population, noteworthy EV adoption rates, and a robust demand from final mile service therein. Also, the battery swapping is adopted as an instant solution to the fleet businesses in these cities.
- **B2B Emphasis and Fleet Partnerships:** The battery swapping station network attracts rigorous investments from companies due to

its accessibility for both personal and commercial vehicle users. Battery swapping is considered a viable option for most users as the growth in infrastructure supports broader EV adoption and alleviates range anxiety.

The Viability of the Business Model: Opportunities and Challenges

The business model of Battery Smart is extending far beyond customer convenience and has a focus on broad vision of sustainability. Battery swapping will ensure each battery's maximum

utilization thereby reducing waste and extended lifespan. Global initiatives of building a circular economy and minimizing carbon footprint of transportation are ensured with the process of reuse and recycle. The business model of Battery Smart redefined environmental responsibility by focusing on scalability and sustainability at the same time.

The Company was listed in APAC Cleantech 25 list for 2025. This recognition highlights such companies across Asia Pacific region who are developing sustainable technologies in areas of energy efficiency, circular economy solutions, and battery innovation.

Partnerships and Collaborations

Battery Smart's mission is to create India's most extensive and accessible battery-swapping

network. For this, battery smart had strategically pursued a series of collaborations across diverse sectors. These partnerships extended quick commerce, infrastructure, logistics, insurance providers, beyond including traditional automotive players. Each partnership had been designed with a dual objective of accelerating EV adoption and integrating Battery Smart's services into the daily routines of millions of users. The firm had constructed a synergistic network capable of driving sustainable, large-scale transformation by connecting with mobility startups, fleet operators, energy infrastructure companies, and original equipment manufacturers (OEMs). Battery Smart's philosophy that the future of clean mobility could not be built in isolation is clearly reflected in these collaborations. They believe that mobility requires coalitions of innovation to excel.

Exhibit 6: Partnerships & Collaborations

Partner	Sector/ Domain	Year of collaboration	Nature of collaboration
Wardwizard Innovations & Mobility Limited	EV manufacturer	Aug 2025	Swappable battery technology will be introduced through swapping infrastructure for E2W under the brand names Joy e-bike and Joy e-rik
BattRE Electric Mobility	EV manufacturer	Oct 2025	BattRE Electric Mobility has introduced Battery-as-a-Service (BaaS) through a partnership with Battery Smart in Jaipur. With Beez riders' smooth access to more than 100 swap stations of Battery Smart across Jaipur, the collaboration ensures replacement of a consumed battery with a fully charged one in not more than two minutes
Bharatsure	Insuretech	July 2005	A new partnership with Battery Smart has been announced by Bharatsure solely for its station partners to safeguard it against natural calamities such as fire, floods, earthquakes, and storms along with personal accident coverage to offer protection of individual livelihoods. The insurance partnership will empower the EV driver individuals with protected assets.
ZEPTO	E-grocery and quick commerce service platform	June 2024	Batter Smart will enable greener last-mile deliveries by providing access to Zepto's delivery partners with over 1,000 battery-swapping facilities.
Park+	An app designed for car owners	Aug 2022	Park+ powered buildings in 25 cities will be available for users of Battery Smart to access its swap stations through this partnership

GoMechanic	Car repair and service provider	August 2021	The swapping stations at key garages across territories will be quickly scaled with the establishment of battery swapping stations by Battery Smart in GoMechanic garages across India.
Zomato	Food Delivery Platform	Aug 2023	To provide its delivery partners with battery-swapping access on the existing network of 800+ swap stations across 30+ cities of Battery Smart, Zomato has partnered with Battery Smart.
Tata Power Delhi Distribution Ltd	Indian electric utility company	March 2022	Tata Power Delhi Distribution Ltd.'s partnership with Battery Smart has enabled setting up of two-and three-wheelers swap stations at various locations across North Delhi since 2022.

Source: Company Websites & Company News

Challenges

- **Policy and taxation:** Lack of policy standardization across different states in India can be challenge. Also, policies like a high GST rate on swapping services can increase costs for users as against the lower rate on the vehicles themselves. Electric vehicles are taxed at 5%, but if you detach the battery, it becomes 18%. The financial impact of 18% GST is substantial. Also, working capital and start up scalability is affected in case of uncertain collections, due to monthly payment of GST liabilities (both IGST and CGST). One such measure worth considering is reducing the GST on swappable batteries and EV charging from 18% to 5%. Reducing GST from 18% to 5% on a ₹40,000 battery would save ₹5,200 per unit¹⁴. For companies managing one million batteries, this could free up over \$65 million in working capital for infrastructure development and service expansion¹⁵. According to 2022 Battery Swapping Policy draft, the centre encourages swappable batteries. But the service and the underlying hardware is discouraged by a higher tax incidence. The differential tax regime changes the business of battery swapping and rental models.
- **Input Cost Inflation:** There is a huge investment by BaaS firms in lithium-ion battery stocks, storage infrastructure, and swap station networks. Also, upfront capex is increased due to 18% GST on imports and domestic procurement. In addition to this, the input tax credits cannot be utilised by many firms due to the service-nature of their output.
- **Pricing Stress:** Fixed-battery EVs enjoys only 5% GST whereas 18% GST on user subscription fees (approx. ₹2,000 to ₹3,000 per month) steeply increases the final cost to consumers
- **Lack of FAME-II eligibility:** There is an additional disadvantage related to the FAME-II subsidy. This subsidy for EV is linked to battery integration. Due to this, many BaaS-based EVs which are sold without batteries, do not qualify for subsidies¹⁶.
- **Standardization:** Another challenge faced is the lack of standardized battery sizes and connectors across different vehicles. This complicates the swapping process and limits the number of vehicles that can use a particular network. Standardisation is required so that new vehicle model does not face issue with a different battery size. The battery swapping guidelines issued by Ministry of Power 2025 as well as the draft policy by NITI Aayog have tried to make

attempts to put some order. Accordingly, for effectiveness of these, some options like uniform battery pack standards, safety and performance requirements, and interoperability protocols are proposed. These guidelines can avoid duplication of infrastructure and can improve the swapping economics. The only advantage is in terms of ease of use until then is related to fast charging.

Infrastructural and operational challenges

- Capital investment and inventory load- Swapping station mechanisms require significant upfront costs. Also, a large inventory of spare batteries is required to be maintained to ensure availability. This is estimated as 1.5 to 2 batteries per vehicle in the network. A different type of Capex viz-a-viz the automated robotics or manual racks station mechanism is required for battery swapping along with an inventory of extra batteries. To ensure availability of a charged battery every time, operators might need 1.5 to 2 batteries available for every EV in a swapping network. This means batteries themselves require a significant upfront investment resulting in duplicated battery assets. For instance, approx. 150 battery packs in circulation are required in a swapping network which is serving 100 e-rickshaws. These spare batteries are the primary fuel for the business model inventory of operators and requires huge capital. This initial expenditure required to establish a broad chain of swap stations is significant and act as a major barrier
- Homologation challenge: The batteries are owned, maintained, and charged by multiple entities and used by different users. Hence, there always remain the safety concerns in the form of crash safety.
- Asset management: Minimizing losses due to theft or pilferage and optimizing the use of battery assets are ongoing operational challenges. Frequent swapping and battery housing demands wear and tear on connectors. Moreover, a swap system uses more batteries as they run more times per day and accumulates discharge faster, compared to a battery which is dedicated to just one vehicle. To make everything work smoothly, huge investment is required in high-quality, long-cycle-life batteries. If managed poorly, accelerated battery degradation can reduce. This is why it is important that compatibility and quality control of batteries of various manufacturers' batteries is analysed.
- Operational complexity: Operating battery swapping requires more complex logistics. The swap operator has to keep track of battery health and manage charging of hundreds of batteries off-board. Also, to meet the demand, the charged batteries must be positioned at the right stations. Complexity is increased due to interoperability. Multiple vehicle models must support the batteries available. The e-scooter will not be able to use battery of one network to swap it at a different provider's station if they lack universal interoperability. This furthermore requires swap providers like Battery Smart to have industry-standard batteries with specific OEMs or retrofit vehicles so that the batteries can be accepted and "walled gardens" of compatibility can be created.

The Way Forward

Battery swapping is a necessity for India's EV dream to become a sustainable, scalable reality. It is no longer a confined innovation. This is high time for policymakers, investors, startups, and

OEMs to come together and build a resilient, interoperable, and future-ready battery swapping network. India has the market size with government support and talented entrepreneurial workers to lead the world in battery swapping. Leadership in battery swapping is not just possible, it is inevitable.

Suggested question to be discussed in the classroom?

- Will the company be able to ensure consistent growth going forward, given the challenges of higher GST rates (18% vs. 5% on battery in-vehicle batteries)— and the high inventory load requirement of maintaining 2–3x batteries per vehicle on the road?
- Will risks related to brand image, visibility, longevity, quality, and trust arise due to the homologation challenge—particularly the safety concerns around crash performance when batteries are owned, maintained, and charged by different parties but used by multiple users?
- What are the entrepreneurial traits of Pulkit Khurana and Siddharth Sikka?
- Discuss past growth of Battery Smart using Ansoff Matrix?
- What are the benefits of this Servitization model? What are the challenges in implementing servitization in the manufacturing sector?
- What are the key trends in the electric vehicle market in India and across the world?
- How well is Battery Smart positioned to take the advantage of future trends in the industry?

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Beyond Adoption: Determinants of Continuance Intention in Wellness Apps

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KEYWORDS

*Effort Expectancy, Social
Influence, Hedonic
Motivation, UTAUT,
Wellness Apps*

ABSTRACT

This research aims to analyse the factors driving variations in continuous engagement with wellness applications among users. A descriptive research design was used for this study to analyse how different types of wellness app users have different patterns of continued engagement with wellness apps. The data was gathered using a questionnaire that was developed in a way that ensured respondents from all parts of India were able to answer. The technology adoption theories (primarily using the UTAUT 2 theory framework) were the main basis for analysing how considered factors of perceived value (usefulness), technical advantage (ease to use), social impact (socially supporting influence), and future intention (intention to continue using) impacted continued engagement. Continuing to use a wellness application is based on the perceived value of the application (in terms of cost), how user-friendly it is, the amount of pleasure derived from it (hedonic motivation), the user's level of privacy concern, and the user effort in using the application. When the user perceives the application to be cost-effective, easy to use, fun and enjoyable, and safe, as well as how much time and energy is expended to achieve significant wellness improvement through the use of the application, then the likelihood of continued usage of the application increases dramatically. The findings of this study give an insight for the policy makers and app developers to improvise and redesign the apps to enable sustained engagement and long-term adherence. This research uses Unified Theory of Acceptance and Use of Technology (UTAUT2) as the base model with specific constructs to study the post-adoption behaviour of digital wellness apps. The study enhances the explanatory power of technology acceptance frameworks in the digital health domain.

INTRODUCTION:

In today's digital era, the concept of fitness and wellbeing has transformed significantly. Digital fitness and wellness have not only seen a rapid emergence but also turned into a digital

ecosystem with increasing smartphone penetration and availability of multiple apps for tracking fitness, mental wellbeing and lifestyle management.

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With the increasing population of health-conscious individuals, the awareness around fitness, lifestyle, and mental wellbeing has given way to adoption of digital tools and apps as they are perceived to enhance and improve everyday habits of those using such wellness applications. In the past decade, the growth of India's fitness and wellness sector has undergone a significant transformation, ever since the smartphone penetration and increasing health-conscious behavior among people have led to fitness and wellness apps expanding rapidly. The digital market has reached an estimated value of USD 1.5 billion by 2024. (Ken Research, 2025). There are various factors that influence the engagement of the user during the first few days of adoption of such wellness applications in comparison with prolonged usage of such applications. The users across various population segments show varied levels of sustained engagement with wellness applications, although the long-term benefit can be associated with sustained and continuous usage of such applications.

This paper aims to understand the behavioral intention that causes variations in continuous engagement with wellness applications among users using the theory of Unified Theory of Acceptance and Use of Technology (UTAUT) by providing an analytical framework. UTAUT suggests a comprehensive approach considering a larger bracket of factors, which include performance expectancy, effort expectancy, and social influence, by facilitating comparison between predictors of behavior intention versus actual usage behavior. This model provides a comprehensive foundation for understanding and examining how users perceive, adopt, and sustain engagement with such wellness applications.

While several past studies have looked at adopting different types of digital health

technology is impacted by things like perceived usefulness, ease of use and user intention, we do still not have a thorough understanding of why users abandon their usage or the factors leading up to their abandonment; therefore, we need to investigate what type of problems or barriers created by the intervention have caused users to become disconnected by from using the wellness application after they initially began using it.

Specifically, the study analyzes the factors associated with whether users adopt wellness app to begin with versus whether they continue to use the app once they have adopted it. Factors being analyzed in the current study included perceived usefulness, ease of use, user behavioral intention and social influence. At the same time that it is providing theoretical insight into this area, the study provides a comprehensive range of practical recommendations for the design of health/wellness apps that better meet the needs of long-term users – helping developers create user-friendly, supportive, efficient apps for promoting and sustaining long term engagement with the product.

LITERATURE REVIEW

The introduction of digital wellness apps such as fitness tracking, mental health support and lifestyle management, has increased significantly in popularity through increased health consciousness and the adoption of smartphones. Digital wellness apps have achieved significant success in both download numbers and initial user acceptance; however, there continues to be a challenge, that of retaining long term user engagement with these apps. Empirical research shows that for many individuals most users of digital wellness apps have stopped using these apps within weeks after using them for the first time, leading to questions about the viability of these

applications and their effectiveness and behavior change over the long term (Dam et al. 2018, Higgins 2016, Yuan et al. 2015).

In addition to this challenge, researchers have completed significant research examining the factors responsible for the gap between initial adoption and continuing engagement with wellness apps. Researchers have used various technology acceptance frameworks, such as UTAUT and UTAUT2, to assess user engagement with digital wellness applications. Although these frameworks have led to valuable insights regarding the variables that influence user engagement, there is increasing evidence to suggest that the variables that drive initial adoption differ from those that motivate continued usage.

This literature review synthesizes the previous literature examining performance expectancy, social influence, the ease of use of apps, hedonic motivation, perceived value of the price, user habit, user trust and privacy concern as the variables that impact user engagement with digital wellness apps. Based on this analysis, the following hypotheses have been developed following the construction of a theoretical framework.

Performance Expectancy (PE)

Performance Expectancy (PE) reflects the user's belief that the wellness app successfully helps them achieve their health or fitness goals over time (Venkatesh et al., 2003). Research confirms PE as a vital, foundational predictor of continuous use across many consumer technologies, including health devices (Liang et al., 2025; Hutabarat et al., 2021). While strong performance is essential, it is often not enough; users may still switch if they face high costs or low enjoyment (Maduku & Thusi, 2022). Therefore, maintaining high and reliable

confirmed utilitarian value is a non-negotiable requirement for long-term retention (Ng & Kee, 2025).

H1: Performance expectancy positively influences user's Continuance intention towards wellness apps.

Social Influence (SI)

Social Influence is the degree to which people let important or close people like friends, family or healthcare providers influence their intention to keep using wellness apps (Venkatesh et al., 2003). This SI is found to have a positive impact over user's continuous usage of wellness apps as it provides external motivation and social reinforcement, and the assurance of being checked in by those in their social circle embeds self-discipline in wellness app users (Liang et al., 2025; Hutabarat et al., 2021). Although one research on fitness apps did not find a significant direct influence on adoption intention (Dhiman et al., 2019), the overall study confirms its importance in continuance, particularly because external networks provide social accountability for sticking to a routine (Ng & Kee, 2025).

H2: Social Influence positively influences user's Continuance intention towards wellness apps.

Hedonic Motivation (HM)

Hedonic Motivation (HM) refers to the fun or pleasure derived from interacting or using the app, by the wellness app user, which is a key intrinsic factor in consumer continuance (Venkatesh et al., 2012). Research has produced mixed results: some research finds that Habitual Motivation (HM) shows positive correlation to continued usage, mainly as related to Specialized Health and Fitness Apps wherein engagement plays a major role (Yuan et al., 2015). Other

studies focused on Goal-Oriented Fitness Apps have found that the enjoyment derived from using the Wellness Apps was not a significant influencer of Behavioral Intentions, thus implying that the majority of the users would rather complete the task than gain enjoyment from it (Dhiman et al., 2019; Maduku & Thusi, 2022). This indicates that HM is an important determinant of Long-Term Engagement; if the Wellness Application contains enjoyable attributes it may enhance the retention of the user base in the Long Term and minimize the perceived obstacles associated with daily utilization and provide a sustained level of Intrinsic Motivation.

H3: Hedonic Motivation positively influences user's Continuance intention towards wellness apps.

Price Value (PV)

Price value (PV) denotes how the user weighs the cost factor over the features or elements offered by the app against the financial and non-monetary costs (Venkatesh et al., 2003). This variable is highly relevant to continuance intentions, as this is the deciding factor with studies confirming that PV acts as a significant predictor for consumer technologies, including mobile banking and health apps, where users justify the perceived cost (Yuan et al., 2015; Yu, 2012). Conversely, studies on wearable health technology often highlight usage cost as a strong negative inhibitor to continuance (Liang et al., 2025). It all comes down to whether the app continuously provides better upgrades or benefits that override the cost-bearing factor by the user, thus making PV a major factor in determining long term loyalty (Sharma & Sharma, 2018).

H4: Price Value positively influences user's Continuance intention towards wellness apps.

Trust

The factor of trust in the context of mobile health refers to an individual's belief in the competence and reliability of the application (Li et al., 2016). Trust is a determining factor as it embraces a fundamental element of technology service acceptance which was previously missing from previous models (Habicht et al., 2022; Venkatesh et al., 2003). Empirical studies confirm the necessity of this construct as it can determine behavioural intention regarding usage of mobile health applications (Habicht et al., 2022) and is crucial factor of post-adoption behavioural intentions (Chudhery et al., 2023). Trust can also act as a risk mitigation mechanism as increased trust levels are known to reduce perception risks (Li et al., 2016).

H5: Trust in the wellness application positively affects continuous engagement among users.

Privacy concern

Privacy concerns are conceptualised as the user's perception of the possible negative outcomes. It primarily focuses on the risks such as identity theft and unauthorised data usage (Li et al., 2016). Investigations into real-life usage of mobile medical apps shows data privacy problems leading to valid concerns regarding adoption (Grundy et al., 2021). Furthermore, many apps have the capability to access and potential share the personal data collected from users (Huckvale et al., 2019).

H6: Privacy concerns are negatively associated with continuous engagement among users.

App User Friendliness

App User Friendliness is termed as the degree of ease associated with the usage of the app (Venkatesh et al., 2012; Venkatesh et al., 2003; Alalwan et al., 2016). High usability portrays high satisfaction levels, which can indicate that the app is easy to use, fulfils all the functionality claims and behavioural intention to use the services (Venkatesh et al., 2003; Alalwan et al., 2016). App User-Friendliness acts as a necessary pre-condition for the development of behavioural automaticity (Baier et al., 2024; Orji and Moffatt, 2018).

H7: App user-friendliness positively affects continuous engagement among users.

Habit

Habit is defined as the automatic behaviour which is a result of consistent repetition of a cognitive patterns and actions. It is an essential component of technology continuance models like UTAUT2 (Tam et al., 2018; Habicht et al., 2022). Habit plays a crucial role in post-adoption which can influence continuance. Repeated usage enables people to adopt habitual patterns in accordance with the app as it ensures the behaviour is performed by default, rather than by a deliberate, effortful decision-making process based on a functional utility evaluation (Tam et al., 2018). Effective wellness apps aim to actively support habit formation by integrating goal setting, self-monitoring, and feedback into their systems. Once established, habit serves as a critical defence mechanism against attrition (Eaton et al., 2024).

H8: Habit positively affects continuous engagement among users.

METHODOLOGY

Measurement

Measurement variables were adopted from already existing UTAUT2 based studies and formed to fit into the context of wellness application. It gives constructs or variables like Performance Expectancy, Social influence, hedonic motivation, price value, trust, privacy concern, user friendliness, habit and continuance intention.

All subjective constructs using Five Point Likert scale, examining user's attitude and behavioral intentions. In addition, MCQs were asked to calculate demographic characteristics and use patterns of application such as usage frequency and which applications were used.

Sample and Data Collection

This study takes the quantitative research approach and primary data were collected with the help of an online survey. The intended population are the people who use wellness app frequently including fitness, mental health, meditation and lifestyle tracking apps data were collected on the pan India basis to capture diverse user perspective across region, age and occupational background.

The respondents who by themselves reported the previous usage of at least a single wellness app were taken into consideration for analysis to make sure the relativity to the studies key focus on uninterrupted engagement. The collected responses were then evaluated to remove and finish the entries before analysis.

Measurement Model

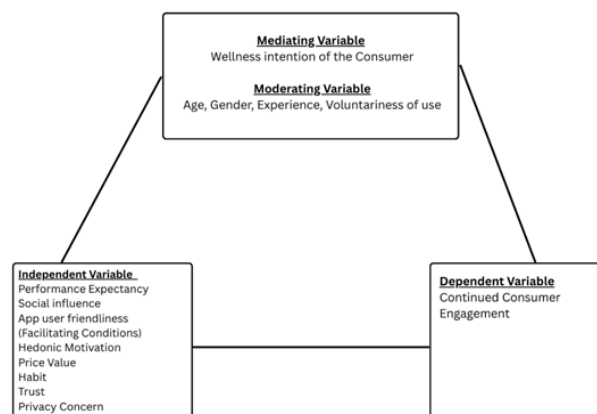
The study is referenced from the united theory of acceptance and use of technology 2 (UTAUT2) framework put forward to evaluate post adoption behavior in the form of uninterrupted engagement with the wellness application. The suggested research model analyses the direct influence of Performance Expectancy, Social influence, hedonic motivation, price value, trust, privacy concern, user friendliness, habit and continuance intention.

Continuous intention serves as the dependent variable, while the UTAUT2 constructs act as an independent variable. The model is empirically tested to assess the strength and significance of the hypothesized relationships, consistent with prior technology continuance research.

Measurement items of variable:

Variables	Measurement Items (7-point Likert scale)	Reference
Performance Expectancy	Using the app is useful in my daily life; helps me accomplish tasks faster.	Venkatesh et al. (2012); Dhiman et al. (2020)
Effort Expectancy	Learning to use the app is easy; interaction is clear and understandable.	Venkatesh et al. (2012); Dhiman et al. (2020)
Social Influence	People important to me think I should use the app.	Venkatesh et al. (2012); Dhiman et al. (2020)
Facilitating Conditions	I have the resources and knowledge necessary to use the app.	Venkatesh et al. (2012); Dhiman et al. (2020)
Hedonic Motivation	Using the app is fun and enjoyable.	Venkatesh et al. (2012); Dhiman et al. (2020)
Price Value	The app provides good value for the money.	Venkatesh et al. (2012); Dhiman et al. (2020)
Habit	Using the app has become a habit for me.	Venkatesh et al. (2012); Dhiman et al. (2020)
Behavioral Intention	I intend to continue using the app in the future.	Venkatesh et al. (2012); Dhiman et al. (2020)

Conceptual Framework



ANALYSIS

For the data analysis, **descriptive analysis** was performed using JASP 0.95.4.0 to understand who the respondents are, what their overall perception is, and usage patterns related to wellness applications. The results of the descriptive analysis showed that the respondents showed moderate to high usage of wellness applications and users have positive perception towards usefulness, features, trust, and wellness impact. The diverse range of user experience indicates that the data is suitable for further analysis.

As the next step, **reliability analysis** was conducted on all the constructs and the Cronbach's alphas of all the variables were above 0.70 (0.719-0.932), indicating good reliability.

Exploratory Factor Analysis

Exploratory Analysis was performed to examine the validity of the measurement scales of the construct. **Table 1** shows that the Kaiser-Meyer-Olkin (KMO) indicated adequate measure of sampling adequacy which was found to be above the acceptable threshold of 0.60, while Bartlett's test of sphericity was found to be statistically significant. This confirms that both are needed for conducting exploratory factor analysis.

Measure	Value
Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy	0.901
Bartlett's Test of Sphericity – Chi-square (χ^2)	5463.194
Degrees of Freedom (df)	903.000
Significance (p-value)	< 0.001

The factor-loading results (Table 3) indicate that the measurement items loaded meaningfully, with most loadings exceeding the acceptable threshold of 0.50, show strong relationship with their respective factors. Low **uniqueness values** suggested that the extracted factors sufficiently represented the variance of the observed variables.

The seven factors were interpreted as follows:

Factor 1 - Reliability and Usefulness: Items measuring reliability (RU1, RU2, RU3) and usefulness (UF1, UF2, UF3, UF4). This factor covers how dependable the system is and how useful users find it. It shows the capacity of users' trust and benefit from the system.

Factor 2 - Web interference / interaction: Items WIC1, WIC2, WIC3, and WIC4. This factor covers website usability, interface quality, and how users interact with the system. It shows how

easy and convenient it is to use the website.

Factor 3 - User Experience / Enjoyment: Items EU1, EU2, EU3, and EU4. This factor shows the overall user enjoyment and experience while using the app.

Factor 4 - Perceived Value / Price-Quality: Items PV1, PV2, PV3 and PC3, PC4. This factor measures if users perceive the app to be worth the cost.

Factor 5 - Product / Content Quality: Items PC1 and PC2. This factor focuses on the content quality of the product and whether the product is useful or not.

Factor 6 - Social Influence: Items SI1, SI2, and SI3. This factor measures the influence in the decision of the user based on friends, family, peers and social groups.

Factor 7 - Affective / Emotional Response: Items AF1, AF2, AF3, and AF4. This factor covers the emotional response and feeling of the user towards the app.

Table 2 Factor Characteristics:

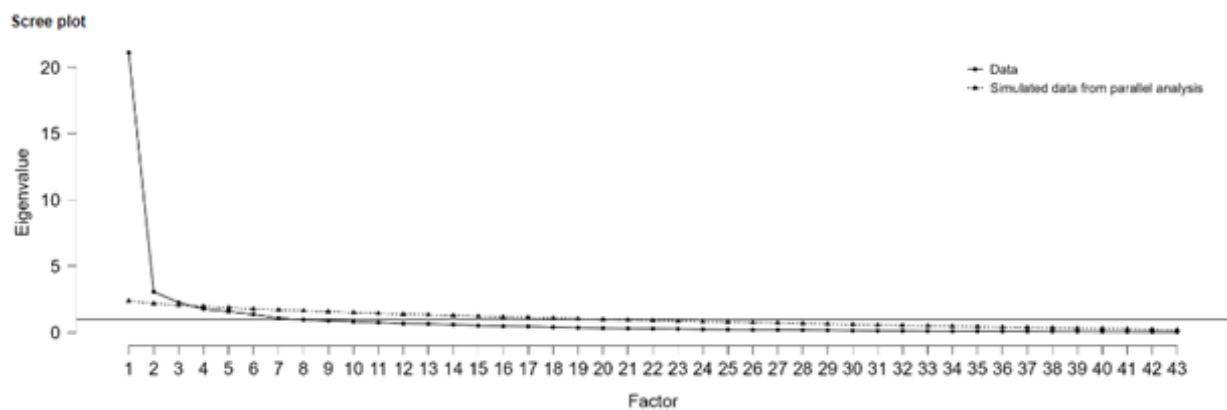
	Unrotated solution			Rotated solution		
	Eigenvalue	Proportion var.	Cumulative	SumSq. Loadings	Proportion var.	Cumulative
Factor 1	20.827	0.484	0.484	7.771	0.181	0.181
Factor 2	2.765	0.064	0.549	6.314	0.147	0.328
Factor 3	1.945	0.045	0.594	5.055	0.118	0.445
Factor 4	1.479	0.034	0.628	4.139	0.096	0.541
Factor 5	1.227	0.029	0.657	3.079	0.072	0.613
Factor 6	1.101	0.026	0.682	1.963	0.046	0.659
Factor 7	0.771	0.018	0.700	1.794	0.042	0.700

According to Table 2, six of the nine factors that had eigenvalues above one are included in the model created by the extracted factors. These six factors explain 68.2% of the total variance in the

initial extraction and range from 1.101 to 20.827 for their eigenvalues; the first extracted factor was the most influential and explained the greatest percentage of the total variance.

The rotated factor solution provided a clearer understanding of how each extracted factor's variance contributed to the overall factor solution; all extracted factors had an even distribution of variance. Based on cumulative variance analysis there is a great deal of overlap between the variance of the extracted factors and that of their respective variables.

The scree plot demonstrated that after the sixth factor there was a clear break in the line indicating that these factors should be retained. In summary, the results support the conclusion that the factor structure is clear and easy to interpret; therefore, the instrumentation for measuring the scale can be assumed to possess strong construct validity.



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Table 3 Factor Loadings

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Uniqueness
RU1	0.737							0.344
RU2	0.714							0.317
UF1	0.677							0.197
UF2	0.657							0.322
UF4	0.652							0.248
RU3	0.645							0.350
E2	0.586							0.353
UF3	0.528							0.362
E1	0.509							0.365
CUI4	0.440							0.237
E3	0.418							0.313
WIC1		0.858						0.226
WIC2		0.801						0.245
WIC3		0.773						0.227
WIC4		0.607						0.275
T1		0.432						0.302
EU4			0.843					0.279
EU3			0.820					0.301
EU2			0.794					0.287
EU1			0.696					0.249
PV3				0.751				0.310
PC4				0.643				0.442
PC3				0.611				0.409
PV2				0.596				0.486
PV1				0.592				0.345
PC1					0.987			0.119
PC2					0.730			0.430
SI1						0.707		0.305
SI2						0.648		0.309
SI3						0.550		0.380
AF4							0.607	0.120
AF3							0.571	0.376
AF2							0.413	0.170
AF1								0.213
CUI1								0.155
CUI2								0.262
CUI3								0.425
T2								0.314
T3								0.298
T4								0.251
VU1								0.240
VU2								0.464
VU3								0.264

Following the completion of the exploratory factor analysis, Composite scores were calculated by averaging all the items within each factor and providing a better understanding of the user's view of each factor. Composite scores of higher values indicate a better view of the factor by the user than composite scores of lower value. Since the composite score represents all items associated with a factor, these scores will be utilized in the analysis to conduct correlation and regression analyses.

Correlation Analysis

Table 4 suggests that there are significant

positive associations between various independent variables and the dependent variable, Continued Usage Intention (CUI) ($p < 0.001$). Trust is identified as having the highest bivariate correlation with CUI ($r = 0.818$), suggesting that user trust is most crucial to continued use. The relationship between Usefulness ($r = 0.795$) and Enjoyment ($r = 0.760$) is also extremely significant, suggesting that both utilitarian and hedonic dimensions play pivotal roles. At the opposite end of significance, Privacy Concerns were found to have the lowest, but still significant, correlation with Intentions ($r = 0.497$). App Features were strongly and positively

associated with Wellness Impact ($r=0.734$), suggesting that it is perceived by users as the main mechanism of achieving these wellness aspects.

Table 4 Pearson's Correlations

		Pearson's r	p
Usefulness	Ease of Use	0.635	< .001
Usefulness	Social Influence	0.507	< .001
Usefulness	App features	0.664	< .001
Usefulness	Enjoyment	0.694	< .001
Usefulness	Perceived Value	0.479	< .001
Usefulness	Regular Usage	0.669	< .001
Usefulness	Trust	0.757	< .001
Usefulness	Privacy concern	0.449	< .001
Usefulness	Wellness Impact	0.677	< .001
Usefulness	Continued Usage Intention	0.795	< .001
Usefulness	Voluntary Usage	0.668	< .001
Ease of Use	Social Influence	0.366	< .001
Ease of Use	App features	0.643	< .001
Ease of Use	Enjoyment	0.429	< .001
Ease of Use	Perceived Value	0.289	.001
Ease of Use	Regular Usage	0.346	< .001
Ease of Use	Trust	0.552	< .001
Ease of Use	Privacy concern	0.322	< .001
Ease of Use	Wellness Impact	0.557	< .001
Ease of Use	Continued Usage Intention	0.604	< .001
Ease of Use	Voluntary Usage	0.605	< .001
Social Influence	App features	0.488	< .001
Social Influence	Enjoyment	0.388	< .001
Social Influence	Perceived Value	0.369	< .001
Social Influence	Regular Usage	0.522	< .001
Social Influence	Trust	0.508	< .001
Social Influence	Privacy concern	0.506	< .001
Social Influence	Wellness Impact	0.497	< .001
Social Influence	Continued Usage Intention	0.479	< .001
Social Influence	Voluntary Usage	0.275	.002
App features	Enjoyment	0.602	< .001
App features	Perceived Value	0.389	< .001
App features	Regular Usage	0.479	< .001
App features	Trust	0.673	< .001
App features	Privacy concern	0.503	< .001
App features	Wellness Impact	0.734	< .001
App features	Continued Usage Intention	0.611	< .001
App features	Voluntary Usage	0.622	< .001
Enjoyment	Perceived Value	0.574	< .001
Enjoyment	Regular Usage	0.655	< .001

Pearson's Correlations

		Pearson's r	p
Enjoyment	Trust	0.728	< .001
Enjoyment	Privacy concern	0.492	< .001
Enjoyment	Wellness Impact	0.632	< .001
Enjoyment	Continued Usage Intention	0.760	< .001
Enjoyment	Voluntary Usage	0.709	< .001
Perceived Value	Regular Usage	0.574	< .001
Perceived Value	Trust	0.640	< .001
Perceived Value	Privacy concern	0.604	< .001
Perceived Value	Wellness Impact	0.440	< .001
Perceived Value	Continued Usage Intention	0.597	< .001
Perceived Value	Voluntary Usage	0.470	< .001
Regular Usage	Trust	0.697	< .001
Regular Usage	Privacy concern	0.510	< .001
Regular Usage	Wellness Impact	0.508	< .001
Regular Usage	Continued Usage Intention	0.651	< .001
Regular Usage	Voluntary Usage	0.498	< .001
Trust	Privacy concern	0.587	< .001
Trust	Wellness Impact	0.700	< .001
Trust	Continued Usage Intention	0.818	< .001
Trust	Voluntary Usage	0.709	< .001
Privacy concern	Wellness Impact	0.475	< .001
Privacy concern	Continued Usage Intention	0.497	< .001
Privacy concern	Voluntary Usage	0.438	< .001
Wellness Impact	Continued Usage Intention	0.722	< .001
Wellness Impact	Voluntary Usage	0.626	< .001
Continued Usage Intention	Voluntary Usage	0.762	< .001

Hypothesis Testing (Regression Analysis)

The multiple linear regression was used to predict the Continued Usage Intention upon eleven independent variables. The result of the regression analysis was significant, with the F-statistic of 44.69 and significance of 0.001. The explanatory power of the result for the variance of intention, as shown in Table 5, was significant.

Table 6 above shows the test for overall goodness of fit for the regression model. Since $p < 0.001$, the overall model has been statistically significant.

With an F-value of 44.69, it indicates that the interaction combination of the independent variables is an efficient way to forecast the outcome variable.

Table 5 Model Summary- Continued Usage Intention

Model	R	R ²	Adjusted R ²	RMSE
M ₀	0.000	0.000	0.000	0.881
M ₁	0.905	0.819	0.800	0.394

Note. M₁ includes Usefulness, Ease of Use, Social Influence, App features, Enjoyment, Perceived Value, Regular Usage, Trust, Privacy concern, Wellness Impact, Voluntary Usage

Table 6 ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	76.17	11	6.925	44.69	< .001
	Residual	16.89	109	0.155		
	Total	93.06	120			

Note. M₁ includes Usefulness, Ease of Use, Social Influence, App features, Enjoyment, Perceived Value, Regular Usage, Trust, Privacy concern, Wellness Impact, Voluntary Usage

Note. The intercept model is omitted, as no meaningful information can be shown.

According to the results shown in Table 7, Trust ($\beta=0.237$, $p=.006$) and Usefulness ($\beta=0.219$, $p=.006$) were both found to be the strongest, positive and most influential predictors of intention, thus confirming that trust and usefulness are necessary for continued engagement and retention of applications. Voluntary Usage ($\beta=0.213$, $p=.003$) and Wellness Impact ($\beta=0.186$, $p=.008$) were both significant predictors of users' intention, as they indicated that users experienced a sense of autonomy in deciding whether or not to use the application, as well as being able to directly relate tangible improvement and benefit from the use of the applications. Enjoyment also made a significant contribution to the model, as a predictor of User's Intention ($\beta = 0.161$, $p = .029$), indicating that making application use enjoyable enhances the

overall user's experience. While App Features did show a positive association in the bivariate analysis, they were found to have a statistically significant negative coefficient in the regression analysis ($\beta= -0.185$, $p=.010$). This negative coefficient indicates a Suppression effect, in which the relationships between other variables, like Usefulness and Wellness, become increasingly complex, resulting in "feature fatigue" that decreases user's intention to continue using the application. The remaining variables, such as Ease of Use ($p=.079$), Social Influence ($p=.272$), and Privacy Concern ($p=.460$), did not meet statistical significance under the multivariate framework. This suggests that these variables certainly positively influence the results, but they did not exhibit the same level of independence regarding predicting user's continued engagement and use.

Table 7 Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p	95% CI		Collinearity Statistics	
							Lower	Upper	Tolerance	VIF
M ₀	(Intercept)	3.599	0.080		44.958	< .001	3.441	3.758		
M ₁	(Intercept)	-0.366	0.221		-1.660	.100	-0.804	0.071		
	Usefulness	0.206	0.073	0.219	2.817	.006	0.061	0.351	0.276	3.628
	Ease of Use	0.117	0.066	0.109	1.775	.079	-0.014	0.248	0.443	2.259
	Social Influence	0.059	0.054	0.061	1.105	.272	-0.047	0.166	0.545	1.834
	App features	-0.176	0.068	-0.185	-2.611	.010	-0.310	-0.042	0.331	3.018
	Enjoyment	0.167	0.075	0.161	2.218	.029	0.018	0.315	0.316	3.167
	Perceived Value	0.101	0.061	0.099	1.659	.100	-0.020	0.222	0.465	2.150
	Regular Usage	0.015	0.058	0.017	0.259	.796	-0.099	0.129	0.379	2.635
	Trust	0.250	0.089	0.237	2.802	.006	0.073	0.428	0.232	4.311
	Privacy concern	-0.050	0.067	-0.043	-0.741	.460	-0.183	0.084	0.493	2.028
	Wellness Impact	0.200	0.074	0.186	2.704	.008	0.054	0.347	0.353	2.834
	Voluntary Usage	0.202	0.067	0.213	2.998	.003	0.068	0.336	0.329	3.041

DISCUSSION

The research findings state that trust and perceived usefulness are the strongest positive predictors of continued usage intention, ensuring that users stay with wellness apps when they use them as credible, dependable tools that authentically help them achieve their health goals. Voluntary usage, perceived wellness impact and interaction simultaneously impact continuance intention, suggesting that independent, tangible, health improvements and positive emotional experience are centre for sustaining long term retention.

Pearson's correlations state that almost all independent variables are positively related with continuance intention, whereas the regression analysis reveals that only a subset-trust, usefulness, voluntary usage, wellness effects and enjoyment – retain exclusive explanatory power in a multivariate context. This suggests that while users may initially enjoy ease of use, social influence and data security, their long-term decision to keep using a wellness app is based more on whether the app proves its value and satisfy their psychological confidence over time

A significant finding is the negative suppression effect of app features: even if features correlate positively with wellness impact and continuance intention at the bivariate level, the regression coefficient becomes remarkably negative once other factors are controlled. This proposes that when feature sets become overly rich or complex, they may result into feature fatigue, where cognitive over exposure and perceived complexity detract from user's intention to continue, whilst the app is powerful on paper.

These patterns reflect the reference study's insight that psychological determinants rather than purely functional or demographic factors

build ongoing behavioural intentions in the reference study resistance and attendance intention for performing arts and in our case continuance intention for wellness apps. In the same way barriers and self-image congruence command non attendee's resistance, here trust, value and experienced outcomes command user's commitment, highlighting that post-adoption behaviour is affected by in depth evaluation than those at the trial or adoption stage.

Theoretically, the study extends UTAUT into the post adoption space by exhibiting that continuance intention is built differently from initial adoption, with experiential and outcome related constructs like trust, wellness impact, enjoyment and independent usage outweighing social and ease of use factors. Basically, this means wellness app designers and managers must prioritize building trust through transparent data practices, making health benefits visible through constructive feedback and progress tracking, keeping feature sets steady and user centric to avoid complexity and curate experiences that feel both voluntary and enjoyable to sustain digital wellness habits.

CONCLUSION

This study was conducted to analyse the factors driving variations in continuous engagement with wellness application and found that trust, perceived benefit, voluntary usage, wellness impact and enjoyment are the crucial determinants of continuance intention among active users in India. Collectively, these factors explain a substantial proportion of variance in continued usage intention ($R^2 = 0.819$), indicating that psychological confidence, perceived value, and positive experience carry more value in long-term retention than interface simplicity or external encouragement alone.

The suppression effect linked with app features demonstrates that “more” is not always “better” adding functionality without careful integration can overwhelm users and reduce their willingness to continue, underscoring the significance of minimalistic and purposeful design. Furthermore, the non-significance of ease of use, social influence, and privacy concern in the multivariate model suggests a post-adoption shift in priorities, where users’ ongoing choices hinge on trust and proven effectiveness rather than on initial usability or social pressure.

Even with these contributions, the study is constrained by its cross-sectional design, reliance on self-reported data, and focus on active Indian users, which restricts causal inference and generalization across contexts and app categories. Future research could adopt longitudinal designs, embody behavioural usage data, compare different types of wellness apps, and use qualitative approaches to explore why disengagement occurs post adoption, thereby improving understanding of the dynamics behind both sustained engagement and dropout.

Largely, the evidence reinforces that sustaining engagement with wellness applications requires more than technological sophistication or enhanced feature sets; long-term retention depends on credibility, meaningful health value, and emotionally positive user experiences that together convert episodic use into stable digital wellness behaviour.

LIMITATIONS

The analysis of this study was subject to several limitations that must be reviewed when evaluating the results of this study. One limitation of the study is the use of a one-time survey method to obtain data. A single survey is an appropriate way to evaluate the relationships indicated in the Unified Theory of Acceptance

and Use of Technology (UTAUT); however, the results produced from the survey only represent how the individual feels about wellness applications and their intentions to use them now. Users’ intentions to use wellness applications and their actual behavior may vary as they become more familiar and continue to use wellness applications. The study did not account for this.

The second limitation of the study is that self-reported measures were used to measure UTAUT constructs such as performance expectancy, effort expectancy, social influence and usage behavior. Since the participants were allowed to self-report their intentions and usage of wellness applications, results may be affected by biases related to a person’s individual bias or desire to present themselves positively.

As a result of the third limitation of the study, the sample was composed of only individuals that were currently using wellness applications during the survey period. Those who had either stopped using or reduced their use of wellness applications were not included. This limits the investigation of the reasons for their decreased behavioral intentions and for discontinuing the use of technology. Finally, wellness applications were studied collectively, with no distinctions made between types of wellness applications.

FUTURE RESEARCH DIRECTIONS

Future studies of this research can further enhance the results of the present study by means of longitudinal research methodology and provide valuable information regarding the positive long-term effects of continued usage and the cessation of sustained engagement with regards to the UTAUT theoretical model.

Subsequent studies may consider investigating the UTAUT individual constructs of

performance expectancy, effort expectancy, and social influence, as defined and articulated by Williams et al., with respect to wellness applications in multiple contexts and to determine whether the relationships found in the initial investigation hold true for other contexts of use.

Also, further research could address how the various attributes of the application's interface, including ease of use, personalized options, and consumer feedback capabilities, act as moderators of the relationship between intention to continue using the application and actual continued use of the application.

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From Visitors to Contributors: Factor Influencing Tourist Citizenship in Bangalore

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KEYWORDS

*Tourism, Tourist Citizenship
Behavior, Destination
Warmth, openness to
experience, Affective
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ABSTRACT

This study explores the impact of residents' hospitality on tourist citizenship behaviour. Despite the growing attention on resident hospitality, its influence on the behaviour of tourists remains limited. Based on reciprocity theory, this research examines the tourist reciprocity behaviour when hospitality is present and absent. Data was collected through an online survey using random sampling of tourists from multiple destinations. Resident hospitality is modelled as the Independent Variable, while Destination warmth and Affective Commitment are used to examine the tourist behaviour during their visit to the destination. Additionally, Openness to Experience and Cultural Intelligence are incorporated as mediating variables. Openness reflects tourists' willingness to explore and engage with diverse cultures, whereas Cultural Intelligence represents their ability to understand, adapt to, and function effectively in culturally different settings. Together, these mediating variables enable one to understand behaviour of tourist at the destination. Residents' hospitality directly impacts the tourist experience which renders it critical for the community to build an environment that is positive and friendly and can foster a social setting valued by the tourists. This can be done by creating awareness among the residents and making them aware that their actions have a direct implication on creating an enjoyable environment for the tourists which in turn also opens up multiple opportunities for them. Previous studies have been conducted that focused on Host hospitality; this study is focused on Resident Hospitality which is a subset of Host hospitality. It analyses psychological rather than purely commercial aspects of Human interaction and its link with the citizenship behaviour of tourist.

INTRODUCTION:

Residents' behaviour and their practice of hospitality play a pivotal role in tourism, as they can leave enduring impressions on tourists. Prior research has demonstrated that residents'

attitudes toward visitors varying in both valence(positive versus negative) and intensity significantly shape tourists' cognitive evaluations, emotional responses, and overall destination experiences (S. Mostafa Rasoolimanesh et.al, 2021).

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The extent to which residents display friendly, kind, and welcoming attitudes, along with corresponding behaviours during direct host-guest interactions, is conceptualised as resident hospitality (Faizan Ali et al., 2023). This form of hospitality reflects not only individual dispositions but also the collective social climate of the destination, thereby influencing how tourists perceive, interpret and respond to their experiences (Faizan Ali, 2023).

Tourists' experiences and subsequent behaviours at the destination are greatly influenced by the hospitality of the locals. According to Mostafa Rasoolimanesh et al. (2021), tourists are more likely to feel emotionally at ease, satisfied, and appreciated when locals treat them with warmth, compassion, and welcoming attitudes. Positive interactions between hosts and guests not only improve the destination's reputation, but they also promote positive reciprocation and return visits, which increases the number of tourists visit the location. According to (S. Mostafa Rasoolimanesh et al. 2021), increasing tourism also boosts a variety of economic prospects for locals, the community, and the growth of entrepreneurship. Positive interactions between hosts and guests not only improve the destination's reputation and overall perception, but also promote positive reciprocation and return visits, which increases the number of tourists visiting the location. According to (S. Mostafa Rasooli et al., 2021), increasing tourism also increases a variety of economic prospects for locals, the community, and the growth of entrepreneurship. Many locals are still ignorant of the vital role hospitality plays in establishing and maintaining brand image, and destinations have acknowledged the strategic significance of hospitality and integrated it into their destination branding strategies. (Sunil Atulkar, et al. 2017). Consequently, investigating the augmenting effects of resident hospitality on tourists'

subsequent behaviours is essential for enabling destination managers and policymakers to understand its role in destination development better and to promote a more welcoming tourism environment (Arcia et al. 2020).

In contrast to resident and its spillover consequences, host hospitality has generated increasing scholarly interest (S. Mostafa Rasooli et al., 2021). According to (S. Mostafa Rasooli et al., 2021). Tourist citizenship behaviour is a developing concept in tourism research that describes travellers' selfless and voluntary acts that go above and beyond their expected duties and help various destination stakeholders. According to current research, these destinations improve destination development and create a peaceful atmosphere, which raises awareness of the destination. According to the stereotype content model, tourists would form a strong destination warmth perception when local residents exhibit a high level of hospitality (Zhang D. et al., 2024). This would enhance tourists' effective reaction, i.e., affective commitment, which may also foster positive behaviours towards the focal destination (Rodriguez et al. 2023). Accordingly, this study investigates destination warmth and affective commitment as key mediating mechanisms through which resident hospitality influences tourist citizenship behaviour at the destination level.

Reciprocity theory posits that human behaviour is influenced by both external environmental factors and internal dispositions, as well as their interaction (Faizan Ali, 2023). This suggests that tourists' stable traits may moderate the relationship between resident hospitality and tourist citizenship behaviour (Rodriguez et al., 2023). Additionally, the reciprocity theory employed in this study clarifies how people react to the deeds of others by returning kindness and malice (Arcia et al., 2020). Positive encounters

between visitors and hosts frequently result in reciprocal behaviours from the standpoint of tourism. Crucially, from a reciprocal standpoint, friendly locals can encourage visitors to participate in tourist civic behaviours, including honouring and promoting local customs. When a high level of hospitality is displayed by residents, tourists are more likely to respond with favourable actions, such as destination-supportive and citizenship behaviours, thereby reinforcing positive host-tourist relationships. (wang, 2025) Thus, resident hospitality serves as a foundational stimulus that triggers tourists' prosocial behaviours, linking host attitudes directly to both community well-being and destination sustainability.

Beyond immediate reciprocal responses, resident hospitality also has an important role in shaping tourists' co-creation, value perception of tourists at the destination. when tourists feel welcomed and emotionally supported by residents, they are more likely to perceive themselves as active participants rather than passive consumers of tourism experiences (Arcia et al., 2020) . This sense of co-creation encourages tourists to engage in behaviour that supports destination functioning, such as providing constructive feedback, cooperating with service providers, and voluntarily contributing to the overall tourist experience of others. (Faizan Ali, 2023)

In addition, openness to experience, one of the Big Five personality traits, reflects an individual's willingness to engage with novel experiences, ideas, and unconventional situations (S.Mostafa Rasoolimanesh et al., 2021). Likewise, cultural intelligence, defined as the ability to function effectively culturally in diverse settings, enables tourists to better understand residents' intentions and behavioural cues. Although prior studies have established its close association with host-guest

interactions, its moderating role in translating resident hospitality into tourist citizenship behaviour has rarely been empirically examined (Zhang et al., 2024). Addressing these problems provides for a more nuanced understanding of when and for whom resident hospitality is more influential in fostering pro-social tourist behaviour.

To address these research gaps and advance understanding of the behavioural consequences of resident hospitality, the present study incorporates cultural intelligence and openness to experience as key moderating factors. Accordingly, this research addresses three central questions: (1) Does resident hospitality augment tourist citizenship behaviour at the destination level? (2) Do destination warmth and affective commitment mediate this relationship of resident hospitality and tourist citizenship behaviour? (3) Do cultural intelligence and openness to experience moderate this process?

This study contributes to the tourism literature in three important ways. First, it advances understanding of resident-tourist relationships by empirically establishing a reciprocal relationship between resident hospitality and tourist citizenship behaviour and by elucidating the underlying psychological mechanisms driving this reciprocity (Sunil Atulkar et al., 2017). Second, it enriches the tourism behaviour literature by identifying the moderating roles of cultural intelligence and openness to experience, thereby providing a more comprehensive explanation of how resident hospitality translates into voluntary, destination-supportive behaviours (Bauer, 2018). Third, this research contributes to the resident-tourist relationship by offering a novel theoretical framework underpinned by reciprocity theory, affective events theory, and the stereotypical content model, which could serve as a reference for future research.

LITERATURE REVIEW

Theoretical Background

The reciprocity theory defines a psychological phenomenon where reciprocal people reward actions that are kind and punish actions that are unkind in nature. It is taken into account that kindness is evaluated by people both by the consequences and underlying intention. (Armin et al., 2006)

Reciprocity is seen included in all aspects of life in a society. It is defined as the basic glue that helps people to constitute groups or societies (Armin et al., 2006).

The economy and life of communities are a bunch of interlinked reciprocities of norms, sentiments, pure gifts, favours and duties, and the commands and self-interested exchanges they include are rather aspects, elements and moments or an all-over reciprocity process. All constituted organizations and groups use reciprocities to some extent, greater or lesser, and generally are unable survive unless some measure of reciprocity is present. This includes good relations among neighbours or colleagues, mutual aid and different types of cooperation, hierarchical and horizontal loyalty, different aspects of labour relations, aspects of the political relations among citizens and between citizens and the state, and so on. (Adam J.S. et al., 1965)

The process of reciprocity is accompanied by actions that are positive and commonly manifest, support and constitute a behaviour that aids forming good social relations. Certain reciprocities are often accompanied by inequalities, stringent duties, heavy norms, moral indebtedness and strong social pressure which can be rather oppressive. But the basic point is that most reciprocities are good which includes sentiments, motivation, relations and

attitude. Goodness refers to the collective judgement that includes concern for others, balanced, free and positive social relations, and so on, and it is generally appreciated by people personally involved. (Adam J.S. et al., 1964)

This research utilises reciprocity theory as the primary framework to study the relationship between resident hospitality and tourist citizenship behaviour. It clarifies the 'why' aspect of reciprocities by exploring the give and take dynamic.

The Stereotype Content Model offers a useful theoretical lens for understanding resident-tourist relationships by explaining how tourists cognitively and emotionally evaluate local residents based on two fundamental dimensions: warmth and competence, reflecting perceived ability, effectiveness, and capability (Chen et al., 2024). In tourism contexts, residents constitute a salient social group for tourists, who often rely on limited interpersonal encounters and situational cues to form judgements about hosts. Resident hospitality behaviour, such as kindness and welcoming attitudes to assist, serves as an important signal of warmth, while a resident's ability to communicate effectively, manage tourism-related interactions, and display situational competence and cultural intelligence signals competence (wang, 2025).

According to the SCM, these warmth and competence perceptions exhibit distinct emotional responses that directly guide behavioural tendencies (S. Mostafa Rasoolimanesh et al., 2021). When residents are perceived as both competent and warm, positive responses are experienced by tourists, including affective attachment, trust, and positive attitudes to the destination. These emotions, in turn, engage tourists in tourist citizenship behaviour, defined as discretionary and voluntary actions that benefit the destination and its stakeholders,

such as complying with local norms, helping fellow tourists, supporting local communities, and generating positive word of mouth (Arcia et al., 2020). By applying SCM to resident–tourist relationships, this study conceptualises resident hospitality as a key antecedent shaping tourists' social perceptions and emotional responses, thereby providing a psychological explanation for how positive host–guest interactions translate into tourist pro-destination behaviours (Chen et al., 2024).

Affective Events theory offers a stellar theoretical lens for understanding resident tourist relationship behaviour in tourism settings by emphasising the role of emotion-laden interactions in shaping attitudes and behaviours (Zhang D. et al., 2024). AET posits that specific events and daily interactions trigger emotional reactions, which subsequently influence individuals' judgements, attitudes and behavioural responses for both parties, thereby shaping subsequent behaviours toward the destination and its stakeholders. (Arcia et al., 2020).

From the residents' perspective, emotionally meaningful experiences within their community, such as pride, attachment, and positive place-related emotions, encourage residents to engage in warm, welcoming, and supportive behaviours towards tourists (Faizan Ali et al., 2023). When residents experience positive affective states toward their destination, they are more likely to perceive tourists as valuable guests rather than behaviour motivated solely by obligation or service norms. (Chen et al., 2024).

For tourists, repeated exposure to positive resident interactions functions as a series of affective events that foster favourable emotional responses, such as feelings of warmth, belonging, and appreciation, which enhance

overall destination perceptions (Rodriguez et al., 2023). Consequently, from an AET perspective, resident hospitality acts as an emotional trigger that initiates affective responses in tourists, translating momentary interactions into enduring behavioural outcomes. (Sunil Atulkar et al., 2017).

Overall, Affective Events Theory elucidates how emotionally charged host–guest interactions operate as a key mechanism linking resident hospitality to tourists' positive behavioural responses (Tu, 2024). By transforming everyday encounters into meaningful affective experiences, these interactions foster reciprocal, emotionally grounded relationships that contribute to destination sustainability and long-term community well-being (Martin, 2023).

Resident Hospitality

Resident hospitality is shaped by the attitude of residents towards the tourist is a significant area for research in tourism literature. It shapes the subsequent image of the destination in the tourist's mind. (Chen, et al 2018). The support and attractiveness of the destination could be shaped by the attitude of the residents towards the tourist. So, they are recognised as co-creators and ambassadors of the destination. (Styvén, et al. 2020).

As studied by (Fan, Zhang, et al. 2020) Positive behaviour could foster post travel satisfaction and emotional attachment in tourists whereas negative behaviours could damage the perceived view of the destination and spark discrimination. Resident hospitality is also critical for enhancing the sustainability and competitiveness of the destination. (Crouch et al.)

A study conducted during Covid 19 crises also marks resident hospitality as a key factor in

shaping perceived benefits, perceived risks and tourism constraints during multidimensional crises (ecological, social, political, economic),(Gómez-Bruna et al.)

Hence, Resident Hospitality can be defined as the extent to which tourists perceive attitudes, behaviour, personality traits and emotions exhibited by the residents which further results in tourists feeling important, welcomed and cared for during their stay.

Tourist Citizenship Behaviour

Tourism Industry has faced an interactive change where tourists and travellers are no longer only the value receivers but also key partners for the destination. (Arica et al., 2020). Tourist now create value through their active participatory behaviour thus bringing a transformation in their role. (Xu et al., 2021). Customer Citizenship Behaviour (CCB) which talks about value co creation behaviour of the customer, are the involuntary roles that customers choose to perform beyond their requirement. This includes giving feedback, recommendations and aiding other customers. (Maciej Mitrega, 2022.)

Tourist Citizenship behaviour arises from the CCB and plays a vital role in overall wellbeing and success of a destination (Yao et al., 2023). It has been proposed by the social exchange theory that a satisfied tourist often voluntarily feels a sense of responsibility to support the destination . This can help create a positive change leading to enhanced performance of a tourist destination. (Torres-Moraga et al., 2021a). Further a study by (Singh V, 2025) reveals that destination psychology impacts the destination attachment which in turn impacts the tourist citizenship behaviour.

H1: The measure of resident hospitality (high or

low) could significantly impact tourist citizenship behaviour. Welcoming and friendly behaviours and attitudes are seen as high- level hospitality and leads to reciprocal and voluntary actions to return the favour to the destination.

The Mediating Role Of Destination Warmth

Warmth perception is a key dimension in capturing tourists' perception of a certain place, with regard to its friendliness, likability, trustworthiness, honesty and sincerity (wang, 2025). Scholars have applied it to the destination context and substantiated that perceived warmth is a crucial aspect of destination image (S. Mostafa Rasoolimanesh et al., 2021). Destination warmth highlights the degree to which tourists perceive a destination's friendliness, kindness, inclusiveness and welcoming atmosphere, as influenced by their interactions with locals, service providers, and overall environment (Chen et al., 2024).

The stereotype content model suggests that people tend to exhibit supportive behaviours, positive feedback, and tolerant attitudes towards others who display high warmth (Vattan Singh et al., 2025). Based on this, it can be inferred that destination warmth may mediate resident hospitality and tourist citizenship behaviour. Literature also revealed that perceived warmth plays a mediating role in impacting consumers' supportive behavioural responses (Sunil Atulkar et, 2017). For instance, (chen et al., 2024) confirmed that customers' warmth perception towards the company mediates the effect of incentive types on customers' electronic word of mouth sharing intentions (Arcia et al. , 2020) .proved that the customer purchase journey phase affects information disclosures via perceived warmth. Accordingly, a hypothesis is postulated

: H1 Destination warmth mediates the effect of

resident hospitality on tourist citizenship behaviour. Specifically, high-level resident hospitality would enhance tourists' perception of warmth toward the destination, which would further boost their citizenship behaviour (Martin et al., 2023).

The Mediating Role Of Affective Commitment

Affective commitment refers to “the psychological attachment of an exchange partner to the other and is based on feelings of identification, loyalty, and affiliation” Affective commitment plays a crucial role in cultivating enduring and positive relationships between consumers and service providers (Morgan et al. 1994). Recently, tourism scholars have introduced this concept to explore tourists' emotional bonding with a focal destination (Zheng et al., 2019). Notwithstanding, this concept has received only limited attention in the field of tourism, with little understanding of its role in the process of resident-guest interaction and tourist behaviour. Affective events theory argues that, when an affective event aligns with an individual's needs or values, it would elicit positive emotions, which further influence subsequent behaviours. (Tu et al., 2024) This suggests that affective commitment may mediate host hospitality and tourist citizenship behaviour. Hence, a hypothesis is established:

H3. Affective commitment mediates the effect of resident hospitality on tourist citizenship behaviour. Specifically, a high level vs a low level of host hospitality enhances tourists' affective commitment towards the destination.

The Moderating Effect Of Cultural Intelligence

Cultural intelligence was first introduced into the social sciences by Earley and Ang in 2003

(Earley et al., 2003). It refers to a person's ability to function effectively in cross-cultural or non-habitual environments and, subsequently, to make reasoned judgements amid new, cross-cultural or non-habitual contexts (Ang & Dyne, 2008). It comprises metacognitive, cognitive, motivational, and behavioural dimensions (Ang et al., 2007). Among them, motivational cultural intelligence pertains to an individual's interest in and drive to adapt to a new cultural environment (Ang et al., 2007). Individuals exhibiting higher motivational cultural intelligence demonstrate higher intrinsic motivation towards engaging in diverse cross-cultural experiences. These people place a premium on novel cultural experiences and derive enjoyment and satisfaction from interacting with individuals from diverse cultural backgrounds (Earley & Ang, 2003).

Studies have confirmed that tourists' cultural intelligence leads to positive post-trip behaviours, such as electronic word-of-mouth (Zhang et al., 2021). In recent years, researchers have started to investigate its role in the field of resident-tourist relationships. (Li et al., 2023) note that cultural intelligence serves as a moderator in the relationship between host hospitality and emotional solidarity. This research deems that tourists' cultural intelligence plays a moderating role between resident hospitality and tourist citizenship behaviour. Tourists with high cultural intelligence are better equipped to recognise and appreciate hospitality expressed by local residents, and put more value on these resident-tourist interactions. In contrast, tourists with low cultural intelligence are reluctant to cross-cultural communication and put less value on resident-tourist interactions; hence, they might not respond as actively as their counterparts. A hypothesis is thus formulated:

H4. Cultural intelligence moderates the effect of resident hospitality on tourist citizenship behaviour. Compared with the group with low

cultural intelligence, this effect is stronger for their counterparts.

The Moderating Effect Of Openness To Experience

Openness to experience as a personality trait reflects a person's willingness to engage with and explore both the inner and outer worlds in a curious, imaginative, and open-minded manner (Forgeard et al., 2022). People with high openness to experience enjoy exploring novel situations and are typically more receptive to new ideas and emotional experiences, and return emotional favour (McCrae & Sutin, 2009). In the resident-tourist relationship, recent research has demonstrated that tourists' openness to experience predicts their perception of being welcomed by the residents (Juric et al., 2021). Based on the above, this research proposed that openness to experience positively moderates the effect of resident hospitality on tourist citizenship behaviour. Compared with people scoring low on openness to experience, this effect would be strengthened for their counterparts,

Existing research posits that individuals with high openness to experience are often more empathetic and open to understanding others' feelings, which allows them to engage with diverse perspectives, connect deeply with others on an emotional level, appreciate the nuances of different emotional experiences and reciprocate emotional support (McCrae, 1996; McCrae & Sutin, 2009). Following this logic, this research further postulates that openness to experience moderates the mediating effects of destination warmth and affective commitment between resident hospitality and tourist citizenship behaviour. The mediating effects of destination warmth and affective commitment would get reinforced, accompanied by the rise of openness to experience. Therefore, three hypotheses are proposed as follows:

H5. Openness to experience moderates the effect of resident hospitality on tourist citizenship behaviour. Compared with the group with low openness to experience, this effect is stronger for their counterparts.

H6. The mediating effect of destination warmth between host hospitality on tourist citizenship behaviour is moderated by openness to experience. Compared with the group with low openness to experience, such mediating effect is stronger for their counterparts.

H7. The mediating effect of affective commitment between resident hospitality on tourist citizenship behaviour is moderated by openness to experience. Compared with the group with low openness to experience, such a mediating effect is stronger for their counterparts.

OVERVIEWS OF THE STUDY

This research studies the effect of resident hospitality on tourist citizenship behaviour. Based on the framework laid by , the study adapts the concept of host hospitality to resident hospitality. Resident hospitality focuses on the perceived behaviour and attitude of the locals at the destination.

Primarily based on the theory of Reciprocity, the study employs a survey based cross-sectional design to study the relationship between Resident hospitality and Tourist citizenship behaviour. It further studies the mediating effect of destination warmth and affective commitment that explains the 'how' aspect of the research. Additionally, it studies the moderating effect of openness to experience and cultural intelligence. Statistical analysis included linear regression, univariate regression and structural equation modelling to study the hypothesised direct, mediating and conditional effects.

STUDY

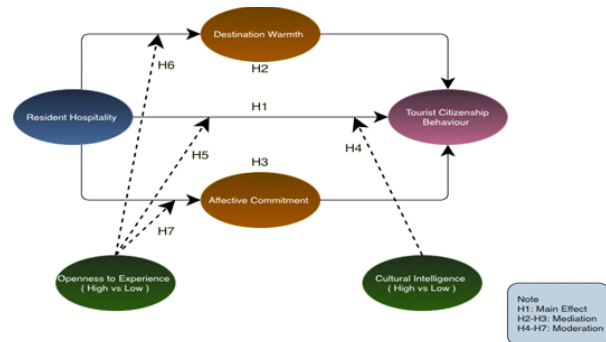
Questionnaire Design

The questionnaire used in the study has been adapted from the (Wang, 2024). These are validated measurement scales with necessary modifications aligned towards resident hospitality, while preserving the conceptual meaning and psychometric properties of the original scales. All questionnaire items were measured using a 7 likert scale with 1 = strongly disagree and 7 = strongly agree. Another section captured the basic demographic information of the respondents including gender, age, educational qualification to describe the sample profile.

Data Collection

Data was collected using an online questionnaire survey administered to tourists who had visited Bangalore. Bangalore was selected due to its urban tourism environment and frequent interactions with local residents. The metropolitan city famous for its technology driven economy, leisure tourism and cultural diversity welcomes both domestic and internationally tourist which opens an opportunity to study the resident - tourist interaction.

The survey was distributed through online platforms and the participation was voluntary. The study adopted a cross-sectional research design. Respondents were instructed to answer based on their travel experiences related to Bangalore. Data completeness was ensured through mandatory setting in Google forms. A total of 122 useable responses were obtained and included in the final analysis.



RESULTS

Descriptive Test And Reliability Analysis

A total of 122 valid results were included in the final analysis which was done using the software JASP 0.95.4.0. All constructs were measured using a 7 likert scale. The Descriptive statistics indicated a moderate to high mean values constructs, which suggests a generally positive perception among the respondents. The Reliability analysis indicated an excellent internal consistency for all the constructs. Cronbach's Alpha values ranged from 0.959 to 0.976 exceeding the recommended threshold of 0.70. This indicates strong reliability. These results indicate that the measurement scales are consistent and reliable within the Bangalore context.

Descriptives

	N	Mean	SD	SE
AVERAGE TCB	122	4.752	1.526	0.138
AVERAGE RH	122	4.552	1.593	0.144

Unidimensional Reliability

Frequentist Scale Reliability Statistics

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α (RH)	0.976	0.004	0.968	0.985
Coefficient α (TCB)	0.974	0.005	0.964	0.984
Coefficient α (DW)	0.973	0.006	0.962	0.985
Coefficient α (AC)	0.973	0.006	0.962	0.984
Coefficient α (CI)	0.959	0.008	0.944	0.974
Coefficient α (OE)	0.967	0.006	0.955	0.980

Direct Effect Of Resident Hospitality On Tourist Citizenship Behaviour.

Linear regression analysis was conducted to study the direct effect of resident hospitality on tourist citizenship behaviour. Regression analysis indicated, $F(1,120) = 151.00$, $p < .001$, directing that the model is statistically significant. The result indicates that resident hospitality is a strong predictor of tourist citizenship behaviour and has a significant and positive effect on it. ($\beta = 0.746$, $t = 12.29$, $p < .001$).

The model depicts 55.7 % of variance in tourist citizenship behaviour ($R^2 = 0.557$; Adjusted $R^2 = 0.554$), which is significant for behavioural research.

The assumptions of linear regression were satisfied as no autocorrelation issues were indicated by the Durbin - Watson statistic (2.10). These findings provide strong empirical support for the hypothesised direct relationship between resident hospitality and tourist citizenship behaviour.

Linear Regression

Model Summary - AVERAGE TCB

Model	R	R ²	Adjusted R ²	R MS E	AIC	BIC	R ² Change	df	df	p	Durbin-Watson		
											Autocorrelation	Statistic	p
M ₁	0.746	0.557	0.554	1.020	354.935	363.347	0.557	1	120	<.001	-0.057	2.102	.585

Note. M₁ includes AVERAGE RH

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	157.0	1	156.980	151.0	< .001
	Residual	124.7	120	1.040		
	Total	281.7	121			

Note. M₁ includes AVERAGE RH

Note. The intercept model is omitted, as no meaningful information can be shown.

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
M ₀	(Intercept)	4.752	0.138		34.402	< .001
M ₁	(Intercept)	1.498	0.280		5.342	< .001
	AVERAGE RH	0.715	0.058	0.746	12.289	< .001

MEDIATION ANALYSIS

Destination Warmth

Structural equation modelling (SEM) was performed to test the mediating role of destination warmth (DW) in relationship between resident hospitality and tourist citizenship behaviour. The results obtained indicated a significant positive effect of resident hospitality on destination warmth ($a = 0.713$, $p < .001$). Tourist citizenship behaviour was, in turn, influenced by Destination Warmth ($b = 0.542$, $p <$

$.001$). The direct path from resident hospitality to tourist citizenship behaviour remained significant, even after accounting for the mediator ($c = 0.329$, $p < .001$) indicating partial mediation. A significant indirect effect (indirect effect = 0.386 , $p < .001$) of resident hospitality on tourist citizenship behaviour via destination warmth was obtained, with confidence intervals not crossing zero. These results confirm that destination warmth act as a mediator and explains why resident hospitality results in positive tourist citizenship behaviour

MEDIATION VIA DESTINATION WARMTH

Effect Type	Path	β	SE	z	p
Path a	Resident Hospitality (RH) → Destination Warmth (DW)	0.713	0.063	11.27	< .001
Path b	Destination Warmth (DW) → Tourist Citizenship Behavior (TCB)	0.542	0.066	8.16	< .001
Direct effect	Resident Hospitality (RH) → Tourist Citizenship Behavior (TCB)	0.329	0.066	4.96	< .001
Indirect effect	RH → DW → TCB	0.386	0.058	6.61	< .001
Total	RH → TCB	0.715	0.058	12.39	< .001

Affective Commitment

Another mediation model tested the role of affective commitment (AC). Resident hospitality substantially predicted affective commitment ($a = 0.623$, $p < .001$), which, in turn, also had a notable effect on tourist citizenship behaviour ($b = 0.241$, $p < .001$). The direct effect of Resident hospitality on tourist citizenship behaviour

remained significant ($c = 0.564$, $p < .001$) indicating partial mediation.

The indirect effect (indirect effect = 0.150, $p = .002$) was also substantial which suggested that emotion attachment to the destination partially explains how resident hospitality results in tourist citizens behaviour. The emphasis was placed on indirect effects and path coefficients.

MEDIATION VIA AFFECTIVE COMMITMENT

Effect Type	Path	β	SE	z	p
Path a	Resident Hospitality (RH) → Affective Commitment (AC)	0.623	0.070	8.94	< .001
Path b	Affective Commitment (AC) → Tourist Citizenship Behavior (TCB)	0.241	0.072	3.37	< .001
Direct effect	Resident Hospitality (RH) → Tourist Citizenship Behavior (TCB)	0.564	0.071	7.95	< .001
Indirect effect	RH → AC → TCB	0.150	0.048	3.15	.002
Total	RH → TCB	0.715	0.058	12.39	< .001

Moderation Analysis

To study the proposed hypothesis multi-group structural equation modelling was employed. The moderators, openness to experience and cultural intelligence, were examined by splitting the sample data into low groups and high groups for each trait. The difference in effective strength was then tested by comparing the path coefficients across groups.

Openness To Experience

Separate structural models were tested for tourists with low and high level of openness. Resident hospitality indicated a substantial and positive effect on destination warmth in both groups. However, slightly stronger effect was observed for tourists high in openness to experience ($\beta = 0.625$, $p < .001$) compared to low in openness to experience ($\beta = 0.591$, $p < .001$).

Similarly, resident hospitality revealed a substantial influence on affective commitment across both groups of openness to experience. A stronger effect for high openness tourists ($\beta = 0.564, p < .001$) compared to low openness tourist ($\beta = 0.432, p < .001$) was observed.

The structural paths were constrained to be equal across low and high openness groups and then compared with the unconstrained models.

Exhibition of a deteriorated model was not observed for constrained models indicating the observed path coefficients differences were not statistically significant. This indicates that openness to experience doesn't significantly

moderate the relationship between resident hospitality and destination warmth or affective commitment.

Marginally stronger emotional responses were demonstrated by tourist with high openness; Resident hospitality exerted a positive influence across both openness groups.

Z-tests compared the path coefficients across low and high openness groups. Non-significant results were obtained for resident hospitality $\rightarrow$ destination warmth. ($z = 0.26, p > .05$) and resident hospitality $\rightarrow$ affective commitment ($z = 0.94, p > .05$) indicating no moderating effect.

Path	Group	β	SE	z	p	Result
Resident Hospitality (RH) $\rightarrow$ Destination Warmth (DW)	LOW OE	0.591	0.096		< .001	
	HIGH OE	0.625	0.087	0.26	< .001	Not Significant
Resident Hospitality (RH) $\rightarrow$ Affective Communication (AC)	LOW OE	0.432	0.098		< .001	
	HIGH OE	0.564	0.101	0.94	< .001	Not Significant

Cultural Intelligence

Cultural Intelligence is acting as a moderator of direct relationship between Resident Hospitality and Tourist Citizenship Behaviour. Multigroup structural equation modelling was adopted which divided the sample into high ($n=68$) and low cultural intelligence ($n= 54$) using median split procedure.

A significant variation in the strength of Resident Hospitality and tourist Citizenship Behaviour relationship across Cultural intelligence groups was observed.

The results indicated a moderate but significant of low CI group on TCB ($\beta = .355, SE = .085, p < .001$) whereas a significantly stronger effect was seen in the high CI group ($\beta = .781, SE = .095, p < .001$) ($z = 3.35, p < .001$). The difference in strength of different CI groups indicate how strongly resident hospitality translates into tourist citizenship behaviour. Thus, Cultural intelligence moderates the relationship by strengthening the RH-TCB relationship under high Cultural intelligence and weakening it under low CI condition.

Path	Group	β	SE	p	Result
Resident Hospitality (RH) $\rightarrow$ Tourist Citizenship Behavior (TCB)	LOW CI	0.355	0.085	< .001	
	HIGH CI	0.781	0.095	< .001	Significant

Summary Of Hypothesis and Results

Hypothesis	Relationship Tested	Key Results	Status
H1	Resident Hospitality $\rightarrow$ Tourist Citizenship Behaviour	$\beta = 0.746, p < .001$	Supported
H2	Destination Warmth $\rightarrow$ TCB	Indirect effect $\beta = 0.386, p < .001$	Supported (Partial Mediation)
H3	Affective Commitment mediates $\rightarrow$ TCB	Indirect effect $\beta = 0.150, p = .002$	Supported (Partial Mediation)
H4	Cultural Intelligence mediates $\rightarrow$ TCB	$z = 3.35, p < .001$	Supported
H5	Openness to Experience Moderates $\rightarrow$ TCB	$p > .05$	Not supported
H6	OE moderates mediation Via Destination Warmth	$p > .05$	Not Supported
H7	OE moderates mediation Via Affective Commitment	$p > .05$	Not supported

CONCLUSION

This study examined the influence of resident hospitality on tourist citizenship behaviour in an urban tourism context, grounded in reciprocity theory. The findings produce robust evidence that resident hospitality plays a critical role in shaping tourists' voluntary and prosocial behaviours, exerting both direct and indirect effects. Destination warmth and affective commitment were found to partially mediate this relationship, demonstrating that hospitable and welcoming interactions with residents foster positive emotional bonds and a sense of attachment towards the destination. These affective responses, in turn, motivate tourists to engage in behaviours that go beyond their formal role as visitors, such as helping others, respecting local norms, and promoting the destination through positive word of mouth.

Furthermore, the study contributes to the literature by identifying culture as a key boundary condition in the resident hospitality tourist citizenship behaviour relationship. Tourists with higher levels of cultural intelligence were better able to interpret, appreciate, and reciprocate residents' hospitable actions, thereby strengthening the positive effects of resident hospitality on citizenship behaviour. In contrast, openness to experience did not experience a significant moderating effect, suggesting that general personality traits may be less influential than context-specific intercultural capabilities in shaping reciprocal tourist experiences. Overall, the findings highlight the central importance of resident tourist interactions in urban tourism settings and underscore the need for destination managers and policymakers to foster hospitable community environments that encourage

positive tourist conduct and sustainable destination development

THEORETIC IMPLICATIONS

The given study contributes to tourism and hospitality literature. It extends the reciprocity theory to explain the interaction between resident hospitality and tourist citizenship behaviour. It identifies affective commitment and destination warmth as mediating mechanism and explains how positive interactions shape voluntary prosocial behaviours.

Conditional roles of individual differences were highlighted by demonstrating that cultural intelligence strengthens the impact of resident hospitality. Openness to experience indicated a nonsignificant moderating effect, regardless of personality traits.

Overall study explains the tourist citizenship behaviour within reciprocity framework, advancing the theoretic understanding by integrating emotional and cognitive mechanism

PRACTICAL IMPLICATIONS

The findings of this study provide valuable insights for destination managers, policymakers, and tourism stakeholders seeking to promote sustainable and responsible tourism development. Enhancing resident hospitality should be treated as a strategic priority, as positive host-guest interactions can encourage tourists to behave as responsible and supportive contributors to the destination. Initiatives such as community engagement programs, resident awareness campaigns, and hospitality workshops can help residents recognise their influential role in shaping tourists' experiences and behaviours. By fostering a culture of openness, friendliness, and mutual respect among local communities, destinations can

create a social environment that naturally promotes tourist's voluntarism and personal actions.

Moreover, creating tourism settings that evoke feelings of destination warmth and emotional attachment can further strengthen tourists' willingness to engage in citizenship behaviours, including assisting fellow visitors, adhering to local customs, and advocating for the destination through positive word of mouth. Destination managers can achieve this by encouraging meaningful resident tourist interactions, supporting community-based tourism initiatives, and highlighting authentic local experiences. Additionally, the findings emphasise the importance of cultural intelligence in amplifying the positive effects of resident hospitality. Tourism stakeholders should therefore develop culturally informative communication strategies, such as interpretive materials, orientation programs, and digital guides, that help tourists better understand local values, norms and practices. By facilitating cultural understanding and adaptation, destinations can maximise the reciprocal benefits of resident hospitality, leading to improved tourist conduct, stronger destination reputation, and long-term sustainability.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The study presents certain Limitations that also provide scope for future research. As cross-sectional design was adopted, the causal relationship between resident hospitality and tourist citizenship behaviour cannot be established. Longitudinal or experimental design could be adopted to address this limitation. The findings are based on the data collected from tourists from a single urban destination, which may reduce the generalisability and introduce response bias.

Multiple destinations can be included to examine multiple data source.

Future studies could future study additional variables to gain a more comprehensive understanding of tourist citizenship behaviour. The reliability of the scales could be made shorter to enhance measurement robustness. Shorter validated scales could be used for measurements to check for reliability. This can enhance the measurement robustness.

DEMOGRAPHIC PROFILE OF THE RESPONDENTS

Variable	Category	n	%
Gender	Male	83	68.0
	Female	38	31.1
	Prefer Not to Say	1	0.8
Age	18-24	90	73.8
	25-34	26	21.3
	35-44	3	2.5
	45+	3	2.5
Education	High School or below	2	1.6
	Undergraduate	53	43.4
	Post Graduate	66	54.1
	Doctorate	1	0.8

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The Impact of Perceived Trust in Fintech Continuance Intention – Integrating Technology Acceptance Model and the Net Valence Framework

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ABSTRACT

Financial Technology (Fintech) is making significant strides in financial services by bringing in convenience and making it accessible, efficient, transparent, and traceable. However, adoption and continued use depend on perceived benefits, trust, and risks. Fintech is an emerging area of research interest, and this research work examines fintech continuance intention in an emerging market like India. Previous research works have been carried out using a single technology model. Whereas our research was conducted by integrating the Technology Acceptance Model (TAM) and Net Valence Framework (NVF). It evaluates perceived usefulness (PU), perceived ease of use (PE), perceived benefit (PB), perceived risk (RI), and trust (TR) and their influence on user retention. A survey of 124 fintech users was analysed using Structural Equation Modelling (SEM). Results indicate PU, PE, and PB positively impact CI, whereas RI negatively affects trust and adoption. Trust is a key factor, emphasising the need for transparency and security. Security concerns can hinder fintech growth. By integrating and validating TAM and NVF, this study provides fresh insights for researchers, businesses, and policymakers. Fintech adoption and continued use intentions depend on enhancing user experience, managing risks, and building trust.

On October 25th, 2024, amidst the heavy rains in Bengaluru, India, Rohit a final year student of a Business Management program, sat in his hostel residence to complete his strategic management assignment on InterGlobe Aviation Limited, popularly known as IndiGo. While browsing the recent headlines, he came across the news that Indigo, reported a loss of INR 9867 million for the Q2 FY 2025. Rohit found it hard to believe - how

could a company that thrived for 18 long years suddenly be in trouble? Determined to understand more, he decided to dig deeper. What made the airlines successful for long? What were the competitive forces of the Indian aviation sector? What had led to these recent financial losses? What strategic options were available for IndiGo to become profitable once again in future?

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By 2030, India is projected to have 150 fintech unicorns and \$200 billion in fintech revenue, with investment tech leading at a 30% CAGR. The digital lending market remains a major driver, receiving 62% of fintech funding in 2023 (Statista, 2024).

Government initiatives like UPI and regulatory support have driven widespread adoption, especially in Tier-4 cities. Major IPOs, such as MobiKwik's \$67 million offering, further reflect investor confidence (Reuters, 2024). As fintech expands, technological advancements, funding, and policy support will solidify India's global leadership (Statista, 2024).

With the rapid growth of technology, global financial services have undergone a significant transformation. It offers users innovative financial digital services, namely UPI transactions, peer-to-peer (P2P) lending, and crowdfunding (Arner et al., 2015). Fintech leverages advanced information technology (IT) to enhance financial transactions by improving accessibility, increasing transparency, and reducing cost (Zavalokina et al., 2016). As a result, the adoption of Fintech has attained tremendous growth. Fintech startups have been at the forefront of receiving funds from across the globe at an unprecedented level (Skan et al., 2014). However, despite its potential, the continuous use of Fintech services remains uncertain due to users' varying perceptions of benefits and risks (Kim et al., 2008)

Existing studies predominantly focus on technology adoption models, namely TAM (Davis, 1989) and UTAUT (Venkatesh et al., 2003), to explain Fintech adoption. However, these models emphasize perceived ease of use (PE) and perceived usefulness (PU) while mainly overlooking the trade-off between perceived risk (RI) and trust (TR) in decision-making (Venkatesh et al., 2003) and (Kim et al., 2008).

There is a need to extend TAM by incorporating the Net Valence Framework (NVF) (Peter and Tarpey, 1975) to balance both benefits and risk factors affecting Fintech adoption and continuance intention.

Most Fintech adoption research focuses on initial user adoption (e.g., factors influencing first-time users of mobile payments or digital lending) (Gefen et al., 2003). There is limited research on why users continue or discontinue using Fintech services, especially when exposed to security concerns, financial risks, and regulatory uncertainties. A risk-benefit perspective can offer deeper insights into user retention.

Prior research highlights perceived risk (financial, security, legal) as a major "Obstacle to adopting technology." (Venkatesh et al., 2003; Gefen et al., 2003). However, few studies examine how trust in Fintech providers moderates the effect of risk on continuance intention. This research fills the gap by exploring how trust reduces the adverse effects of perceived risk, which can significantly influence decision-making and behaviour, offering practical implications for building consumer confidence in Fintech services.

Most Fintech adoption research is concentrated in developed markets (U.S., Europe, China) (Zavalokina et al., 2016). Limited empirical studies focus on Fintech adoption and risk perception in India, which has one of the largest Fintech users in the world. This study contributes by analyzing Indian Fintech users' behavioral patterns and offering region-specific insights.

THEORETICAL BACKGROUND

Fintech and Its Adoption

According to (Arner et al., 2015), Fintech is reshaping financial services by leveraging

technology to enhance efficiency, cut costs, and expand access. Zavalokina et al., (2016) noted that, unlike traditional banks, Fintech operates on digital platforms, offering services like UPI payments, Insurtech, and crowdfunding. Rapid growth in this sector is driven by technological advancements and rising investor interest (Skan et al., 2016). Technology adoption depends on perceived value, influenced by both benefits and risks (Kim et al., 2008). Convenience, cost savings, and accessibility encourage use (Lee, 2009). However, security concerns, regulatory issues, and reliability challenges may deter users. To foster trust and create long-term engagement, fintech firms must address these concerns while enhancing user experience.

TAM Model and Fintech Continuance Intention

As discussed in [8], the TAM provides a theoretical framework for understanding user adoption of new technologies. The model highlights perceived usefulness (technology's efficiency boost) and perceived ease of use (user friendliness) as key drivers of user adoption.

TAM later evolved into TAM2 (Venkatesh & Davis, 2000) and TAM-3 (Venkatesh & Bala, 2008) incorporating social norms, facilitating conditions, and cognitive processes for gaining deeper insights into adoption behaviour.

Research by Kim et al., (2010), Zhou (2011), and Alfalah (2019) shows TAM's widespread use in studying UPI payments, digital banking, and cryptocurrency adoption. However, Featherman & Pavlou (2003) noted its limitations in addressing trust, perceived risk, and emotional factors, which play a critical role in financial services. As digital finance evolves, refining TAM to include behavioural, psychological, and market-specific factors will improve predictions

of adoption, trust, and retention in fintech.

Net Valence Framework and Fintech Continuance Intention

The author Mackenzie (2015) noted that FinTech has reshaped traditional financial services by increasing efficiency, lowering costs, and improving accessibility, making it essential in the digital economy. A key advantage is economic benefit – users enjoy lower transaction fees, better interest rates, and improved investment opportunities over traditional banking. He also highlighted that fintech enables seamless, automated transactions without intermediaries, enhancing user convenience. Chisti (2016) emphasized accessibility as a major driver, as mobile apps allow users to manage finances anytime, anywhere.

However, FinTech also introduces risks that impact trust and adoption. Fraud, system failures, and unethical practices are part of financial risks (Savitha et al., 2022). Regulatory risks comprise legal uncertainties and compliance issues, which lead to distrust (Zavalokina et al., 2016). Since most of the fintech activities are online, hacking, data breaches, and identity theft raise concerns over data safety, leading to security risks (Savitha et al., 2022). Over-dependence on online platforms leads to service disruptions, technical failures, and poor support, leading to service disruptions and thereby reducing confidence in fintech operations (Savitha et al., 2022).

For sustained adoption, fintech firms need to strike a balance between benefits and risk management. Security, regulatory compliance, and customer support are crucial for a trusted, user-friendly financial ecosystem and, hence, need to be strengthened.

Research Model and Hypotheses

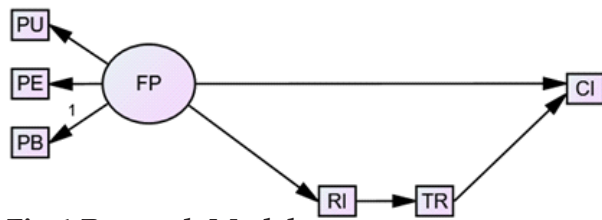


Fig-1 Research Model

RESEARCH OBJECTIVES

This research work is aimed at assessing the key factors influencing fintech adoption and its continuance intention. The focus is on perceived usefulness (PU), perceived benefit (PB), perceived ease of use (PE), perceived risk (RI), and trust (TR).

The research objectives are to:

1. Assess the impact of perceived usefulness (PU) and perceived ease of use (PE) on continuance intention (CI).
2. Evaluate the role of perceived benefit (PB) and its influence on continuance intention (CI)
3. Examine the effect of perceived risk (RI) on trust (TR) in the context of fintech adoption.
4. Analyse trust (TR) as a mediator between perceived risk (RI) and continuance intention (CI).

LITERATURE REVIEW

Prior research has widely acknowledged that perceived usefulness plays a vital role in continuance intention in fintech, as noted by multiple researchers (Putritma, 2019; Nurlaily et al 2021; Nurdin et al., 2023; Bergmann et al., 2023). Hence, we hypothesize.

H1: Perceived Usefulness (PU) positively influences Continuance Intention (CI).

Perceived ease of use focuses on user-friendliness in fintech adoption and has been widely researched by Putritma, (2019, Nurlaily et al (2021) and Bergmann et al (2023). Perceived ease of use plays a key role in continuance intention. Hence, we hypothesize.

H2: Perceived Ease of Use (PE) positively influences Continuance Intention (CI).

There are multiple benefits that fintech users derive, and which are captured in P2P lending has been captured by Purnama et al (2023). Economic benefits and perceived benefits in fintech payments have been vital for continuance intention (Dina & Leon, 2020) and researched in mobile-based fintech payments (Putritma, 2019). Hence, we hypothesize

H3: Perceived Benefit (PB) positively influences Continuance Intention (CI).

Lack of trust affects the adoption of fintech, whereas trust plays a very significant role in the adoption of fintech (Meyliana & Fernando, 2019). Mobile financial service platform adoption is strongly related to perceived trust (Yan et al., 2021). Trust and risk are important aspects in the usage of fintech adoption, opines (Fernando and Touriano, 2018). Hence, we hypothesize

H4: Perceived Risk (RI) negatively affects Trust (TR).

Perception of regulatory uncertainty regarding the financial risk in investing in such platforms. Perceived risk has a weak negative relationship with mobile payment adoption (Al-Qudah et al., 2024). Hence, we hypothesize

H5: Perceived Risk (RI) negatively affects Continuance Intention (CI).

Previous work has supported that trust plays a mediating role in fintech adoption studies

(Nurdin et al., 2023). Social and technical factors play a role in developing trust, which in turn is key for continuance intention in fintech (Wang et al., 2019). Further, research indicates that institutional trust, interpersonal trust, and technology trust together are important for continuance intention (Xia et al., 2023). Hence, our hypothesis is

H6: Trust (TR) positively influences Continuance Intention (CI).

H7: Trust (TR) mediates the relationship between Perceived Risk (RI) and Continuance Intention (CI).

METHODOLOGY

This study is empirically validating the model using the data using Structural Equation Modelling. Survey research was conducted among Fintech users for data collection purposes on emerging markets.

Measurement Development

To ensure content validity, questions were adopted from validated constructs in previous studies Lee (2009) and Byrne (2013). A five-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree") measured the constructs.

Data Collection and Sample

Sampling Strategy

A survey was conducted among Fintech users in Bengaluru, India, a country with a highly developed digital financial ecosystem. The respondents were required to have prior experience using online payment systems.

Sample Characteristics

The survey was administered online via Google Forms, ensuring a representative sample of 124

Fintech users (refer to Table 1).

Table 1. Sample Characteristics

Demographic Variable	Categories	Percentage (%)
Gender	Male	64.4%
	Female	35.6%
Age Group	18-24	54.2%
	25-34	16.9%
	35-44	10.2%
	45+	18.6%
Education Level	High School	6.8%
	Bachelor's Degree	49.2%
	Master's Degree	33.9%
	PhD/Doctorate	12%
Employment Status	Employed	35.6%
	Retired	1.7%
	Self-Employed	5.1%
	Student	55.9%
	Unemployed	1.7%
Fintech Usage Experience	1 – 3 years	25.4%
	6 months – 1 year	13.6%
	Less than 6 months	23.7%
	More than 3 years	37.3%

The sample is male-dominated (64.4% male, 35.6% female), allowing for gender-based comparisons in fintech adoption. Young adults (18-24 years) form the largest group (54.2%), followed by 25-34 (16.9%), 35-44 (10.2%), and 45+ (18.6%), reflecting a mix of early-career and older individuals.

Most respondents are highly educated, with 49.2% having a bachelor's degree, 33.9% a Master's, and 12% were PhD holders, while only 6.8% have a high school education. Students dominate (55.9%), followed by employed individuals (35.6%), with the rest being self-employed (5.1%), unemployed (1.7%), or retired (1.7%).

Fintech experience varies, with 37.3% having over three years, 25.4% with 1-3 years, and 37.3%

with less than a year. The strong presence of experienced users suggests well-informed perspectives on trust, risk, and usability in fintech adoption.

Table 2. Respondents Fintech Usage

Mobile Payments	114
Digital Lending	34
Wealth Management	32
Insurtech	26
Cryptocurrencies & Blockchain-based Services	6
Others	2

The study explores fintech adoption trends, identifying the most used digital financial tools among respondents (see Table 2). Mobile payment services like Google Pay, PhonePe, and Paytm are the most popular, with 114 users, reflecting the growing reliance on digital wallets due to their convenience, speed, and merchant acceptance.

Digital lending services (BNPL, P2P lending) and wealth management platforms (Zerodha, Grow) have 34 and 32 users, respectively, indicating moderate adoption as investment and credit-based fintech solutions gain traction.

Digital insurance (Insurtech) is used by 26 respondents, suggesting ongoing expansion but facing barriers like trust and regulatory concerns. Cryptocurrency adoption remains niche, with just 6 users, likely due to market volatility and regulatory uncertainty.

Only 2 respondents reported using fintech services beyond these categories, indicating that alternative fintech solutions are yet to gain mainstream traction.

Reliability and Validity

To ensure measurement reliability and validity, the study used Cronbach's alpha, which is

provided in Table

Table 3 Reliability data

Construct	Cronbach's Alpha
PU	.934
PE	.952
PB	.885
RI	.871
TR	.897
CI	.922

The study confirms the strong reliability of the measurement scales, with all Cronbach's Alpha values exceeding 0.70.

- Perceived ease of use ($\alpha = .952$) and perceived usefulness ($\alpha = .934$) show the highest reliability, emphasizing fintech usability and effectiveness.
- Trust ($\alpha = .897$) and continuance intention ($\alpha = .922$) indicate strong reliability, reflecting consumer confidence and sustained usage.
- Perceived benefit ($\alpha = .885$) and perceived risk ($\alpha = .871$) also demonstrate high reliability, ensuring accurate assessment of fintech advantages and concerns.

These findings align with past research on technology adoption and trust in fintech services.

The correlation matrix is given in Table-4

Table 4. Correlation Analysis

PU	PU	PE	PB	RI	TR	CI
PU	1					
PE	.741**	1				
PB	.673**	.692**	1			
RI	.313**	.253**	.349**	1		
TR	.429**	.463**	.442**	-.555**	1	
CI	.618**	.513**	.535**	-.411**	.517**	1

- PU, PE, and PB significantly impact CI. PU has the strongest correlation ($r = .618$, $p < .01$), making it the primary driver of continued use. PE ($r = .513$, $p < .01$) and PB ($r = .535$, $p < .01$) also positively influence CI, reinforcing the importance of usability and benefits.
- PU and PE share the highest correlation ($r = .741$, $p < .01$), suggesting that ease of use enhances perceived usefulness.
- Trust (TR) plays a crucial role in fintech adoption, strongly correlating with CI ($r = .517$, $p < .01$) and moderately with PU ($r = .429$, $p < .01$), PE ($r = .463$, $p < .01$), and PB ($r = .442$, $p < .01$).
- Perceived Risk (RI) negatively affects both Trust ($r = -.555$, $p < .01$) and CI ($r = -.411$, $p < .01$), indicating that security and privacy concerns hinder adoption.
- However, RI still shows moderate correlations with PU ($r = .313$, $p < .01$), PE ($r = .253$, $p < .01$), and PB ($r = .349$, $p < .01$), suggesting that even risk-aware users acknowledge fintech's advantages.

Data Analysis Approach

Structural Equation Modelling

To test the hypotheses, **SEM** was used due to its effectiveness in analyzing complex relationships between latent variables [40]. The **SEM** software was employed for structural model analysis.

Analysis and Results

This section presents the results of the SEM analysis, evaluating both the measurement model and the structural model.

Structural Equation Modelling (SEM) Analysis

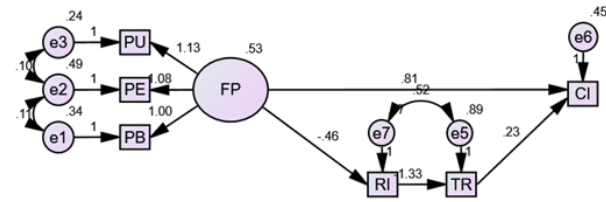


Fig-2 Structural Equation Modelling

The final structural model demonstrated a strong and acceptable fit, as supported by multiple fit indices. The chi-square statistic, $\chi^2(4) = 7.006$, $p = .136$, indicates that the model does not significantly deviate from the observed data. According to [40], if the p-value exceeds the recommended threshold of .05, it is a good model fit. Byrne (2003) asserted that the chi-square to degrees of freedom ratio ($\chi^2/df = 1.75$) should be within < 3.00 . The Root Mean Square Error of Approximation (RMSEA) is .080 with a 90% confidence interval of [0.000, 0.176]. While slightly on the higher end of acceptability, the RMSEA value remains within the threshold for an adequate fit (Browne & Cudeck, 1993).

Table 5. Hypothesis Testing

Hypothesis	Path	Standardized Estimate (β)	p-value	Result
H1	FP $\rightarrow$ PU	1.13	***	Supported
H2	FP $\rightarrow$ PE	1.00	***	Supported
H3	FP $\rightarrow$ PB	0.53	***	Supported
H4	FP $\rightarrow$ RI	-0.46	***	Supported
H5	RI $\rightarrow$ TR	-1.33	***	Supported
H6	TR $\rightarrow$ CI	0.23	.247	Not Supported
H7	FP $\rightarrow$ CI	0.52	***	Supported

*** indicates $p < .001$ (highly significant).

H6 (TR $\rightarrow$ CI) was not supported, suggesting that Trust does not significantly influence Customer

Intention in this model. All other hypotheses were supported. The analysis confirmed most of the hypothesized relationships, providing strong empirical support for the model.

Fintech Perception demonstrated a significant positive impact on Perceived Usefulness, Perceived Ease, and Perceived Benefits, reinforcing its role as a key driver of these perceptions. Additionally, FP was found to reduce Perceived Risk, aligning with the expectation that a stronger predictor lowers perceived uncertainty.

Higher Perceived Risk had a strong negative impact on Trust ($-1.33, p < .001$), indicating that customers' trust in the system or service significantly declines when they perceive greater risk. However, interesting findings emerged regarding the direct relationship between trust and continuance intention. Despite initial expectations, this path was not statistically significant ($\beta = 0.23, p = .247$), suggesting that while trust may play an indirect role, Other factors likely have a stronger influence on customer decision-making.

On the other hand, FP had a direct and significant effect on CI ($\beta = 0.52, p < .001$), underscoring its critical role in shaping customer intent. This finding implies that even if trust does not directly predict CI, FP remains a major determinant of behavioural outcomes.

RESULTS AND DISCUSSION

The final structural equation model provides strong empirical support for most of the hypothesized relationships while also revealing unexpected insights. Fintech Perception (FP) emerged as the strongest driver of Continuance Intention (CI), exerting both direct and indirect effects through Perceived Usefulness (PU), Perceived Ease (PE), and Perceived Behavior (PB). Additionally, FP was found to significantly

reduce Perceived Risk (RI) ($\beta = -0.46, p < .001$), which in turn had a strong negative influence on Trust (TR) ($\beta = -1.33, p < .001$).

This confirms prior research suggesting that minimizing perceived risk enhances consumer trust in a system or service. Surprisingly, the direct effect of Trust (TR) on CI was not statistically significant ($\beta = 0.23, p = .247$), contradicting widely accepted models of trust-driven decision-making. This suggests that trust may exert its influence through indirect pathways or in the presence of additional moderating factors, such as brand reputation or prior experience. In contrast, FP maintained a strong and significant direct effect on CI ($\beta = 0.52, p < .001$), reinforcing its central role in shaping consumer behaviour.

Overall, the model achieved a strong fit with the data ($\chi^2/df = 1.71, p = .130, RMSEA = .080$), validating its theoretical structure. The findings highlight the importance of reducing risk to foster trust while also emphasizing that direct predictors of behaviour, such as FP, remain highly influential.

Theoretical Implications

This study advances fintech adoption research by integrating the TAM and NVF to explain continuance intention. Fintech Perception is the strongest predictor of CI ($\beta = 0.52, p < .001$), suggesting that practical benefits outweigh trust in adoption decisions. Trust does not significantly impact CI ($\beta = 0.23, p = .247$), implying its influence is context-dependent. Perceived Risk strongly negatively affects Trust ($\beta = -1.33, p < .001$), reinforcing the need for risk mitigation strategies. The study calls for more complex behavioral models beyond linear TAM/UTAUT frameworks, emphasizing indirect influences and mediating factors in fintech adoption.

Practical Implications

This study offers actionable and meaningful insights for businesses and policymakers aiming to enhance consumer trust, reduce perceived risk, and drive fintech adoption. Findings are particularly relevant to digital banking, whereby trust and risk perception influence consumer decisions. Thus, it emphasizes the need for risk reduction and trust-building strategies to boost adoption. It helps companies develop data-driven approaches to strengthen consumer confidence and retention.

Policy Implications

The study highlights the importance of risk reduction, functional reliability, and regulatory safeguards in shaping consumer behavior. By implementing stronger consumer protection policies, trust certification programs, and AI fairness regulations, policymakers can create a more secure and transparent digital environment that increases consumer confidence and participation.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

While this study sheds light on consumer behaviour, trust, and risk perception, it's important to recognize its limitations. Since the research relies on cross-sectional data, it captures a single moment in time, making it difficult to understand how these relationships evolve - something longitudinal studies could address. Additionally, because the data is based on surveys, there's a chance of common method bias (CMB), which future research could reduce by incorporating behavioural data or experimental approaches. The study's findings may also have limited generalizability, as factors like cultural differences, industry-specific variations, and demographic influences could

affect how trust and risk perception shape consumer intention. Lastly, trust's role in decision-making appears more nuanced than expected, suggesting the need to explore additional influences, such as brand reputation, prior customer experience, and regulatory frameworks, to better understand its impact. Financial literacy, social norms, and tax implications can be included in the model and researched further. Further brand reputation among the respondents can also be investigated.

CONCLUSION

This study sheds light on consumer perceptions of fintech, the role of trust, and the influence of risk on continued usage. It offers both practical insights and theoretical contributions to fintech adoption research. Usability and functionality drive consumer behaviour, while trust plays a less direct role than previously thought. Perceived risk strongly affects trust, emphasizing the need for risk reduction strategies to build consumer confidence. The study raises new questions—trust may still influence decisions indirectly, warranting further research on its key drivers. By refining our understanding of consumer behavior, this study provides actionable strategies for businesses and policymakers. Enhancing security, improving user experience, and fostering trust will be essential for long-term fintech adoption.

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Indigo Airlines: Turbulence In The Blue Skies

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ABSTRACT

This case examines the strategic journey and recent challenges of InterGlobe Aviation Limited (IndiGo), India's leading low-cost airline, through the perspective of a management student analyzing its unexpected financial downturn in Q2 FY2025. Despite maintaining a dominant market share and a strong track record of operational efficiency, IndiGo reported a significant quarterly loss, raising concerns about the sustainability of its long-standing business model. The discussion delves into key challenges contributing to IndiGo's financial losses, including aircraft groundings due to engine defects, rising aviation turbine fuel costs driven by geopolitical tensions, increased airport charges, and operational disruptions. Additionally, reputational issues and intensifying competition have further strained the airline's performance.

The case encourages analysis of external industry forces and internal strategic decisions, prompting consideration of future growth avenues such as international expansion, service differentiation, and potential shifts in market positioning. It invites learners to evaluate whether IndiGo should adapt its no-frills model—such as introducing business-class offerings—to sustain profitability and competitive advantage in an evolving aviation landscape.

On October 25th, 2024, amidst the heavy rains in Bengaluru, India, Rohit a final year student of a Business Management program, sat in his hostel residence to complete his strategic management assignment on InterGlobe Aviation Limited, popularly known as IndiGo. While browsing the recent headlines, he came across the news that Indigo, reported a loss of INR 9867 million for the Q2 FY 2025. Rohit found it hard to believe - how could a company that thrived for 18 long years suddenly be in trouble?

Determined to understand more, he decided to dig deeper. What made the airlines successful for long? What were the competitive forces of the Indian aviation sector? What had led to these recent financial losses? What strategic options were available for IndiGo to become profitable once again in future?

His mood turned reflective as he pondered on some of the above questions.

Professor, Prin. L. N. Welingkar Institute of Management Development and Research, Bangalore

BACKGROUND

InterGlobe Aviation - the operating company for IndiGo, was India's largest passenger airline in terms of domestic market share. Promoted by Rahul Bhatia and Rakesh Gangwal, the company was originally incorporated in January 2004 as a private limited company, headquartered in Gurgaon, India and converted into a public limited company in June 2006. The airline from the beginning adopted a low-cost carrier business model, offering no-frills air-commute to passengers in the domestic as well as international sectors. It commenced operations from August 2006 with a single aircraft. Subsequently, in 2016, it proceeded with its initial public offering, wherein its shares were listed on the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE)ⁱⁱ.

In February 2022, Rakesh Gangwalⁱⁱⁱ, announced exit from the board of InterGlobe Aviation Limited^{iv}. Following this, in September 2022, Pieter Elbers the former Chief Executive Officer (CEO) of KLM Royal Dutch Airlines, the world's oldest passenger carrier joined Indigo as its CEO with a mission to expand the airline's global presence^v. The airlines had achieved many milestones (refer exhibit 1).

BUSINESS MODEL AND OPERATIONS

IndiGo pioneered the sale and leaseback (SLB) model in Indian aviation. Under SLB, an airline purchased an aircraft from the manufacturer at an attractive price and then sold it to a lessor who then leased it back to the original owner. By placing bulk orders and adopting the SLB model, they secured they secured substantial discounts on procurement of aircrafts and retained liquidity given the long tenor of the leases, which was crucial for an airline business.

With an average fleet age of 3.94 years and over 300 modern aircraft, IndiGo stood among the top

10 global carriers^{vi}. It boasted of the most fuel-efficient fleet in India, where fuel typically accounted for over half of an airline's operational costs. Indigo implemented several measures to enhance fuel efficiency. They used ground power units to convert diesel into electricity for planes at the boarding gates, as diesel was cheaper than auxiliary power. Additionally, the pilots were trained in fuel saving techniques such soft landings that used only three of the aircrafts wing flaps, resulting in a six kg per flight fuel saving.

As of March 2023, 80% of IndiGo's aircraft fleet was comprised of Airbus A320 Neo models, which were 15% more fuel-efficient than older generations. Recognizing the impact of aircraft weight on fuel consumption, IndiGo's operations team continuously monitored the loads of items used on board. After multiple trials, they received approval from the Directorate General of Civil Aviation (DGCA) for a Less Paper Cockpit (LPC), allowing them to remove Technical Paper Manuals, which weighed 40 kg, from each Airbus cockpit. In 2015, they had already replaced crew's paper charts and manuals with iPads, that had an added advantage for the crew of easier access to the latest updates. Additionally, they substituted the in-flight magazine with a lighter catalogue of food and duty-free items. These weight reductions contributed to lower fuel consumption, successfully reducing annual carbon emissions by 2,500 tonnes^{vii}.

In January 2024, they partnered with Swedish Innovation company Altered to equip their fleet with advanced water nozzles, drastically cutting on-board water consumption by 98%. This innovative solution not only yielded significant savings in fuel and water but also led to a notable reduction in carbon emission, marking a pioneering step in the aviation sector's pursuit of water conservation^{viii}.

IndiGo, recognized for its exceptional utilization rates, operated its aircraft an average of 16 hours daily, maintaining a 90% capacity utilization. Boasting the best turnaround times in the industry, the crew began cleaning even before the aircraft had landed. Departing passengers were instructed to close window blinds to help cool the aircraft more quickly^{ix}.

They had long utilized digital data links to facilitate communication between its aircrafts, ground stations, and satellites, enabling efficient operations control, reservations, and dispatch. These advanced links helped minimize flight cancellations to just 0.3%, while achieving an industry-leading on-time performance of 89.2%^x (refer exhibit 1b)

MARKET POSITIONING

From inception IndiGo had positioned itself as a 'No Frills' airline. It had done away with white elephants of in-flight dining, and on-board entertainment screens. Gangwal's believed that pampering the customer with extras was unnecessary. He said,

"A piano on the plane may give it a fancy look, but does it contribute to profitability?"^{xi}

Unlike other Airlines, this carrier implemented single -class seating with no Business Class, which streamlined the need of separate stewards. The arrangement of seats was optimized and the absence of business class ensured that the cost per seat was significantly reduced. There was no associated loyalty program, they offered one competitive pricing but charged for seat assignments during the web-check-in. Clean aircraft, affordable fares, good onboard service, and being 'on time' were its priorities. Additionally, its extensive network of domestic flights connected 84 destinations across India, including metropolitan cities as well as a range of Tier 2 and Tier 3 cities, made it a

preferred choice for many travellers^{xii}.

AVIATION INDUSTRY LANDSCAPE

The aviation industry one of the fastest-growing transportation sectors enabled travel and access services from around the globe, thereby creating new opportunities. The industry, in particular, facilitated connections like no other mode of transportation. It comprised of all features of mechanical air transportation carried out using an aircraft and all activities that facilitated it.

Airplanes allowed people and goods to cover vast distances in just a few hours. Moreover, aviation sector significantly impacted the global economy. In 2023, the estimated global market size of the airline industry reached 762.8 billion U.S. dollars marking a substantial increase from the previous years (refer exhibit 2a).

In 2022, Delta Air Lines topped the charts as the world's most profitable airline, with annual revenues of USD 29.9 billion, followed by American Airlines and United Airlines. By 2037, India was projected to be the third-largest market for air passenger traffic, trailing only China and the United States^{xiii} (refer exhibit 2b).

The Indian Aviation industry was broadly divided into military and civil aviation. The civilian (passenger) air transportation network was extensive with Air India tracing its origins to 1932 as the flag carrier of India. Directorate General of Civil Aviation (DGCA) – the regulatory body responsible for Indian civil aviation was governed by Ministry of Civil Aviation and Airports Authority of India was responsible for the management of civil aviation infrastructure.

The Indian aviation industry had experienced a meteoric rise, fuelled by soaring demand and the government's unwavering commitment to its growth through supportive policies and

initiatives. For instance, National Civil Aviation Policy (NACP) 2016 aimed to improve the international footprint of India based airline services. Under this policy airlines that deployed either 20 number or 20% of their total capacity to domestic operations were allowed to commence international operations. Another initiative was the Regional Connectivity Scheme – Ude Desh ka Aam Nagrik (RCS-UDAN) launched under NCAP, aimed to provide connectivity to unserved and underserved airports of the country through the revival of the existing airstrips and airports. Further 100% and 74% foreign direct investment was being allowed under the automatic routes for greenfield and brownfield projects. Airport projects were provided with 100% tax exemption for a period of 10 years and Indian aircraft Manufacture, Repair and Overhaul (MRO) service providers were given complete exemption from customs and countervailing duties.

The number of operational airports in the country had doubled from 74 in 2014 to 157 in 2024 and the aim was to increase this number to 350-400 by 2047. There had been a 15 percent YoY increase in total air-passengers handled at Indian airports reaching 376 million in FY24^{xiv}. This dynamic shift had propelled India to the forefront of the global aviation ecosystem.

The thriving Indian aviation industry had attracted significant FDI of approximately USD 3 billion in development of the domestic aerospace infrastructure like airport, air bridges and airstrips. The sector presented significant growth opportunities for related sectors such as tourism and manufacturing, including maintenance, repair, and overhaul (MRO), as well as the development of the domestic aerospace manufacturing industry. Additionally, the spill-over effects of such economic growth in future included regional infrastructure development and increase in employment opportunities.

At the same time, the Aviation sector was not exempt from challenges. Reports suggested as in January 2024 over 160 aircrafts from across the airlines like Air India, Spice Jet, Go Air, and Indigo were grounded due to unsafe aircrafts^{xv}. This subsequently also reflected in Indian Airlines consolidated loss of USD 1.6 to 1.8 billion in FY 24. Reports suggested delays in aircraft deliveries and supply chain issues with the original equipment manufacturers had hindered the industry's capacity to meet the growing demand. The sector was witnessing a peculiar paradox, though a fastest growing sector, it was facing a human resources crisis with 17% deficit of skilled pilots, maintenance engineers and cabin crew members which often led to operational disruptions and increase in turn-around time of the airlines^{xvi}. Further, despite the rapid growth in the passenger traffic, the India's domestic per capita penetration of domestic air travel (0.13 seats deployed per capita) remained significantly lower than countries like China (0.49) and Brazil (0.57)^{xvii}. High fuel prices on account of high taxes on aviation turbine fuel and monopoly of inefficient public sector airports were deterrents to rapid growth of this sector. The highspeed trains in railways and roadways for shorter routes were the immediate substitutes for airlines for the price sensitive population of country. Aviation experts argued that Aircraft Act, 1934 and Aircraft Rules, 1937 had not kept pace with modern technology in aerospace, this leading to increased costs of the industry's operation.

COMPETITION

Before the COVID-19 pandemic, the Indian aviation sector was fiercely competitive, with a wide variety of airlines striving for market share. The prime competitors to IndiGo included SpiceJet, Vistara, Jet Airways, Go First, AirAsia India. Each airline established a unique market position by implementing distinct strategies and

leveraging unique selling propositions (USPs) to attract and retain customers^{xxiii}. In 2019, when three-decade old full carrier service Jet Airways declared bankruptcy^{xxix}, Vistara – the Tata Sons airlines gained popularity and by 2022 emerged as the second biggest airline with a 10.4 % of the market share. The number one position was held by IndiGo with 58.8% market share and the number three positions kept shuffling between SpiceJet and Air India^{xx}. Budget carrier Akasa Air started its commercial operations in August 2022^{xxi} quickly growing its market share to 4.8% by 2023^{xxii}, marking as a competition to IndiGo. By 2023, GoAir, filed for voluntary insolvency^{xxiii}, followed by SpiceJet that faced insolvency pleas from lessors^{xxiv}.

In January 2022, Tata Sons, acquired 100 % stake in Air India, followed by consolidation of its airlines Vistara and Air India, which was completed in November 2024. In another move, Tata Group's low-cost airlines Air Asia and Air India Express merged. These two mergers created a full-service carrier and a low-cost carrier for Tata Group, marking a significant boost and consolidation in the Indian aviation sector. Thus, in 2024, the Indian aviation market structure emerged as a duopoly with two large airlines IndiGo (63%) and Tata Group Airlines (37%)^{xxv}. (refer exhibit 3)

There was more competition coming in near future with several new airlines preparing to take to the skies in 2024-25. While Goa-based Fly91 had launched its operations in March 2024, Assam-based Jettwings Airways, Uttar Pradesh-based Shankh Air, and two Kerala-based ventures, Air Kerala and alhindair, were poised to enter the Indian aviation landscape soon^{xxvi}.

PRESENT CHALLENGES

In contrast to the second quarter of FY23, where

the company posted a profit of INR 1890 million, the second quarter of FY24 saw a loss of INR 9870 million (refer exhibit 4). There were multiple challenges that added to this quarter loss^{xxvii}.

In July 2023, IndiGo had to ground 40 of its Airbus A320neo aircrafts due to issues with the Pratt & Whitney engines. Pratt & Whitney, the engine manufacturer for Boeing Airbus aircrafts, reported a rare powder metal defect that could cause engine component cracking in the twin-engine Airbus A320neo, posing a safety risk. These numbers of grounded A320neo aircrafts rose to 75 by January 2024, which adversely affected IndiGo's available seat per Kilometer (ASK) metric, thus reflecting in the decline in the second quarter profitability^{xxviii}.

Also, the sharp rise in the aviation fuel costs, which accounted for 32% of the overall airline spending in 2024^{xxix} negatively impacted the financial performance of IndiGo. The rise in fuel costs was largely attributed to geopolitical factors including Russia's war with Ukraine and the ongoing conflict between Israel and Palestine.

Additionally, with start of FY 25, 16 airports in India had increased their airport charges from 2% to 200%, and yet the airlines had not increased their flight ticket prices^{xxx}.

Increased aircraft rentals and the seasonal downturn were among the other factors that contributed to these accumulated losses. Furthermore, IndiGo was in the social media spotlight for all the wrong reasons, including denying a child with special needs to board the aircraft^{xxxi}, manhandling a passenger^{xxxii}, and failing to communicate flight schedules in certain sectors, leading to passenger unrest^{xxxiii}. These incidents indirectly harmed their brand equity in the market.

FROM TRIUMPHS TO TOMORROW'S GOALS

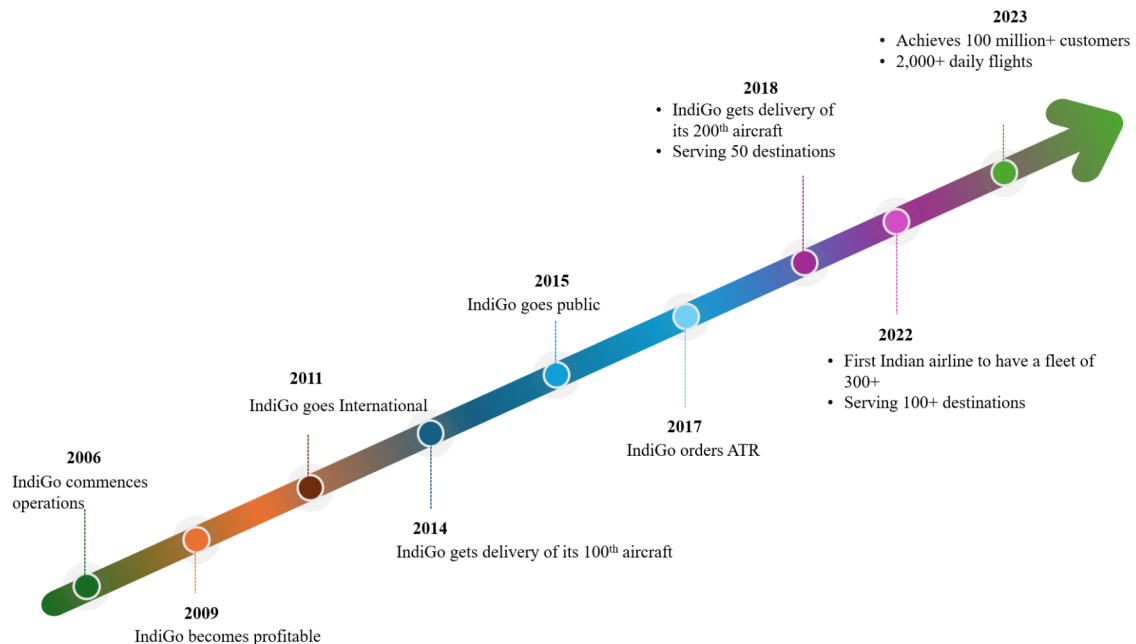
As of October 2024, IndiGo operated over 2,000 daily flights to 122 destinations—88 domestic and 34 international. With a fleet of over 382 aircraft, the airline held a 62% market share, making it the largest in the country. For an 18-year-old airline, this was a significant achievement. More importantly, IndiGo had managed to survive and thrive in a competitive market, unlike many other Indian airlines.

They had set ambitious targets to double its fleet size and hence capacity by 2030. Elbers shared, “An airline with double of today's size, global reach and footprint by the year 2030”^{xxxiv}. This growth was not possible by focussing only on the

domestic markets, it had to focus on picking up momentum in international markets, they planned to increase their codeshare from 20 to 40 with the international partners by end of 2024. In August 2024^{xxxv}, they had launched a customized business product for India's busiest and business routes – the IndiGo Stretch.^{xxxvi} The IndiGo Stretch customers enjoyed a host of complimentary benefits. The aim was to enter a new customer segment in the competitive times ahead.

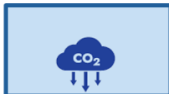
As Rohit looked up from his notes, he wondered if it was time for IndiGo to introduce new market segments by addressing the gap of business class seating in their business model. Would it be appropriate? Yet, he still had to decipher the puzzle of financial losses for the last quarter.

EXHIBIT 1a INDIGO AIRLINES KEY MILESTONES



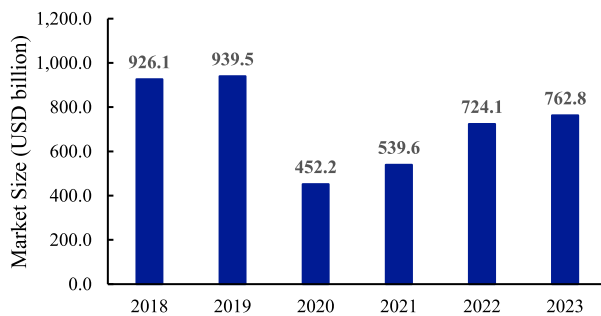
Source: Recreated by Author from IndiGo Annual report 2022-23, P14-15.

EXHIBIT 1a INDIGO AIRLINES KEY MILESTONES

 5th most punctual airline in the world (OAG mega airline category)	 7th largest airline by daily departures	 Avoided 1 million+ tonnes of CO₂ emissions	 Replaced over 83 million single use plastic (SUP) products
 0.3% Lowest cancellations globally	 One of the largest training academies in the world with 1,800+ trainings conducted every day	 Progressively investing in Electric Vehicles	 32k+ workforce 44.2% women

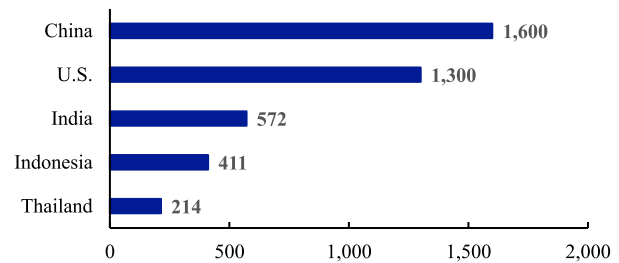
Source: Recreated by Author from IndiGo ESG report 2022-23.

EXHIBIT 2a
GLOBAL MARKET SIZE OF THE AIRLINE
INDUSTRY - 2018 to 2023 (USD BILLION)



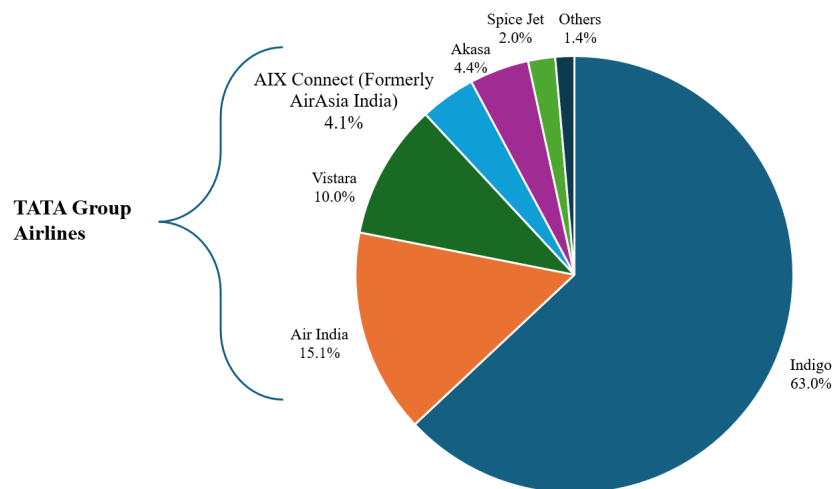
Source: Recreated by author based on information available on Statista
<https://www.statista.com/markets/419/topic/490/aviation/#statistic2>

EXHIBIT 2b
PROJECTED AIR PASSENGER
TRAFFIC - 2037 (IN MILLION PASSENGERS)



Source: Recreated by author based on information available on Statista
<https://www.statista.com/markets/419/topic/490/aviation/#statistic2>

EXHIBIT 3
INDIAN AIRLINES DOMESTIC MARKET SHARE



Source: Recreated by author basis the data available in the ET Article as accessed at <https://economictimes.indiatimes.com/industry/transportation/airlines/-aviation/domestic-air-passenger-traffic-rises-6-pc-in-september/articleshow/114257371.cms?from=mdr>

EXHIBIT 4 INDIGO FINANCIAL DATA

Sr. No.	Particulars	For Quarters Ending				For Quarters Ending	
		30-Jun-23	30-Sep-23	31-Dec-23	31-Mar-24	30-Jun-24	30-Sep-24
1	Income						
	a. Revenue from operations	1,66,831.0	1,49,439.0	1,94,521.5	1,78,253.0	1,95,707.0	1,69,696.0
	b. Other income	4,778.0	5,590.0	6,101.0	6,798.0	6,782.0	7,894.0
	Total income	1,71,609.0	1,55,029.0	2,00,622.5	1,85,051.0	2,02,489.0	1,77,590.0
2	Expenses						
	a. Aircraft fuel expenses	52,281.0	58,560.0	68,414.1	59,791.0	64,165.0	66,052.0
	b. Aircraft and engine rentals	1,946.0	1,956.0	2,990.7	3,860.0	6,241.0	7,636.0
	c. Supplementary rentals and aircraft repair and maintenance (net)	24,251.0	21,171.0	26,307.1	27,587.0	26,033.0	27,446.0
	d. Airport fees and charges	12,195.0	9,813.0	12,367.8	11,863.0	12,861.0	13,848.0
	e. Purchase of stock-in-trade (In-flight)	722.0	818.0	960.2	868.0	837.0	813.0
	f. Changes in inventories of stock-in-trade	25.0	3.0	24.6	2.0	19.0	(1.0)
	g. Employee benefits expense	14,498.0	15,217.0	16,916.1	17,987.0	17,572.0	18,494.0
	h. Finance costs	9,537.0	10,213.0	10,952.1	10,991.0	11,576.0	12,401.0
	i. Depreciation and amortisation expenses	14,078.0	15,490.0	16,657.2	18,033.0	18,758.0	20,875.0
	j. Foreign exchange loss (net)	(1,161.0)	6,171.0	509.4	1,654.0	575.0	2,406.0
	k. Other expenses	12,330.0	13,726.0	14,538.0	14,705.0	15,812.0	16,691.0
	Total expenses	1,40,702.0	1,53,138.0	1,70,637.4	1,67,341.0	1,74,449.0	1,86,661.0
3	Profit / (loss) from operations before exceptional items and tax (1-2)	30,907.0	1,891.0	29,985.1	17,710.0	28,040.0	(9,071.0)
4	Exceptional items	-	-	-	-	-	-
5	Profit / (loss) before tax (3+4)	30,907.0	1,891.0	29,985.1	17,710.0	28,040.0	(9,071.0)
6	Tax expense						
	a. Current tax	1.0	2.0	3.9	4.0	752.0	796.0
	b. Deferred tax (credit) / charge	-	-	-	(1,242.0)	-	-
	Total tax (credit) / expense	1.0	2.0	3.9	(1,238.0)	752.0	796.0
7	Profit / (loss) for the period / year (5-6)	30,906.0	1,889.0	29,981.2	18,948.0	27,288.0	(9,867.0)
8	Other comprehensive income						
	a. Items that will not be reclassified to profit or loss						
	- Remeasurements of defined benefit plans (net of tax)	(20.0)	6.0	(117.2)	(20.0)	60.0	(70.0)
	b. Items that will be reclassified to profit or loss						
	- Net gain due to foreign currency translation differences	-	-	-	-	-	-
	- Debt instruments through other comprehensive income (net of tax)	6.0	(16.0)	(1.0)	17.0	11.0	-
	Other comprehensive income / (loss) for the period / year, net of tax	(14.0)	(10.0)	(118.2)	(3.0)	71.0	(70.0)
9	Total comprehensive income / (loss) for the period / year (7+8)	30,892.0	1,879.0	29,863.0	18,945.0	27,359.0	(9,937.0)
10	Profit / (loss) for the period / year attributable to						
	- Owners of the Company	30,906.0	1,889.0	29,981.2	18,948.0	27,288.0	(9,867.0)
	- Non-controlling interest	-	-	-	-	-	-
11	Other comprehensive income / (loss) for the period / year attributable to						
	- Owners of the Company	(14.0)	(10.0)	(118.2)	(3.0)	71.0	(70.0)
	- Non-controlling interest	-	-	-	-	-	-
12	Total comprehensive income / (loss) for the period / year attributable to						
	- Owners of the Company	30,892.0	1,879.0	29,863.0	18,945.0	27,359.0	(9,937.0)
	- Non-controlling interest	-	-	-	-	-	-
13	Paid-up equity share capital (face value of Rs. 10 each, fully paid)	3,855.0	3,858.0	3,859.5	3,860.0	3,860.0	3,863.0
14	Reserves excluding revaluation reserves as per balance sheet	-	-	-	-	-	-
15	Earnings Per Share (of Rs. 10 each):						
	a. Basic (Rs.)	80.16	4.90	77.69	49.09	70.70	(25.55)
	b. Diluted (Rs.)	80.03	4.89	77.58	49.03	70.57	(25.51)

Source: Recreated by author basis the data provided in IndiGo Annual report

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Core Values

◆ **Passion**

The soul of welingkar blossoms in our heart, mind and body.

◆ **Breakthrough thinking**

We foster academic rigour in an environment conducive to innovation.

◆ **Result oriented process driven work ethic**

We adopt dynamic quality processes to ensure accountability and exceptional performances.

◆ **We link and care**

We support and collaborate with all our stakeholders through mutual trust and respect.



Quality Policy

We are committed to give our students Quality Management Education in tune with the changing needs of business and industry.

We shall endeavour to do this by

- ◆ Providing the best learning resources.
- ◆ Making the environment conducive for students to develop their creativity, leadership skills and ability to learn continuously.

We shall follow a data oriented factual approach to quality Management leading to continual improvement of our processes culminating in total customer satisfaction





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