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FOREWORD

The Post Graduate Department of Business Management, Sardar Patel University, has consistently upheld a strong tradition of academic excellence, research innovation, and societal engagement. Established in 1989, the Department has emerged as a leading centre for management education and research in Gujarat, supported by the University's **NAAC "A" Grade accreditation (CGPA 3.11)** and a vibrant academic ecosystem.

Research and knowledge creation remain central to the Department's mission. The Department has successfully undertaken several major research initiatives supported by prestigious funding agencies. Under the **UGC-SAP (DRS-III)** programme, the Department completed the project on "**Managing Transformation of Rural Economy**," contributing significantly to the understanding of rural socio-economic development. The Department has also received support from the **Indian Council of Social Science Research (ICSSR)** for projects examining the implementation of the **National Education Policy (NEP) 2020** in Gujarat, institutional awareness and readiness for educational reforms, and the impact of information privacy concerns on internet users' behaviour. These initiatives reflect the Department's commitment to addressing contemporary policy, educational, technological, and social challenges through rigorous research.

The present volume of *Synergy – Journal of Management* continues this tradition by bringing together scholarly work on digital transformation, artificial intelligence, financial technology, consumer behaviour, public transportation, forensic accounting, platform-based work, and financial well-being. The articles published in this volume provide valuable insights into the changing nature of organizations, markets, and society, while offering practical implications for managers, policymakers, and researchers.

I congratulate the editorial team, reviewers, and contributing authors for their dedication and scholarly efforts in bringing out this volume. I am confident that the research presented in this issue will enrich academic discourse and contribute meaningfully to the advancement of management knowledge and practice.

I extend my best wishes for the continued success of *Synergy – Journal of Management* in its pursuit of excellence in research and publication.


Prof. Niranjana P. Patel
Vice-Chancellor

Synergy – Journal of Management
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It is our pleasure to present **Volume 27, Issues 1 and 2 (2025)** of *Synergy – Journal of Management*. This volume brings together a diverse collection of scholarly contributions that address emerging challenges and opportunities in management, technology, finance, marketing, transportation, and human resource management. The papers published in this issue reflect the dynamic interplay between digital transformation, changing consumer behaviour, workforce evolution, and socio-economic development.

The issue features research on customer satisfaction in online and offline cab services, highlighting the role of technology, service quality, and safety in shaping user experiences. Contemporary workplace challenges are explored through a conceptual framework linking organizational silence, AI-driven skill gaps, and generational dynamics to employee commitment, performance, and turnover intentions. The volume also includes a systematic review of bus transit service quality and user satisfaction, offering valuable insights for improving public transportation systems.

Several contributions examine the impact of digital technologies on business and society. These include studies on youth perceptions of in-game advertising, generational perspectives on FinTech adoption, forensic accounting and fraud detection in Indian companies, and the implications of algorithmic management in India's food delivery sector. The issue further addresses financial well-being through a multidimensional review of retirement planning among gig workers, emphasizing the importance of financial literacy, behavioural factors, and institutional support.

Collectively, these contributions reaffirm *Synergy's* commitment to publishing research that is theoretically sound, empirically informed, and socially relevant. We hope this volume stimulates meaningful academic discourse and provides useful insights for researchers, practitioners, policymakers, and students.

We extend our sincere appreciation to all authors, reviewers, editorial board members, and readers for their continued support and contribution to the advancement of management scholarship.

Dr. Darshana R. Dave
Chief Editor

Volume 27 – No 1 and 2 – January 2025-December 2025

Sr No	Name of the author	Title of the paper	Page no.
1	Ms. Margi Mehta and Darshana Dave	A comparative analysis of customer satisfaction in online and offline cab services.	1-12
2	Prinal Mori and Mitesh Jayswal	Organizational Silence, AI-Driven Skill Gaps, and Generational Dynamics: Implications for Performance, Commitment, and Turnover in the Modern Workplace	13-35
3	Arun Menon Dr. Raju Rathod Anish Parmar	User Satisfaction in Bus-Based Transit: Literature Review and Conceptual Framework.	36-63
4	Vilas Kulkarni and Ratna Vyas	Gig Workers in the Food-Delivery Industry in India: A Comprehensive Literature Review and Managerial Roadmap.	64-75
5	Dr. Komal Mistry and Janet Joseph	Examining the Gloomy Outlook of Indian Corporate Sector: A Study on Forensic Accounting and Fraud Detection in Indian Companies.	76-87
6	Dr. Ashish C. Mehta and Drashtiben N. Patel	Generational Perspectives on FinTech: A Comparative Study of Gen Y and Gen Z in Ankleshwar city.	88-98
7	Sejal Chavda and Dr. Vilas Kulkarni	Retirement Planning in the Gig Economy: A Multidimensional Review of Financial Literacy, Behavioral Traits, and Structural Barriers	99-117
8	Riddhi Reshiya and Dr. Hitesh Parmar	Gaming meets Advertising: Exploring Youth Reactions to Online In-Game Ads	118-132

A comparative analysis of customer satisfaction in online and offline cab services

Margi Mehta¹

and

Darshana Dave²

Abstract

Every business nowadays becomes successful only by achieving customer satisfaction. In this competitive modern world, the key to success for any business depends on how satisfies their customers are. The taxi cab sector is no different as there is now intense competition between the tradition ride-hailing cab services and the modern app-based cab aggregators. This study is a comparison of these two business models in terms of customer satisfaction, convenience, pricing, safety and reliability. 238 responses were collected from those consumers who have used both these types of services.

This research paper attempts to measure customer satisfaction of online cab service users and analyse how technological improvements such as GPS tracking, fare estimate, and availability of online payments options influence satisfaction levels. This has been done by taking into account aspects like surge pricing, service cancellations, rides, and changes in rides and whether they affect consumer trust will be tested. Also, the satisfaction levels of users of online cab services will be tested through this study, based on factors such as familiarity with driver, negotiable fares and convenience due to non-reliability on technology. Negative factors such as varying fares and poor service quality will also be taken into consideration. For this study, online cab users include consumers using mobile application to book cabs.

The study also attempts to study how expectation of safety features, service dependability, and pricing impact customer experience. Here, gender difference will be emphasized as it is more

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likely that female users of cab services may be more concerned about the availability of safety features in cabs.

The results of the study will include recommendations for both the online and traditional cab services on how they can increase customer satisfaction. For instance, the traditional cab services must improve the reliability of their services and pricing structure by incorporating technological features. In a nutshell, this study will provide insights on how the traditional as well as online cab services can increase their competitiveness by focusing on their consumer satisfaction.

Key Words: Customer Satisfaction; Cab Services; Ride Hailing Platforms; Service Quality

INTRODUCTION

The traditional taxis have come a long way, from the black-and-yellow which had to be hailed and customers had to go looking for them when needed, to the modern day app-based cab services that are available at the fingertips of customers wherever and whenever they need them. Technology is one of the major factors that has revolutionized the way people commute. In 2021, the global cab or ride-hailing market was estimated at approximately \$85.8 billion, and by the end of 2026, the same is projected to reach \$185 billion at a CAGR of 16.6% (Statista, 2022). The traditional taxi services, although occupying a significant part of the ride-hailing industry, there is intense competition from the digital ride-hailing platforms. In this dynamic landscape, customer satisfaction plays a crucial factor for the success of the ride-hailing platform. In India, particularly in Gujarat, technological advancement and urbanization are on a rise, and so, understanding customer preferences and choices has become very essential for enhancing service quality.

Ever since Europe began carriages for hire in the 17th century, followed by the introduction of organized taxi services in London and Paris, they have been a primary mode of transportation. In India, cabs were synonymous with the black-and-yellow taxis sharing the market with auto-rickshaws for shorter distances. They provided familiarity and locally recognized drivers. However, customer dissatisfaction increased with issues such as inconsistent pricing, inconsistent availability and lack of technology. This scenario changed with the introduction of app-based ride-hailing services by Uber in 2009, and in India, by Ola in 2010. These

companies changed the definition of customer service through cashless payments, fare estimates and ride-sharing.

According to studies, nearly 60% of Indians prefer app-based cab services over traditional cabs because of the transparency of fares coupled with the convenience in booking (Economic Times, 2021). Though, the tech-savvy consumers appreciate the real-time tracking, user-friendly interfaces and digital payment options, recently there have been growing concern about surge-pricing, service cancellations and inconsistency, which has posed a big question to the overall reliability and trustworthiness of these digital and app-based ride-hailing services. The Indian Ministry of Road Transport published a report in 2022 indicating that majority of women emphasized the need to incorporate safety features such as Panic buttons and GPS tracking in cab services.

This study aims to analyse customer satisfaction in both traditional and app-based cab services by taking into consideration factors like convenience, technology, safety and service reliability. Responses from 238 users, who have experienced both service models have been taken for a comparative view. The study also attempts to provide recommendations to both traditional and online cab service providers for enhancing customer experience and increase customer satisfaction.

RESEARCH OBJECTIVES

The primary objectives of this research are as follows:

- To compare customer satisfaction levels between traditional taxi services and app-based ride-hailing services.
- To evaluate the impact of technological advancements such as GPS tracking, fare estimation, and digital payments on customer satisfaction.
- To examine the role of safety measures in influencing consumer preference, particularly among female passengers.
- To analyse service reliability issues such as ride cancellations, driver availability, and service consistency.
- To recommend strategies for traditional taxi services to integrate digital solutions and improve competitiveness.

- To suggest improvements for app-based ride-hailing services in terms of pricing models, service quality, and consumer trust.

LITERATURE REVIEW

In the modern world, fast growing sectors such as the taxi cab services lay a lot of emphasis on customer satisfaction. Service quality, convenience, and pricing are very important factors that shape consumer behaviour (Kotler and Keller, 2016), and so, they are very relevant to the cab service sector. There have been many studies conducted that have concluded that traditional cab services are gradually evolving into online or app-based cab services through technological advancements and also due to changes in customer expectations (Rayle et al., 2016).

The app-based cab services have gained popularity in India especially due to their easy access, competitive pricing and their tracking features (Parida and Jena, 2019). However, it has been found that consumers are dissatisfied due to certain issues such as surge pricing, service cancellations, and safety concerns, especially among female passengers. To gain customer trust, certain factors such as driver reliability, fare transparency, and ease of booking are very influential to the consumers of ride-hailing services (Balachandran and Hamzah, 2020).

Many studies have also explored the regulatory challenges related to the ride-hailing platforms. Policymakers of different countries are updating their policies while adapting to the rapid increase in digital transportation, at the same time maintaining fair competition with traditional taxi services (Shaheen et al., 2018). Also, even the reports of the Indian indicate that it is important to have strict regulatory measures in order to address customer complaints and ensure implementation of safety measures by app-based services (Ministry of Road Transport and Highways, 2022).

There are also some studies based on difference in customer satisfaction in different genders. The findings of these studies indicate that safety features such as GPS tracking, emergency buttons and verified drivers are very significant for female cab service users and they highly impact their satisfaction levels (Meena and Singh, 2021).

Thus, the findings of these studies serve as a foundation for understanding the critical factors that influence customer satisfaction in the cab service industry. Taking these into consideration, along with the primary data collected through this research study, the aim of this study is to

offer a comprehensive analysis of how traditional and app-based taxi services can improve their services to enhance the customer experience.

RESEARCH METHODOLOGY

This is a quantitative research study and it uses a descriptive and comparative research design to assess customer satisfaction levels between traditional taxi services and app-based ride-hailing services. Convenience sampling method was used to collect data from five cities - Ahmedabad, Surat, Rajkot, Vadodara, and Palanpur as there is a significant presence of both kinds of cab services in these cities. Those respondents were chosen who had used both traditional (offline) and app-based (online) cab services. A structured questionnaire was used to collect data from 238 respondents from the mentioned cities through Google Forms and also printed hard copies. The questionnaire consisted of closed-ended questions using a Likert scale (1 to 5) to measure customer satisfaction and perceptions.

DATA ANALYSIS AND INTERPRETATION

Analysis of the data collected for this research study was done using SPSS. The factors identified were convenience, pricing, service reliability, safety measures and technological impact.

Reliability Analysis

Cronbach's Alpha test was conducted to assess the internal consistency of the satisfaction scale for both traditional and online cab services. The results are as follows:

- **Traditional Cab Services:** Cronbach's Alpha = **0.957**
- **Online/App-Based Cab Services:** Cronbach's Alpha = **0.945**

Interpretation: A Cronbach's Alpha value above **0.7** is generally considered acceptable, and values above **0.9** indicate excellent internal consistency (Nunnally & Bernstein, 1994). Both values exceed 0.9. Therefore, both the scales measuring customer satisfaction for traditional and online cab services are reliable, and the items measuring are strongly correlated and consistent.

**Traditional Cabs
Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.957	.958	25

**Online Cabs
Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.945	.948	25

Paired Samples t-Test Analysis

- **H₀ (Null Hypothesis):** *There is no significant difference in customer satisfaction between traditional and online cab services.*
- **H₁ (Alternative Hypothesis):** *There is a significant difference in customer satisfaction between traditional and online cab services.*

Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 <u>TCab Overall Satisfaction & OCab Overall Satisfaction</u>	238	.558	.000

Interpretation: A paired samples t-test was performed to analyse the differences in customer satisfaction levels between traditional cabs and online/app-based cabs. The test produced a significance (p) value of 0.000, which is in the acceptance region of 0.05.

With $p < 0.05$, we reject the null hypothesis (H₀) and assert that customer satisfaction levels between traditional and online cab services differ statistically.

Pearson Correlation Analysis – Traditional & Online Cab Services

In order to determine the relationship between the technological factors (GPS tracking, fare estimation, and digital payments) and customer satisfaction for both traditional and online cab services, a Pearson correlation analysis was performed.

- **Null Hypothesis (H_0):** *There is no significant relationship between technological factors and customer satisfaction in both traditional and online cab services.*
- **Alternative Hypothesis (H_1):** *There is a significant relationship between technological factors and customer satisfaction in both traditional and online cab services.*

Correlations – Traditional Cab Services

		Overall Satisfaction	Payment Options	Fare Estimate	GPS
Overall Satisfaction	Pearson Correlation	1	.689**	.725**	.721**
	Sig. (2-tailed)		.000	.000	.000
	N	238	238	238	238
Payment Options	Pearson Correlation	.689**	1	.563**	.375**
	Sig. (2-tailed)	.000		.000	.000
	N	238	238	238	238
Fare Estimate	Pearson Correlation	.725**	.563**	1	.403**
	Sig. (2-tailed)	.000	.000		.000
	N	238	238	238	238
GPS	Pearson Correlation	.721**	.375**	.403**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	238	238	238	238

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations – Online/App-based Cab Services

		Overall Satisfaction	Payment Options	Fare Estimate	GPS
Overall Satisfaction	Pearson Correlation	1	.699**	.636**	.747**
	Sig. (2-tailed)		.000	.000	.000
	N	238	238	238	238
Payment Options	Pearson Correlation	.699**	1	.350**	.551**
	Sig. (2-tailed)	.000		.000	.000
	N	238	238	238	238
Fare Estimate	Pearson Correlation	.636**	.350**	1	.481**
	Sig. (2-tailed)	.000	.000		.000
	N	238	238	238	238
GPS	Pearson Correlation	.747**	.551**	.481**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	238	238	238	238

** . Correlation is significant at the 0.01 level (2-tailed).

Interpretation: The results are positive for both service types and statistically significant ($p = 0.000$) for all factors, meaning that technological advancements positively influenced customer satisfaction. The positive values of the correlation coefficients imply that improved GPS tracking, fare estimation, and digital payment systems resulted in higher satisfaction levels across traditional and online cab services.

A Pearson correlation test was performed to understand how different factors of reliability are connected to customer satisfaction in traditional cab services.

- **Null Hypothesis (H₀):** *There is no significant relationship between reliability factors and customer satisfaction in traditional cab services.*
- **Alternative Hypothesis (H₁):** *There is a significant relationship between reliability factors and customer satisfaction in traditional cab services.*

Correlations - Traditional Cab Services

		Overall Satisfaction	Ease of Booking	Punctuality	Remote Access	Safe Driving	Complaint Handling
Overall Satisfaction	Pearson Correlation	1	.599**	.729**	.733**	.783**	.706**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	238	238	238	238	238	238
Ease of Booking	Pearson Correlation	.599**	1	.520**	.262**	.354**	.455**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	238	238	238	238	238	238
Punctuality	Pearson Correlation	.729**	.520**	1	.442**	.562**	.434**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	238	238	238	238	238	238
Remote Access	Pearson Correlation	.733**	.262**	.442**	1	.550**	.504**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	238	238	238	238	238	238
Safe Driving	Pearson Correlation	.783**	.354**	.562**	.550**	1	.567**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	238	238	238	238	238	238
Complaint Handling	Pearson Correlation	.706**	.455**	.434**	.504**	.567**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	238	238	238	238	238	238

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations - Online/App-based Cab Services

		Overall Satisfaction	Ease of Booking	Punctuality	Remote Access	Safe Driving	Complaint Handling
Overall Satisfaction	Pearson Correlation	1	.688**	.688**	.606**	.755**	.685**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	238	238	238	238	238	238
Ease of Booking	Pearson Correlation	.688**	1	.610**	.144*	.492**	.536**
	Sig. (2-tailed)	.000		.000	.026	.000	.000
	N	238	238	238	238	238	238
Punctuality	Pearson Correlation	.688**	.610**	1	.325**	.467**	.529**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	238	238	238	238	238	238
Remote Access	Pearson Correlation	.606**	.144*	.325**	1	.362**	.295**
	Sig. (2-tailed)	.000	.026	.000		.000	.000
	N	238	238	238	238	238	238
Safe Driving	Pearson Correlation	.755**	.492**	.467**	.362**	1	.605**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	238	238	238	238	238	238
Complaint Handling	Pearson Correlation	.685**	.536**	.529**	.295**	.605**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	238	238	238	238	238	238

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

□

Interpretation: The result of the tests shows that factors of reliability are positively correlated to customer satisfaction in the traditional cab services. Therefore, the null hypothesis was rejected. The most powerful correlation derived was with the factor of safe driving ($r = .783$, $p = .000$), meaning that customers are most satisfied with the service when they perceive that the ride is safe. The factors remote access ($r = .733$, $p = .000$), and punctuality ($r = .729$, $p = .000$) were also positively correlated, meaning that they impact customer satisfaction and add to the overall experience when they are present in the service. Other factors, ease of booking ($r = .599$, $p = .000$) and complaint handling ($r = .706$, $p = .000$) are also positively correlated in customer satisfaction, meaning that services with better complaint handling and an easier process to book will provide more satisfaction to customers.

Chi-Square Testing

A chi-square test was conducted to check whether gender differences in safety perception are statistically significant.

- **Null Hypothesis (H_0):** *There is no significant association between gender and the importance of safety in cab services.*

- **Alternative Hypothesis (H₁):** *There is a significant association between gender and the importance of safety in cab services.*

Gender	Factor - Safety
18.303 ^a	341.496 ^b
1	4
.000	.000

Interpretation: Since the p-value is less than 0.05, we reject the null hypothesis and conclude that gender and safety perception are significantly associated. This means that the males and females have different perceptions of safety in cab services.

MAJOR FINDINGS AND RECOMMENDATIONS

The result of the study did indicate that there is noteworthy difference on customer satisfaction level of the traditional taxi service versus that of the app-based ride-hailing services. App-based cab services are liked by customers because of quick booking, ride fare transparency, and increasing use of technology. Ride cancellations and unavailability of drivers were cited as the most important issues of this service. Participants also cited safe arrival of service as important with respect to satisfaction, as well as the ability to request rides from any location. Although 60% of survey participants liked the app-based services because of ride fare transparency, many cited compensation policies as a disadvantage. A unique aspect of this study was the identification of a perceptual difference of safety between men and women. For female passengers, the study identified that service features such as GPS tracking, emergency access, and driver verification are very important. For male passengers, the study noted that ride cost and service availability were important.

Also, the data collected indicates that the ability to use technology positively impacts customer satisfaction in taxis, primarily because of the GPS tracking of cabs in real-time and the ability to pay online. Therefore, in order to achieve higher customer satisfaction, it can be recommended that regular taxis incorporate the aforementioned features.

They can also build online booking systems or mobile applications to improve their booking accessibility. Also, as seen in the study, real-time tracking system is highly important for consumers, and so, traditional cabs can introduce this feature to enhance customer trust. Safety features such as GPS tracking and emergency buttons can also be installed. As reliability is a

major concern for traditional cabs, these services must ensure availability during peak hours and may also introduce a complaint handling system.

Online or app-based services have shown higher satisfaction levels comparatively, even then there are certain concerns that can be addressed. It was seen that surge pricing is seen as a drawback for app-based cab services, and so it is important for these services to introduce some kind of fare protection measures to improve customer trust. Nowadays, demand can be predicted by using AI can be used, and thus, better driver allocation can be ensured. It is also very important that background check of all the drivers must be done to ensure passenger safety. Female-friendly features such as panic buttons will be very detrimental to the reliability of online cab services.

CONCLUSION

The study shows that customer satisfaction is definitely more in app-based ride-hailing services compared to traditional taxis with respect to convenience and technology. Despite that, app-based services face challenges concerned with reliability and surge pricing issues. On the other hand, traditional taxis are strong in features such as familiarity and accessibility, but they strongly need to integrate technology in their services to remain competitive. If these concerns are effectively addressed, both these services can enhance satisfaction and the overall experience of the consumers.

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Organizational Silence, AI-Driven Skill Gaps, and Generational Dynamics: Implications for Performance, Commitment, and Turnover in the Modern Workplace

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Abstract

The rise of technology-driven and rapid change in the adoption of Artificial Intelligence (AI) has drastically changed the work structure of organizations, requiring the re-skilling of employees for the adoption of AI-related skills. Today, the organization is fully dependent on digital use for solving complex problems and their solutions. This change has emphasized a huge range of skill gaps to handle new emerging technologies. Today, these AI demand skill gaps are found to be very common among employees with different generations, i.e, Gen Z and Gen Y, who are working together, where both have their own ways of doing work. Sometimes, due to a lack of support, ignorant employees remain silent as they don't find training or re-skilling needs. All these together gradually reduce the performance, and employees might think of leaving the organization where they feel devalued. This paper presents the conceptual framework about how organisational silence (OS) impacts organisational commitment (OC) with the moderating effect of AI skill demand and generational dynamics. Also, explore how organisational commitment mediates the effect of AI demand and generational differentiation with relation to Organisational silence and performance. This will also provide an understanding of how this AI demand skill gaps turn into turnover intention of employees. Presently, the generation-wise approach works differently with Gen Z and Gen Y, which shapes overall organizational as well as employees' performance. Providing this perspective on organizational silence, generational differences

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towards AI-driven skill gaps offer a framework that suggests understanding the linkage between employees' capabilities, communication gaps, and employee intent to leave the organization. All this insight guides organizations to develop the re-skilling programs and training initiatives, and also guides this new generation with their job-hopping behavior decisions and making decisions to remain silent. Lastly, this will help to foster strategies for organization and HR to develop and implement new practices and policies to maximize human capabilities, efficiency, and effectiveness in the context of an AI-driven workforce.

Keywords: Artificial Intelligence, Organizational Silence, Skill Gap, Generational Differences, Employee Performance, Turnover Intention, Organizational Commitment

1. Introduction

Today, rapid technological change has affected the work structure of various sectors. Since the Industrial Revolution, labor has consistently enhanced and transformed, replacing physically demanding tasks and repetitive tasks with mechanized, automated solutions that supported human development (Ali et al., 2023). In modern times, artificial intelligence represents the most significant continuation of this trajectory and enhances human cognitive capabilities across various sectors (Kaplan & Haenlein, 2020; Chien et al., 2020; Kumar et al., 2023). AI has become increasingly integrated in organizational work processes, and employees need to redevelop and reskill in new forms of the required skills to thrive in the workplace. However, scholarly research has increasingly placed a greater emphasis on a more balanced perspective, arguing for the coexistence of humans and AI in the workplace (Jaiswal et al., 2021; Wilson & Daugherty, 2019). Nowadays, the workplace has diverse skills which have emerged as a critical issue between high-skilled and low-skilled employees. Researchers have grouped the skills required for effective use with AI into three categories, i.e., technical, human, and conceptual, which form the foundation for reskilling and upskilling initiatives for skill development of the employees (Zirar et al. 2023)

Although historical data indicate that earlier waves of technological advancement in the 19th and 20th centuries did not result in long-term job losses (Autor, 2015), currently, the contemporary anxieties about AI and robotics are considerably more noticeable (Brynjolfsson

& McAfee, 2014; Arntz, Gregory, & Zierahn, 2017). These anxieties intersect strongly with the ambitions and experiences of Generation Z, who place a premium on education and techno-savvy generation, as the pathway to career success, while simultaneously rising student debt and financial independence pressures (Mazmanian, 2013; National Center for Education Statistics, 2017). This generation emphasizes independence with professional growth over long-term organizational loyalty. Therefore, organisations need not only to focus on required skill gaps but also to align with the generational values that the employees are expecting while performing tasks.

The organizational behavior literature has importance of the silence and voice of employees in shaping organisational outcomes. However, employees often possess valuable ideas, insights, concern, but often they remain to silent or may choose to remain silent due to threat, resignation, or strategic consideration, which is said as organisational silence (Van Dyne & LePine, 1998). The silence can be formed multiply, including acquiescent silence, defensive silence, and prosaic silence (Van Dyne & LePine, 1998; Brinsfield et al., 2009), and may become entrenched at the organisational level or group level, resulting in climates of withheld communication (Brinsfield et al., 2009). Importantly, silence has been linked to turnover intentions, as employees feel disengaged when their voices are ignored, which sometimes results in leaving the organisational (Kuvaas, 2006).

Additionally, taking together these two dynamics of organisational silence and AI-driven skill gaps, which are two factors inter depended with each other and affecting employee turnover intention and employee performance. Also, the generational difference also shapes the behavior of employees who respond and service to the challenges they face in the organization. Therefore, this paper provides an understanding of the relationship between generational difference and OS in an AI context. We also explore employee technology adaption, their behavior and generation studies and offering implications of skill development and OS in employees who are committed, affecting their turnover intention.

Novelty

The proposed model has three key innovations absent in the existing literature. First it brings in OS as a proximal mechanism linking AI-driven skill gaps to performance and turnover intention outcomes. This addresses the limitation of prior studies that have analyzed either silence or skills in isolation. Second, it incorporates generational cohort moderation (Gen Y vs Gen Z) on the silence-skill gap pathways. The paper highlights an underexplored boundary condition in which the tech-native Gen Z employees may buffer or amplify the effects of silence differently than Gen Y employees. Third, the model uses a moderated mediation framework positioning AI skill demand as a contingency that amplifies the negative effects of silence. This creates a comprehensive AI-silence-generational nexus that has never been tested in already-proposed models, which usually focus on direct technostress or commitment paths. In combination, this synthesis overcomes the critical lacunae in the study of the AI workforce by explaining how and for whom organizational silence exacerbates the challenges of digital transformation.

2. Theoretical backgrounds and hypothesis development

2.1 Organizational Silence

Organisational silence is where employees refrain from sharing their ideas, concerns, or suggestions, which can result into organisational outcomes. Silence is not merely the absence of voice but a distinct behavior shaped by many motive, while often contrasted with voice, which denotes proactive efforts to express opinions for constructive change (Van Dyne & LePine, 1998; Brinsfield et al., 2009). Scholars have identified many various dimensions of silence, which includes driven by resignation and a belief that speaking up is pointless, acquiescent silence, quiescent silence, motivated by fear of negative repercussions; and prosaically silence, where employees withhold information to protect organization as well as others (Van Dyne et al., 2003). However, employees often find it, risky, useless and ineffective to speak up. Although silence begins at the individual level, it often becomes “contagious,” creating collective climates in employees (Brinsfield et al., 2009). Such climates restrict knowledge sharing, innovation, ideas, and ultimately weaken trust in management. As Empirical research results found that silence is affected in a way that it lower engagement,

higher turnover intentions and decreased organisational commitment, as employees are more likely to disengage and exit when ignored (Kuvaas, 2006). In contemporary AI-driven organizations, silence creates greater risk, as employees may avoid discussing their reskilling, retraining needs, or challenges with new technologies, thereby widening skill gaps and reducing performance. The difference among Generation Y and Z in AI-driven context, silence plays a dynamic role among these generation, Generation Z when they feel the organisation doesn't support their goals and ambitions they remain to be silent, in contrast Gen Y, they are older employees, often hide their suggestions as they don't find training need is necessary (Mazmanian, 2013).

2.2 Organizational Commitment

Organisational commitment has been studied and acknowledged as a very crucial concept in organizational behavior, where it shows various developments and implications in the context of organisational growth and its outcomes. OC reflects the psychological connection between workers and their companies, influencing their attitudes, actions, and willingness to support the company's objectives (Andrew, 2017). Researchers have emphasized its importance in understanding how employees involve themselves with organisational values and loyalty over the past few decades.

Trice et al. (1984) previously introduced and operationalised affective commitment as an employee's emotional connection with, and belonging to the company. This type of commitment is a means by which the individual shows support for the organization and its goals, a willingness to exert effort on behalf of the organization, and a desire to maintain membership in it. Mowday, Steers and Porter (1979) also contended that the level of identification per se with the organisational was an impetus for employee involvement. Later, Allen and Meyer (1990) extended the construct by introducing a three-component model: affective commitment (AC), continuance commitment (CC) and normative commitment (NC). AC represents affective commitment and the desire to stay because one wants to; NC is a matter of normative obligation, where individuals remain because they ought to; and CC is derived from perceived costs of leaving, where people simply have to stay. Committed employees are less inclined to leave the organisation and more motivated to attain organisational goals (Allen & Meyer, 1990). OC has been also conceived as a temporal belief

that an individual will stay in social relationships due to the confidence, loyalty and common purpose created by "fulfilment of obligations element" and by which long-term employees evidencing high commitment display feelings of enthusiasm, endurance and alignment with the organisation strategies (Mowday et al., 1979).

Furthermore, OC has been seen as a significant source of competitive advantage, particularly when human resources are thought to be an organization's most valuable asset. As a result, OC directly affects performance, retention, and overall effectiveness while acting as a strategic resource for organizations and a psychological anchor for workers.

2.3 Performance

According to Campbell (1990) and Sonnentag & Frese (2002), employee performance is considered a crucial determinant for the success of organizations because it reflects how well people execute their ascribed roles and contribute to strategic objectives. Two common dimensions in conceptualizing performance are task performance, about which roles are job-specific, and contextual performance, which captures behaviors that support the greater social and psychological context of work (Borman & Motowidlo, 1993). According to various studies, factors that consistently predict performance outcomes include motivation, job satisfaction, organizational commitment, and leadership support (Judge et al., 2001; Riketta, 2008). High-performance work systems, defined by training, empowerment, and participatory decision-making, have been found to enhance performance at the level of individuals and groups (Boxall & Macky, 2009). In contrast, hindrances such as role conflict, work stress, and lack of resources deplete performance through the depletion of workers' mental and physical resources (Bakker & Demerouti, 2007). As a result of integrating technologies like AI, workers in the rapidly changing digital era have to adapt to skill sets, new tools and workflows (Kaplan & Haenlein, 2020; Kumar et al., 2023). In this regard, this is an organizational failure that widens the skill gap among employees and reduces their performance and productivity, particularly when workers would prefer to keep quiet regarding their needs, challenges, and growth. Thereby, performance is a complex construct directly influenced by organizational, technological, and personal factors. This organizational failure reduces performance and productivity while increasing the employee skill gap, especially when workers would prefer to remain silent about their needs, challenges, and growth. Therefore, performance is a

multifaceted concept that directly affects competitiveness and sustainability and is influenced by organizational, technological, and individual factors.

Focusing on AI workspaces, this study stresses task performance related to proficiency in using AI tools and contextual performance that reflects employees' ability to adapt and collaborate in AI-enhanced settings. AI skill gaps have negative effects on task performance through errors and inefficiency, while organizational silence further suppresses contextual performance by limiting valuable voice behaviors integral to continuous learning and innovation concerning AI-related matters. The focus here is congruent with established performance frameworks and empirical results in the context of digital work.

2.4 Turnover Intention

The intentions to leave refers to the employee's deliberate and conscious choice to think about quitting the job or leaving the organization voluntarily (Kuvaas, 2006). It is common knowledge to be a good predictor of actual turnover behavior which means the higher those turnover intentions the more likely people will leave and or be absent. Over and above individual consequences, turnover intention as psychological, social, and economic problems for organizations raise critical concern among researchers and practitioners (Hwang & Kou, 2006). Various studies have unveiled that there are factors which predict intention to quit that is an important antecedent of turnover intention, psychological health and well-being [4]–[6], while the most crucial one is organizational silence. Silence is the condition in which employees intentionally withhold that ideas, opinions suggestions that might have a positive impact on organizational effectiveness (Brinsfield et al., 2009).

First it was introduced in the organizational research by Morrison and Milliken (2000), silence is seen as the opposite of voice and is often linked to negative consequences for individuals and organisations as well. Usually employees avoid raising issues, innovative solutions are not taken serious and suppressed, problems remain unresolved, and group conformity becomes the norm, limiting the organization's ability to adapt. Silence may occur at both the individual and organisational levels, as employees influence one another, creating a broader silence climate (Johannesen, 1974).

The role of culture and leadership is crucial in the context. When managers fail to create safe spaces for employees to speak up, silence can intensify, contributing to dissatisfaction, impaired communication, and counterproductive behaviors (Morrison & Milliken, 2003; Yirik et al., 2012). Over time, this disengagement undermines employee attachment and increases their likelihood of leaving (Çakıcı, 2007; Xu et al., 2005; Çetin et al., 2013; Bagheri et al., 2012). As earlier silence was interpreted as a sign of loyalty, but presently scholars have highlighted that silence results in the concealment of problems or dissatisfaction and directly leads to intent to leave (Çakıcı, 2010).

Turnover intention deserves further investigation in AI-driven contexts, given emerging gaps in understanding how technological disruption amplifies voluntary exit behaviors in the context of skill obsolescence and job insecurity. While the literature is well-studied, it predominantly examines traditional antecedents such as commitment and satisfaction while neglecting AI-specific mechanisms such as perceived threats from automation that heighten turnover through reduced organizational support and technostress. Generational dynamics show critical differences: Gen Z has higher turnover intentions driven by unmet expectations of rapid skill development and work-life quality in AI economies, whereas Gen Y's focus is on stability in the context of changes within the gig economy. This is exacerbated by the changing economy, where AI is extending skill gaps that predict attrition in digital marketing and tech sectors; however, few studies integrate silence or skill deficiencies as proximal drivers of turnover. We address these lacunae in providing a framework linking organizational silence to AI-aggravated turnover across cohorts and offering novel boundary conditions absent in prior models.

2.5 Organizational Silence and Organizational Commitment

Previous research has drawn the result that organizational silence (OS) has a negative relationship with organizational commitment (OC) (Çetin, 2020). OS is said to be an employee deliberately remaining silent and withholding their thoughts and suggestions from being shared (Van Dyne et al., 2003). Therefore, this silence over a period of time reduces commitment and attachment within employees to their organization, and employees also experience disengagement. Studies have shown that different forms of silence—defensive, acquiescent,

or prosocial—can affect organisational commitment (OC) dimensions in varying ways, and when silence prevails, it leads to a weakening of commitment.

One of the studies in Istanbul from sports organization examined that defensive silence declines organisational commitment, while prosocial silence only had a positive impact on continuance commitment (Çetin 2020). Similarly, Aflatoon, Mahdi, Ahmad, and Reza (2018) studied employees at the Iranian University of Medical Sciences and confirmed a significant negative relationship between Organizational silence and Organizational commitment. In another context, Hozouri, Yaghmaei, and Bordbar (2018) discovered that organisational rumors intensified silence and ultimately diminished employees' commitment in a municipal corporation.

Collectively, these studies highlight that when employees perceive their voices are unheard or unwelcome, they become less emotionally attached, less loyal, and less willing to exert effort on behalf of the organisation. Based on this body of evidence, we propose the following hypothesis:

H1: Organizational Silence (OS) is negatively associated with Organisational Commitment (OC).

2.6 Organizational Silence and Turnover Intention

Turnover intention is commonly referred to as an individual employee's conscious and voluntary willingness of intent to leave the job or organization (Kuvaas, 2006). It is a valid criterion in the prediction of definable turnover as high levels of turnover intention leads to greater absence and exits. The attention given to turnover intention is attributed to its psychological, social and economic consequences with scholars calling for the study into its antecedents among others in order for management to adopt strategies that will avert these (Hwang & Kou 2006).

Organisational silence (OS) is one of the most significant antecedent of turnover intention. In other words, silence is “the absence of information whether and when available (Alparslan, 2010) and occurs when staff suppress their ideas, concerns or suggestions that could enhance problem solving and organisational development. Opposite to voice, OS was first proposed by Morrison and Milliken (2000), describing an environment in which employees believe that

it is unsafe or pointless to speak up. Without employees speaking up, creativity is stifled, issues late to be raised and compliance as the rule hinders organisational adaptability (Souba et al., 2011).

The 'Prolonged silence has serious organizational consequences. Studies suggest that it undermines trust, communication and satisfaction, discouraging employees' engagement (Morrison & Milliken, 2003; Yirik et al., 2012). Therefore, there is little investigation about the connection between OS and TI which directly illustrates what knowing gap of silence that could create withdrawal behavior among employees. In this regard, we already suggest OC as a mediator in which OS is negatively related to OC and then having an effect on the increase of turnover intention.

H2: OC mediates the relationship between OS and TI.

2.7 Organizational Silence and Performance

Organizational commitment (OC) has often been recognized as a mediating mechanism in the explanation of how workplace behaviors impact performance outcomes. Employees who remain silent often experience feelings of disengagement, reduced performance, diminished psychological safety, weakened trust, and weakened sense of belonging, which turns into reduced commitment towards organizations (Morrison & Milliken, 2000; Vakola & Bouradas, 2005). Prior research demonstrates that silence affects emotional commitment negatively because employees perceive a lack of voice opportunities as a sign that their efforts are not recognized. As a result, it reduces commitment where employees feel demotivated and their efforts show low performance (Meyer & Allen, 1997; Riketta, 2008). On the other hand, it has been demonstrated that high levels of organizational commitment have resulted in increased task performance and discretionary behaviors, as committed employees are more likely to put extra effort in support of organizational goals (Riketta, 2002). In this paper, as a result, OC plays a mediating role. If employees are having a high level of silence, there is likely to be a decrease in commitment. As a result, it will affect employees' performance. In contrast, if employees have strong commitment and remain engaged, their performance will increase and fulfill the organisational goals even when changing or challenging AI dynamics. Thus, OS indirectly affects performance due to its negative impact on OC.

H3: OC mediates the relationship between OS and EP

2.8 AI Skill as a Moderator

In the AI-driven organization, the demand for skills has increased as demands are continuously evolving, bringing together both opportunities and challenges for employees. Those who have greater AI knowledge or skills tends to have higher confidence, flexibility and persistence when adjusting under the challenges of technology transformation; employees with skill gaps usually feel insecure and anxiety. These discrepancies can demonstrate the impacts of silence on the organization. Also, Employees with strong AI competencies could mitigate the adverse consequences of OS on their commitment and performance, because they are more capable of staying inventive and relevant even in the face of silence within their organizations. On the other hand, when employee who have a high AI skill gap, the detrimental impact of OS on their engagement and effectiveness is likely to intensify.

However, the definition is in line with established frameworks such as the SFIA global digital skills model, which maps AI-related competencies-e.g., data analysis, AI ethics, and automation awareness-against role requirements, and empirical reviews that confirm that unaddressed gaps result in reduced employability and organizational adaptability. When conceptualizing moderation effects-such as H4-these AI skill gaps are operationalized in terms of perceived or objective deficits, relative to the role-specific demands relevant to AI; increased gaps, then, maximize the negative consequences of silence by lowering commitment and buffering capacity during times of technological change. Although these gaps have not been quantified in this paper, future empirical work may adapt already-validated measures, such as Chaturvedi's 2023 AI Competency Gap Scale or Pala's 2023 Digital Skills Gap Inventory. Therefore, it is reasonable to assume that the need for AI skills will moderate the association between OS, commitment, and eventual job outcomes.

H4: AI skill demand moderates the relationship between OS and employee outcomes, such that the negative effects of OS on OC and Performance, and the positive effect on TI, are stronger when AI skill demand is high.

2.9 Generational Dynamics as a Moderator

Generational dynamics have added another crucial layer of complexity to the organizational silence–outcomes relationship. Generation Y and Generation Z employees differ in terms of expectations, adaptability, and behaviour toward organizational practices and climate. Gen Y employees, who entered the workforce earlier, often value stability and structured career progression, whereas Gen Z employees, as digital natives, are generally more adaptable to technology but may also expect greater empowerment and openness in organizational culture. These go beyond simple birth years; for example, Generation Y: 1981-1996, Generation Z: 1997-2012; they also include cohort-specific imprints which mold worldview and workplace expectations, such as economic conditions, technological exposure, cultural shifts, and major events. The JD-R theory: generational resource differences in technology confidence and voice propensities moderate skill gap effects. This speaks to a key literature gap: while most silence/skill studies do not consider demographic moderators, cohort-specific response patterns presage divergent approaches to AI-driven change.

These generational differences influence how silence is perceived and how it affects performance and turnover intention. For example, Gen Z employees may react more strongly to silence climates, interpreting them as barriers to innovation and growth, while Gen Y may exhibit a comparatively higher tolerance, though with gradual disengagement.

H5: Generational dynamics (Gen Y vs. Gen Z) moderate the relationship between Organizational Silence (OS) and employee outcomes, such that the effects of OS on Performance (EP) and Turnover Intention (TI) differ significantly across generations.

This conceptual model takes as its basis three major theoretical perspectives: Social Exchange Theory, Psychological Safety Theory, and the Conservation of Resources Theory. Together, these frameworks explain why organizational silence may impact employee attitudes and behaviors and how such impacts, in turn, can mold performance and turnover intention.

Social Exchange Theory (SET), (Blau, 1964) posits that an employee assesses his/her relation with the organization based on the principles of reciprocity, fairness, and availability of socio-emotional resources like trust, respect, and support. In such a context, employees perceive voice being discouraged or ignored as a violation of the exchange relationship. Such

perceptions weaken the emotional attachment to the organization and make them more prone to withdrawal behavior such as reduced effort, diminished loyalty, and greater turnover intention.

According to the Psychological Safety Theory, developed by Edmondson (1999), people need to feel safe enough to share concerns, ideas, or challenges without feeling embarrassed, punished, or otherwise penalized. In cultures of silence, this psychological safety is lacking, and therefore employees would refrain from contributing even if they knew something important. This suppression engenders a lack of engagement, lowers motivation, and in the end impairs performance.

The Conservation of Resources (COR) Theory by Hobfoll (1989) further develops this idea, suggesting that individuals strive to acquire, maintain, and protect their psychological and emotional resources. Organizational silence burdens employees because they have to regulate their emotions, suppress concerns, and work without adequate information or feedback. In developing this process, resources are depleted, leading to lower commitment, reduced performance, and heightened turnover intention.

These complementary theories together create a strong foundation from which to understand how organizational silence can negatively shape employee outcomes.

In this model, AI skill demand plays a moderating role. It is defined as employees' perceived need to develop or improve artificial intelligence-related competencies to remain effective in their jobs. The stronger the AI-related skills an employee possesses, the more confident and adaptable they often feel, which may buffer negative effects of silence. On the other hand, employees who perceive high levels of skill deficiencies may feel insecure and overwhelmed in the face of technological change, thus intensifying the negative effect of silence on commitment and performance, heightening their intention to leave. Generational dynamics also moderate the relationship between organizational silence and employee outcomes. The differences that exist between Generation Y and Generation Z influence how employees interpret and respond to the silence climate. Typically, Gen Y employees may appreciate stability, planned career growth, and supportive leadership, which may make them somewhat tolerant of silence, although long-term exposure will still erode their engagement. On the other hand, Gen Z employees are digital natives, and they expect openness in communication and

psychological safety, empowering them to be themselves. From this point, they might react most strongly to silence, noticing it as a block to innovation and personal growth. Such generational variations provide an indication of the strength and nature of the relationships proposed in the conceptual model. The research conceptual model has been illustrated in Figure1.

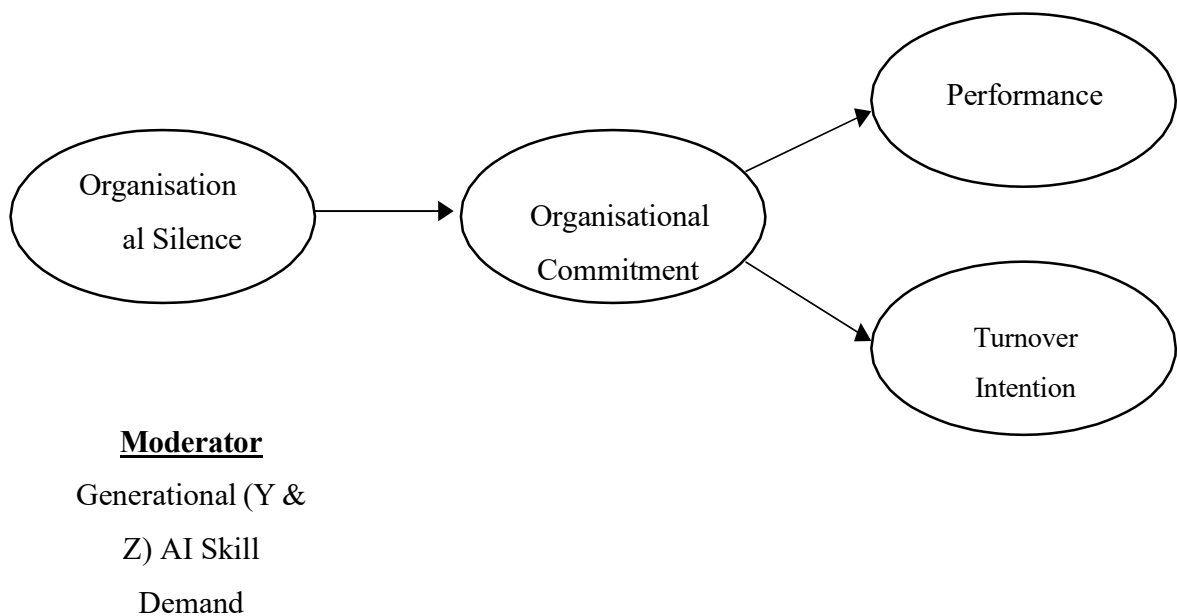


Fig.1: : Conceptual Framework of Organizational Silence and Employee Outcomes: Moderating Effects of Generational Differences and AI Skill Demand

3. Methodology (Proposed)

To examine the proposed moderated-mediation model—where Organizational Silence (OS) influences Employee Performance (EP) and Turnover Intention (TI) through Organizational Commitment (OC), moderated by perceived AI Skill Demand and generational cohort (Gen Y vs. Gen Z)—a cross-sectional, survey-based research design is conceptually proposed. The target population includes full-time employees across a variety of sectors in India where AI

tools are actively used in day-to-day work. A non-probability, stratified convenience sampling strategy is suggested to ensure diversity across job roles (e.g., analytics, operations, development, support, management) and generational groups, while allowing practical access to respondents. A sample size of around 350 is considered adequate for confirmatory factor analysis (CFA), structural equation model (SEM) and multi-group analysis. The measurements of the constructs will be carried out applying modified 5-point Likert scales according to questionnaires, Organizational silence is generally measured through the use of validated scales that gauge its multi-dimensional nature. The seminal Employee Silence Scale developed by Van Dyne, Ang, and Botero (2003) captures acquiescent, quiescent, and prosocial silence via 15 items on a 5-point Likert scale anchored from 1 (strongly disagree) to 5 (strongly agree), with Cronbach's α consistently above 0.85 across studies. Brinsfield (2009) compiled a 27-item comprehensive measure distinguishing six motives: ineffectual, relational, defensive, diffident, disengaged, and deviant. This also was highly reliable ($\alpha = 0.90-0.94$). Both these scales have been adapted and validated in diverse contexts, including technology-driven workplaces. OC from Meyer and Allen (1993), EP by (Na-Nan et al., 2018) and others TI via Hom et al.,(1984). Perceived AI Skill Demand assesses with developed items the perceived skill gaps, upskilling pressure, and confidence in use of AI tools. Generation will be measured as year of birth, and we will control for variables such as tenure, workload/size (in FTE), type of role and access to AI technologies. Ethical considerations Consent, anonymity and voluntary nature of participation will be maintained and no personal identification will be requested. Data will be analyzed using SPSS and AMOS, reliabilities tests (Cronbach's α , $CR \geq .70$), convergent and discriminant validity ($AVE \geq .50$, Fornell–Larcker criteria), configural and (partial) scalar 25 invariance across generations. The mutli-group SEM will be tested for both direct, indirect and moderated. The model testing results can serve as empirical evidence to assess the validity of AI Skill Demand Test in a different cultural context/field of study. In a conceptual paper, the methodology section does not describe a study that has been conducted but, instead, it describes how the model proposed could be empirically tested. It demonstrates feasibility in that it shows how constructs can be measured and relationships examined; it provides direction to future researchers as to how hypotheses could be tested or extended; and it operationalizes constructs, which makes the rigor and credibility of the conceptual framework stronger. Despite its conceptual nature, this

approach offers a strict empirical roadmap for future research on how AI- related skill demands, as well as generational identity, affect employee outcomes through the process of organizational silence.

4. Discussion and Implications

4.1 Discussion

The model presented in the study emphasizes both salient employee outcomes (commitment, performance and turnover intention) are strongly influenced by OS in the current AI-based details of advancement. Grounded in social exchange perspective, the model indicates that employees' effort exertion is suppressed and trust is impaired that results from silence and consequently reduces performance centered when increased withdrawn behavior. Prior literature repeatedly supports this reasoning, indicating that silence climates decline affective commitment, normative commitment, and continuance commitment, which in turn reduce organizational effectiveness.

Further study introduces Organizational Commitment (OC) as a mediator, providing a deeper understanding of the mechanism through which OS influences outcomes. When employees' opinions are not valued, silence diminishes commitment and causes them to have reduced identification with organizational goals. As employee commitment reduces, employees are less likely to exert discretionary effort, experience a decrease in their performance, and are more likely to consider leaving the organization. This framework lies in the major contribution of AI skill demand as a moderator.

With the rapid digitalization, employees do not have the ease for the AI-related competencies they need to build such confidence while performing the task, or they may feel insecure about their career roles, which leads to a negative effect of being silent. In contrast to that, employees who have high competencies related to AI may not remain silent and perform well. Additionally, the conceptual model in this paper explores and understands the importance of the generational difference between the Gen Z and Gen Y workforce. Especially Gen Z are very active and fast learners in the digital age of AI and might not remain silent if they find there is an obstacle to innovation, whereas Generation Y might not react that quickly as Gen

Z, and they gradually disengage. This is how generational differences are highlighted, and it is necessary to tailor them with proper management strategies to be implemented.

4.2 Theoretical Implications

Social exchange theory helps in the proper understanding of organizational silence and explores how silent behavior occurs, which influences employee behavior, and how these influences affect organizational outcomes. By recognizing AI skill needs as a contextual moderator that influences how silence lessens performance or disengagement, it contributes to the growing body of research on digital transformation and human resource management (HRM).

As a fact that silence is not a uniform phenomenon, it can be observed differently in Gen Y & Z, where it can be experienced that this generational identity affects employees to react to organisational dynamics. This makes a clear understanding of how both mechanisms of moderation, the mediation model, i.e., moderation via AI demand and Generational dynamics, and mediation via organizational commitment, in which silence affects organisational outcomes such as performance and turnover intention. Thus, it provides an understanding of existing theories with demographic insights, generational insights, contemporary issues, and technological advancement.

4.3 Managerial Implications

The findings will help organisational leaders to draw practical insight while implementing the policies to lessen the negative consequences of organisational silence. Managers must strongly discourage the silent behavior or environment and promote a proper, safe working climate, which is very crucial for the employee to be actively engaged in discussion, or which ultimately reduces silence, and it would directly lead to increasing their performance and commitment towards the organization. Presently, technology plays an important role in most sectors, so properly planned strategies related to AI-related skill initiatives must be implemented. Also, it might happen that employee who have secured with high AI-related skills feel less affected by silent behavior and are open to sharing their thoughts or concerns. Most importantly, while planning any initiative to implement a sensitive management culture, it's important to look for the proper needs of different generations. As if for Gen Z, they may value openness and

transparency, whereas for Generation Y, employees may remain in a stable work climate or be well-organized in their career development

This paper focuses on how organisational commitment acts as a mediator that influences organisational silence and can result in various organisational outcomes, i.e., Performance and Turnover intention of employees. That is why HR practice and policies, while framing such strategies, help them to understand the impact of such outcomes, which leads to negative behavior, so they should implement policies in such a way that enhances the commitment level of employees towards the organization, which would lead to the growth and fulfill the objective of the organization. Lastly, as organisational commitment mediates the impact of organisational silence on outcomes, HR practices should aim to focus on enhancing both affective commitment and normative commitment through policy implementation, such as emphasizing recognition, procedural fairness, and personalized career progression pathways.

4.4 Policy Implications

In the policy implication levels, players include those from the business stakeholders, and the government level may develop and implement policies to promote such practices that reduce silent behavior and increase inclusivity in the technological age. By developing proper strategies and funds that help in skilling the new initiatives to undertake and ensure a prepared workforce against these challenges, and fill the gap between these two cohorts of generational dynamics and AI-related demand. Disengagement and a less open culture arise due to silence, but if properly planned strategies are implemented that promote employees to be involved in open discussion and make them participate in decision-making, it can also lead to reducing silence and developing the culture of engagement and transparency. However, promoting and implementing such practices may encourage and motivate the multi-generational employees to work together despite of such difference in their working and skill gaps among them, where they have treated inclusively participated in communication, guidance and mentorship programs, flexible strategies, development towards their career pathways which would lead to reduce intergenerational conflicts, skill gaps and help organization to build positive growth towards achieving its capabilities with both Gen Y and Gen Z, ensure future ready workforce.

5. Conclusion and Future Research Directions

In the present paper, we developed a conceptual framework in which, with a diverse workforce, AI-driven skill demand has been examined with different organizational and employee outcomes. It includes how organisational silence affects three important employee outcomes, i.e., organisational commitment, performance, and turnover intention. The theory of social exchange highlights how organisational commitment influences organisational silence, which leads to a decline in performance, and employees intend to leave. The model suggests how organisational silence results in negative outcomes, where organizational commitment acts as a mediator.

However, the impacts of silence can vary among employees; thus, the study incorporates generational differences. Here, we use AI skill demand and generational dynamics as moderators. Employees with great AI-related skill knowledge may maintain engagement despite a silent culture, but those with fewer AI-related skill gaps might suffer the negative impact of silence in the organization. Similarly, generational dynamics also differ. For example, Gen Y, who may tolerate as they are older, employees remain silent before leaving, but in the case of Gen Z, who prioritize more transparency and value open discussions, if they are not being listened to, then they may leave the organization or observe a decline in their performance too. By knowing perspective on the conditional nature of silence's impacts, this conceptual contribution adds to the literature on organizational behavior, HRM, and technology change. This study provides an understanding that guides the performance improvement and increases the efficiency of employees in a rapid change environment, which will develop employee commitment towards the organization, resulting in a decrease in intention to leave the organization or job hopping behavior of employees, and also they can get involved in open discussion.

6. Future Research Directions

This conceptual paper suggests the future direction in which structural equation modeling (SEM) should be used for analysis to test the model empirically with various organisational samples where AI-driven use is extensive. Even in Longitudinal research designs, it would give a broad understanding of how organisational silence and organisational commitment evolve, in the context of AI. Additionally, comparative research across various sectors and

cultural settings may also determine whether the suggested connections are universal or change based on cultural or organizational norms.

Even other moderators can be examined and studied, which include job autonomy, leadership style, organizational citizenship behavior, and corporate culture; this would enrich the holistic understanding of each moderator related to silence with employee as well as organizational outcomes. With all things considered, it offers a strong basis for comprehending how this AI-driven skill, reskilling training needs, and generational differences affect organisational productivity and efficiency. It also adds the effective use of existing as well as new theory development, or modifying these theories, and offers best practices to the organization on how to effectively use AI, with increased performance and commitment of employees.

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Bus Transit Service Quality and User Satisfaction: A Systematic Literature Review

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The research that have tried to look at the quality of service in the public bus service have always indicated that the service attributes play a significant role in satisfying the passenger. Comfort, accessibility, and safety are some of the service attributes that have been proven to play the biggest role in passenger satisfaction (Bakar et al., 2022; Noor, Nasrudin, and Foo, 2014). Specifically, the comfort levels like the cleanliness of the bus, availability of seats, and the overall appearance of the bus have been seen to have the strongest influence on customer satisfaction. Moreover, attributes of convenience like the degree of convenience of the bus stops and time wasted when waiting to be served by the bus have also been found to have a serious impact in passenger satisfaction. In addition, the question of safety during the ride has been identified to impact positively passenger satisfaction (Eboli and Mazzulla, 2007; Noor, Nasrudin, and Foo, 2014). It is also established well that the service characteristics differ according to the socio-economic and traveling nature of the passengers, hence creating heterogeneity of service priorities (Bose & Pandit, 2020). Further research methods like factor analysis and structural equation modeling have demonstrated that such attributes of service operation like service reliability and planning have significant role in defining passenger satisfaction and determining their use of bus services (Eboli and Mazzulla, 2007; Tanwar, 2024). Despite the fact that the service quality has increased, there remains a disparity between the service standards that are laid down by the regulatory authorities and the service quality as felt by the passengers (Bakar et al., 2022).

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1. Introduction

The quality of services provided by public transport can be said to be a critical aspect to guarantee passenger satisfaction and success of the public transport services. The literature on the subject focuses on the idea that the quality of the public bus service is a multi-dimensional concept that includes many factors including reliability, comfort, safety, accessibility, cleanliness, and the provision of timely information (Bakar et al., 2022; Eboli and Mazzulla, 2007; Noor et al., 2014). The issues of comfort and safety are deemed to have dominant impacts on passenger attitudes towards the services of a bus which are provided publicly (Noor et al., 2014; Bakar et al., 2022). Further research methods including factor analysis and structural equation modeling are implemented to determine the latent factors of public bus services and establish the dimensions of the quality of the public bus services. It has been established that scheduling and reliability of services are important factors to make sure that the passengers are satisfied (Eboli and Mazzulla, 2007; Tanwar, 2024). The existence of high heterogeneity in the perceptions of passengers in relation to the quality of bus services in the public is also highlighted in the literature on the study. A difference in passenger socio-economic traits has been discovered to affect passenger perceptions towards public bus services (Bose and Pandit, 2020). This literature review paper seeks to offer an insight into the aspects influencing the quality of the public bus services by reviewing the research literature on the topic. This literature review aims at supplying the evidence that would help policy makers to formulate strategies to help in offering quality public bus services to satisfy the needs of the passengers.

2. Methodology – Review of Literature

2.1 Identification

This is a review paper that adhered to the PRISMA (Preferred Reporting Items to Systematic Reviews and Meta-Analyses) model of a Structured and Systematic Review of Literature (Moher et al., 2009). To guarantee a wide and comprehensive literature coverage, Two major databases, namely, ScienceDirect, ResearchGate, were chosen in this study. The following set of keywords was used in finding the relevant literature used in both databases i.e. bus transport/bus transit/public transport and user satisfaction/service quality/ customer perception. First, literature was chosen according to title and abstract and then the full-text was screened. There was a total of 165 articles which were picked in the initial identification process in the two databases.

2.2 Screening

The screening was the second step in the article collection process. The initial activity that was undertaken in this stage was to select and weed out all the duplicative articles in the sampled articles. Following this task, 47 duplicate articles were removed and 118 articles were left. The inclusion and exclusion criteria were applied in the second section of the screening. Only original research articles were taken into account in this study. Other forms of articles such as reviews, systematic reviews, meta-syntheses, meta-analyses, books, book chapters, book series and conference proceedings were not included. Moreover, in this research, the articles that were related to English language were only considered. Thus, the articles in other languages were excluded. Furthermore, to guarantee that the review was not old and obsolete, only the articles published in 2000-2025 were taken into account. Having used the above-mentioned criteria, 63 articles were excluded, and 55 articles were proceeded to the next level.

Table 1. Inclusion and exclusion criteria.

Criteria	Inclusion	Exclusion
Type of Publication	Research articles only	Reviews, systematic reviews, meta-syntheses, meta-analyses, books, book chapters, book series, conference papers
Language	English-language articles	Non-English articles
Publication Year	Between 2000 and 2025	Before 2000
Research Focus	Studies on service quality and user satisfaction in bus transport	Studies not related to bus transport or not focused on user satisfaction/service quality

2.3 Eligibility

Eligibility check was the third step in the selection of the articles. At this step, 55 articles were carefully analyzed. The articles were reviewed by the title, abstract, methodology and contents to determine whether they were comprehensive in regards to the inclusion criteria. At this point, 22 articles were filtered in that they were not directly associated with bus transportation. At this point, the remaining 33 articles were deemed as eligible.

Figure 1 below presents the PRISMA flow diagram illustrating the article selection process.

Figure 1. PRISMA Flow Diagram

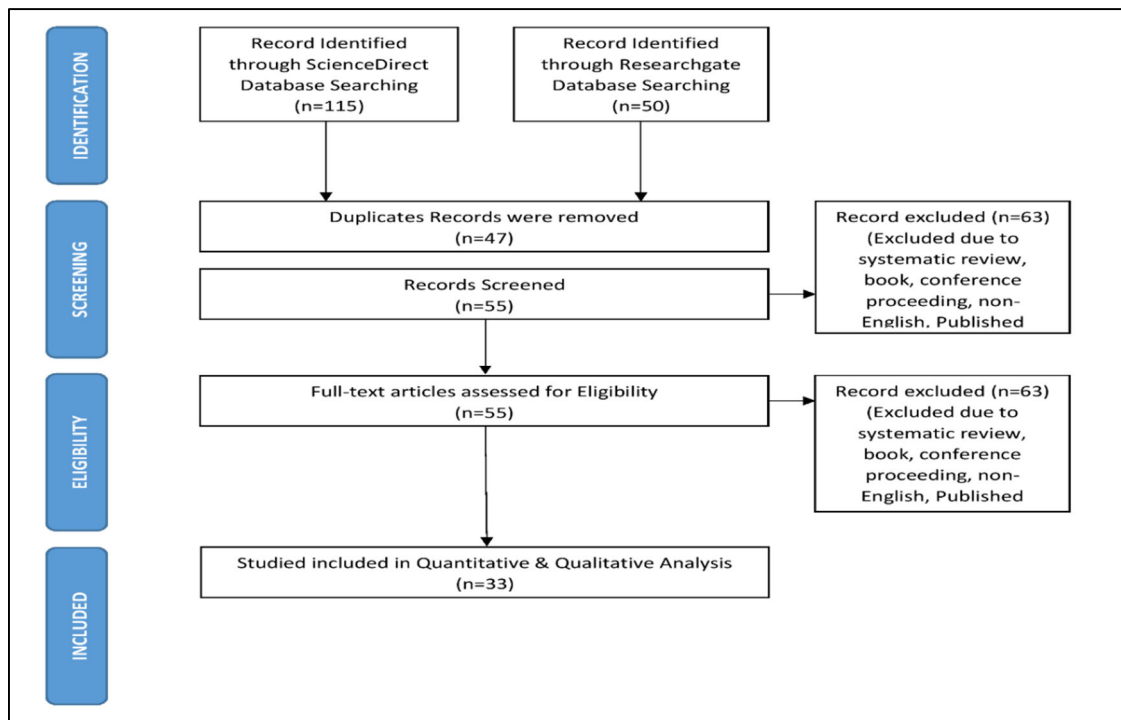


Figure 2. Country of Origin of Reviewed Research Papers

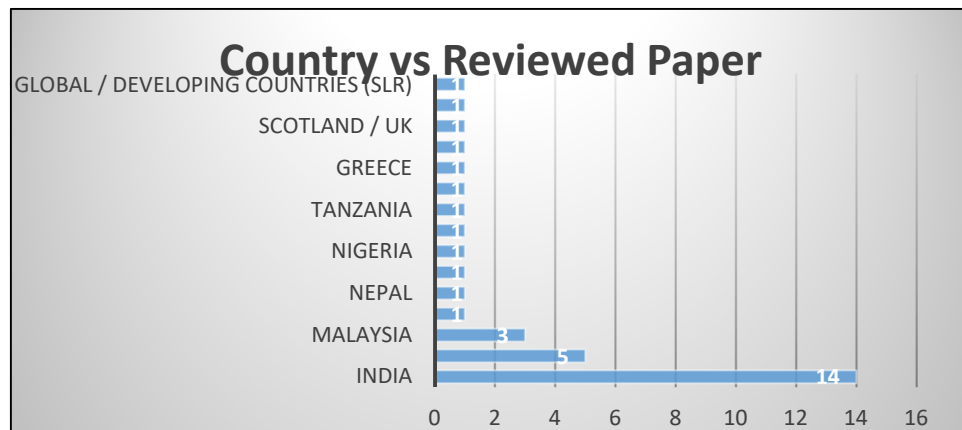


Table 2. Journals from which papers were selected.

S.No.	Journal Name	Publisher	No. of Papers
1	Transportation Research Part A: Policy and Practice	Elsevier	2
2	Transportation Research Record	SAGE / TRB	2
3	Transport Policy	Elsevier	4
4	Case Studies on Transport Policy	Elsevier	3
5	Journal of Public Transportation	USF Libraries	2
6	Sustainability (MDPI)	MDPI	2
7	Public Transport	Springer	1
8	SAGE Open	SAGE	1
9	Lecture Notes in Civil Engineering (Springer Proceedings)	Springer	1
10	Romanian Statistical Review	National Institute of Statistics, Romania	1
11	JIEMAR (Journal of Industrial Engineering & Management Africa Research)	JIEMAR	1
12	Travel Behavior and Society	Elsevier	1
13	Transportation Research Procedia	Elsevier	1
14	Expert Systems with Applications	Elsevier	1
15	Procedia – Social and Behavioral Sciences	Elsevier	1
16	Research Journal of Business Management	Academic Journals	1
17	Indian Journal of Marketing	Indian Journal of Marketing	1
18	International Journal of Scientific Research in Science and Technology	IJSRST	1
19	Studies in Business and Economics	Lucian Blaga University	1
20	MDPI Applied Sciences	MDPI	1
21	International Journal of Business and Management	CCSENET	1
22	PLoS Medicine (PRISMA methodology)	PLOS	1

3. Service Quality Factors

A study conducted on the bus transit service has found that there is a uniform set of service attributes that determine the user perception and satisfaction. Such considerations would be punctuality and reliability, comfort and cleanliness, safety, affordability and accessibility, service frequency and capacity, information and facilities, and last but not the least, fare and value. Punctuality and reliability (e.g., on-time arrival and adhering to schedules) have turned out to be the most significant service attributes in bus transit services (Chepuri et al., 2022; Tanwar and Agarwal, 2025; Sarkar et al., 2022; Sam et al., 2018). Some of the factors including comfort like seating, interior, and cleanliness have been found to have an impact on user satisfaction. Crowding and poor hygiene have been found to cause user dissatisfaction (Lodhi et al., 2024; Tyrinopoulos and Antoniou, 2008; Sarkar et al., 2022). The other critical service attribute that is disclosed in different studies in different geographical locations is safety. It is especially crucial in the case of females (Chepuri et al., 2022; Kumar Yadav et al., 2025; Sogbe et al., 2025). Bus transportation is also influenced by the factor of affordability and accessibility (Singh, 2017; Saxena et al., 2024). Lastly, the service frequency and information can also be discussed as significant service characteristics disclosed in different sources related to bus transit services (Sam et al., 2018; Leong et al., 2022).

3.1 Punctuality and Reliability

Performance (on-time performance) and consistency of the service has a strong influence on user satisfaction. According to Chepuri et al. (2022), users are concerned with punctuality because uncertain bus arrival times lead to waiting periods and low ratings of perceived reliability. The theory used by Tanwar and Agarwal (2025) in Bhopal is the Structural Equation Modeling that demonstrated that reliability is a significant latent predictor of satisfaction. In a discrete choice study of Bhopal buses, Singh et al. (2024) have observed that frequent delays are one of the primary causes of dissatisfaction. The regression analysis of Abuja, Nigeria (Nwachukwu, 2018) also attributed long waiting time, as well as unreliability, to a decreased ridership. According to Sarkar et al. (2022) Schedule adherence was identified in Kolkata as one of the two biggest magnitude perception-expectation gaps along with all 22 SERVQUAL service attributes that underwent regression analysis, making it evident that Reliability is the most dominant dimension of the satisfaction equation. Using SERVQUAL methodology Sam et al. (2018) discovered that Reliability had the lowest negative service gap of all the SERVQUAL dimensions and with Responsiveness as a partner, it accounted more than 50 percent of overall satisfaction among core bus users. Sun et al. (2023) also corroborated in Xiamen, China, that the stability of bus operation is the top-ranking improvement attribute, and

threshold effects imply that when the improvement is made in terms of the reliability, the non-proportional but significant changes are made on the passenger loyalty.

3.2 Comfort and Cleanliness

The physical comforts such as good seating, ventilation, space and cleanliness of the vehicles and stops should be reasonable, expected by the passengers. According to Lodhi et al. (2024), the bus system in Bhopal was found to be the primary source of dissatisfaction, where the major concerns were comfort and safety, and overcrowding, as well as dirty interiors. Tyrinopoulos and Antoniou (2008) mention that cleanliness is a stable predictor of satisfaction in Europe. Noor et al. (2014), in the case of SERVQUAL survey in Malaysia, emphasize that it is necessary to clean and maintain buses and terminals on a regular basis so as to enhance passenger perception. According to Sarkar et al. (2022), Comfort contributed the most to the dissatisfaction equation among Kolkata bus users, where sufficient seating capacity and bus sanitation took the top position in terms of gap. The use of enhanced Importance-Performance Analysis (IPA) was done by Esmailpour et al. (2020), who studied the city of Tehran: comfort was found to fall in the "Concentrate Here" quadrant, i.e. high importance and low performance, with the greatest deficits observed in the elderly and disabled facilities gap of , ventilation, and cleanliness. Weng et al. (2018) assessed 3,012 Beijing bus passengers on 100 bus lines and discovered that the general satisfaction was moderate (78.2/100) but the rest of the dimension components were cleanliness and the condition of the vehicles, distinguishing between the types of services, in particular, personalized premium buses.

3.3 Safety and Security

Personal security from accidents and crime is a major concern of users, which has a strong influence on mode choice and satisfaction levels. Chepuri et al. (2022) reported that female commuters, in particular, value safety, which aligns with the global perspective presented by Lai and Chen (2013), who listed vehicle safety as one of the important service quality attributes. Nwachukwu (2018) also reported in Abuja that the absence of safe infrastructure such as lighting and security cameras resulted in lower perceptions of bus safety. Tyrinopoulos and Antoniou (2008) clearly pointed out that safety upgrades such as CCTV cameras and the presence of staff members increase ridership satisfaction. Sarkar et al. (2022) reported that safety-related service attributes, specifically personal security of property, showed the largest perception-expectation gap among all 22 SERVQUAL attributes in Kolkata, suggesting that drivers should close bus doors between stops to prevent theft, showing how operational issues can be addressed to improve safety. Kumar Yadav et al. (2025) showed in Kathmandu that Information/Safety/Security had the strongest influence on overall service quality as

a latent factor (standardized regression weight = 0.34), with women perceiving safety significantly lower than men, particularly concerning security from harassment at night. Sogbe et al. (2025), in a systematic review of 104 studies from developing countries, found Safety and Security to be the most prominent determinants of service quality, with crowdedness being a compound factor that simultaneously affects comfort, safety, and perceived security.

3.4 Affordability and Accessibility

Affordability and accessibility of fares and ease of physical accessibility are important factors in shaping positive attitudes towards transit. Singh (2017) demonstrated in his Lucknow studies that the factor of fare affordability had strong loadings in service quality constructs. At the same time, poor coverage negatively affects satisfaction. Transit planners thus aim to ensure low fares and extensive coverage. Tanwar and Agarwal (2025) emphasized the importance of accessibility in Bhopal SEM analyses, suggesting improvements in network coverage and feeder services for the unserved population. Saxena et al. (2024) conducted SEM analysis on BRT system users in Bhopal (Indian Tier 2 city), concluding that higher fare prices and travel times negatively impacted satisfaction and trip frequency, while improved usability and accessibility positively influenced satisfaction. The result that most users were low-income captive passengers emphasized the equity aspect of fare sensitivity, where poor last-mile connectivity was identified as a significant research gap. Sogbe et al. (2025) further validated that affordability and accessibility are essential factors in developing-country settings, where first-mile/last-mile connectivity is a significant unexplored research gap.

3.5 Service Frequency and Capacity (Overcrowding)

Frequency of service and capacity of vehicles are factors that influence the comfort level of travel and waiting times. Large levels of overcrowding and headways result in dissatisfaction. Some Indian research, such as Lodhi et al. (2024) and Singh (2017), specifically mention overcrowding and lack of capacity as important factors of dissatisfaction. In the case of Lucknow, lack of capacity was one of the five major factors of satisfaction. The need to increase the frequency of services to reduce waiting times and increase the number of buses to reduce overcrowding is suggested. In Kolkata, Sen and Roy (2025) identified waiting time as the most important factor in determining satisfaction levels of high-end bus services, and providing exclusive bus lanes and increasing the frequency of services as the major interventions. Headway and transfer times were identified as important areas for improvement by Cheranchery et al. (2024) for both user groups (tolerant captive users and quality-seeking choice riders) in Kochi.

3.6 Information and Amenities

Information that is up-to-date and easily available, such as schedules and real-time arrival information, as well as user amenities like protected stops and benches, have a positive effect on satisfaction. According to Taneja et al. (2021), although information may be less important than other considerations, the lack of it negatively affects service quality. Tyrinopoulos and Antoniou (2008) also identified information related to accessibility as an important consideration. Friendly staff help, cleanliness, and basic amenities are essential components of the overall service experience (Noor et al., 2014). Kumar Yadav et al. (2025) specifically identified that the availability of real-time digital information was one of the lowest-rated factors in Kathmandu, which is a common deficiency in developing countries' transit services. Sarkar et al. (2022) suggest GPS tracking of routes and smart card ticketing systems as additional information and service improvements for the Kolkata bus network.

3.7 Fare and Perceived Value

The factor of affordable fares plays a major role in influencing satisfaction, particularly for transit-dependent and economically disadvantaged commuters. Efthymiou et al. (2023) concluded that the affordability of fares is strongly associated with satisfaction in urban transport, and fare increases can lead to a potential decline in ridership during economic downturns. Singh (2017) also emphasized the importance of fare sensitivity in directly influencing patronage choice in the context of Lucknow. Das and Pandit (2013) described the issue of ensuring fare equity and financial sustainability as a policy concern in Indian urban transport. Saxena et al. (2024) also confirmed that fare price was a strong negative predictor of both satisfaction and trip frequency for BRT system users in Bhopal. Wang et al. (2020), in the context of urban rail transport in Tianjin, a comparator system, found that service factors had the strongest impact on satisfaction, and economy-related factors were a threshold factor, where commuters expected reasonable fares and would punish any unreasonable increase.

4. Service Quality Models and Measurement

They often employed sophisticated multivariate statistics to identify the underlying dimensions of service quality from a broad range of observed variables, such as comfort, safety, and reliability, using techniques such as factor analysis and principal component analysis (PCA) (Bose & Pandit, 2020; Bakar et al., 2022). To validate measurement models and examine the relationships between various service quality dimensions and overall satisfaction and loyalty, they employed confirmatory factor analysis (CFA) and structural equation modeling (SEM) (Eboli & Mazzulla, 2007; Tanwar,

2024; Saxena et al., 2024; Kumar Yadav et al., 2025). Some of them also employed importance-performance analysis (IPA) to identify improvement opportunities in terms of how users rate the importance and performance of attributes (Bose & Pandit, 2020; Esmailpour et al., 2020; Cheranchery et al., 2024). Regression models, such as multiple linear regression and logistic regression, were used to examine the relationships between service attributes and socio-economic variables and satisfaction and mode choice (Singh, 2016; Noor et al., 2014; Sarkar et al., 2022; Michael & Layaa, 2025). Latent class and cluster analysis identified distinct groups of users with different preferences and satisfaction levels (Bose & Pandit, 2020; Cheranchery et al., 2024). Some of them combined qualitative research approaches with quantitative research approaches, using thematic analysis and mixed-methods research designs that combined surveys with other methods such as interviews and focus group discussions to explore users' experiences and expectations in more depth (Bakar et al., 2022; Sam et al., 2018).

Regression analyses, such as multiple linear regression and logistic regression, were employed to examine the relationship between service attributes and socio-economic variables and satisfaction and mode choice (Singh, 2016; Noor et al., 2014; Sarkar et al., 2022; Michael & Layaa, 2025). Latent class and cluster analysis were used to determine the existence of distinct groups of users with different preferences and levels of satisfaction (Bose & Pandit, 2020; Cheranchery et al., 2024). Some studies combined qualitative and quantitative approaches, using thematic analysis in mixed-methods studies that integrated surveys with interviews and focus group discussions to gain insights into users' perceptions and expectations (Bakar et al., 2022; Sam et al., 2018). The SERVQUAL approach, which measures the perception-expectation gap in five service attributes: Reliability, Responsiveness, Assurance, Empathy, and Tangibles, has been extensively used in bus transit studies. In Kumasi Metropolitan Transport, Ghana, Sam et al. (2018) reported negative gaps on all 22 service items, with Reliability (gap = -4.52) and Empathy (gap = -4.24) being the lowest performers, and the joint effect of Reliability and Responsiveness accounting for more than half of the variation in satisfaction. Kewate and Gandhewar (2023) conducted a study on MSRTC buses in the state of Maharashtra, emphasizing the importance of upgrading basic facilities and dependability. Leong et al. (2022) conducted a PLS-SEM analysis incorporating SERVQUAL factors for bus commuters in Sarawak, Malaysia, and identified Tangibility as the most influential predictor of satisfaction ($\beta = 0.249$), followed by Assurance and Empathy, which were not statistically significant. Sarkar et al. (2022) modified SERVQUAL for WBTC buses in Kolkata by rearranging the five service qualities: Reliability, Safety, Comfort, Responsiveness, and Empathy, over 22 service attributes measured on a 5-point Likert scale. One of the interesting analytical approaches was the

use of a Satisfaction equation and a Dissatisfaction equation through two separate multiple regressions, enabling them to distinguish between the drivers of positive satisfaction and the drivers of active dissatisfaction. The study also employed a percentage deviation-based Level-of-Service (LOS) measurement to convert gap scores into meaningful service levels, which is a useful tool for transport authorities.

More contemporary studies have since progressed from SERVQUAL to incorporate machine learning and hybrid models. In Xiamen, Sun et al. (2023) validated a dual-model framework that combined SEM with Gradient Boosting Decision Trees (GBDT). They discovered that non-linear relationships between service quality and loyalty were apparent in both models, suggesting the presence of threshold values that linear models cannot capture. Cheranchery et al. (2024) combined a Naïve Bayes classifier (with 91% accuracy) with fuzzy C-means clustering and revised-IPA to classify Kochi bus transport users, demonstrating the classification capability of the model surpassed standalone clustering. Sogbe et al. (2025) surveyed 104 papers from 2000 to 2023 from Scopus, Web of Science, TRID, Inspec, Compendex, and GeoBase databases, tracing the evolution from SERVQUAL/SERVPERF to SEM and finally to the latest machine learning techniques. Wang et al. (2020) demonstrated that the SQ-satisfaction-reuse intention relationship could be transferred across modalities in metro systems, with a four-dimensional model indicating service planning and service reliability had the most significant effect on satisfaction.

5. Findings from recent studies in India

These issues have been reflected in recent studies on Indian bus transport. In Bhopal, Lodhi et al. (2024) conducted a massive survey with 1,313 participants and found that less than 10% of the respondents were satisfied with the service and rated it "excellent." A discrete choice analysis revealed that comfort and safety were the primary causes of dissatisfaction, followed by punctuality, driver ability, ease of boarding, waiting time, and condition of the vehicle. In Lucknow, Singh (2017) also found a high level of dissatisfaction among passengers. In her PCA analysis of the survey results, she identified five key factors, with the first factor being a combination of comfort and safety, followed by adequacy of capacity, cleanliness, design of the vehicle, and accessibility of the network. She suggested that improving these deficiencies would help increase passenger satisfaction and, consequently, increase the number of passengers using buses.

A few studies have tried to understand what the commuters of city buses are concerned about. Chepuri et al. conducted a survey of commuters in Hyderabad, Navi Mumbai, and Surat using the Garrett ranking method. They concluded that commuters are most concerned about on-time arrival,

reliability, and short waiting times, and that information availability is the least important aspect, although safety parameters were of prime importance to women commuters. On a completely different note, Manikandan and Vanniarajan employed structural equation modeling to analyze the data of Madurai, Tamil Nadu, and concluded that the most important areas of focus for improving quality are service design, the network, safety, cleanliness, comfort, and friendliness of staff. Another approach was adopted by Kewate and Gandhewar, who conducted a SERVQUAL study of the state buses of Maharashtra. They again emphasized the importance of improving basic services such as clean halts and properly maintained buses, as well as overall reliability to increase commuter satisfaction.

Sarkar et al. from 2022 used the SERVQUAL method to evaluate the Kolkata-based West Bengal Transport Corporation (WBTC) bus service, conducting a survey of 350 passengers at 10 strategic points. Passengers rated the service overall as LOS 2, or “Good,” but their expectations were unfulfilled on all 22 service aspects. The largest gaps between what was expected and what was perceived existed in passenger security (safety of belongings) and the adherence to the schedule, while assistance from staff to disabled passengers had the smallest gap. In the regression analysis, the dimensions of Reliability and Comfort were the most important factors in overall satisfaction, while Empathy had the smallest influence. Notably, Safety was the second-largest gap in expectations but played a less important role in the regression analysis, which the authors attributed to the gender-neutral formulation of safety questions. The paper proposes several improvements: GPS route tracking to improve schedule adherence, smart cards to reduce dwell times, increasing the number of buses on busy routes, and stricter enforcement of cleanliness.

In a first-of-its-kind SEM analysis of BRT satisfaction in the Indian Tier 2 city of Bhopal, ease of use, comfort, and reliability were found to increase satisfaction levels, while higher fares and longer travel times decrease them. The network relies very heavily on low-income captive commuters, and fare sensitivity is a unique characteristic. Inaccessibility and last-mile connectivity were identified as key structural deficiencies, with BRT stations being more representative of richer neighborhoods, indicating a critical equity problem. Cheranchery et al. (2024), using machine learning-assisted segmentation in Kochi, identified two distinct user types: tolerant users (72%, low-income captive commuters) and quality seekers (28%, higher-income car owners). For both types, the most desired improvements were in pre-trip and wayside information, pedestrian environment, headways, and transfer times. Quality seekers also prioritized cleanliness, decreased congestion, punctuality, and shorter in-vehicle travel times. Sen and Roy (2025) analyzed the satisfaction of premium bus services in Kolkata using a multinomial logit discrete choice model, concluding that waiting time is the most

important factor in determining satisfaction levels. AC regulars and choice riders showed the highest satisfaction levels. Their suggestions include exclusive bus lanes and increased frequency to retain choice riders and resist the threat of paratransit services. These recent Indian studies collectively highlight the importance of context-driven and segmented analysis for understanding and improving service quality.

6. International Perspectives for Comparison

Internationally, studies show a clear trend: reliability, comfort, safety, and cost are the top drivers. In Malaysia, Noor and Foo (2014) examined users of urban buses and concluded that comfort, accessibility, and safety are the main concerns. In Europe and North America, satisfied passengers are likely to remain loyal and continue to use and recommend the service. De Oña et al. (2023) emphasize that satisfaction and perceived quality are the most frequently cited drivers of passenger loyalty for bus transit. Research with a policy orientation indicates that modest improvements in quality—better information, more frequent service, greater comfort—can surprisingly increase ridership.

In emerging regions, Sogbe et al. (2025) synthesized 104 studies and identified a core set of dimensions that emerged across Africa, Asia, and Latin America: Safety and Security, Reliability, Comfort, Affordability, Accessibility, and Availability. The landscape of studies revealed a geographic bias—China (23 studies) and India (18 studies) combined represented over 40% of the literature, leaving Africa and South America relatively underrepresented. A comfort improvement scheme in Chicago proved a 5% increase in patronage, highlighting that service quality improvements can lead to tangible increases in ridership even in more developed nations. In Kumasi, Ghana, Sam et al. (2018) identified that the primary commuters—those taking three or more trips per week—ranked reliability and responsiveness as their top priority, while also calling for BRT implementation and ICT-based real-time information as essential improvements. Michael and Layaa (2025) in Dar es Salaam, Tanzania, demonstrated that more traditional infrastructure, social, and service quality variables accounted for only 1.3-3% of the variation in passenger satisfaction levels. This strongly suggests that in many rapidly expanding African cities, passengers may have become accustomed to service deficits, with emotional and equity-based considerations—dignity, trust, fairness—potentially being more prominent, and that Western service quality paradigms may not be directly applicable.

In the Southeast Asian region, research indicates the presence of similar underlying factors in influencing rider satisfaction. Leong et al. (2022) conducted a PLS-SEM analysis with SERVQUAL

factors to analyze the situation in Sarawak, Malaysia, and concluded that Tangibility had the highest influence on satisfaction ($\beta = 0.249$) in a region where car ownership is high, and improvement in physical infrastructure and vehicle quality is necessary to encourage people not to drive. In Beijing, Weng et al. (2018) conducted a survey among 3,012 passengers on 100 bus routes and identified that the type of bus is the key factor in differentiating satisfaction levels—customized buses scored 87.1 out of 100, while the average score in the city was 78.2. Timeliness ranked second at 74.3, while reliability ranked highest at 80.4. In Tianjin’s urban rail system, considered a quality benchmark, Wang et al. (2020) identified that Service Planning and Reliability had the highest influence on passenger satisfaction ($\beta = 0.775$). Overall, while the relative importance of each factor varies depending on the region, the fundamental factors of on-time performance, safety, comfort, and affordability show a remarkable cross-cultural similarity.

7. Impact on Ridership and Transport Effectiveness

Much of the reason we care about satisfaction has to do with its relationship to the system’s performance as a whole. Throughout various studies, it has been evident that as service quality increases, so does the number of users who ride and remain with the system. For instance, Allen and Allen (as cited by De Oña et al.) suggest that satisfied users of public transport intend to continue using the service and even recommend it to others. Conversely, the gaps between quality will result in a reduction in the number of users who choose the mode. Singh (2017) makes the point clearly: by identifying where the gaps are and improving service quality, more people can be attracted to taking the bus. And Sun et al. (2023) demonstrate a non-linear relationship between people’s perceptions of service quality and their loyalty to the service in Xiamen, China. In their study, passenger satisfaction completely mediates the relationship between service quality and loyalty—meaning that small improvements in quality will not lead to increased ridership. Rather, improvements will be seen once you push attributes past certain points. This has important implications for policy, suggesting that in reality, the focus of effort should be on pushing key service attributes past these critical points rather than trying to improve everywhere.

Sogbe et al. (2025) summarize the worldwide evidence that even small changes in quality, such as the “SQ improvements” they refer to, make a difference in the number of people who use the service. They cite the comfort improvement in Chicago as evidence that in developed countries, quality improvements can lead to real gains in ridership. Cheranchery et al. (2024) introduce a more complex perspective from Kochi: a two-tier system that provides high-end alternatives for those who value quality while simultaneously enhancing the quality of the less expensive, ordinary services for those

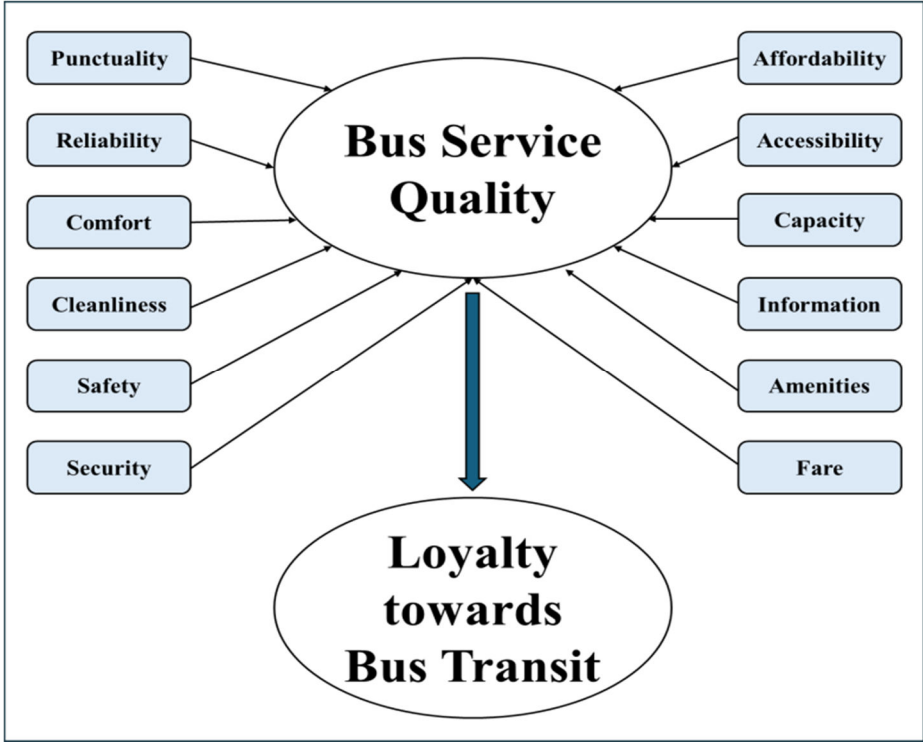
who are more price-sensitive is the key to satisfying all riders simultaneously. Sen and Roy (2025) demonstrate that paratransit services are pitted against high-end buses for “choice riders” when waiting times are suboptimal, highlighting that improvements in bus quality are not merely about passenger comfort but are also a strategic move in the larger transit environment. In other words, user satisfaction is both a consequence and a driver of how effective a transit system is. When users are satisfied with the quality of transit in terms of punctuality, safety, comfort, and cost, buses attract more passengers and alleviate traffic congestion. When these are not met, ridership stagnates or decreases.

8. Conceptual Framework

A large body of international and Indian research literature indicates a wide range of factors that influence perceptions of bus service quality and passenger loyalty. In a wide range of empirical research studies, passengers have consistently evaluated bus services on the basis of important service qualities such as timeliness, reliability, comfort, cleanliness, safety, security, affordability, accessibility, capacity, and availability of information.

Research indicates that these factors have a role in not only influencing satisfaction but also in shaping the behavior of individuals, whether they remain loyal to the service and promote it through word-of-mouth. In urban areas such as Bhopal, Lucknow, Surat, Kochi, Kolkata, and Kathmandu, studies have emphasized that improvements in reliability, comfort, safety, network accessibility, and price levels contribute to a significant increase in the perception of service quality and trust (Lodhi et al., 2024; Chepuri et al., 2022; Singh, 2017; Kewate & Gandhewar, 2023; Cheranchery et al., 2024; Kumar Yadav et al., 2025). Furthermore, the importance of having the right information, convenient facilities, and friendly customer service is increasingly recognized as a critical element in promoting loyalty to bus transit services. Taking into consideration these aspects, the conceptual framework below integrates the manner in which each service factor contributes to the overall perception of bus service quality and, in turn, loyalty to bus transit services.

Figure 3. Conceptual Framework: Service Quality Dimensions and User Loyalty in Bus Transit.



9. Results and Discussion

9.1 Overview of Study Characteristics

The synthesis integrates 33 studies published between 2007 and 2025, sourced from five prominent databases: ScienceDirect, ResearchGate, Scopus, Web of Science, and Google Scholar. The studies are from 15 countries in Asia, Africa, Europe, and Oceania, with the largest number from India (9 studies) and China (4 studies). In terms of methodology, there is a noticeable trend from basic descriptive research using surveys to more complex multivariate analysis and machine learning algorithms. Among the most prominent advanced methods is Structural Equation Modeling (SEM), which is used in studies by Eboli and Mazzulla (2007), Tanwar and Agarwal (2024), Saxena et al. (2024), Kumar Yadav et al. (2025), and Wang et al. (2020). This method enables the researcher to investigate latent service quality variables, overall satisfaction, and behavioral intentions concurrently. SERVQUAL gap analysis is used in studies by Kewate and Gandhewar (2023), Sam et al. (2018), Sarkar et al. (2022), and Leong et al. (2022). On the cutting edge of methodology, machine learning algorithms such as GBDT (Sun et al., 2023), Naïve Bayes classification

(Cheranchery et al., 2024), and random forest (Sogbe et al., 2025) are pushing the boundaries in this area.

9.2 Key Results Across Studies

Through the 33 studies reviewed, reliability was found to be the most prominent predictor of overall satisfaction with bus transit services. This is true regardless of the geographical location and analytical method used, ranging from SERVQUAL studies conducted in Ghana and Kolkata to SEM studies in Bhopal and machine learning studies in Xiamen. Safety and security were found to be the most important latent variables in Nepal, and this factor alone ranked highest in a massive 104-study meta-analysis of developing country studies. Comfort and cleanliness were found to have the largest absolute IPA values, and the elderly and disabled were the most affected. Affordability and last-mile connectivity were found to be important equity-related issues, particularly in the Indian BRT and city bus context. Information delivery, despite being viewed as a lower-priority service by users, was found to be the poorest-performing service, particularly real-time digital information in developing country settings.

9.3 Discussion

The results highlight a combination of theoretical and applied insights. First, the issue of rider diversity persists as an uncharted territory in bus service quality studies. As long as the user community is divided into subgroups through cluster analysis (Esmailpour et al., 2020; Cheranchery et al., 2024), latent class analysis (Bose & Pandit, 2020), or sociodemographic divisions (Kumar Yadav et al., 2025; Cheranchery & Maitra, 2018), it has been confirmed that overall IPA or SERVQUAL scores conceal important variations. More specifically, captive vs. choice riders, men vs. women, and low- vs. high-income users respond differently. This means that models designed for a single group are not accurate for diverse urban riders.

Second, the nonlinear relationship between service quality and loyalty has important implications for policy. Sun et al. (2023) confirmed this finding independently using SEM and GBDT in Xiamen. If there are turning points in the SQ-loyalty relationship, then public transportation agencies should concentrate their efforts on improving the lowest-rated attributes beyond critical points rather than improving all attributes simultaneously. This corresponds to IPA-guided recommendations from Esmailpour et al. (2020) and Cheranchery et al. (2024), which identified comfort and information as the most important attributes requiring immediate attention (the “Concentrate Here” quadrant).

Third, Western-style service quality frameworks are weak in sub-Saharan Africa, as demonstrated by Michael and Layaa (2025) in Dar es Salaam. This leads to a critical rethinking of the transferability of models, as most models were developed largely from Asian and European data. The very low explained variance for the more traditional SQ variables (about 1.3-3%) indicates that equity-oriented, relational, and dignity-related aspects of the service experience may be more important than mere technical performance in contexts where deprivation is pervasive and normalized.

Fourth, gender-disaggregated results from a number of studies (Kumar Yadav et al., 2025; Sarkar et al., 2022; Chepuri et al., 2022; Sogbe et al., 2025) all demonstrate that women rate safety lower than men, particularly with respect to personal security and harassment risk. However, most current measurement instruments have gender-neutral item designs, which may systematically downplay women's safety concerns in aggregate analysis.

There is a definite gap when we consider the mapping of where the research is coming from and how it is conducted. India and China combined represent about 40% of all research that has been conducted in this field (Sogbe et al., 2025). On the other hand, African and South American transit systems are grossly underrepresented, even though they are the ones that carry the largest number of people who use the transit system. The research has matured from SERVQUAL to SEM to machine learning (as mentioned by Sogbe et al., 2025), indicating a higher level of sophistication. However, this sophistication is not evenly distributed, and most of the research conducted through machine learning to determine the quality of transit systems is from China and other developed countries.

9.4 Synthesis of Common Findings

In the 33 studies, one thing is evident: bus transit service quality is not a single concept but a multi-dimensional one. The underlying dimensions of service quality—Reliability, Safety, Comfort, and Affordability—are always at work in shaping passenger satisfaction, irrespective of the scenario. These dimensions do not work independently; instead, they are interdependent. For instance, consider the effect of crowded buses. The more crowded the buses, the more it affects comfort, reduces perceived safety, and impacts reliability (Sogbe et al., 2025). However, the relative weight of these dimensions is not uniform across all geographies and demographics, depending on the type of service as well. The relationship between satisfaction and loyalty is well understood. In many studies, passenger satisfaction has been found to fully mediate the relationship between service quality and behavior intentions, implying that satisfied passengers are the ones who are most likely to return and spread the word (Sun et al., 2023; Wang et al., 2020; Leong et al., 2022). This set of studies provides

a robust foundation for transit authorities to focus on service quality dimensions that work best in improving ridership and satisfaction.

10. Research Gap

Despite the extensive research on the impact of service quality attributes such as reliability, comfort, cleanliness, fare, accessibility, and information on the user satisfaction of bus transit services (Eboli & Mazzulla, 2012; Lodhi et al., 2024; Chepuri et al., 2022; Kewate & Gandhewar, 2023), there are still some gaps in the research. Most of the research is cross-sectional and rarely longitudinal or experimental, tracking user expectations or satisfaction levels post-service and technology improvements (de Oña et al., 2016; Tanwar & Agarwal, 2025). Further, the research is largely focused on urban areas and pays less attention to peri-urban, rural, and marginalized regions (Singh, 2017; Bhowmick et al., 2024). The research rarely focuses on the needs of vulnerable and under-represented sections of society, including senior citizens, women, and low-income groups (Manikandan & Vanniarajan, 2016; Kumar Yadav et al., 2025).

From a methodological perspective, there is little application of big data, real-time feedback, and advanced analytics to support more general findings (Saleem et al., 2023; Taneja et al., 2021). The great preponderance of published models focus on passenger needs, often to the exclusion of the perspectives of service providers, the environment, and the interplay between how things are and how they are experienced (Lai & Chen, 2013; Eboli & Mazzulla, 2012). Moreover, many studies based on the SERVQUAL model, such as Sarkar et al. (2022), rely on cross-sectional perception surveys and gender-neutral factor structures, which may obscure safety concerns that are particular to women and other at-risk populations. The authors themselves observe that the comparatively weak correlation for Safety in their model may reflect the use of gender-neutral item construction, which highlights the importance of more disaggregated and gender-sensitive approaches to measuring service quality. In terms of geographic distribution, the great majority of studies are centered in India and China (Sogbe et al., 2025), which leaves Africa and the developing countries of South America largely unrepresented, and which further limits the generalizability of current service quality models to these regions. And although Michael and Layaa (2025) demonstrate that more conventional SQ models may not be well-suited to Sub-Saharan African cities, as yet there has been no validated and regionally specific framework for such environments..

11. Scope for Future Research

Future studies should examine the longitudinal and mixed-methods analysis of satisfaction and loyalty dynamics over time, particularly after the implementation of service innovations and technology adoption (de Oña et al., 2024). There is an evident need for systematic research to investigate transit experiences in non-traditional regions and among marginalized groups, delving extensively into accessibility and equity (Tanwar & Agarwal, 2025; Singh, 2017; Sogbe et al., 2025). Advanced analytics, behavioral models, and geospatial mapping can help advance our knowledge of dynamic ridership patterns and facilitate real-time service assessments (Saleem et al., 2023; Taneja et al., 2021). Cross-city, cross-mode, and cross-demographic analysis is essential for validating service quality models and constructing equitable frameworks (Eboli & Mazzulla, 2012; Lai & Chen, 2013). The development of gender-sensitive measurement instruments that focus explicitly on women's perceptions of safety and security is an important and pressing methodological concern (Kumar Yadav et al., 2025; Sarkar et al., 2022; Sogbe et al., 2025). The role of digital information systems, eco-friendly projects, and multimodal integration also deserves special consideration to promote sustainable and responsive transit systems (Chepuri et al., 2022; Lodhi et al., 2024).

12. Conclusion

This literature review combines 33 empirical studies from 15 countries, spanning 25 years of research on bus service quality and the level of satisfaction among passengers. The overriding finding is simple: bus service quality is not a single entity. It is complex, and what shines through as the four most important pillars of bus service quality are Reliability, Safety, Comfort, and Affordability. These are not separate considerations but interact with each other. For example, when buses are full, the impact of comfort, safety, and reliability all suffer. When there is a lack of information about delays and timetables, the frustration with unreliability grows.

From this literature review, several important findings emerge. First, reliability, particularly schedule adherence and waiting times, is the best predictor of overall satisfaction with bus services. This is irrespective of the research methodology. This includes SERVQUAL studies in India and Ghana, SEM studies in India and Nepal, and machine learning in China. In developing countries, where unreliability is most pronounced, adherence to schedules must be the number one operational priority. Second, issues of safety and security—especially for women—appear to be systematically underestimated in gender-neutral measurement instruments. This indicates that the present service quality metrics might systematically underestimate the degree of dissatisfaction of female passengers with safety. Future instruments should systematically include gender-disaggregated safety questions.

Third, there is considerable heterogeneity among passengers: between captive passengers and those who have a choice, between different income classes, and among different demographic groups. Aggregate and uniform scores might obscure important variations in what people value and what drives their satisfaction. More effective policy pathways than generic improvement plans might be offered by service strategies specifically targeted to particular groups, such as the dual-service approach proposed for Kochi by Cheranchery et al. (2024) and the differentiated level-of-service standards proposed for Kolkata by Cheranchery & Maitra (2018). Fourth, the relationship between service quality and passenger loyalty is not linear. It is mediated by overall satisfaction, so that strategic improvements that push a few key attributes past performance thresholds might result in much larger gains in ridership than small, incremental gains in all dimensions.

The preponderance of transit quality studies is focused on India and China, and there is a dearth of studies on sub-Saharan Africa, Latin America, and other developing areas. The evidence from Dar es Salaam (Michael & Layaa, 2025) indicates that the conventional Western models of service quality may not be entirely applicable in contexts where service deprivation is prevalent, and there is a need for models that are context-specific in the underrepresented regions. Future studies should strive to develop longitudinal research, gender-sensitive research instruments, real-time satisfaction tracking through machine learning algorithms, and cross-cultural validations of service quality theories.

13 Summary of Statistics

Table 2. Summary of All Reviewed Studies (N=33).

Study (Ref)	Context (Location)	Method/Model	Key Findings (Factors, Outcomes)
Lodhi et al. (2024)	Bhopal, India (city bus)	Survey + Discrete Choice (MNL, mixed logit)	Widespread dissatisfaction (<10% "excellent"); comfort and safety were top drivers of dissatisfaction, followed by on-time running, driver skill, boarding ease, waiting time, vehicle condition
Singh (2017)	Lucknow, India (city bus)	Survey + PCA	Majority dissatisfied. PCA extracted 5 factors; comfort and safety had the greatest impact on overall satisfaction, followed by capacity adequacy, cleanliness/orderliness, bus design, and accessibility. Concluded that closing these gaps can attract more riders.
Chepuri et al. (2022)	Multiple Indian cities (Hyderabad, Mumbai, Surat)	Questionnaire + Garrett ranking	Identified 7 attributes. Found bus on-time performance, reliability, and waiting time to have the highest priority for users, while real-time information was least prioritized. Women respondents weighted safety attributes more heavily.

Kewate & Gandhewar (2023)	Maharashtra State bus, India	Survey + SERVQUAL	Applied the SERVQUAL model to MSRTC buses. Passengers evaluated tangibles (bus/stop condition) and service reliability. The study highlights the need to improve basic amenities and staff responsiveness to raise satisfaction.
Manikandan & Vanniarajan (2016)	Madurai, Tamil Nadu, India	Survey + SEM	Found that key service quality factors were service planning, network quality, safety, cleanliness, comfort, and staff receptivity. These factors influenced overall satisfaction with city buses in this Indian region.
Noor & Foo (2014)	Kota Kinabalu, Malaysia	Survey + Factor Analysis	Identified comfort, accessibility (coverage), and safety as the major dimensions of bus service quality affecting satisfaction. Overcrowding and long waits were highlighted as concerns.
Luke & Heyns (2013)	Johannesburg, South Africa	Adapted SERVQUAL	Using SERVQUAL, they found that targeting reliability, responsiveness, assurance, empathy and tangibles (bus appearance/equipment) would markedly improve users' perception of the bus system.
De Oña et al. (2023)	Medium European cities	Literature review	Synthesized global literature: satisfied transit users show strong loyalty (continued use/recommendation). Perceived quality and satisfaction are primary determinants of ridership and loyalty.
Saleem et al. (2023)	Pakistan (Multan, Lahore, Islamabad, Peshawar)	Mixed methods: interviews, IPA, gap analysis, factor analysis, regression	Three factors: tangibles, reliability, ergonomics. Cleanliness gained importance post-COVID; ergonomics strongest predictor.
Tanwar & Agarwal (2024)	Bhopal, India (multimodal: bus, metro, train)	Survey, EFA, CFA, SEM, subgroup analysis, IPA	Six factors: reliability, comfort, safety, accessibility, information, service. Reliability and comfort most influential.
Nwachukwu (2014)	Abuja, Nigeria (intra-city bus)	Survey, descriptive stats, PCA, regression	Four factors: comfort, accessibility, stops, capacity. Users largely dissatisfied; comfort and accessibility critical.
Morton et al. (2016)	Scotland (bus transit)	Household survey, factor analysis, CFA, logistic regression	Three factors: convenience, cabin environment, ease of use. Convenience strongest; gender and socioeconomic gaps noted.
Noor et al. (2014)	Kota Kinabalu, Malaysia (minibus & bus)	Survey, factor analysis	Three factors: comfort, accessibility, safety. Comfort dominant; issues with crowding, safety, elderly access.

Deb & Ahmed (2018)	Agartala, India (city bus)	Survey, EFA, CFA, regression, SEM	Four factors: safety, comfort, accessibility, timeliness. Quality below expectations; accessibility rated higher.
Efthymiou et al. (2018)	Athens, Greece (bus users)	User surveys, Mann-Whitney, logit models	Crisis reshaped priorities; frequency, punctuality, and coverage most influential.
Bose & Pandit (2020)	Kolkata, India (bus users)	Survey, PCA, CFA	Eight factors including information, convenience, fare, personnel, crowding. Socioeconomic differences affect satisfaction.
Rong et al. (2022)	Shijiazhuang, China (bus)	Survey + GPS data, GBDT ML	Non-linear link: travel time, turning, and stopping key drivers; vehicle stability important.
Li et al. (2025)	Chibi, China (urban-rural bus)	Survey, PLS-SEM, MGA	Company image and quality drive satisfaction; convenience most critical; satisfaction linked to loyalty.
Tanwar & Agarwal (2025)	Bhopal, India	Factor analysis	Six factors: integration, reliability, comfort, safety, accessibility, service. Comfort and accessibility rate higher than reliability.
Eboli & Mazzulla (2007)	Cosenza, Italy (university bus)	SEM, EFA, survey	Four factors: planning/reliability, comfort, safety, network design. Planning/reliability most impactful.
Esmailpour et al. (2020)	Tehran, Iran (bus terminals)	Survey (n=390), EFA, Cluster Analysis, enhanced IPA	Four SQ components: Comfort, Convenience, Reliability, Security. Comfort falls in 'Concentrate Here' quadrant. Largest gaps: elderly/disabled facilities (−1.87), ventilation (−1.65), cleanliness (−1.52). Security satisfactorily performing. Satisfaction inversely related to education level.
Saxena et al. (2024)	Bhopal, India (BRT)	Survey (n=403), EFA, SEM (JASP); CFI=0.953, RMSEA=0.076	Ease of use, comfort, and reliability positively affect BRT satisfaction. Fare price and travel time negatively affect satisfaction and trip frequency. Poor last-mile connectivity = critical gap. First SEM-based BRT satisfaction study in Indian Tier 2 city context.
Kumar Yadav et al. (2025)	Kathmandu, Nepal	Survey (n=526), EFA, CFA, second-order SEM (AMOS 21)	Three SQ factors: Information/Safety/Security (most influential, SRW=0.34), Comfort (SRW=0.25), Accessibility/Availability (SRW=0.20). SQ > Personal Attitudes as predictors of satisfaction. Women rated safety significantly lower, especially nighttime security.
Cheranchery et al. (2024)	Kochi, India	Survey (n=1,971), Naïve Bayes ML (91% accuracy), revised-IPA, fuzzy C-means	Two segments: Tolerant users (72%, captive) vs Quality seekers (28%, car owners). Both groups: pre-trip info, headway, transfer time need improvement. Aggregate IPA results misleading for heterogeneous ridership. Recommends dual-service model.

Sun et al. (2023)	Xiamen, China	Survey + SEM + GBDT (machine learning) + TALE + IPA	Non-linear SQ–loyalty relationship confirmed. Bus operation stability = highest priority. Satisfaction fully mediates SQ–loyalty. Threshold effects: incremental improvements won't yield proportional ridership gains.
Sarkar et al. (2022)	Kolkata, India (WBTC city bus)	Survey (n=350), SERVQUAL (5 dimensions, 22 items), paired t-test, multiple regression	Overall LOS rated 'Good' (LOS 2) but lags on all 22 factors. Largest gaps: belongings safety and schedule adherence. Reliability and Comfort most important dimensions. Empathy least important. Recommends GPS monitoring, smart card ticketing.
Sam et al. (2018)	Kumasi, Ghana	Survey (n=103 core users), SERVQUAL, paired t-test, multiple regression	Negative gaps on all 22 SERVQUAL items. Reliability = largest gap (−4.52); Empathy = −4.24. Reliability + Responsiveness = strongest predictors ($R^2=0.502$). Recommends BRT, bus-only lanes, real-time ICT-based information.
Wang et al. (2020)	Tianjin, China (urban rail — comparator)	SEM (Amos 22), EFA + CFA, survey (n=220)	Four-dimensional SQ: Functional SQ, Technical SQ, Comfort & Cleanliness, Service Planning & Reliability. Service planning & reliability = most influential ($\beta=0.775$). SQ → Satisfaction → Reuse Intention chain confirmed.
Sogbe et al. (2025)	Global developing countries (104 studies SLR)	SLR/PRISMA; databases: Scopus, WoS, TRID, Inspec, Compendex, GeoBase	Safety & security = most influential SQ determinants (esp. for women). Core dimensions: Reliability, Comfort, Affordability, Accessibility, Availability. Research geographically skewed: China + India = 40%+. First-mile/last-mile = major gap. Methodological evolution: SERVQUAL → SEM → ML.
Sen & Roy (2025)	Kolkata, India (premium bus)	CSI, HCSI, Chi-Square, Spearman correlation, MNL discrete choice model (n=345)	Waiting time = most critical satisfaction factor. Regular AC riders and choice riders most satisfied. Comfort (AC) = highest-rated; cost = lowest-rated. Paratransit competes when bus waiting times are unsatisfactory. Recommends dedicated lanes and improved frequency.
Michael & Layaa (2025)	Dar es Salaam, Tanzania	Survey (n=315), Multiple Regression (SPSS)	Infrastructure, social, and operational aspects explained only 1.3–3% of satisfaction variance—none statistically significant. Challenges Western SQ frameworks' applicability in Sub-Saharan African contexts. Emotional/equity factors likely more influential.
Leong et al. (2022)	Sarawak, Malaysia	SERVQUAL, PLS-SEM, n=300	Tangibility, Reliability, and Responsiveness significantly influence satisfaction. Tangibility = strongest predictor ($\beta=0.249$). Assurance and Empathy not significant. Bus

			schedule = most reported problem (37% respondents). High car ownership context.
Weng et al. (2018)	Beijing, China	Stratified sampling, n=3012, 100 bus lines, Cronbach's Alpha, CFA, MANOVA	6-indicator framework: Timeliness, Safety, Convenience, Comfort, Reliability, Economy. Overall score = 78.2/100. Timeliness scored lowest (74.3). Reliability scored highest (80.4). Customized buses scored highest (87.1). Bus type = primary differentiating factor.
Cheranchery & Maitra (2018)	Kolkata, India	LSIS, on-board survey, n=2000	Significant difference in perception between captive and choice riders. Captive riders show higher tolerance for crowding and access-egress time. On-time performance and crowding = biggest concerns. Distinct LOS standards needed for ordinary vs premium services.

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Algorithmic Management and Labour Process in India's Food Delivery Sector: A Managerial Framework and Literature Review

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and

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Abstract

The most recent works on platform-based food delivery focus on how opaque incentive systems and costly operations affect how workers encounter algorithmic management in the gig economy. New research out of India and other comparable countries in the Global South also captures how such platforms work in Integrated Precaution and Innovation. Emerging literature also captures the developing strategies from workers in the Global South towards system adaptation and even systemically orchestrated collectivisation in the context of new solutions from regulators. This allows the consolidation of diagnostic work around management, workers' health systems, and the more strategic work around policy initiatives in food delivery in India.

Keywords: Gig economy, food delivery, algorithmic management, India, labour process theory.

Introduction

In India, platform-mediated food delivery services have quickly changed how people consume products and how people are employed in different cities. The introduction of inexpensive smartphones, digital payments, and lifestyle changes among consumers have made companies like Swiggy and Zomato the leaders in logistics for last-mile deliveries. The sector no longer focuses solely on restaurants and delivers services through hyperlocal logistics, using apps like Dunzo, Zepto, Blinkit, and Shadowfax. Additionally, Rapido combines bike taxi services with parcel deliveries (KPMG, 2023; Heeks, 2021).

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While platform executives highlight the entrepreneurial and flexible nature of the work, studies indicate ongoing precariousness, volatility of income, and a scarcity of autonomy for workers (Parwez, 2022; DEF India, 2021; Wood et al., 2019). The solely automated system of labour control and appraisal, that is, the algorithms, fundamentally changes the nature of work relationships in India's cities.

In this context, the paper studies algorithmic management in the food delivery sector and outlines a managerial approach that focuses on the objectives of worker welfare, example, operational sustainability, and social accountability.

Literature Review and Methodology

Review Methodology

This literature review consolidates findings from peer-reviewed journals, government reports, and policy papers published between 2016 and 2024. Searches were conducted on databases such as Scopus, JSTOR, and Google Scholar using keywords including “gig economy India,” “food delivery platforms,” “algorithmic management,” and “labour process.” Sources were included if they:

- a) Focused on gig or platform work in India;
- b) Analysed food delivery or hyperlocal logistics sectors; and
- c) Discussed managerial, economic, or policy dimensions.

For its relevance to policy, grey literature from Fairwork India, Dvara Research, and Competition Commission of India was also included. The data was thematically organized into: (a) earnings and costs, (b) algorithmic management and control, (c) occupational health and safety, (d) worker organization, and (e) emerging regulations.

Overview of the Indian Food Delivery Market

The platform economy in India is rather concentrated. Swiggy and Zomato control the restaurant-linked delivery market, Zepto and Blinkit operate in quick commerce, and Dunzo and Shadowfax work in a variety of delivery segments. Rapido focuses on the bike-taxi and parcel delivery market (KPMG, 2023). There is an emphasis on autonomy and flexibility — Sriharsha Majety (Swiggy) described gig partners as “the backbone of our operations,” while

Deepinder Goyal (Zomato) stated efforts on “flexibility and dignity in work.” However, systemic issues such as low effective wages, non-transparent incentive systems, and minimal safety protections remain (DEF India, 2021; Fairwork India, 2023; Dvara Research, 2024).

This extended review seeks to organise the rapidly expanding works on platform-mediated food delivery along five related lines: (a) algorithmic governance and control, (b) economics of gig work (earnings, costs, incentives), (c) health, safety and working conditions, (d) worker strategies, organisation and voice, and (e) issues of regulation, measurement and methods. Each of these links empirical data for India to the broader global discourse, arguing positions on intended managerial actions and future research.

Table 1: Estimated Number of Gig or Delivery Workers Engaged by Major Food-Delivery and Quick-Commerce Platforms in India (as of November 2025)

Company / Platform	Estimated No. of Delivery Partners	Notes	Sources
Zomato	1.5 million (15 lakh) delivery partners (2024)	CEO statement citing total partners who worked with Zomato in CY 2024.	https://www.fortuneindia.com/enterprise/15-lakh-delivery-partners-worked-with-zomato-in-cy24-saw-earnings-rise/120371
Zomato (alternate metric)	352,000 average monthly active delivery partners (June 2023)	Average monthly active figure; reflects more stable estimate of active workforce.	https://www.financialexpress.com/business/industry-zomato-delivered-647-million-orders-worth-rs-263-1-billion-across-800-cities-during-fy23-says-rakesh-ranjan-3291075/
Swiggy	522,000 delivery partners (Q2 FY 2025)	From Swiggy’s official shareholder letter (Dec 2024).	https://www.swiggy.com/corporate/wp-content/uploads/2024/12/Letter-to-Shareholders_Q2FY25.pdf
Swiggy (alternate)	400,000 delivery partners	Business Standard (Sept 2024) reports “around 4 lakh partners.”	https://www.business-standard.com/companies/start-ups/swiggy-launches-project-next-to-offer-career-growth-for-delivery-partners-124091700723_1.html
Blinkit (subsidiary of Zomato)	300,000 + delivery partners	Company website description (accessed Nov 2025).	https://eternal.com/our-businesses/blinkit
Zepto	50,000–100,000 (estimated, unconfirmed)	No official disclosure; industry analysts estimate	https://www.livemint.com/companies/start-ups/zepto-crosses-1-bn-revenue-run-rate-as-quick-commerce-grows-11713376521027.html

		between 50–100k gig partners.	
Dunzo	Workforce largely reduced; service shutdown reported in Jan 2025	Once employed thousands of riders; most operations suspended.	https://restofworld.org/2025/dunzo-shutdown-india-quick-commerce/
BigBasket (BB Now)	25,000 – 30,000 delivery staff (2024)	Quick-commerce vertical of BigBasket expanding across 40 cities.	https://economictimes.indiatimes.com/tech/startups/bigbasket-scales-up-bbnow-quick-commerce-service-to-40-cities/articleshow/107049892.cms
Amazon Fresh (India)	20,000 – 25,000 delivery associates (estimated 2024)	Estimate based on internal partner and warehouse associate data.	https://www.businesstoday.in/latest/in-focus/story/amazon-fresh-india-how-jeff-bezos-company-is-competing-in-the-quick-commerce-race-428145-2024-09-28

Algorithmic governance and control

A central theme across the literature is how platforms substitute software-mediated control for traditional supervision. Foundational studies (Rosenblat & Stark, 2016; Mateescu & Nguyen, 2019; Duggan et al., 2020) demonstrate that task-allocation algorithms, dynamic pricing rules, deactivation logics and customer-rating systems become the primary levers of managerial authority. In the Indian context, scholars emphasise opacity and information asymmetry: workers frequently lack clear knowledge of how incentives are computed or why deactivations occur, producing distrust and gaming behaviour (Sinha & Pandit, 2023; Wood et al., 2019). This literature also stresses the “behavioural” design of apps — nudges, streak bonuses and surge notifications — whose effects on worker risk-taking and time use are documented empirically (Rosenblat & Stark, 2016; Parwez, 2022). From a labour process perspective, algorithmic governance represents a digital intensification of control: authority is retained by platforms but exercised through seemingly neutral code that embeds managerial priorities (speed, completion rates, and customer satisfaction) over worker welfare.

Economics of gig work: earnings, costs and incentives

Empirical work in India consistently finds that headline gross earnings overstate worker take-home pay once operating costs (fuel, repairs, data, prepaid commissions, and unpaid waiting time) are deducted (DEF India, 2021; Dvara Research, 2024; Fairwork India, 2023). Typical estimates show 25–40% of gross earnings eaten up by operating expenses, producing effective

hourly wages that in many cases fall below statutory minima. The literature interrogates incentive architectures — base fares, distance/time multipliers, and time-limited bonuses — showing how small parameter changes can substantially alter worker incomes and platform margins. Several comparative studies also show how pay opacity and frequent redesign of incentive schemes reduce predictability and increase vulnerability (Berg et al., 2018; Mehrotra & Parida, 2023). This strand foregrounds the need for transparent pay-models and regular third-party pay audits.

Health, safety and working conditions

Studies link the algorithmic emphasis on speed and short delivery times to elevated road risk and worker stress (Cant, 2019; Apouey et al., 2020). The pandemic literature added nuance: while riders were framed as “essential workers,” many lacked consistent PPE, paid sick leave or formal insurance (Huws et al., 2019; ILO, 2021). Indian case studies also document regional differences in risk exposures (monsoon hazards, heat stress, and congested urban corridors) and uneven deployment of platform safety measures such as accident insurance or emergency hotlines (Dhindsa/Blinkit responses are partial and uneven). Together, these findings suggest incentive redesign (safety-weighted metrics) and cost-sharing for PPE and insurance as managerial priorities.

Worker strategies, organisation and voice

Despite fragmentation, evidence from India and abroad shows growing instances of collective action, informal mutual aid, and emerging institutionalised voice (driver unions, rider councils, and coordinated strikes) (Tassinari & Maccarrone, 2020; Joy et al., 2023). The literature emphasises diverse repertoires of contention — from app-based rating refunds and coordinated log-offs to offline protests — shaped by platform scale and local political opportunity structures. Studies also note the limitations of spontaneous action and the potential for institution-building through rider cooperatives, democratically elected councils, and platform-facilitated grievance redressal mechanisms.

Regulation, measurement and methodological gaps

A recurrent observation is that research outcomes depend heavily on methodology (surveys vs. platform audits vs. ethnography). Many Indian studies rely on cross-sectional surveys or small-

site ethnographies; longitudinal, mixed-methods work remains scarce. Measurement challenges include estimating actual hours worked, distinguishing between online and paid time, and accessing platform logs for auditing. Policy research points to evolving regulatory responses — from the Code on Social Security (2020) to state-level welfare boards — but stresses uncertainty about enforcement and firm-level compliance. Comparative work (Brazil, Indonesia, South Africa) is suggested as a route to generalisable Global South insights (Abílio et al., 2021; Heeks, 2021). Methodologically, the literature calls for data-sharing frameworks between platforms, regulators and researchers to enable system audits and robust causal evaluation.

Synthesis and implications for this study

Synthesising these strands shows that Indian food delivery platforms are simultaneously sites of technological innovation and labour-market precarisation. Algorithmic governance increases operational efficiency but amplifies asymmetries of information and risk; incentive designs shift costs onto workers; and regulatory developments are nascent and uneven. For managerial practice, the literature converges on several actionable recommendations: algorithmic transparency, safety-oriented incentive restructuring, cost-sharing for operational expenses, institutionalised worker voice, and proactive engagement with social security mechanisms. For researchers, priority areas are longitudinal tracking of earnings and health outcomes, mixed-method algorithm audits, and comparative Global South studies. This extended review thus strengthens the conceptual links between algorithmic inputs, managerial mediation and worker outcomes that underpin the framework proposed in Section 5.

Theoretical Framework

Labour Process Theory (LPT)

Labour Process Theory (Braverman, 1974) provides a lens to understand how managerial control is embedded within production systems. In gig work, platforms mediate the labour process algorithmically rather than through direct supervision. Digital systems allocate orders, set pay rates, and monitor worker performance — effectively extending managerial authority through technology. From an LPT perspective, this represents a digital reconfiguration of the classic struggle over control, consent, and autonomy at work (Rosenblat & Stark, 2016).

Algorithmic Management

Algorithmic management refers to the use of software-driven systems to assign tasks, track performance, and enforce discipline (Mateescu & Nguyen, 2019; Duggan et al., 2020). Although marketed as neutral, algorithms often encode managerial priorities — optimizing delivery time and customer satisfaction rather than worker welfare. In India, these systems operate in a low-wage, weakly regulated environment, amplifying risks of exploitation while obscuring accountability.

Analysis and Discussion

Earnings and Costs

Multiple studies indicate that gig workers' net earnings, after deducting fuel, maintenance, and mobile data costs, often fall below statutory minimum wages (DEF India, 2021; Dvara Research, 2024; Fairwork India, 2023). Riders typically spend 30–40% of gross earnings on operating expenses. While platforms argue that flexibility compensates for these costs, the absence of guaranteed minimum pay contributes to economic vulnerability. Under the Code on Wages (2019), states may introduce wage floors for gig workers, which could reshape business models across the sector.

Algorithmic Control and Behavioural Incentives

Algorithms govern work allocation, customer ratings, and incentive eligibility, creating an opaque system of behavioural nudges. Workers often adapt to the algorithm by prolonging online time, accepting risky orders, or speeding to maintain streak bonuses. This gamification of control, while efficient for platforms, can encourage unsafe driving and mental stress (Rosenblat & Stark, 2016; Sinha & Pandit, 2023). As Zepto's CEO Aadit Palicha stated, "Speed is our promise" — yet such metrics may conflict with legal safety obligations under the Motor Vehicles Act (1988).

Health, Safety, and COVID-19 Experience

Food delivery riders face exposure to road hazards, weather extremes, and infectious diseases (Apouey et al., 2020; Huws et al., 2019). During COVID-19 lockdowns, riders performed essential work under uncertain conditions, often without adequate protection or benefits. Although platforms like Blinkit introduced accident insurance and emergency support

(Dhindsa, CEO Blinkit), implementation remains inconsistent. The Occupational Safety, Health and Working Conditions Code (2020), if enforced, could extend certain protections to gig workers.

Worker Organization and Emerging Regulations

Despite fragmented employment relations, gig workers have organized to protest pay cuts, incentive changes, and safety issues (Joy et al., 2023; Tassinari & Maccarrone, 2020). State governments in Karnataka and Telangana have introduced welfare bills establishing grievance mechanisms and welfare boards for platform workers (2025). These initiatives signal a shift toward formal recognition of platform labour and may influence managerial strategies regarding compliance and social responsibility.

Conceptual Framework: Algorithmic Management and Worker Outcomes

The relationship between algorithmic systems, managerial practices, and worker outcomes can be represented as an interactive model:

Algorithmic Inputs (Platform Design): Order allocation logic, performance metrics, incentive structures, and deactivation rules.

Managerial Mediation: Corporate policy choices, transparency mechanisms, communication channels, and cost-sharing schemes.

Worker Outcomes: Earnings stability, perceived fairness, safety behaviour, and collective organization.

Policy and Institutional Moderators: Labour codes, social security provisions, and state-level welfare boards.

In this framework, algorithmic systems function as the control layer, managerial strategies as the intervention layer, and worker welfare and performance as outcomes. Effective managerial intervention can recalibrate the balance between efficiency and fairness.

Managerial Implications and Framework

Transparent Algorithmic Management

Opaque algorithmic processes erode trust and lead to conflict. Managers should disclose key parameters behind order allocation, incentive eligibility, and penalty mechanisms. This aligns

with calls for explainable algorithms in platform governance (Mateescu & Nguyen, 2019). Transparency reduces disputes, improves retention, and ensures compliance with evolving data disclosure norms.

Cost-Sharing and Pay Structures

Given that riders bear substantial operational costs, platforms should implement cost-sharing mechanisms such as fuel allowances, maintenance subsidies, or inflation-indexed pay floors. These measures align with the Code on Wages (2019) and promote both fairness and loyalty. Regular pay audits can ensure parity with state minimum wages.

Safety-Oriented Incentive Design

Performance metrics that reward speed may inadvertently promote unsafe driving. A shift toward safety-first incentives — rewarding reliability, customer feedback, and adherence to traffic laws — can reduce accident rates and legal exposure (Cant, 2019; Apouey et al., 2020). Safety-focused training and monitoring can further enhance compliance with the Motor Vehicles Act (1988).

Integration with Social Security Frameworks

The Code on Social Security (2020) enables the inclusion of gig workers in welfare schemes. Platforms should proactively contribute to welfare boards or portable benefit systems to improve resilience and corporate reputation (ILO, 2021; Rani & Furrer, 2021). Early adoption positions firms as leaders in ethical gig management.

Institutionalized Worker Voice

Structured feedback systems — such as rider councils, periodic consultations, and in-app surveys — allow platforms to co-design policies with workers. Evidence suggests that participatory governance improves operational efficiency and reduces turnover (Joy et al., 2023; Tassinari & Maccarrone, 2020). Institutionalized dialogue also anticipates legal mandates under emerging state-level welfare laws.

Conclusion and Future Research Directions

This review consolidates fragmented scholarship and policy discourse on India's food delivery gig economy into a coherent managerial framework. It demonstrates that algorithmic

management, while technologically efficient, reproduces traditional asymmetries of control within a digital context. Labour Process Theory helps reveal how algorithmic systems mediate power between platforms and workers, while managerial strategies determine whether this mediation leads to efficiency or exploitation.

The paper proposes a multi-level managerial framework that links algorithmic transparency, cost-sharing, safety-oriented incentives, social security integration, and worker participation to improved operational sustainability. These interventions are not merely ethical imperatives but strategic necessities for talent retention and regulatory compliance.

Future Research Agenda

Future studies should conduct longitudinal analyses across multiple Indian cities to assess changes in earnings, attrition, and health outcomes. Evaluate the impact of welfare boards and social security schemes on gig worker livelihoods. Examine cross-sectoral differences between food delivery, ride-hailing, and e-commerce logistics. Explore algorithmic transparency mechanisms using mixed methods combining system audits and worker ethnography. Compare India's emerging regulatory frameworks with those in Brazil, Indonesia, and South Africa to derive Global South insights.

In conclusion, the Indian food delivery sector illustrates both the potential and the perils of platform capitalism. With proactive managerial intervention, transparency, and institutionalized worker voice, gig platforms can evolve from extractive intermediaries into sustainable employment ecosystems.

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Examining the Gloomy Outlook of Indian Corporate Sector: A Study on Forensic Accounting and Fraud Detection in Indian Companies

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and

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Abstract

Due to an increase in corporate frauds like Enron and WorldCom, organizations are focusing more on investigation of frauds. Due to these challenges, a specialized discipline called Forensic Accounting has emerged. However in India, the adoption of forensic accounting is still at an emerging phase. In order to detect the irregularities in the business, more companies are appointing accountants who are experts in detecting frauds in their companies. The objective of the study is to find out how the corporate frauds were detected in India which help to prevent frauds in future. Out of the many frauds prevailing in the market, Indian companies faced customer frauds, cybercrime, Failure in KYC, tax frauds and procurement frauds the most. With the increase in technology and AI (artificial intelligence), cybercrimes have been drastically increasing.

Here researchers have made an attempt to study the importance of forensic accounting with reference to Indian corporate frauds. It also focuses on different categories of frauds faced by Indian companies which led to the reason for adopting forensic accounting. For the purpose of study, the global economic crime survey of 2022 published by PwC was taken under study. Thus, this study shows that with the help of forensic accounting one can detect and prevent frauds in its organization.

Keywords: Forensic Accounting, Corporate Frauds, Fraud Detection, Indian Scams

Introduction

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In the world of finance and business, maintaining trust and integrity is essential. However, due to an increase in corporate frauds like Enron and WorldCom, organizations are focusing more on investigation of frauds. In response to these obstacles, the field of forensic accounting has emerged as a specialized subject, wielding investigative techniques and financial support to unveil the truth behind financial irregularities. The Accountant Maurice E. Peloubet was the first to coin the term Forensic Accounting in his essay 'Forensic Accounting: Its Place in Today's Economy'. According to (ACFE (*Association of Certified Fraud Examiners*)), 2022) 'Forensic accounting' is the use of accounting skills to investigate fraud or embezzlement and to analyse financial information for use in legal proceedings. Forensic accountants integrate their accounting, auditing and investigative skills to search for indicators of fraud and other financial crimes, quantify the damages incurred and provide assistance in legal proceedings. The term "forensic" implies the application of these skills in a manner which is legally used in court. The origin of forensic accounting can be traced back in ancient civilization. Kautilya was the first Indian to mention in his book Kautilya Arthashastra about the famous forty ways of misappropriation. Forensic accounting serves several key objectives including fraud detection, financial dispute resolution and the provision of expert opinion in legal proceedings. There are many differences between Auditing and Forensic Accounting but one assumes it is the same. Forensic accounting is the result of loopholes in auditing. Frauds which are not detected by auditors are done by forensic accountants. Scams such as The Satyam Computers Scam (2009), Ketan Parekh Stock Market Scam (2001), Harshad Mehta Stock Market Scam (1992), Punjab National Bank Scam by Nirav Modi (2018), 2G Spectrum Scam (2007), Common Wealth Game Scam (2010), Telgi Scam (2003), Vijay Maliya Scam (2015) etc. gave rise to forensic accounting. To combat the frauds, organizations such as Serious Fraud Investigation Organization (SFIO), Foreign Exchange Management Act (FEMA), Reserve Bank of India (RBI), Central Bureau of Investigation (CBI) - Economic Office Wing deals with big financial frauds whereas Central Vigilance Commission deals with corruption. In India, the foundation of the Serious Fraud Investigation Organization (SFIO) is considered to be a remarkable contribution to the field of forensic accounting. With increase in technological advancement, globalization of financial transactions and sophisticated crimes related to money, forensic accountants play a crucial role in maintaining trust, transparency and accountability. Chartered accountants in India are called upon to undertake such investigative tasks. Their work contributes to the

stability of financial markets, protects stakeholder's interests and determines fraudulent activities.

Literature Review

(Gupta, 2022) states that forensic accounting is a combination of accounting, auditing and investigation skills. (Azman, 2021) mentioned in her study that forensic accounting is a fraud mitigation tool and one should use it for detecting frauds in the business. (Hossain, 2020) reveals that though the concept of auditing and forensic accounting is somewhat similar, there is a difference between them. Auditing considers only checking of financial statements as per standards while forensic accounting considers any fraud occurring in financial statements. (Awolowo, 2019) states that the difference between an auditor and a forensic accountant is that of a patrolman and detective. (Moid, 2016) states that the role of a forensic accountant is that of a watchdog which helps to detect the frauds and minimize its occurrence. (Supriya, 2019) mentions that the uniqueness of a forensic accountant depends upon its skill, knowledge and experience. (Enofe et al., 2023) and (Karabayir, 2019) states that forensic accounting is useful in legitimation support, expert testimony and fraud auditory. (Tiwari & Debnath, 2017) states that one should have knowledge of accounting, auditing, statistics, information technology and human skills. (Supriya, 2019), (Enofe et al., 2023) and (Gupta, 2022) suggest that one should include the knowledge of forensic accounting in their university curriculum. Only chartered accountants are familiar with this type of accounting and so more people should be made aware which will increase experts in this field in near future. (Gupta, 2022) and (Jain & Lamba, 2020) reveals that there are different challenges such as lack of knowledge of forensic accounting, huge expenses in investigations, lack of forensic auditors, political involvement, cybercrimes, economic laws, internal frauds etc. which hinders the adoption of forensic accounting. (Jain & Lamba, 2020) and (Moid, 2016) mentioned that benchmarking, ratio analysis, specialist software, system analysis etc are some of the techniques of Forensic accounting. (Patil, 2023) states that forensic accounting has the ability to find financial frauds as it deals with in depth economic data and so adoption of forensic accounting should be made to reduce such frauds. (Unuigbokhai, 2022) states that there is a positive relation between forensic accounting and fraud control, between forensic accounting and reporting quality as well as between forensic accounting and internal control. The study also concludes that adopting forensic accounting increases the value of business. (Chaturvedi, 2015) suggests the government provide a regulatory framework to conduct forensic accounting. (Parihar et al.,

2023) and (Karabayir, 2019) reveals that due to increasing frauds and application of artificial intelligence (AI) in the corporations the need for forensic accounting will increase and so there will be a rise in demand for forensic accountants in near future. Thus the study wants to do a comprehensive study on fraud detection and find out the most common audit fails which can help to prevent frauds in future.

Research Methodology

Objective of Study

The study wants to find out the importance of forensic accounting with reference to frauds in the Indian corporate sector. It focuses on the common ways of fraud commitments in Indian organization and the different ways to detect such frauds in the Indian context.

Source of data collection

The data regarding corporate frauds in India was incorporated from websites, literature review and articles. The data regarding common frauds in Indian companies were incorporated from the latest report of PriceWaterhouseCoopers (PwC)'s Global Economic Crimes and Fraud Survey 2022: India Insights. For the purpose of analysis, samples of top 10 Indian frauds were taken. Table 1 shows the Top 10 frauds in the Indian corporate sector and how they were detected.

Table 1: Summary of Top 10 Corporate Frauds in India

Name of scam	Amount of scam	General details	Details of detection	Outcomes
The Satyam Computer Scam (2009)	14000 Cr.	Also known as the Enron scam of India was done by founder chairman of satyam computers Ramalinga Raju. He manipulated the financial statements by overstating the sales which showed high profitability resulting in more investments by investors.	An anonymous whistleblower alerted the SEBI and the regulators which prompted them to investigate, resulting in Ramalinga to confess his misdeed.	Company act 2013 came into force. It was mandated to change auditors after 5 years and the auditing firm after 10 years. The directors responsibility statement was included in the report of Board of Directors Under the Company Act 2013, SFIO was founded and given the position of statutory body

Ketan Parekh Scam (2001)	137 Cr.	Ketan Parekh, a chartered accountant, manipulated the stock market by a pump and dump scheme. He purchased shares at a low market price and sold them using circular trading.	Bank of India alleged that he had defrauded which was further revealed by Suchita Dalal a journalist in Times of India resulting in CBI to take charge and arrest him.	SEBI banned the badla system and circular trading. Annual inspection of stock accounts were done. Collateral loans were provided only by NSE and BSE.
Harshad Mehta Scam (1992)	5000 Cr.	Harshad Mehta was a broker in BSE. He discovered the loopholes in ready-forward deals to manipulate the lending system between the banks. He created fake receipts of banks and manipulated the prices of shares.	Suchita Dalal, a journalist in Times of India finding keen interest in his over luxurious lifestyle, dug into his misdeed resulting in the CBI to investigate the scam.	In 1992, Securities and Exchange Board of India (SEBI) came into force to enhance transparency and protect investors in the stock market.
Nirav Modi Scam (2018)	14000 Cr.	Nirav modi a diamond jeweller and designer along with a few employees of Punjab National Bank manipulated by issuing fake letters of undertaking to import pearls in India.	Evidence came when 9 of Nirav's employees revealed how they were taken to Egypt to sign documents making them owners of dummy companies which nirav had established.	RBI banned the letter of undertaking. The integration of SWIFT with CBS. Prompt Corrective Action (PCA) was implemented on different banks. Fugitive Economic Offenders Act (2018) was formed by the Indian Government to confiscate all the benami assets of offenders.
Saradha Scam (2008)	2460 Cr.	Sudipta sen chairman of Saradha company issued bonds and debenture without an approval from SEBI luring agents to get commission for each investment made.	Due to collapse of Ponzi scheme (chit fund scheme), SEBI found misappropriation in the company which resulted into investigation by state government	The government implemented strict reforms to strengthen regulations in investment schemes and chit funds.
2G Spectrum Scam (2007)	176000 Cr.	This scam is called the mother of all scams. It was done by Andimuthu Raja, minister of the department of telecom, by providing a licence to telecommunication companies which was	It was detected by the controller and audit general of India when there was a loss in market price in 2007.	

		actually done on auction basis.		
Common Wealth Game Scam (2010)	35000 Cr.	Suresh Kalmadi the chairman of organizing committee manipulated the funds given for accommodation and management of indian athletes and used those fund to invest in foreign banks	Central vigilance commission a government body issued a report on governmental corruption showing irregularities in 14 CWGs	
Telgi Scam (2003)	30000 Cr.	Abdul Karim Telgi a con artist manipulated by printing duplicate stamp papers. Many government officials were involved in this.	It came to light when two men transporting these stamp papers were caught and during the interrogation the scam was exposed.	The finance ministry changed the design of stamp papers. The new stamp papers were printed on special paper. The new stamp paper will be state specific having the name of state on the stamps.
Vijay Mallya Scam (2015)	9000 Cr.	Vijay Mallya, owner of Kingfisher took loans from 17 banks and never repaid them. He invested this money in shell companies.	The scam came to notice when he bought properties worth 330 crore in France which led the CBI to investigate him for this misdeed.	Strengthening the legal framework by imposing strict penalties and enforcing agencies to provide aid in swift justices.
ABG Shipyard scam (2022)	22842 Cr.	The company took loans from 28 banks for the purpose of their business and never repaid them.	NV Dand & Associates conducted the stock audit of the company and found faults in their accounts.	

Source: Incorporated by Researcher from Various Website and Articles

Data Analysis and Interpretation

The concept of forensic accounting is still in its emerging phase. Due to the rise in frauds in global as well as in India, more companies are encouraged to appoint forensic accountants to detect such frauds and take necessary actions. Table 2 shows the different categories of frauds faced by Indian organizations in 2022.

Table 2: Different Categories of Frauds Faced by Indian Organizations in 2022

Categories	Different kinds of frauds in each category	Percentage (%) (2022)
Misconduct risk (90%)	• Customer frauds • Procurement frauds • Accounting/financial statements frauds • Bribery and corruption	52 29 25 23
Platform risk (53%)	• KYC failures • Disinformation/misinformation • Money laundering and Terrorism financing • Anti- embargo	65 32 26 16
Cyber risk (45%)	• Phishing Attacks • Ransomware Attacks • Malware Attacks • Business Email Compromise (BEC)/ Social Engineering • Data Breaches/ Data Loss Incidents • Hacking/ Unauthorized Access	40 80 58 17 19 17
Insider trading (33%)	• Deceptive business practices • Insiders/unauthorised trading	63 47
Legal risk (24%)	• Anti – competition/ law infringement • Intellectual property theft	79 57

Source: PwC’s Global Economic Crime and Fraud Survey 2022: India Insights, India Cybersecurity Domestic Market 2023 Report.

Different frauds are committed by Indian companies namely misconduct frauds, platform frauds, cybercrimes, insider trading, legal frauds etc. As shown in Table 2, 90% of frauds are misconduct frauds done by Indian companies. These frauds include customer frauds, procurement frauds, accounting frauds and bribery. It is followed by platform risk (53%) which includes KYC failures, misinformation, money laundering and anti embargo. Though the percentage of frauds in cybercrime (45%), insider trading (33%) and legal (24%) is comparatively less, one should not avoid the fact that it is equally harmful for the companies. Table 3 shows the Top 5 frauds in Indian companies as per PwC’s Global economic crime and fraud survey 2022.

Table 3: Top 5 Frauds Faced by Indian Organizations

Name of Frauds	Percentage (%) (2022)
Customer Frauds	47
Cybercrimes	45
KYC Failure	34
Tax Frauds	28
Procurement Frauds	26

Source: PwC's Global Economic Crime and Fraud Survey 2022: India Insights

As shown in Table 3 out of the different categories of frauds prevailing in the market, customer frauds, cybercrimes, KYC failure, tax frauds and procurement frauds are the most prevailing ones. Customers being one of the prominent parties of business are manipulated the most when it comes to frauds. Frauds like phishing, identity theft etc. are included in customer frauds. The next worst fraud in Indian companies is cybercrime. Due to increase in technology and AI, the frauds through cybercrimes have increased dramatically. Manipulating the profit and assets of the company leads to tax frauds and procurement frauds. Thus these frauds have been increased due to constant greed of parties to earn more.

Though there is increasing fraud happening in corporations, companies are taking various steps to detect and reduce such frauds. As mentioned by (Jain & Lamba, 2020) and (Moid, 2016) there are different techniques of detecting frauds like ratio analysis, benchmarking, use of different software etc. Ratio analysis helps to find the change in ratios over the period and difference in ratio leads to fraud detection. According to (PwC, 2022) companies are opting different ways to detect frauds such as appointment of chief risk officers, to stay vigilant for red flags, to measure, monitor and control frauds by appointing forensic experts, to provide awareness regarding fraudulent risk and encourage verification and validation of documents for fraud detection. If we analyse the Indian frauds, the government has made a lot of reforms so that these frauds can be prevented.

Conclusion

The study wants to find the importance of forensic accounting with reference to frauds in Indian corporate sectors. It also focuses on different categories of frauds faced by Indian companies. For this the global economic crimes and fraud survey of 2022 published by

PwC was taken under study. The study revealed that due to increasing economic crimes, the need to adopt forensic accounting has been increased but still it is at an emerging phase. In India, the percentage of economic crimes is increasing. Though with the help of auditing, misappropriations can be detected but due to loopholes in the auditing framework many such frauds keep on happening. Auditors are appointed by companies so that they can reveal the true and fair view of their accounts. But eventually these auditors are working for the company and so they might not perform their duties properly. On the contrary, even if the auditor is true to its work, he is only capable of detecting whether the accounts are prepared as per standards or not. In order to detect frauds, specialized knowledge in all fields is required and so the role of such experts who are called forensic accountants comes into action. The courses of forensic accounting should be included in university curriculum helping to gain this specialized knowledge. If we consider the sample of Indian corporate frauds all were detected when in depth investigation was carried on and such in depth investigation can be done by forensic accountants. Thus increase in corporate frauds led to adoption of forensic accounting. Different types of frauds prevailed in India out of which the percentage of misconduct frauds and cybercrimes was highest. This is due to the increase in technology and AI in business activities. In order to detect such frauds at an early stage, one should provide awareness regarding these fraudulent frauds. Considering the Indian frauds, we can see how the government has made different reforms so that frauds can be prevented in future. One must appoint forensic experts, and adopt different techniques like ratio analysis, benchmarking to detect such frauds. Regulatory bodies like SFIO have come into force to provide a framework to detect such frauds. Thus the study concludes the need for forensic accounting and fraud detection in Indian companies.

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Generational Perspectives on FinTech: A Comparative Study of Gen Y and Gen Z in Ankleshwar city

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And

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Abstract

“Financial Technology (FinTech) has had a tremendous transformation in the financial sector through the provision of contemporary digital services, including mobile banking, online payment, online lending and investment services. The biggest consumers of such services are the Generation Y (Millennials) and Generation Z”, which is adaptable to technology. This paper is an explore the major factor that contribute for the adoption of FinTech between these two generations in an industrial city where financial transactions are active and therefore the name of the city is Ankleshwar. The study will use structured questionnaire and sample of 400 respondents to Measure awareness and motivators of adopting, challenges and the effects of FinTech to traditional banking. Statistical techniques like Chi-square and multiple linear regression show that convenience, security and trust are significant contributors of adoption. The fears of transaction failure and privacy dangers are however a deterrent to the proliferation. The results reveal that although the adoption of FinTech is a gradual but stable trend, the substantial growth of FinTech must include security considerations, an improved customer experience, and user confidence. The presented research adds to the existing knowledge regarding the FinTech adoption rates in industrial areas and offers recommendations that financial service institution can adopt to increase the level of digital financial accessibility.

Keywords: FinTech, Millennials, Generation Z, Adoption

Introduction:

“Financial Technology (FINTECH) has had a tremendous impact on the financial and banking business by providing new online financial services, such as mobile banking, online payment systems, investment application, and digital lending services Generations Y (born between 1981 and 1996) and Z (born between 1997 and 2012) are the most active

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users of these services”, as they are familiar with online technologies and prefer such means of financial services (Elsaid & Abbas, 2020; Al-Qudah et al., 2024; Addula, 2025).. Being an industrial city, Ankleshwar has a population that regularly carries out financial transactions, which is why this city is a good place to study the trends in the adoption of FinTech.

FinTech: Financial Technology refers to the application of technology and innovation to improve financial services, making them more efficient, accessible, and cost-effective (Schueffel, 2017). It includes services like mobile banking, UPI payments, digital wallets, investment apps, crypto currency trading, and digital lending (Gomber, Koch, & Siering, 2017). According to the Financial Stability Board (FSB, 2017), financial technology (FinTech) refers to “technology-enabled financial innovation that leads to the development of new business models, applications, processes, or products, and exerts a material impact on financial markets and institutions.” FinTech innovations cover a broad range of services, like as digital payment and transfer, among them UPI, mobile wallets, and internet banking services. They further expand to lending and credit products offered on online lending sites like KreditBee and Bajaj Finserv, investment and wealth management solutions that include stock trading online, working with crypto currencies, and robo-advisory sites. Moreover, the crypto currencies and DeFi systems that are Blockchain-based are a quickly growing area of the FinTech ecosystem.

The so-called Generation Y, or Millennials, is made up of people who were born between 1981 and 1996 (Dimock, 2019). This group of people has gone through the slow process of replacing the traditional banking systems with digitally powered financial services. Consequently, the Millennials are becoming more and more active users of FinTech solutions to enjoy greater convenience, faster transactions, and better personal financial management tools (Deloitte, 2020). Generation Z, on the other hand, comprises people who were born between the years 1997 and 2012 (Dimock, 2019). Being digital natives, Gen Z people have been raised in a world where they interact through smartphones, high-speed internet access, and digitally mediated financial transactions. As a result, this generation has a higher inclination toward the use of new FinTech products, such as crypto currencies, online lending programs, and artificial intelligence-based investment solutions (Accenture, 2021).

Literature Review

In the paper published in the International Journal of Management and Humanities (IJMH), Acharya and Bhojak (2024) studied the topic of FinTech adoption among the younger generation (Z) and Generation Y consumers. Data were collected using a convenience sampling method that involved a measurement by a structured questionnaire that was measured using a five-point Likert scale, in the absence of an established consumer database. The reliability analysis showed that the Cronbach alpha of all the constructs was higher than 0.7 which is a measure of strong internal consistency. The analyses were performed with the help of SPSS 22.0 and included such methods as a regression analysis and one-way ANOVA. The results found that social influence, perceived benefits and technological proficiency.

Geidam et. al (2024) have highlighted the importance of systematic literature review (SLR) based on the Preferred Reporting Items (PRISMA) of systematic reviews and meta-analyses framework, and specifically in FinTech research. As part of their investigation, they emphasized that the implementation of a systematic and transparent review approach can contribute to a high level of rigor and reliability, since it guarantees the incorporation of quality research studies. The authors highlighted the explanatory utility of the theoretical models of the TAM, TRA, UTAUT, and TOE framework to explain FinTech adoption behaviour. The fact that increased information on FinTech acceptance has been gathered through systematic reviews also demonstrates the significance of systematic review as a tool of synthesising empirical evidence and identifying all the important elements influencing consumer behaviour.

In the framework of the fast evolution of technologies and the situation after the global financial crisis, Firmansyah et. al(2023) explored the concept of financial technology development and its transformative effect on the financial sector. They conducted a SLR as a methodology in order to guarantee the inclusion of quality and relevant academic publications in their study using Scopus database. A total of sixteen articles that corresponded to the inclusion criteria were published in journals and journal continuity in the Scopus index was used as a unique selection criterion. The results were a useful contribution to the existing knowledge on the factors of FinTech adoption that strengthens the necessity to choose a source carefully when conducting a business study.

In their analysis, Kanimozhi and Rose (2022) argued on the role of technology in enhancing financial inclusion by applying FinTech and highlighting the ability to decrease the cost of transactions and increase access to microfinance services. Although the study revealed some operational inefficiencies, it concluded that FinTech has helped in the financial inclusion. On the same note, Vijai (2019) also took a look at the potential of the Indian FinTech industry with regards to its own challenges and opportunities. The paper has shed light on the technological innovations and the role of the sector in ensuring reliable and effective financial transactions, as well as observed the active involvement of government assistance in the model transformation of the Indian financial environment.

Kirobo and Lissah (2022) have reviewed 57 scholarly articles to assess the advantages and disadvantages of cashless payment systems in the world. They analysed different forms of digital transactions, as well as mobile money services and card payments. Although the results have shown significant benefits like efficiency and convenience to the user, it has also shown that there are still some challenges that are associated with security gaps and imbalanced access to online financial services. The authors supported the idea of governmental intervention to create centralized cashless payment systems that would make them more widely adopted and consider the transition issues. On the whole, the literature suggests a significant shift in the economic environment all over the world towards cashless economies, which means that more studies are necessary to enhance the security and inclusiveness of digital payment systems.

Research Methodology

Research Objectives

- To assess the level of awareness of FinTech services among Generation Y and Z.
- To identify the key factors influencing FinTech adoption.
- To examine the challenges faced by these generations in adopting FinTech services.

Research Design: Descriptive research design used in which the objective is to document and analyse the characteristics, behaviours, and perceptions of the target population systematically.

Sampling Method: The sampling strategy used was a stratified random sampling, whereby the respondents had been categorized into two generational stratification namely

Generation Y and Generation Z to give proportional representation as well as equal participation of every cohort.

Data Collection Instrument: The data were collected using a structured, close-ended questionnaire, having five sections. These questions included demographic information including age, gender, education, occupation, and income, as well as variables that touched on FinTech awareness, uptake, and challenges.

Data Analysis Techniques: Data was analysed using the Microsoft Excel with descriptive statistical data analysis tools used to summarise and describe respondent properties and patterns of responses.

Sampling Frame and Sample Size: The population of Ankleshwar city that was sampled was the urban population. According to the 2011 Census, the population of the city was 89,457 that is projected to have reached about 128,000 by the year 2025. According to the Morgan Table of determining the sample size, 400 respondents of the Generation y and Generation Z that lived in the city of Ankleshwar were selected to participate in the study.

Results and Discussion

The study analysed survey data collected from Generation Y and Generation Z respondents across various localities in Ankleshwar city. To achieve the stated objectives, hypotheses were formulated, followed by statistical analysis and interpretation of results.

Table 1: Demographic Analysis

Category	Groups	Frequency	Percentage
Age Group	12 - 27 years (Gen Z)	200	50
	28 - 43 years (Gen Y)	200	50
Gender	Male	216	54
	Female	184	46
Education Level	Postgraduate	185	46.25
	Undergraduate	96	24
	Diploma	72	18

	Higher Secondary	47	11.75
Occupation	Employed	173	43.25
	Student	79	19.75
	Self-employed	68	17
	Business owner	65	16.25
	Other	15	0.0375
Monthly Income	Below ₹30,000	113	28.25
	₹30,000 - ₹60,000	106	26.25
	₹60,000 - ₹90,000	86	21.5
	₹90,000 - ₹1,20,000	44	11
	More than ₹1,20,000	51	12.75

The sample was a 400 respondent sample consisting of 50/50 (200) representatives of Generation Z (12-27 years) and Generation Y (28-43 years). The sample included 216 respondents male and 184 female respondents. The level of education was diverse as most of them had undergraduate and postgraduate degrees. The respondents were students, employed, self-employed people, and business owners among other workers in terms of occupation. The distribution of incomes indicated that there was a variety of economic profile among the sample.

Table 2: FinTech Awareness among Generation Y and Generation Z

Awareness Level	Generation Z (12-27 years)	Generation Y (28-43 years)	Total
Yes	180	174	354
No	10	16	26
Maybe	10	10	20
Total	200	200	400

The null hypothesis posited no significant difference in FinTech awareness between Generation Y and Generation Z. Awareness levels indicated that a substantial majority of respondents from both generations reported being aware of FinTech services. A chi-square

test revealed a chi-square value of 0.702 with a p-value of 0.704. Since the p-value exceeded the 0.05 threshold, the null hypothesis was not rejected, indicating comparable levels of FinTech awareness across both generations.

Factors Influencing FinTech Adoption

H₀: Convenience, security, and Trust do not significantly influence FinTech adoption among Generation Y and Generation Z.

Multiple Linear Regression analysis was attempted to determine after assigning numerical values to the Likert scale responses related to Convenience, Security, and Trust.

Table 3: Table 3. Effects of Convenience, Security, and Trust on FinTech Adoption: Results of Multiple Linear Regression Analysis

Variable	Beta Coefficient	t-value	p-value
Convenience	0.45	3.89	0.001
Security	0.32	2.76	0.007
Trust	0.28	2.45	0.015

A multiple linear regression analysis was performed as a means to check the impact of convenience, security, and trust on FinTech adoption using numerically coded Likert-scale responses. The findings showed that convenience ($\beta = 0.45$, $p = 0.001$), security (0.32, $p = 0.007$), and trust (0.28, $p = 0.015$) had statistically significant impacts on FinTech adoption. Since all p-values were less than 0.05, the null hypothesis was rejected, which proves the significance of these factors in the creation of the FinTech use among Generation Y and Generation Z.

Challenges in Adopting FinTech Services

H₀: There are no significant challenges faced by Generation Y and Z in adopting FinTech services.

Table 4. Frequency Distribution of Challenges Influencing FinTech Adoption

Challenge	Frequency	Percentage
Transaction failures and refund issues	160	40%
Security concerns related to fraud and data privacy	120	30%
Customer support inefficiencies	80	20%
Hidden fees and charges	40	10%

The null hypothesis asserting the absence of significant challenges in FinTech adoption was tested using a chi-square analysis. Transaction failures and inadequate reporting of challenges ranked as the most common ones. Refund, then security, which is a fraud and data security issue, customer. Support inefficiencies, and concealed charges. The chi-square test had a value of 15.62 with a p-value. of 0.001. The p-value was lower than 0.05, which led to the rejection of the null hypothesis and means that these. Challenges also have serious impacts on the adoption of FinTech, and the failure of transactions and security issues. Becoming the most noticeable obstacles. Future of FinTech versus Traditional Banking

H₀: FinTech services will not significantly replace traditional banking

Table 5: Chi-Square Analysis of Perceptions Regarding the Future Role of FinTech in the Financial Ecosystem

Response	Frequency	Percentage
Yes, completely	160	40%
Yes, but only partially	180	45%
No, traditional banks will always be necessary	60	15%

To assess perceptions regarding the future role of FinTech relative to traditional banking, a chi-square test was conducted. The majority of respondents believed that FinTech would either partially or completely replace traditional banking systems. Statistical results

revealed a t-value of 4.82 and a p-value of 0.0003. Given the substantial statistical significance, the null hypothesis was rejected, suggesting strong respondent belief in the dominant future role of FinTech within the financial ecosystem.

Conclusion

The research paper points out uses of FinTech has increased among the Generation Y and Generation Z in the city of Ankleshwar due to the perceived convenience, reliability and efficiency in transaction. The results verify that the two generations have a similar level of awareness in terms of FinTech services, and other inputs like trust, security have a significant result on the adoption decision. However, unresolved issues such as transaction failures, security threats and lack of proper customer service keep obstructing widespread adoption. The statistical data also suggest that FinTech will take on a leading position in the financial sector in the future, either to supplement or even partially replace the traditional banking system. The concerns of the consumers and the enhancement of financial literacy will be crucial in the sustainable and inclusive growth of digital finance adoption.

Future Scope of the Study

This work just examines the city area of Ankleshwar. Future studies can also build upon this study by having a bigger sample with more variety of respondents (in terms of their economic backgrounds and geographical locations). The use of comparative analysis of urban and rural FinTech adoption could provide information on the digital divide and financial inclusion.

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Retirement Planning in the Gig Economy: A Multidimensional Review of Financial Literacy, Behavioral Traits, and Structural Barriers

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Abstract

The fast growth of the gig economy across India and internationally has prompted the economic fragility of the workers on the platform with special reference to the retirement planning as an urgent issue. The paper conducted a multidimensional literature review of the available literature to examine the role of financial literacy in contributing to the retirement readiness of gig workers. The study is based on the theoretical foundations of Image Theory and the Theory of Planned Behaviour and insights into how cognitive knowledge is integrated with psychological characteristics (e.g., future time perspective and self-control) and institutional ones (e.g., income volatility and the lack of employer-sponsored benefits). The results indicate that, in spite of the fact that financial literacy is a primary requirement to retirement preparedness, its effectiveness is often diluted by structural limitations inherent in the gig economy such as the absence of social security and the intermittent nature of work on platforms. The paper recognizes the existence of a strong research gap in developing countries like India where organizations have 70-90 percent of employees working in an informal environment but the current models of the financial behaviour study are still based on the formal environment. This paper summarizes all of this learning into a theory base, as well as outlines education goals of future studies and transferable benefit policies, where digital financial inclusion policies and transferable benefits frameworks are required to ensure the long-term economic security of the various groups of gig workers.

Keywords: Gig economy, financial literacy, retirement planning, informal labor, behavioral finance, India

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Introduction

India's gig economy is expanding rapidly, with more than 7.7 million individuals now employed on platforms. That figure is predicted to increase to 23.5 million by 2030 (NITI Aayog, 2022). Gig workers continue to struggle to secure long-term financial security, including beyond retirement, considering their growing economic contribution. They frequently do not have access to social security benefits, employer-sponsored pension plans, or organised financial planning tools as regular employees do.

A worldwide study conducted by the International Labour Organisation (2020) found that less than 10% of South Asian informal workers have any sort of retirement savings, underscoring the urgency of this issue. Global labour markets have seen significant changes as a result of the gig economy's growth. Although it has diminished traditional work protections, it has also produced new chances for independence and flexibility (De Stefano, 2016).

The accountability for financial well-being has progressively moved from organisations to individuals, as digital platforms now mediate a wide range of work activities, from professional freelancing to delivery and transportation services. Because of this, a lot of gig workers have irregular pay, no formal agreement to work, and little access to social security or financial education (OECD, 2020).

In these changing circumstances, a person's capacity to plan for retirement is greatly influenced by their level of financial literacy. Its effectiveness, however, is influenced by several institutional barriers and personal behavioral factors that are distinctive to gig employment. Concentrating on workers within the gig sector, this study critically examines existing research and integrates theoretical as well as empirical insights on the relationship between financial literacy and retirement planning. The paper seeks to address existing research gaps and to provide direction for policies that can better support informal and flexible labor sectors by analyzing the combined effects of cognitive, behavioral, and institutional influences.

This paper considers many definitions. Few of them consist of Retirement planning refers to preparation for the time when a person would leave the work force and work-related income would cease to exist (Sweta Tomar, 2021). According to the Organization for Economic Cooperation and Development (OECD) Inter- national Network on Financial Education

(INFE) (2011, 3), financial literacy is “a combination of awareness, knowledge, skill, attitude and behavior necessary to make sound financial decisions and ultimately achieve individual financial well-being.” Financial literacy is defined as the ability to understand and implement various financial skills such as personal financial management, budgeting, and saving that allow people to manage their money wisely (Yong et al., 2018). Financial Risk Tolerance “refers to an individual’s willingness to accept the risk of loss as a result of investing (Grable and Roszkowski, 2008)”. Future time perspective is a psychological variable that, It is a measure of the extent to which individuals focus on the future, rather than the present or past (Jacobs-Lawson and Hershey, 2005).

Literature Review

Hershey et. al (2013) developed a conceptual model for understanding the determinants of effective retirement planning behavior. Through the three dimensions, capacity, willingness, and opportunity, determine the efficiency of planning and savings for retirement. Capacity refers to the cognitive factors, aptitude, comprehension, knowledge which distinguishes two individuals from each other. The second dimension -willingness - is defined through the psychological and emotional characteristics that provide the impetus to start retirement planning and continue with it over time. It includes factors like attitude, clarity of financial and retirement goals, personality traits, ethics, virtues, and rectitude, which defines an individual’s self-image. The third dimension, opportunity includes those factors that are external to an individual like availability of employee pension plans, diverse investing options, long-term economic and financial market trends, fiscal policies, and tax regulations (Sweta Tomar, 2021).

Methodology

A number of internet databases were explored, including Google Scholar, Science Direct, Emerald, and SAGE. Reviews of the literature highlight significant problems and provide insightful information. Numerous keywords, including retirement planning, financial literacy, and demographic characteristics, have been identified in order to carry out this literature search. 45 papers that were found through this search were thought to be pertinent to this investigation. Every paper was examined and divided into different dimensions namely financial literacy, behavioral biases, structural barriers and psychological factors.

Research Gap and Aim

Financial preparedness, especially retirement preparation for gig workers, has not gotten much

attention despite the gig economy's development. The mostly research has focused on workers in the organised sector, where financial behaviour is influenced by institutional support and steady income sources (Lusardi & Mitchell, 2014; OECD, 2020). Gig economy represents employment in the fragmented labour regimes, which include low levels of social security, unstable payment and limited financial literacy opportunities (De Stefano, 2016; ILO, 2020). Informal employment is the centre of attention of much imbalance in scholarly studies particularly in developing nations like India where about 70-90 percent of the workforce falls under the informal category.

The present study addresses the gap by integrating theoretical and empirical evidence related to retirement preparedness among gig workers. It adopts a multidimensional perspective that considers financial literacy, psychological dimensions such as self-control and future time orientation and behavioral factors.

Findings

Table1: Key research paper with Citations and contributions

Year	Paper Title	Author	Country	Contribution	Citations
2001	Psychological Determinant of Financial Preparedness for Retirement	Douglas. Hershey, and John. Mowen	America	Personality constructs And financial knowledge were significant predictors of pre-retirement planning	521
2003	Financial Education and Retirement Savings	Robert L. Clark, Madeleine, d'Ambrosio, Ann, Mc Dermid, Kshama Sawant	Washington, DC	This paper has shown the importance of financial education to successful retirement planning.	129
2007	Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education Programs	Annamaria Lusardi and Olivia S. Mitchell	USA	analyze the causes and effect of financial illiteracy to better understand why retirement planning is lacking	2900
2009	Understanding the Influence of	Jasmina Petkoskaan	Australia	Degree to which workers were engaging in	348

	Demographic and Psychological Variables on Retirement Planning	Joanne K. Earl		financial, health, interpersonal/ leisure, and work planning for retirement	
2011	Financial literacy around the world :an overview	Annamaria Lusardi and Olivia S. Mitchell	Cross country analysis	Women are less financial literate than men, the young and the old are less financial literate than the middle-aged, and more educated people are more financial knowledgeable	3550
2011	How financial literacy and Impatience shape Retirement wealth and Investment behaviors	Justine S. Hastings Olivia S. Mitchell	Cambridge	financial literacy with time preferences influences retirement wealth and investment choices, behavioral barriers to effective planning.	664
2011a	Financial literacy and retirement planning in the Netherlands	Maarten C.J. van Rooij, Annamari, Lusardi, Ro, J.M. Alessie	Netherlands	Examine relationship between financial knowledge and retirement planning in the Netherlands.	1040
2011b	Financial literacy and stock market participation	Maarten van Rooij Annamaria Lusardi Rob Alessie	De Nederland sche Bank (DNB)	Author finds that financial literacy Affects financial decision making: Those with low literacy are much less likely to Invest in stocks.	5382
2012	Financial literacy, retirement planning and Household wealth	Maarten C.J. van Rooij, Annamaria Lusardi and Rob J.M. Alessie	USA	1) Financial knowledge increases investing in the stock market, allow individuals to benefit from the equity premium. 2) FL is positively related to retirement planning.	1747
2014	The Economic Importance of Financial Literacy: Theory and Evidence	Annamaria Lusardi and Olivia S. Mitchell	USA	People who are more financially literate are more likely to plan towards Retirement	8574
2019	Building a Model on Influence of Behavioural and Cognitive Factors on	Mousumi Singha Mahapatra, Jayasree	India	in the field of cognitive and behavioural decision theories, the role of financial cognition and	57

	Personal Financial Planning: A Study Among Indian Households	Raveendra, Anupam De		mental accounting is examined as antecedents to personal financial planning of Indian household	
2019	Does Behavioural Biases Influences Individual Investment Decisions	Aigbovo O., & Ilaboya O. J.	Nigeria	behavioural biases play important role in individual investment decisions	66
2021	Psychological determinants of retirement financial planning behavior	Sweta Tomar, H. Kent Baker, Satish Kumar, Arvid O.I. Hoffmann	India	investigates cognitive and psychological factors (retirement goal clarity, attitudes, personality traits, and social support) that influence retirement planning behavior.	175
2021	Financial literacy, debt, risk tolerance and retirement preparedness: Evidence from NZ	Jelita Noviarini, Andrew Coleman, Helen Roberts, Rosalind H. Whiting	New Zealand	The paper explores how financial literacy relates to debt anxiety and risk tolerance, influencing how Individuals allocate Resources for retirement in New Zealand's older population. Findings highlight the importance of literacy in managing financial risk and preparedness	79
2020	Financial literacy and retirement preparation in China	Geng Niu, Yang Zhou, Hongwu Gan	China	This study measures financial literacy levels and their effect on retirement preparedness in China, emphasizing workers' self-driven saving behaviors in the absence of formal pensions.	223
2023	Physical and psychological hazards in the gig economy system: A systematic review	Kelvin Taylor, Pieter Van Dijk, Sharon Newnam, Dianne Sheppard	Australia	study is to provide a holistic representation of the hazards across the gig economy system, representing a critical step developing a comprehensive understanding of the systemic nature of the factors contributing to safety outcomes in gig	47
2023	Behavioral finance	Bashar		examine the impact of	226

	factors and investment decisions: A mediating role of risk perception	Yaser Almansour, Sabri Elkrghli & Ammar Yaser Almansour		behavioral finance factors on investment decisions in the Saudi equity markets through the mediating variable of risk perception.	
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Evolution of Retirement Research

The results highlighted in Table 1 reveal the evident change in the academic focus where the emphasis moved not on a general review of financial literacy but on a complex study of psychological and structural aspects which are dominant in the modern working setting.

Core Determinants of Preparedness:

According to the literature on the literacy-planning nexus, created by various researchers, the most notable being Lusardi and Mitchell (2007, 2014), the people with increased financial literacy are both much more likely to plan their retirement and accumulate wealth with age.

As a predictive, Hershey and Mowen (2001) discovered that financial knowledge, coupled with certain constructs of personality, is a key antecedent of pre-retirement planning participation.

In regards to the behavior of investment, a study by Van Rooij et al. (2011b, 2012) confirms that low financial literacy is one of the factors that discourage the participation of individuals in the stock-market, thus hindering them to enjoy higher returns that are required to secure financial security in the long-term.

Psychological and Behavioural Dimensions:

The data suggests that "knowing" is not enough; "behavior" is equally critical:

Time Orientation: Hastings and Mitchell (2011) emphasise on the fact that impatience and time preferences may be detrimental in the abilities, even of a literate person so that saving can take place effectively.

Cognitive Factors: Indian studies also have shown that recent research by Tomar et al. (2021) has revealed that the two cognitive constructs of clarity of goals and social support play a crucial role in planning behavior, especially in non-traditional work environments.

Risk Tolerance: The resources that an individual allocates throughout their lifetime as a result of aging are determined by their desire to accept financial risk according to empirical evidence in New Zealand (Noviarini et al., 2021).

Global Trends and the Gig Economy Shift

Self-Driven Savings: Research in China (Niu et al., 2020) emphasizes that in the absence of formal employer-sponsored pensions, retirement preparedness becomes an

Systemic Hazards: The most recent work by Taylor et al. (2023) suggests that the gig economy introduces systemic physical and psychological hazards that complicate long-term financial stability.

Demographic Vulnerabilities:

Lusardi and Mitchell (2011) identify specific vulnerable cohorts—women, the young, and the elderly—who consistently show lower literacy levels and require targeted interventions. The findings in Table 1 provide the empirical "why" for study: while literacy is the foundation, the gig economy (characterized by income volatility and lack of institutional support) requires a multidimensional approach that combines cognitive, psychological, and structural perspectives.

Table 2: Theories Identified in the Reviewed Papers

Year	Theory	Author	Citations
2001	Social Identity Theory and Organization	Blake E Ashforth, Fred A. Mael	20887
1950	Life cycle theory	Modigliani	2574
1998	Image Theory: Theoretical and Empirical Foundations	Lee Roy Beach	297
1999	Mowen's3 M Theory	John C. Mowen	896
1977	Social learning theory	Albert Bandura	96068
1991	Theory of planned behavior	ICEKAJZEN	158931
1980	Attribution theory psychological theory	HaroldH. Kelley and John L. Michela	4717
2006	Intention Change Theory (ICT)	Boyatzis (2006)	714

The analysis below seeks to discuss the theoretical foundations as outlined in Table 2, and thus explain how these models can explain the nature of the shift in the conventional behaviour of life-cycle savings to behavioural complexity of the modern gig economy.

The identified theories in the literature provide a multidimensional prism according to which, it is possible to understand financial decision-making process, social identity, and behavior change in the framework of the retirement planning.

Behavioral and Social Psychological Theories:

Life Cycle Theory (Modigliani, 1950): This is the primordial theory of retirement studies, which assumes that all people aspire to even out their consumption over their lifespan, thus accumulating savings at work at an early age in life to use them in later ages after the retirement.

Image Theory (Beach, 1998): This theory goes beyond standard economics because it highlights the direct influence and use of the inner images of the person to make a decision on financial matters which is the conglomeration of ideals, dreams and planned actions.

Theory of Planned Behavior (Ajzen, 1991): The most mentioned among the frameworks, it is used to explain how the attitude as well as social norms and presumed behaviors control affect the intention to make future-oriented savings.

Social Learning Theory (Bandura, 1977): This theoretical solution explains how the gig workers can learn to have financial habits due to observation of other people or other social model, a learning process that is of certain value in informal industries where no formal training can be received.

Attribution Theory (Kelley and Michela, 1980): This model explains the cause attributions people give to either their financial achievements or failures, and differentiates between those causes that are internal like financial literacy and those that are external like market trends. Identity and Change Models.

Social Identity Theory (Ashforth & Mael, 2001): This theory is extremely applicable to the gig economy as the research is discussing a sense of belonging to the profession or organization. In the case of gig workers, absence of organizational identification can create a disinterested attitude towards benefits in the long term usually offered by an employer.

3M Theory developed by Mowen (Mowen, 1999): This is a Meta-Theoretic Model of Motivation and Personality presenting the hierarchical analysis of the impact that personality traits make on consumer and saving behavior.

Intention Change Theory (ICT) (Boyatzis, 2006): ICT aims at detailing how individuals change their long-term intentions hence informing the creation of interventions that will encourage gig workers to start the process of retiring.

Table 3: Measuring the Impact of Literacy

Paper title	Author	How it Measured	Sample size	Findings
Financial literacy and stock market participation (2011)	Maarten van Rooij, Annamaria Lusardi Rob Alessie	Basic Literacy Questions Advanced Literacy Questions	1,373	Those who have low financial literacy are significantly less likely to invest in stocks (Alessie, 2007)
Financial literacy around the world: an overview (2011)	Annamaria Lusardi, Olivia S. Mitchell	i)Understanding of interest compounding (ii)Understanding of inflation; (iii)Understanding of risk diversification.	1200	Women are less financial literate than men, the young and the old are less Financially literate than the middle- aged, and more educated people are more financial knowledgeable (Annamaria Lusardi, 2011)
Effects of risk tolerance, financial literacy, And financial status on retirement Planning (2022)	Heejung Park, William Marti n	Financial Literacy scale	12,686	Financial literacy, income, and savings are found to have positive relationships with retirement planning
Financial literacy and personal retirement planning: a socioeconomic approach (2021)	Kulondwa Safari, Charity Njoka, Mugisho Guershom Munkwa	Financial knowledge, Computation capability, financial education, Attitudes toward financial products	361	Financial literacy has a significant impact on personal retirement planning (Kulondwa Safari, 2021)

This table provides a critical analysis of the many methodologies that scholars use to measure

the concept of financial literacy and the subsequent inferences on the preparedness to retire in a continuum of international environments.

Different Measurement Metrics

The researchers use different measures, comparing elementary level to high complexity of literacy items, such as concepts of interest compounding, inflation, as well as more complex social-economic measures which are used to assess computational ability and attitudes to financial products.

This is a similarity that has been found to exist across the reviewed literature, with Van Rooij et al. (2011) providing the most notable example: Through a lack of financial literacy, individuals also tend to be strongly less likely to engage in any of the more complex financial procedures, such as the need to join equity markets.

Demographic Inequality:

The results provided by Lusardi and Mitchell (2011) are in line with the fact that the distribution of financial literacy is unequal as women, younger adults, and older adults all show lower levels when they are compared to those that are middle-aged and have a higher level of education.

Positive Relationship with Planning:

Reciprocal research data with large samples containing at least 12686 respondents show that financial literacy along with income and savings maintain a substantial positive correlation with advanced retirement planning (Park and Martin, 2022).

Importance of Attitudes:

Safari et al. emphasize that the concept of financial literacy goes beyond the idea of quantitative competence to include “attitudes towards financial products, which has a profound effect on the retirement planning services of an individual.

Discussion and Recommendation

As per the literature, studies show the relationship between all these variables to retirement planning.

Financial Literacy and Retirement planning dimension:

Most of the people have no idea how to plan, save and invest for retirement (Lusardi and

Mitchell, 2007; 2011b; Hastings and Mitchell, 2020). Related studies from other countries like Netherlands, USA, UK, Germany, Canada shows the significant effect of financial literacy to retirement planning (Bucher-Koenen and Lusardi, 2011; Lusardi and Mitchell, 2011; Van Rooij et al., 2011a; Boisclair et al., 2017). Clark et al. (2003) found significant impact of financial education programs on retirement savings.

Furthermore, Kulondwa Safari in 2021, done experimental study on effect of financial education program on retirement planning. In his study result shows people changes their goals after attaining the training and educational programs.

According to Lusardi and Mitchell (2014), “people who are more financially literate are more likely to save for retirement and build wealth over time”. In contrast to any employee, gig economy workers lack the employer sponsored retirement plan, education programs, and regular incomes, these affects to their retirement planning. Furthermore, the OECD (2020) emphasises that in order to enhance financial outcomes for workers in the informal sector, structural reforms must be implemented in addition to financial education. Atkinson and Messy (2021) reveals that good financial literacy leads to better financial retirement.

Psychological and Behavioral Dimension:

According to recent study, a number of “psychological factors—like risk tolerance, attitudes towards retirement, outlook on the future, clarity of retirement goals, and social group support—have a substantial impact on retirement planning”. The theoretical foundation 4 these psychological aspects come from Beach's Image Theory, which holds that an individual's internal representations of values, objectives, and workable plans influence decision-making processes—retirement planning—and has demonstrated high correlations with financial literacy, particularly for women.

Retirement planning has been found to be significantly influenced by behavioural factors like self-control, risk tolerance, and the propensity to plan ahead. One of the indicators that affects financial behaviour is time orientation since Webley and Nyhus (2006) also revealed that individuals who have a strong prospective perspective are more likely to participate in the planning of retirement funds. In addition, as Hershey and Mowen (2000) argue, the retirement preparedness is predictable by the personality traits that include planning propensity and

conscientiousness, but these qualities can be underdeveloped or lost amid the workers in the gig economy because of the prevalence of short-term contracts and uncertainty (Kerry, 2018).

According to Gerrans and Heaney (2016), BNs and goal-setting can be more effective than traditional education-based interventions using the analysis to prompt workers vulnerable to financial precarity to save towards their retirement. These results highlight the complexity of retirement planning where behavior and psychological treatment plans are crucial especially when the long-term employment values and financial consultancy or service is not available (Gerrans, 2012).

The Special Need for Retirement Planning Among Gig Employees

The workers of the Gig economy are more open to financial fluctuations because of the range of remuneration and the impossibility of the employer to use conventional retirement benefits. The value of financial literacy, retirement setting, time orientation, and socio-economic factors in promoting efficient saving orientations and behavior among gig workers have been highlighted by empirical research rendered in Malaysia and other countries where gig economies are rapidly growing. The interventions should accommodate the gap in knowledge that might exist by addressing the psychological and structural dilemmas that are unique in gig employment.

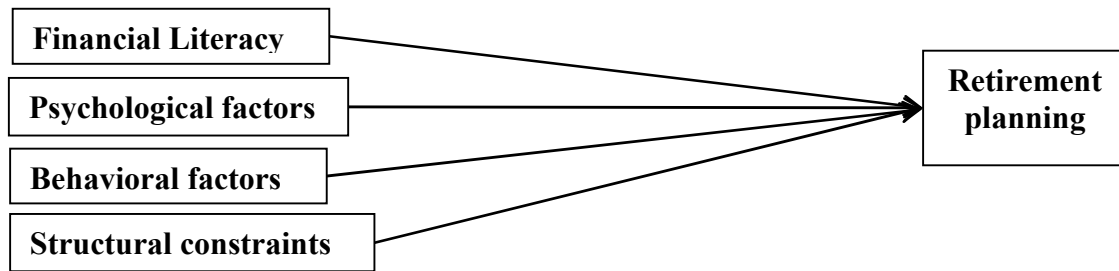
Structural and Institutional Constraints:

The very nature of a gig job is very discontinuous thus making it difficult to have proper retirement planning. Unlike traditional workers, gig workers do not always work within the precincts of official labour laws and social welfare systems. According to De Stefano (2016), the work model in platforms is usually not overseen appropriately, depriving workers of a right to a retirement plan and other related benefits.

As a result, this institutional divide widens gaps in retirement preparedness, and the same is especially true of low-wage and rural gig workers. The recent research by Southeast Asia and India highlights the urgent need to develop a digital strategy of financial inclusion, transferable benefit and specific pensions to informal workers (Sengupta and Jha, 2021; International Labour Organization, 2020).

This is a conceptual framework diagram, which shows how financial literacy, psychological traits, and structural factors converge to influence retirement planning among gig economy worker.

Conceptual Framework of Determinants of Retirement planning



(Authors own compilation)

Contribution of the study

The paper builds on the existing literature by taking a multi-dimensional view, summarizing the literature on gig economy workers' retirement planning and focusing on the financial, behavioral, social and institutional dimensions of retirement planning. Previous studies have been mostly concerned with retirement planning of working people in the formal sector. The present review further explores the unique retirement planning challenges faced by the gig workforce, especially in emerging markets like India. Moreover, this review incorporates several behavioural theories to give a thorough knowledge of retirement planning behaviour and determining the gaps in the current literature. It also outlines research gaps in need of further research, offering a framework for future empirical research and policy interventions focusing on financial security and retirement planning in the gig economy.

Conclusion

The growth of a financial risk of gig workers has been explained by the fact that the gig economy in India and the rest of the world grows rapidly, and the market affects retirement planning especially strongly. Empirical research shows that financial literacy improves the retirement preparedness, but structural barriers and psychological factors have offset the role of financial literacy. The traditional financial behaviour models have been found to be rather inapplicable to the gig workers due to income fluctuations, lack of formal retirement schemes, and financial literacy.

The present body of literature is less consistent as far as cross-regional and cross-occupational approaches are concerned, so there is a piecemeal picture of gig employee finance. Future studies should go geographically further, distinguish between the outcome

in this cohort by type and demographic factors, and by examining both behavioural and technological interventions that can potentially reduce risk.

The financial instability of the gig economy is increased by the restructuring of the labour market through the gig economy, and most notably in India, and hence becomes a big challenge to the retirement planning. Studies emphasise the need of financial literacy to prepare optimally when retiring, but studies cannot do so due to psychological constraints, as well as institutional constraints. The variability of the gig income, a lack of access to formal retirement options, and lack of financial literacy makes the traditional financial behaviour models unsuited to such population.

The need to have a more inclusive and contextually relevant research is clearer, as gaps in the existing corpus are highly pronounced, particularly with regard to the generalizability of the results to different occupations in gigs as well as the localities. Future research ought to expand to include developing countries and examine the data based on stratification by type of gig and demographics.

Limitations of the study

When conducting a review of the available literature on the topic of financial literacy and retirement planning in the context of the gig economy, it can be noted that a set of considerable limitations can be identified.

Majority of the data available is based on short term studies or cross section surveys which are insufficient to determine changes in long term behavioural alterations in terms of retirement planning. The longitudinal research is crucial to comprehending the dynamic of financial literacy development and its role in retirement preparedness in the long-term with regard to the episodic character of gig work and the changing income levels.

There is a problem with generalisation of findings across different disparate industries and geographic settings of the gig industries. The gig economy is a diverse cluster of jobs which are defined by unique institutional and financial conditions, as in the case of platform-based employees and digital freelancers.

The contemporary literature is mostly amongst the developed economies which include United States, the Netherlands and China with very few representations of the developing scenarios so as in India where the informal labour is predominant. Such differences emphasize the need to have a more geographically localized and sector-related inquiry.

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Gaming meets Advertising: Exploring Youth Reactions to Online In-Game Ads

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and

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Abstract:

The game universe has come to be the biggest force of transformation of the way the entertainment industry is operated and at the same time a massive influence on how things are advertised, yet you will notice this for the first time. The current research has examined these issues: young gamers' perception towards online game ads in relation to brand perception, their preference on advertisement format, and how gaming affects these factors. Advertising in gaming world is now a primary marketing strategy where engaged audiences spend time playing these games. Results of a structured survey as well as the use of SPSS software, have shown the prevalence of certain key trends among young gamers.

Reward-Driven Ads, also known as in-game rewards such as bonuses and virtual money, emerge as the most alluring alternatives, encouraging positive brand associations and behavior. These influential gamers, embedded deep within gaming culture, act as trustworthy go-betweens and bring about brand awareness and authenticity. The findings above offer key takeaways for marketers attempting to be successful digital gaming marketers and assist them in designing their ad formats in a way that addresses the requirements of "gamer" demands in order to ensure successful marketing campaigns to reach this nimble demographic segment. This research study points out the need for incorporating creative gamer strategies to unlock value for a dynamic market.

Keywords: Brand Advertisements, Advergames, Online Games, In-game Advertising

1. Introduction

1.1 Background

The gaming industry has emerged as a gainful platform for advertisers to engage audiences in Interactive environments. In-game advertising integrates brand messages into gameplay elements like billboards, costumes, or virtual goods, enhancing realism while promoting

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products. For instance, players in a racing game may encounter real-world brand advertisements on virtual trackside billboards.

1.2 In-Game Advertising in India

The placement of adverts inside video games is known as in-game advertising. It is comparable to having advertisements pop up while you are playing a game. Billboards, symbols, and even game components may display these advertisements. They can even be incorporated into the gameplay by having a character sport a branded costume or use a certain item.

Consider playing a racing game while driving through a virtual city and seeing billboards advertising real-world brands or the players sporting jerseys that feature the logo of actual sponsors during a sporting event.

The gaming sector offers useful information for advertisers to improve their advertising techniques. Advertisers may compile information on player demographics, habits, and preferences with user approval. By using this information, advertisers may provide more engaging and effective advertisements.

The goal of in-game advertising is to increase the sense of realism and immersion while giving marketers a channel to interact with players. It enables marketers to present their goods or services to a receptive and interested audience. The advertisements may be static or dynamically updated, which means they may alter over time to highlight various businesses or special offers.

1.2 Problem Statement

Despite the increasing use of in-game advertising, there is limited understanding of how different advertising formats influence youth perceptions and behavior. Existing studies have examined factors such as entertainment and irritation, but lack a structured model linking advertisement characteristics with brand perception and purchase intention.

Additionally, there is insufficient research focusing on:

- Reward-based advertisements
- Advertisement intrusiveness
- Influencer impact

This study addresses these gaps by developing a conceptual model that explains how in-game advertising affects youth behavior.

2.Literature Review

Abbasi and Rehman (2021) carried out a study to investigate the advertising value of pop-up ads in online games. Using the Ducoffe Advertising Value Model and Partial Least Squares analysis, they surveyed 321 online gamers. The results show that variables such as incentives, entertainment, legitimacy, customization, and annoyance play important roles in determining the advertising value of pop-up ads, which further influence the motivation of gamers. This study provides theoretical and practical suggestions for enterprises using pop-up ads to attract gamers.

Valaei and Bressolles (2013) examined the lack of research on players' perceptions of in-game ad utility. Analyzing 600 responses, they identified escapism, enjoyment, social connection, and entertainment as factors influencing experiential value. They found that most relationships between cognitive/affective involvement and experiential value were linear, but social affiliation and entertainment showed nonlinear impacts on word-of-mouth and gaming intentions.

Mishra (2021) analyzed the effect of gamification in mobile games on customer engagement. Using the concepts of psychological ownership and schema theory, the study was conducted on 326 gamers using AMOS 25 and SPSS. The findings revealed that gamification had a positive effect on customers' perceptions of advertisements in the game through psychological ownership and ad efficacy, but intrusive ads had a negative effect. The paper has both theoretical and practical implications.

Dardis (2011) investigated the effectiveness of various in-game ad formats. Comparing banner and video ads across two contexts, the authors reported that among the nonbranded games, preroll video ads had a better impact compared to banners, though midroll placement had the most significant effect. This research confirms that ad placement plays an important role in a brand's recall and attitude.

Exploration in humorous message entertainment value and consumer attitudes Jung and Min (2011) examined how the ad's entertainment level affects consumer attitude. High-entertainment commercials, including game ads, provoked more favorable brand evaluations and purchase intentions than low-entertainment commercials. However, these influences were contingent on consumer goals and dispositional factors such as the desire for cognitive closure.

Huang (2013) studied the effect of ad type (animated vs. static) and game/ad relevance in web-based games. Caricatured advertising led to greater recognition and more favorable attitudes. High relevance game ads increased perception, whereas low relevance ads increased recognition.

Terlutter and Capella (2022) also recently suggested an approach to studying in-game advertising that includes in-game ads, advergames, and ads found within popular social network games. The contribution is on the analysis of game aspects, psychological response, and social factors, gives more insights as well as topics for further research.

Varshini (2022) focused on the influence of ads in gaming apps and its associated impact on user behavior. This study underlines the need for the AMO to relate to specific audience on suitable type of ads and time, considering effectiveness.

Berlo (2016) conducted a review of 20 years of gamified advertising research that examined factors influencing In - game advertisement effectiveness. The paradigm was suggested by the study to direct future research in this area.

Robinson (2019) discussed the challenges of monetizing free-to-play (F2P) games. Despite high revenue potential, ads accounted for only 38 of total income compared to in-app purchases. The paper places great emphasis on user acquisition and monetization strategies.

Robinson (2019) has analyzed the challenges in monetization of free to play (F2P) although extremely profitable, accounted for only 38 of overall “a more balanced approach to earnings guidance and a stronger emphasis on the importance of user acquisition and monetization strategy.

Hera (2013) has investigated the rise of digital marketing games, brought about by technology and casual gaming. Due to casual games’ accessibility and social nature, they are an ideal platform for non-disruptive advertising.

YeuKorea (2021) explored the effectiveness of banner ads in games. Although often ignored, banner ads influenced implicit memory, especially among experienced gamers, indicating their potential for subtle advertising impacts.

Vratonjic (2021) investigated ad-blocking tools and their effects on online monetization. A game-theoretic model revealed that tailored monetization strategies outperform generic approaches, emphasizing the need to understand user preferences and content valuation.

3. Theoretical Framework and Conceptual Model

3.1 Theoretical Foundation

Theoretical Foundation

The present study is grounded in established theoretical frameworks that explain consumer responses to advertising in digital and interactive environments. These theories provide a strong foundation for understanding how in-game advertising influences gamer perceptions, engagement, and behavioral outcomes.

a. Ducoffe's Advertising Value Model

Ducoffe (1995) proposed that the effectiveness of advertising is determined by its **perceived value**, which is influenced by three key dimensions:

- **Entertainment** (the extent to which ads are enjoyable)
- **Informativeness** (the usefulness of ad content)
- **Irritation** (the degree of annoyance caused by ads)

In the context of in-game advertising, reward-based advertisements enhance entertainment and perceived value, whereas intrusive advertisements increase irritation and negatively affect user attitudes. This model is particularly relevant in explaining how gamers evaluate different advertisement formats.

b. Schema Theory

Schema Theory explains how individuals process and interpret new information based on their existing knowledge structures (schemas). In gaming environments, players develop cognitive schemas regarding gameplay flow and immersion.

When advertisements align with the gaming context (e.g., native ads or rewarded ads), they are processed smoothly and accepted positively. However, intrusive or irrelevant ads disrupt these schemas, leading to negative perceptions and reduced engagement.

c. Psychological Ownership Theory

Psychological Ownership Theory suggests that individuals develop a sense of ownership toward objects or experiences when they feel control, involvement, or personal connection.

In gaming, reward-based advertisements (e.g., earning coins, bonuses, or skins) enhance players' sense of ownership and participation. This increases engagement and creates positive associations with the advertised brand.

3.2 Variables of the Study

Independent Variables:

- Reward-Based Advertising
- Advertisement Intrusiveness
- Advertisement Format Preference
- Influencer Credibility

Mediating Variables:

- Perceived Advertising Value
- Gamer Engagement

Dependent Variables:

- Brand Perception
- Purchase Intention

3.3 Hypotheses

H1: Reward-based advertisements positively influence perceived advertising value.

H2: Advertisement intrusiveness negatively affects gamer engagement.

H3: Advertisement format preference significantly influences perceived advertising value.

H4: Influencer credibility positively impacts brand perception.

H5: Perceived advertising value positively influences gamer engagement.

H6: Gamer engagement positively affects brand perception.

H7: Brand perception positively influences purchase intention.

3.4 Research Gap

The gaming industry is growing so fast in the world, in this era the gaming developers are generating more income from the advertising placement in their games, such as video ads, banner ads, etc. The gamers can get rewards from watching a short video ad, this is sometime interrupting for them when it appears without rewards. To know the actual perception towards online advertising in gamers, this research is conducted.

3.5 Objectives of the Study

- a. To determine the components that affect the value of in-game advertising on brand perception among young gamers.
- b. To analyse the preference of in-game advertising among the young players.
- c. To investigate the function of gaming influencers and their impact on teenage gamers' impressions of marketed brands.

4. Research Design

4.1 Research Methodology

Research Design: The descriptive research design was used to examine the views of youth on advertisements that appear in online gaming platforms.

Population: Youth who participate in online gaming.

Sample Size: 201 respondents.

Sampling Technique: A convenience sampling method was used due to:

- Accessibility of respondents
- Time and cost constraints
- Exploratory nature of the study

Data Type: Primary data.

Data Collection Instrument: A structured questionnaire using a 5-point Likert scale ranging from Strongly Like to Strongly Dislike.

Variables Studied: Perceptions of different forms of advertisements (advertisements-free with rewards, advertisements-free without rewards, advertisements-free and paid, and advertisements with additional rewards) and a demographic variable (age).

4.2 Data Analysis Tools

Descriptive Statistics: Used to calculate the mean and standard deviation to explain general perception trends.

Kruskal-Wallis Test: This test is used to determine the differences in perception with age, as the data is not normally distributed and is ordinal.

Cluster Analysis (K-Means): Used to divide the respondents into clusters based on their similarity in perceptions of advertisement formats. 4. **Cross-Tabulation:** This technique was used to analyze the distribution of age groups in the identified clusters.

5.Data Analysis and Findings

5.1 Demographics

Table - 1 : Demographics

Category	Sub-Category	Frequency	Percentage
Gender	Male	120	60.0
	Female	80	40.0
	Total	200	100
Age	15–20 years	19	9.5
	20–25 years	109	54.5
	25–30 years	55	28.0
	30–35 years	16	8.0
	35–40 years	1	0.5
	Total	200	100
Education	8th Pass	1	0.5
	SSC	7	3.5
	HSC	21	10.5
	Diploma	1	0.5
	Graduation	105	52.5
	Post Graduation	62	31.0
	Ph.D.	3	1.5
	Total	200	100
Occupation	Student	110	55.0
	Service	42	21.0
	Business	20	10.0
	Housewife	26	13.0
	Researcher	1	0.5
	Student & Job	1	0.5
	Total	200	100

The demographic profile significantly supports the research objective. The fact that the majority of the respondents belong to the age group of 20-25 years (54.5) and 25-30 years (28) reveals that the sample population is mainly comprised of active youth who are regular smartphone and online game users, thus making it relevant for the research study on online game advertising. The fact that a major portion of the respondents are graduates and postgraduates (83.5) reveals that the respondents have the ability to critically evaluate the content of advertisements, the messages, and the strategies used in online games. Moreover, the fact that a majority of the respondents are students (55) reveals that they are a group of people who are actively engaged with digital entertainment platforms, thus increasing their exposure to online game advertisements. Hence, the demographic structure is adequate and sufficient to explain the perceptions of youth towards online game advertising in Anand, and the results can be considered representative of digitally active youth in the study region.

Table - 2 : Types of In-Game Advertisements Preferred

Responses	Frequ ency	Percentage	Responses	Freque ncy	Percentage
Ad-Free with Rewards			Ad-Free and Paid		
Strongly Like	165	82.5	Strongly Like	14	7.0
Like	22	11.0	Like	34	17.0
Neutral	8	4.0	Neutral	16	8.0
Dislike	1	0.5	Dislike	65	32.5
Strongly Dislike	4	2.0	Strongly Dislike	71	35.5
Ad-Free without Rewards			Ads with extra Rewards		
Strongly Like	113	56.5	Strongly Like	112	56.0
Like	51	25.5	Like	47	23.5
Neutral	26	13.0	Neutral	25	12.5

Dislike	5	2.5	Dislike	8	4.0
Strongly Dislike	5	2.5	Strongly Dislike	8	4.0

Table - 3 Descriptive Statistics of Study Variables and Respondents' Age

	N	Mean	Std. Deviation	Minimum	Maximum
Ad-free with rewards	201	1.29	.746	1	5
Ad-free without rewards	201	1.69	.961	1	5
Ad-free and paid	201	3.18	1.033	1	5
Ads with extra rewards	201	1.78	1.084	1	5
Age	201	2.35	.786	1	5

Table - 4 Kruskal–Wallis Test Results for Differences in Subscription Preferences Across Age Groups^{a,b}

	Ad-free with rewards	Ad-free without rewards	Ad-free and paid	Ads with extra rewards
Kruskal-Wallis H	9.523	12.311	1.971	3.286
df	4	4	4	4
Asymp. Sig.	.049	.015	.741	.511

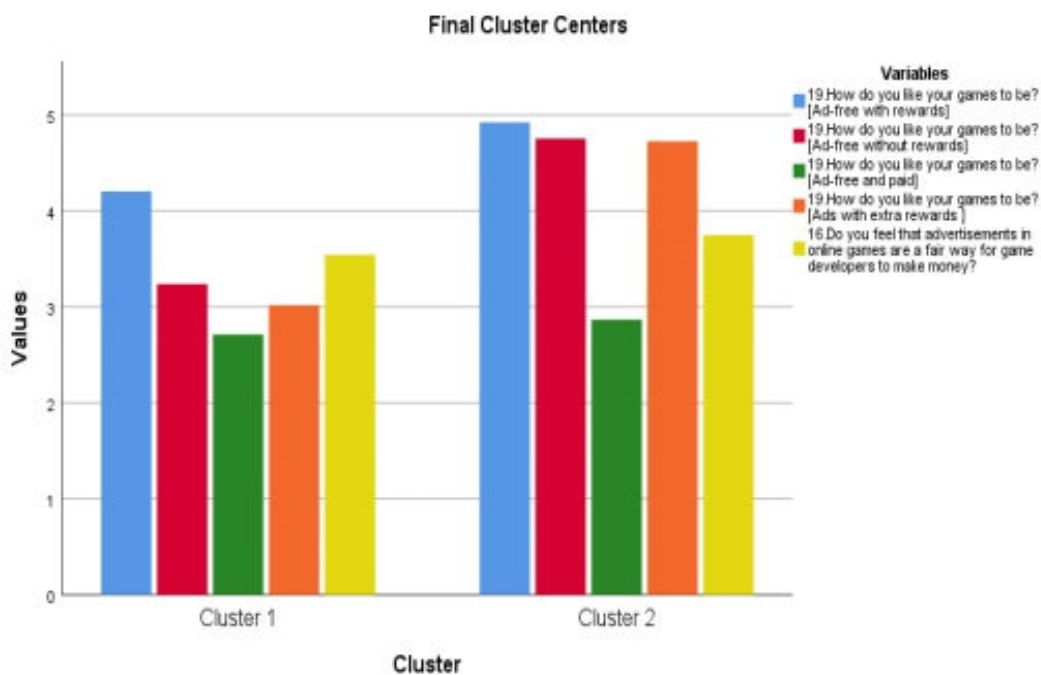
a. Kruskal Wallis Test

b. Grouping Variable: Age

The Kruskal-Wallis test reveals the existence of a statistically significant difference in attitudes toward Ad-free with rewards ($p = 0.049$) and Ad-free without rewards ($p = 0.015$) among the different age groups, as the p-values are less than the traditional significance level of 0.05. This

result implies that different age groups of youths hold different attitudes toward these two types of advertisement formats. However, there is no significant difference in attitudes toward Ad-free and paid ($p = 0.741$) and Ads with extra rewards ($p = 0.511$) among the different age groups of youths, which indicates that the attitudes of the youths toward these two advertisement formats are similar.

Figure - 1 Analysis of Gaming Preferences and Reward-Based Cluster



**Table
5 -**

Cluster Analysis of two perceptual segments

			Cluster Number of Case		Total
			1	2	
Age	15-20	Count	9	11	20
		within 1.Age	45	55	100.0
	21-25	Count	30	79	109
		within 1.Age	27.5	72.5	100.0
	26-30	Count	15	40	55

		within 1.Age	27.3	72.7	100.0
	31-35	Count	4	12	16
		within 1.Age	25.0	75.0	100.0
	36-40	Count	0	1	1
			within 1.Age	0.0	100.0
Total			Count	59	142
			within 1.Age	29.4	70.6

The cluster analysis reveals two perceptual segments among the youths. Cluster 2, which comprises a large majority of the respondents (70.6), is marked by stronger and more prominent attitudes towards various online game advertising formats, especially those that are reward-providing or have less interruption, which reflect greater

engagement and acceptance of the in-game advertising strategies. On the other hand, Cluster 1, which comprises 29.4 of the total sample, represents a relatively less engaged group with moderate levels of perception, which reflect a lack of fervor or a more neutral stance towards the advertising mechanisms in online games.

The results show that the game players have the most favorable attitude towards ad-free games that provide rewards, as a large majority of the

respondents are either strongly favorable (82.5) or favorable (11). Rewards have an effect on gaming, and this cannot be attributed to exposure to advertisements. On the other hand, the ad-free and paid games received a strongly negative response, with 68 of the respondent disliked or strongly disliked.

This suggests that although young generation dislike advertisements, they are not willing to pay for ad-free gaming services. The response to ad-free games without rewards was moderately positive, with 82 indicating liking, indicating that although youths appreciate the service without interruption even if there are no rewards, the rewards have a significant effect on acceptance and satisfaction for the gameplay experience.

In games that show advertisements and also offer rewards, the majority of the respondents (79.5) reacted positively, suggesting that the youth are willing to watch advertisements if they are directly related to rewards like extra lives, points, or bonuses. This suggests a conditional acceptance of advertisements in gameplay, where the advertisements are acceptable if they give something as a reward in return.

In general, the results indicate that attitudes among youth towards advertisements in online games are not always negative; acceptance is highly dependent on whether advertisements are perceived as beneficial or reward-enhancing. Therefore, reward-based advertising strategies are more effective and acceptable among youth gamers in Anand than compulsory or paid ad-free advertising models.

6. Discussion

6.1 Implications for Advertisers

- Brands can create localized advertisements to appeal to Indian gamers' linguistic and cultural diversity.
- Ads should enhance the gameplay experience rather than disrupt the gaming experience.
- Brands should leverage popular gaming influencers as they can enhance brand trust and engagement.

6.2 Limitations

The research was based on Anand City. The results may differ to another region. As a relatively new field of study, there is a quite limited theoretical base.

6.3 Recommendations

Through the use of non-disruptive games that are naturally inclined with the gameplay experience, marketers should focus on making in-game advertising less intrusive and annoying to gamers. Ads can be improved through reward-based systems for viewing ads, which will encourage voluntary engagement by game players. Data analytics should be used to analyze player behavior and preferences of them, allowing advertisers to create more relevant and personalized advertising that resonates with the gaming community. While age is not a significant factor of gaming behavior, advertisers should take into consideration campaign

segmentation along alternative demographic lines, such as interests and preferences of each age unit, to ensure relevant and personalized ad experiences.

6.4 . Conclusion

The game and game play-experience with ads or non ad games is totally different, players don't like the interruption while the game play, it ruins their game play experience, while some games provides rewards for watching the ads as the players can get new play things like, skin, clothes, armor and weapon from watching an ad. Hence advertisers should focus more on reward based ads and also include popular game influencers to enhance profit.

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The
tree in
the Crest is
the Historic Mango
tree where the founders
of this seat of learning
started their activity and the
rising sun behind the tree represents
the light of learning that is being
spread by this Rural Centre of Education.
The Sanskrit dictum in the form of a
crest presents the ideal viz. "Character
and conduct are the fruits of
learning" - "शीलवृत्तफलं श्रुतम्" - that
is set before it by the
great personality after
whom this place
and this Uni-
versity are
named.