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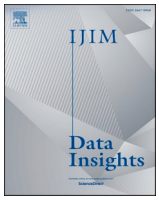

Does service quality matter in FinTech payment services? An integrated SERVQUAL and TAM approach

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ABSTRACT

As the number of FinTech start-ups continues to rise globally, the utilization of these services by users becomes increasingly crucial, especially considering potential risks. Various factors affect users' utilization of financial technology, with the quality of services offered by FinTech providers standing out as a significant consideration. The aim of this study is to investigate the relationship between the quality of services offered by FinTech payment platforms and the utilization of FinTech services. We develop a novel conceptual model integrating elements from SERVQUAL and TAM (the Technology Acceptance Model) to investigate these dynamics. To gain a comprehensive understanding, we employed a mixed methods research approach. This approach included a quantitative survey analyzed using a partial least squares structural equation model (PLS-SEM) to examine the proposed framework and the relationships between its constructs. Following the survey, a follow-up focus group discussion with industry experts and academics was conducted to delve deeper into the findings and explore the "why" behind the statistical relationships. The findings reveal a significant impact of the quality of services offered by FinTech payment service providers on the utilization of such services. It demonstrates that in the FinTech sector, perceived usefulness does not always dominate perceived ease of use. Moreover, it confirms the profound influence of perceived usefulness in shaping attitudes and subsequent behaviour related to technology use. These insights contribute to an enhanced understanding of the factors driving the utilization of FinTech services.

1. Introduction

FinTech payment services offer a convenient and efficient way for consumers to conduct financial transactions, and their popularity is rapidly increasing. The COVID-19 pandemic has further accelerated the growth in the adoption and use of FinTech applications. The quality of a service or the technology underlying a specific technical platform significantly influences the usage of that technology. Examining FinTech payment services reveals that usage intention is shaped by the technology and the financial services consumed and deployed by users. Furthermore, this distinction creates a clear boundary between the two components of FinTech payment services: the quality of financial services being offered and the usage of technology by individuals. Both elements in FinTech payment services appear to be complementary to each other. Consumers may refrain from using financial services if their service quality expectations are unmet (Markowska et al., 2023). Likewise, if financial services meet the consumer's expectations, but the technology is not user-friendly, usable, or beneficial, the consumer may hesitate to use such a FinTech service (Rupeika-Apoga & Wendt, 2022). This necessitates the examination of two distinct aspects offered to consumers on the same platform: first, the quality of FinTech payment services, and second, the usage of technology.

India has a unique fintech and mobile payment ecosystem driven by government initiatives, digital infrastructure, and adoption of innovative solutions (Migozzi et al., 2023). The demonetization drive in 2016 paved the way for Unified Payments Interface (UPI), facilitating seamless inter-bank fund transfers (Singhal, 2024). Biometric identification system Aadhaar and other components of the India Stack have enabled paperless financial services, promoting financial inclusion. Mobile wallets like Paytm, PhonePe, and Google Pay have revolutionized

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transfers and merchant transactions (Srinivasan et al., 2024). Indian fintech companies have pioneered innovative business models tailored to local needs. The regulatory bodies have developed policies to foster innovation while ensuring consumer protection and systemic stability (Verma & Chakarwarty, 2024).

The increasing affordability of smartphones and mobile technology has facilitated the adoption of FinTech solutions for digital payments among individuals with limited access to traditional banking services. In India, mobile payment options like mobile wallets, UPI, and mobile banking apps have become widely adopted by banks and businesses to reach previously underserved customer segments. With the rising smartphone ownership and user-friendly mobile apps, digital transactions have become increasingly convenient for Indians (ETBFSI, 2021). Initiatives promoting access to digital financial services through mobile devices have significantly contributed to the surge in digital payments, with UPI being a key driver. UPI enables secure and effortless money transfers between bank accounts using only a mobile phone, fostering the growth of a cashless society in India (Kar, 2018). The FinTech industry is rapidly expanding and evolving, prompting researchers to explore the factors driving users' utilization of these innovative financial solutions (Kar, 2021). With FinTech payment platforms gaining popularity across various age demographics, understanding the determinants of their continued growth is imperative. However, many studies on technology use rely on established models such as TAM (Hu et al., 2019; Singh & Singh, 2023; Singh et al., 2020), which may overlook external factors influencing user behaviours (Acikgoz et al., 2023).

The substandard service quality can lead to a lack of trust, dissatisfaction, and perceived risk among users regarding FinTech platforms (Elsotouhy et al., 2023). Transactions frequently fail or contain errors, with slow or inadequate responses to users' inquiries or service-related issues. Additionally, vulnerabilities or breaches related to security and data privacy significantly weaken users' trust in the services (Buckley et al., 2019; Gandhi & Kar, 2024). Therefore, theoretical frameworks tailored to the context of FinTech payments are needed to examine multifaceted influences. Limited research has delved into the dynamics of service quality within the FinTech industry and the factors driving usage intentions, which are likely to differ from those observed in traditional service environments. Unlike physical products, FinTech platforms offer monetary transaction services, making the quality of these services potentially as influential as in traditional banking. By examining these differences, new perspectives can be gained. Although service quality is well-established as crucial for user satisfaction and retention in most service contexts (Al-Hawari et al., 2009; Chatterjee & Kumar Kar, 2020), few studies have quantified its impact specifically regarding FinTech payment services (NGUYEN et al., 2021; Lim et al., 2019). There remains a significant gap in the literature regarding metrics for estimating this effect size. Therefore, this study aims to address this gap by proposing an integrated model incorporating TAM and SERVQUAL to analyse the relationship between service quality and the utilization of FinTech payment services.

With this aim in mind, the study sought to accomplish the following objectives:

1. To investigate the impact of service quality on users' perception of usefulness and ease of use of FinTech payment services, as well as the influence of perceived ease of use on perceived usefulness.
2. To assess the effects of users' perceived usefulness and attitudes on their intention to use FinTech payment services, and to examine the relationship between intention to use and actual usage behavior.

This research provides fresh insights by exploring how assurance, reliability, tangibles, empathy, and responsiveness influence usage intentions and behaviours both individually and collectively. Moreover, it examines the mediating effects of perceived usefulness and ease of use in this relationship, contributing to the understanding of user behaviour in the context of FinTech payment services. This approach sets a precedent for more comprehensive theoretical investigations into the utilization of FinTech payment services, enhancing the theoretical framework for future studies in the field.

Practically, our findings offer valuable insights into service quality in FinTech payments, impacting academia, policymaking, and regulation. This knowledge can help create policies promoting FinTech usage and enhancing financial inclusion and innovation. For FinTech providers, our research show up the importance of robust risk management and constant service improvement in building trust and loyalty among users, essential for the sector's growth.

The paper is organised into five sections. The introduction provides an overview of FinTech payment services and service quality concepts and identifies the research gaps addressed in this study. The second section presents an extensive literature review and hypotheses to build the conceptual model. The third section elaborates on the research methodology employed, while the fourth section focuses on data analysis and interpretation. Finally, the last section of the paper delves into a detailed discussion, examining the findings' implications and suggesting potential future research directions.

2. Relevant studies, theoretical background, and hypotheses

2.1. Fintech payment services

FinTech payment services are "technology-enabled financial solutions that facilitate the transfer of monetary value between parties for products or services" (Haddad & Hornuf, 2023). Leveraging advanced digital infrastructure, they utilize innovations such as blockchain, artificial intelligence, and analytics to offer seamless payment services to end-users (Moro-Visconti & Cesaretti, 2023). According to Jagtiani and Lemieux (2018), FinTech payment services enable economic transactions through digital interfaces and perform basic banking functions such as storing value, transferring value, and exchanging assets using electronic platforms. They enable faster and more convenient payments across mobile wallets, peer-to-peer transfers, and merchant platforms. The key characteristics that distinguish FinTech payment services include real-time processing, enhanced user experiences, global connectivity, and back-end technological innovation (Awotunde et al., 2021; Hwang et al., 2021). Leading examples include PayPal, Apple Pay, Google Pay, BNPL (Buy-Now-Pay-Later), UPI (Unified Payment Interface), CBDC (Central Bank Digital Currency), and cryptocurrency exchanges like Coinbase, introducing alternatives to traditional payment methods and value chains. The intuitive user interfaces incorporated by FinTech payments enhance ease of use and navigation for consumers (Zavolokina et al., 2016). Features like biometric login and integrated support further lower barriers to usage. Such improvements over traditional systems allow wider user adoption.

FinTech in India refers to the innovative application of technology to enhance and streamline the delivery of financial services. This encompasses a broad spectrum of offerings, including digital payments, personal finance management, online banking, peer-to-peer (P2P) lending, InsurTech (insurance technology), and WealthTech (wealth management technology) (Basu et al., 2024). India boasts a remarkable FinTech adoption rate, ranking second globally with 87 % of consumers actively utilizing FinTech services in 2022 (EY, 2022).

A key driver of this adoption is the emergence of groundbreaking innovations such as the Unified Payments Interface (UPI), developed by the National Payments Corporation of India (NPCI). UPI simplifies interbank transfers using a mobile number or virtual payment address, significantly transforming the digital payment landscape (Bali, 2021). This is evidenced by the high transaction volumes processed by platforms like PhonePe and Paytm, exceeding 868 million and 260 million transactions, respectively, in a single month of 2020 (Bali, 2021). Further emphasizing UPI's success, NPCI reported a record 7.8 billion transactions worth $135 billion processed through the platform in

March 2023 (NPCI, 2024). The Indian FinTech market is projected to reach a staggering $150 billion by 2025, reflecting a robust compound annual growth rate (CAGR) of 31.2 % between 2021 and 2025 (State of Indian Fintech Report, Q4, 2022).

India's leadership in FinTech adoption can be attributed in part to the widespread use of digital payments. Furthermore, FinTech plays a critical role in fostering financial inclusion by providing access to financial services for previously unbanked or underbanked populations, particularly in rural areas with limited traditional banking infrastructure.

However, the growth of FinTech in India is not without challenges. Network quality issues can disrupt transactions, impacting roughly two-thirds of digital payment users monthly (Sankaran & Chakraborty, 2021). Additionally, despite the increasing popularity of mobile banking, a significant portion of the population remains hesitant and prefers traditional banking methods. This highlights the need for continued efforts in financial literacy education to promote the adoption of digital financial services (Sankaran & Chakraborty, 2021).

Utilizing the latest technologies enables FinTech solutions to significantly lower transaction fees and financing costs for payments (Jagtiani & Lemieux, 2019). FinTech solutions implement advanced encryption, blockchain verification, biometric authentication, and data protection to prioritize transaction security (Hernández et al., 2019), minimizing fraud risks and fostering consumer trust in digital payments (Cumming et al., 2023). Promoting financial inclusion, FinTech solutions provide the unbanked and underserved access to affordable payment instruments (Danladi et al., 2023), with global reach further enabling access across geographies.

2.2. Service quality and servqual

Service quality is pivotal for providers seeking to attract and retain customers. While different definitions of quality have been proposed, such as zero defects (Crosby, 1980), conformance to requirements (Beamon & Ware, 1998), and internal and external let-downs (Garvin, 1983), these descriptions are mainly applicable to the manufacturing sector. It is challenging to replicate objective quality measurements in service environments using indicators such as durability, defects, and reliability (Parasuraman et al., 1988). Service quality is considered a comprehensive evaluation or perception of the service's overall excellence or superiority (Rupeika-Apoga & Solovjova, 2016). The disconfirmation model is a mutual approach to conceptualising service quality that focuses on the gap between service expectations and actual performance (Dedeke, 2003; Kar, 2021), allowing for a holistic evaluation of a customer's overall service quality.

The quality of e-services includes all the stages where customers interact with the organisation (Parasuraman, 1998). Earlier studies have proved that quality significantly influences users' attitudes toward using services (Ajzen & Fishbein, 1975; Heller et al., 2013). Various works on quality have focused on the quality of information, satisfaction, and information systems(Kettinger & Lee, 1994; Shim & Jo, 2020). Few studies have used an extended TAM to relate the various aspects of service quality with technology usage (Lederer et al., 2000). Such as consumer perception towards a website (Wolfinbarger & Gilly, 2003) or sports websites (Carlson & O'Cass, 2010).

The SERVQUAL model is a popular framework used to measure and evaluate the quality of services provided by organisations. It was developed by researchers Parasuraman, Zeithaml, and Berry in the 1990s and is widely used in service and customer experience management (Asubonteng et al., 1996). The SERVQUAL model is based on the premise that the gap between customers' expectations and their perceptions of the actual service received determines service quality. It involves five extents or factors that customers use to evaluate service quality:

1. Reliability (R): Service providers ensure consistent, accurate, and reliable delivery, encompassing fulfilling promises, offering dependable information, and promptly executing services.
2. Responsiveness (RES): The service provider aids customers by offering quick and attentive support, encompassing their readiness to help, responsiveness to customer inquiries and concerns, and swift resolution of issues.
3. Assurance (ASS): Includes the service provider's skill in building trust, providing precise information, and showcasing professionalism and competence while delivering the service.
4. Empathy (EMP): The service provider proves attentive care by understanding and addressing customer concerns, actively listening, and empathising with their emotions and needs.
5. Tangibles (TAN): Tangibles rise to the visual elements of a service, covering the physical evidence like facilities, equipment, and personnel. This includes the cleanliness and appearance of the service facility, the condition of the equipment used, and the presentation of service personnel.

The SERVQUAL model evaluates service quality by connecting customer perceptions to initial expectations across five dimensions (Parasuraman, 1998; Parasuraman et al., 1988). This approach, implemented through surveys or questionnaires, assists organisations in identifying areas for improvement in service delivery, setting goals, and tracking progress. By closing the gap between expectations and perceptions, businesses improve their service quality, satisfaction, and loyalty.

FinTech services rely heavily on building trust and user satisfaction. The SERVQUAL model, adapted for FinTech, provides a framework for evaluating and enhancing service quality in this digital financial landscape. The Table 1 below details how core SERVQUAL constructs translate into the FinTech context, emphasizing aspects crucial for user experience and building trust.

2.3. Technology acceptance model (TAM)

The Technology Acceptance Model (TAM) is a renowned model for examining users' adoption and integration of new information technology systems. Initially developed by Davis et al. (1989), TAM has undergone various refinements and extensions by several researchers. This model posits that users' perceptions and attitudes toward technology are pivotal in their decision to adopt and utilise it.

Central to TAM are two cognitive beliefs: perceived usefulness (PU) and perceived ease of use (PEU). These beliefs focus on users' assessments of a technology's potential to enhance their work performance or efficiency. Adoption and usage likelihood increases when users perceive a technology enhances their effectiveness and simplifies goal achievement. PEU refers to the user-friendliness of a system and its ease of learning and use. TAM suggests that these beliefs significantly influence users' attitudes toward technology, impacting their decisions to adopt or reject it.

Numerous studies have highlighted the significance of maximising utility in personal technology usage. Models such as TAM, the Unified Theory of Acceptance and Use of Technology (UTAUT), and its extension, UTAUT2, have been prevalent in examining consumer behaviour in the adoption of financial technology services (Negm, 2023; Slade et al., 2014; Zaid Kilani et al., 2023). These models provide insights into the myriad factors influencing users' adoption and integration of technology in their financial routines.

UTAUT, based on four key constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions—is typically employed in understanding information system adoption and use (Venkatesh & Morris, 2000). However, the choice to use TAM over UTAUT in this study is influenced by several considerations. Firstly, UTAUT is more suited for information systems, whereas TAM is more applicable to a broader range of technologies. Additionally, UTAUT's

Table 1
Understanding SERVQUAL Constructs in the Context of FinTech.

Construct	Core Description	Extended Construct (Fintech focus)	FinTech Focus Description	Citation
Reliability	The ability to consistently and accurately deliver the promised service	Transaction Integrity	Ensures all transactions are accurate and record-keeping is reliable	(Bauer et al., 2005)
		System Availability	Ensures the payment system runs smoothly with minimal service interruptions	(Oney et al., 2017)
Responsiveness	The willingness to assist customers and offer prompt service	Real-Time Processing	Employs real-time transaction processing for faster settlements and instant account updates	(Gai et al., 2018).
		Customer Support	Offers dedicated customer support channels specifically designed for addressing FinTech-related issues, such as troubleshooting digital payments	(Laukkanen, 2017)
Assurance	The knowledge and courtesy of employees and their ability to convey trust and confidence	Security Measures	Employs robust security measures, including encryption, multi-factor authentication, and regular security audits, to safeguard user data and prevent fraudulent activity	(Kesharwani & Bisht, 2012)
		Compliance and Trust	Maintains user trust by adhering to relevant data privacy regulations and industry best practices, ensuring transparency in data handling and user privacy practices	(Liao et al., 2011)
Empathy	The caring, individualized attention provided by service providers to their clients	Personalization	Customizes the user experience based on individual preferences and past interactions, enhancing customer loyalty	(Gimpel et al., 2018)
		Inclusive Design	Provides features that promote accessibility for all users, including those with disabilities or limited technical abilities	(Harsono1 et al., 2024)
Tangibles	The appearance of physical facilities, equipment, personnel, and communication materials	User Interface Design	Creates user-friendly FinTech interfaces that prioritize clear navigation and security to optimize user experience	(Zhong et al., 2021)
		Physical Components	Ensures reliable and secure FinTech touchpoints (e.g., ATMs) through maintenance, updates, and strong security protocols	(Patil et al., 2020)
User Experience	The overall experience of a user when interacting with a provided service	Seamlessness	Integrates seamlessly with other financial institutions and services, enabling users to easily transfer funds, manage accounts, and make payments through a unified experience	(Kar, 2021)
		Engagement	Utilizes gamification elements, personalized financial insights, and goal-setting features to keep users engaged and motivated in managing their finances	(Baptista & Oliveira, 2015)
Service Quality	The degree to which a service meets the customer's expectations and needs	Transparency	Provides clear explanations of FinTech products, fees, and terms to avoid surprises	(Gomber et al., 2017)
		Feedback Systems	Leverages multiple channels (e.g., in-app surveys) to gather user feedback and improve FinTech services	(Ariyanti & Joseph, 2020; Barbu et al., 2021; Sharma et al., 2023)

'facilitating conditions' construct, which assesses beliefs about organisational and technical support for a system, is less relevant in studies focusing on individual consumer attitudes and behaviours toward FinTech payment services (Venkatesh & Morris, 2000; Venkatesh & Davis, 2000). Lastly, this study aims to examine the impact of service quality on FinTech payment service usage. Integrating the SERVQUAL model as an external variable with TAM, the authors contend that TAM is more appropriate for addressing this research objective than UTAUT.

Despite the extensive application of TAM in various fields, such as information systems, marketing, and consumer behaviour, a significant gap remains in identifying the factors influencing the use of FinTech payment services. According to TAM, PU and PEU are vital in shaping an individual's attitude toward technology use, influencing their intention to use or reject it (Bashir & Madhavaiah, 2015). This model has been widely used to study and explain technology usage behaviours across domains. This study examines user engagement with FinTech services through the lens of the Technology Acceptance Model (TAM). Table 2 outlines TAM's core constructs, such as Perceived Usefulness and Perceived Ease of Use, which influence user behavior regarding FinTech utilization.

2.4. Conceptual model on technology use

Several theoretical frameworks have been used to study users' acceptance of new technologies over the years. The Technology Acceptance Model (TAM) proposed by Davis (1989) is one of the most widely applied, positing that perceived usefulness and perceived ease of use determine users' intentions to use a technology. However, critics argue that TAM overlooks external variables that can influence usage. Alternative models like UTAUT by Venkatesh et al. (2003) incorporated additional drivers of acceptance like social influence and facilitating conditions. Nonetheless, these established models may not consider contextual factors unique to adopting FinTech payment platforms.

Recent research highlighted that beyond usefulness or effort expectancy, the quality of service itself plays a key role in FinTech use. Service quality, as measured via SERVQUAL dimensions like reliability, assurance, tangibles, empathy, and responsiveness, affects levels of satisfaction, trust, and perceived risk, which are key antecedents to usage intentions. However, only a handful of studies have examined service quality in the context of FinTech payment platforms. Wei et al. (2021) developed a model linking service quality to usage intentions among mobile payment users, mediated by perceived value. Overall, the impact of service quality dynamics on FinTech usage remains underexplored.

In this research, a conceptual framework is developed by integrating the Technology Acceptance Model (TAM) and the Service Quality Model (SERVQUAL). This framework aims to examine how user intentions towards FinTech payment services are shaped by service quality dimensions, including assurance, responsiveness, empathy, and tangibles, as well as by the core TAM constructs of perceived usefulness and ease of use.

The SERVQUAL model is employed to assess the quality of services provided by FinTech companies, focusing on the gap between customer expectations and actual service experiences. This assessment encompasses various service quality dimensions: assurance, responsiveness, empathy, and tangibles. The TAM, in contrast, evaluates customer perceptions of the benefits and usability of technology, influencing their beliefs and subsequent behaviours. The quality of service can significantly affect the perceived utility and user-friendliness of technology.

In this framework, service quality is conceptualised as a multifaceted construct comprising five distinct elements that reflect various aspects of FinTech services: reliability of payment systems, responsiveness to user inquiries, assurance of security and privacy, empathetic understanding of user needs, and tangible elements of the service interface. These service quality dimensions are posited to exert an external influence on

Table 2
Understanding TAM Constructs in the Context of FinTech.

Core Construct	Core Description	FinTech Focus Description	Citation
Perceived Usefulness	The degree to which a person believes that using a particular system would improve their performance or achieve their goals	Clear communication of benefits like streamlined tasks, improved accessibility, and competitive rates drives user adoption by fostering a perception of usefulness.	(Singh et al., 2020)
Perceived Ease of Use	The degree to which a person believes that using a particular system would be free from effort	Intuitive and user-friendly designs that integrate seamlessly into financial routines are crucial to promote adoption due to the high importance of perceived ease of use	(Nurdin et al., 2023)
Attitude	A user's overall affective reaction to using a system	Positive user attitudes are crucial for long-term adoption. FinTech providers should focus on building trust, ease-of-use, and perceived benefits to cultivate a positive attitude towards their services	(Lin et al., 2022)
Behavioral Intention	The strength of a user's willingness to use a particular system	Positive behavioral intention, influenced by factors like trust and ease of use, leads to sustained adoption of FinTech services	(Gupta et al., 2023a)
Actual Usage	The real use of the system by an individual	Social influence, facilitating conditions (e.g., internet access), and habit formation significantly influence the adoption and actual use of FinTech services, especially in underbanked areas	(Azman Ong et al., 2023)

the two primary constructs of TAM—perceived ease of use and perceived usefulness (Burton-Jones & Hubona, 2006).

The theoretical model combines TAM and service quality concepts, giving a potent framework to investigate in-depth how users' intentions to accept payment services are influenced by service quality in the FinTech sector. Our knowledge of the elements impacting user's usage of FinTech payment services is enriched and generated simply by this model. Service quality within this framework comprises five distinct elements, each representing a unique facet of FinTech services: reliability in payment systems, responsiveness to user inquiries, assurance of security and privacy, empathetic handling of user needs, and tangible elements in the service interface. Technology acceptance is significantly predicted by perceived usefulness (PU) and perceived ease of use (PEU) as cognitive attributes simultaneously. Whereas PEU focuses on user perceptions of simplicity and user-friendliness, PU evaluates users' beliefs about how these services increase efficiency. This model offers a sophisticated analysis of the multitude of factors pushing users toward FinTech payment services by combining TAM constructs with service quality dimensions. Scholars can investigate direct relationships with this powerful tool. Perceived ease of use (PEU) in this framework addresses user perceptions regarding the simplicity and user-friendliness of FinTech payment services. Perceived usefulness (PU), on the other hand, relates to users' beliefs about the extent to which these services enhance their efficiency and effectiveness (Edo et al., 2023). The conceptual framework offers a comprehensive perspective for analysing the factors that influence user intentions toward using FinTech payment services. By integrating TAM constructs with service quality dimensions, this model allows us to explore the interaction between technology perception and service quality dimensions in shaping user utilisation in the FinTech sector.

2.5. Hypotheses

Service quality plays a pivotal role in shaping a positive overall experience for users, fostering trust, and meeting expectations, which in turn enhances their perception of the usefulness of a service. In the context of FinTech payment services, when users perceive tangible benefits such as convenience, efficiency, and cost-effectiveness, they are more inclined to use the service regularly. This perception of benefit is intimately connected to the quality of the service provided. Reliable and error-free transaction processing enhances the service's perceived value (Renduchintala et al., 2022). The significance of security is also highlighted, with users perceiving a service as more useful when they trust it to protect their financial data (Roca et al., 2009). This theory aligns with the Technology Acceptance Model (TAM) principles, which suggest that service quality significantly shapes users' perceptions of a service's usefulness (Davis et al., 1989). Therefore, we hypothesise that the quality of service offered by FinTech payment platforms plays a crucial role in shaping users' perceptions of the service's usefulness, influencing their usage and ongoing utilisation of the service. This hypothesis is grounded in the TAM framework, which emphasises the importance of perceived usefulness in accepting technology.

H1: Service quality is positively associated with how users perceive the usefulness of FinTech payment services.

Superior quality services often feature intuitive, well-designed interfaces (Gupta et al., 2023b). Additionally, providing clear and concise instructions for payment services further enhances this quality. Users gain considerably when reliably anticipate a service's performance and behaviour, facilitating easier incorporation into their financial routines (McKenzie-Mohr, 2000). Consequently, users are more likely to view the service as user-friendly and compatible with their existing financial practices (Yakin, 2024). A high-quality service, characterised by seamless transactions, user-friendly interfaces, transparent information dissemination, and responsive customer support, is typically perceived as more user-friendly (Klopping & McKinney, 2004). This observation aligns with the Technology Acceptance Model (TAM) principles, which emphasise the significant role of service quality in shaping users' perceptions of the ease of use of a FinTech service. The model highlights the importance of such user-friendly characteristics in influencing how easily users can navigate and integrate FinTech services into their daily financial activities.

H2: Service quality is positively associated with how users perceive the ease of using FinTech payment services.

The effectiveness with which users can accomplish tasks using a service is a crucial determinant of its suitability, particularly in addressing their time-sensitive financial needs. A service's ease of use and understandability play a significant role in enabling users to navigate it efficiently (Saksonova & Papiashvili, 2021; Wilson et al., 2021). The usability of a service is directly correlated with users' evaluations of its usefulness, especially in the context of FinTech payment services (Sharma et al., 2023). A high-quality service that meets user expectations not only diminishes barriers to adoption but also enhances users' efficiency in managing financial tasks. Perceived usefulness, in this context, pertains to users' assessment of how a technology or service fulfils their needs and facilitates their tasks. When FinTech payment services are perceived as valuable tools that simplify financial transactions, users are more likely to adopt and utilise them (Ryu, 2018). Services that contribute to increased efficiency and streamlined task completion are highly valued by users (Cima et al., 2011). Perceived ease of use positively impacts users' perceptions of usefulness and their likelihood of using these services. Conversely, if users find a technology or service overly complex or challenging to use, they may deem it less valuable or effective (Kuo & Yen, 2009), which could diminish their future propensity to engage with the technology or service. This

relationship between perceived ease of use, perceived usefulness, and the likelihood of technology use point out the necessity of user-friendly design in FinTech payment services.

H3: Users' perceived ease of use is positively associated with their perceived usefulness of FinTech payment services.

The perception of a service's value significantly influences an individual's attitude towards it (Özkan et al., 2020). When individuals perceive that a service fulfils their needs and offers benefits, they tend to develop a favourable attitude towards it (Bashir & Madhavaiah, 2015). This positive attitude is a crucial determinant of their intention to use the service. In the context of FinTech, users find these services streamline transactions and manage finances effortlessly, enhancing their experience and increasing the perceived usefulness of the service (Alalwan et al., 2018). Attitudes represent an individual's overall appraisal of an entity, whether positive, negative, or neutral.

The concept of perceived usefulness extends beyond immediate tasks (Klopping & McKinney, 2004). If users perceive that, utilizing FinTech services will improve their overall financial management and quality of life, their attitude towards these services becomes more favourable. The perceived usefulness of FinTech services is a potent influencer of users' attitudes towards them (Gupta et al., 2023d; Hu et al., 2019). A positive perception of how these services facilitate financial activities and enhance quality of life fosters a favourable attitude. As users recognise the efficiency and ease FinTech services bring to transactions, financial management, and related activities, their attitude towards using these services grows more positive (Sampat et al., 2024). This positive attitude, shaped by perceived usefulness, is integral in determining user engagement with FinTech services.

H4: Users' perceived usefulness is positively associated with users' attitudes toward using FinTech payment services.

Attitudes exhibit an individual's beliefs and thoughts about a subject. Positive cognitive attitudes toward FinTech payment services—believing them to be convenient, secure, and efficient—strongly correlate to the use of these services. In broader terms, attitudes reflect an individual's overall evaluation or feelings toward an object, service, or behaviour (Fazio & Zanna, 1981). Trust, familiarity, and alignment with users' needs and preferences often contribute to positive attitudes. Users who perceive FinTech services as enhancing their financial experiences and streamlining transactions are more likely to intend to use them. Favourable perceptions directly influence their willingness, perceived value, confidence, and overall engagement with the technology (López-Nicolás et al., 2008). Social interactions, psychological drives, self-perception, and other factors also shape users' behavioural intentions to utilise services. Individuals tend to align their actions with their objectives and internalised scripts (Vallaster & De Chernatony, 2006), thus positively affecting their service usage. The willingness and intention to use technology, termed behavioural intention, significantly influence actual usage behaviour.Users with a positive behavioural intention toward using technology are more likely to put it into practice.

H5: Users' attitude is positively associated with behavioural intentions for using FinTech payment services.

Behavioural intention means the conscious decision to engage in a particular behaviour (Limayem & Cheung, 2011). This decision-making process takes the individual to the next step: turning that intention into action through the use of technology. Positive behavioural intentions can help individuals overcome obstacles or uncertainties associated with adopting new technologies (Hooda et al., 2022; Sharma et al., 2023). These intentions serve as a driving force and overcome initial resistance or doubt. When individuals have a positive behavioural intention to use FinTech payment services, it creates a strong inclination and motivation to engage with these services (Hassan et al., 2022). This intention connects the decision to adopt and the action to use the services, ultimately encouraging increased adoption and use of the technology.

The positive influence of behavioural intention on actual usage applies to both the SERVQUAL and TAM models. This implies, for example, that if a user perceives a service as high quality in the SERVQUAL model and intends to use it, they are more likely to actually use it (Li & Shang, 2020). Similarly, in the TAM model, when users have a positive attitude towards technology and show an intention to use it, they are more likely to use it.

H6: Users' behavioural intention is positively associated with actual usage of FinTech payment services.

Fig. 1 illustrates the authors' projected conceptual model.

3. Methodology

The increasing use of fintech solutions has also raised concerns regarding data privacy, cybersecurity, and operational risks. Thus RBI is providing partial data availability due to the rapid evolution and expansion of the FinTech sector (Rao, 2021; RBI, 2021). To address privacy concerns and maintain a competitive edge, FinTech platforms such as digital payments and lending apps keep user data and details confidential, making customer base numbers proprietary metrics that are not shared publicly. Apart from data privacy, there are other few factors that contribute toward the scarcity of publicaly available data on active FinTech users in India. As per (Venaik et al., 2024) India lacks a robust data-sharing infrastructure or framework that facilitates the secure and controlled exchange of user data among fintech companies, financial institutions, and other stakeholders. Further, financial data in India is often fragmented across different institutions, such as banks, credit bureaus, and fintech companies. This lack of data integration make it difficult to consolidate and access comprehensive user data (Aayog, 2020). Given the lack of publicly available data on active FinTech users in India, we employed snowball sampling, following Johnson (2014) recommendation for unknown population samples. The snowball sampling technique is a non-probability sampling method that leverages social networks to identify research participants meeting specific eligibility criteria through peer referrals (Biernacki & Waldorf, 1981).

Initially, a group of FinTech users was identified as seed participants through online advertising on platforms such as Facebook and LinkedIn, as well as through email outreach. These initial participants were then requested to distribute the questionnaire link within their social and professional networks via email, messages, and social media platforms. Subsequently, newly referred participants continued the process by referring others, thus generating an exponential snowball effect for recruitment.

In the pilot study phase, we initially approached 20 respondents and provided them with the research instrument. These respondents were first screened with a preliminary question regarding their current usage of FinTech payment systems. From this initial pool of 20 respondents, 15 individuals met the criteria of being active FinTech users and were subsequently selected to participate in the pilot study. The decision to include 15 participants was based on ensuring a focused sample of individuals who had direct experience and engagement with FinTech payment services, thus providing valuable insights into user behaviours and perceptions within this specific user group. In determining the sample size for the pilot study, while specific guidelines for pilot studies related to FinTech are not explicitly outlined in existing literature, a commonly referenced rule of thumb suggests a minimum of 10 participants per group (Fink, 2003; Saunders et al., 2009). This rule served as a starting point for determining the sample size for our pilot study.

After gathering feedback from the participants during the pilot study, certain statements such as "How helpful do you find the budgeting feature of the Fintech app?" were revised to "FinTech payment service boosts my efficiency" to gain a more comprehensive understanding from the participants.

A pragmatic approach was used to determine the sample size of FinTech users as it is difficult to identify the total population size of this group. Applying Cochran's formula, we determined that a sample size of 385 or more responses would be necessary to achieve a confidence level of 95 % and a margin of error within ±5 % of the measured or surveyed value. We aimed to distribute the questionnaire to 900 individuals using

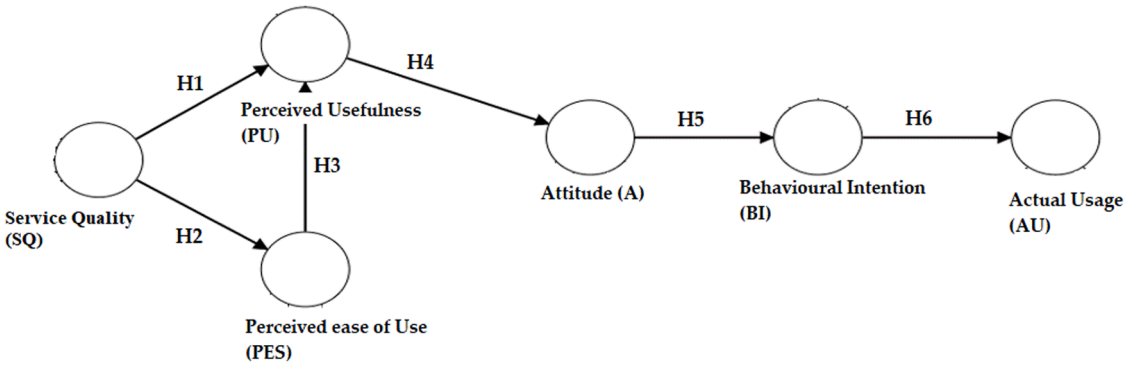

Fig. 1. Projected conceptual model (authors' creation).

our snowball sampling method to meet this criterion. Between January and April of 2023, we distributed the questionnaire through various online channels, reaching out to 850 individuals in Northern India. Our response rate was substantial, at 73.50 % (calculated as 625 responses out of 850 approaches). A preliminary screening question was included to ensure that the sample consisted of FinTech users, and respondents who answered "NO" were excluded. After data validation, 37 responses were omitted, resulting in a final sample of 588 respondents, surpassing the recommended 10-to-1 ratio of responses to paths in the conceptual model, as (Hair et al., 2019)advised for PLS-SEM validation.

A structured, self-administered questionnaire comprising two main sections was developed. Demographic information from respondents was gathered using a nominal scale in the first part of the questionnaire. Following this, the subsequent section used a seven-point Likert response scale, adapted from Jangir et al. (2022), with one indicating strongly disagree and seven indicating strongly agree. The study designed constructs and measurements, such as the TAM (Zhu et al., 2012) and consumers' perceived service quality offered by payment services, concerning five dimensions of the SERVQUAL scale adopted for the research (Asubonteng et al., 1996). The design and parameters of the study in Table 3 were based on existing research in this area.

We measured eleven constructs using 37 measures, all adapted from previous literature. This research aims to examine the structural relationship between service quality factors and the use of FinTech payment services. The TAM constructs act as mediators in this framework to clarify this connection. Since the data were collected simultaneously and thus were non-longitudinal, structural equation modelling (SEM) was the most suitable methodological approach (Hair et al., 2019). SEM deftly captures complex interactions between observed and latent constructs. According to Hair et al. (2020), PLS-SEM is particularly suitable for predictive analyses in theoretical frameworks in the social and behavioural sciences. To evaluate structural models, the measurement models of first- and second-order constructs were evaluated using the bias-corrected percentile method with a two-tailed test and 10,000 bootstrap subsamples. This assessment followed the methodology described by Franke and Sarstedt (2019).

To complement the quantitative survey data, we conducted a follow-up focus group discussion (FGD) with a mix of industry professionals and academics. The FGD participants were carefully chosen based on their expertise in user behavior, FinTech services, and financial technology adoption. The group comprised five industry representatives with experience in developing and managing FinTech payment services, and three academics with research backgrounds in user behavior and technology adoption. The FGD discussion guide focused on the key findings from the survey, particularly the relationships between service quality, perceived usefulness, and user engagement with FinTech payment services. The experts' insights, informed by both practical experience and academic knowledge, helped us triangulate the survey findings and gain a richer understanding of the underlying factors influencing user behavior.

4. Results

4.1. Sample demographics

The study included participants aged 20 and over 50, with 55.27 % men and 44.72 % women. Furthermore, 53 % of participants had an income of five lakh or more, indicating varying understanding of FinTech users on service quality parameters and their behavioural intentions when using FinTech payment services.

Table 4 presents the demographic statistics of the sample.

4.2. Assessment of first-order models with measurement

Evaluation of the measurement model for both first- and second-order constructs was carried out following the presented guidelines (Henseler et al., 2015; Yadav et al., 2024). The reliability of indicators for all latent constructs is presented in Table 5, which includes Henseler's Rho-A and composite reliability measures to assess internal consistency and average variance extracted (AVE) to assess convergent validity. Discriminant validity, on the other hand, was assessed using the heterotrait-monotrait (HTMT) correlation ratio. All construct indicator loadings exceeded the critical value 0.70 (Henseler et al., 2015). However, the model retained four elements whose AVE values exceeded the threshold of 0.50 (Sarstedt et al., 2022).

First-order constructs' discriminant validities were confirmed using the HTMT correlation ratio, as detailed in Table 6. All HTMT ratios reported (Henseler et al., 2015) remained under the threshold value 0.85. This indicates that the latent variables under study exhibit suitable discriminant validities. It is a synopsis of the study's quality criteria for these first-order constructs.

4.3. Assessment of second-order formative models with measurement

In this study, we measured FinTech payment services employing a reflective-formative approach as outlined by Franke and Sarstedt (2019). Second-order constructs were derived from lower-order construct scores, such as service quality. Notably, we do not anticipate substantial correlations among indicators in formative measurement models due to their lack of inherent interchangeability. High correlations between formative indicators indicate collinearity, impacting weight estimation accuracy and statistical significance (Hair et al., 2019). We used the Variance Inflation Factor (VIF) to gauge collinearity in PLS-SEM. In Table 7, VIF values for formative indicators remained below the threshold of 3 (Hair et al., 2019; Sarstedt et al., 2019), demonstrating no multicollinearity concerns in the service quality assessment. Convergent validity for the second-order service quality construct was established using a single global item (Sarstedt et al., 2019). Additionally, we assessed the significance and relevance of formative indicators through outer weights derived from multiple regression. Bootstrapping techniques aided in calculating these weights.

Table 3
Measurement items.

Construct & Source	Question & Measure
Behavioural Intention (Singh & Sharma, 2023)	I intend to use FinTech payment services as my primary payment method (BI1) I am committed to incorporating FinTech payment services into my financial routine (BI2) I intend to continue using FinTech payment services for my future financial transactions (BI3)
Service Quality (SERVQUAL) (Ehigie & McAndrew, 2005)	My interactions with other users have positively influenced my impression of the quality of FinTech payment services (SQ1) The overall quality satisfaction level of this FinTech payment service is very close to my ideal (SQ2) I am pleased with the business transaction payment service (SQ3) The payment deal procedure is secure when I utilise the FinTech service (SQ4)
Reliability (Johnson & Nilsson, 2003)	FinTech payment services consistently provide reliable and error-free transactions (RE1) FinTech payment services fulfil their promises and commitments promptly (RE2) The information provided by FinTech payment services is always accurate (RE3) FinTech payment services maintain a high level of dependability in handling financial transactions (RE4)
Responsiveness (Baird et al., 2011)	FinTech payment services quickly respond to my service requests (RES1) Customer support for FinTech payment services is timely and efficient (RES2) I experience quick feedback and resolution of issues with FinTech payment services (RES3) FinTech payment services are proactive in resolving potential problems (RES4)
Assurance (Kersten & Koch, 2010)	I feel confident about the security of my transactions with FinTech payment services (ASS1) The employees of FinTech payment services are consistently courteous and trustworthy (ASS2) I trust that FinTech payment services handle my financial data securely (ASS3) I am assured of privacy and confidentiality when using FinTech payment services (ASS4)
Empathy (Sivabrovornvatana et al., 2005)	FinTech payment services cater to my individual needs and preferences (EMP1) FinTech payment services demonstrate a personal interest in their customers (EMP2) FinTech payment services go the extra mile to ensure customer satisfaction (EMP3) I feel that FinTech payment services understand my specific financial requirements (EMP4)
Tangibles (Qin & Prybutok, 2008)	The design and layout of FinTech payment services are visually appealing (TAN1) FinTech payment services provide high-quality visual and technical aesthetics (TAN2) FinTech payment services offer a professional-looking platform (TAN3) The physical equipment (like card readers) used by FinTech payment services is of high quality (TAN4)
Perceived Usefulness (Karim et al., 2022)	I find FinTech payment services useful in my daily financial activities (PU1) Using FinTech payment services increases my productivity in managing finances (PU2) FinTech payment service boosts my efficiency (PU3)
Perceived ease of use (Jangir et al., 2022)	I find FinTech payment services easy to use (PEU1) Learning to operate FinTech payment services is easy for me (PEU2) Using FinTech payment services is straightforward and requires minimal effort on my part (PEU3) The FinTech platform I use is easy to navigate and understand (PEU4)
Attitude Toward Use (Karim et al., 2022)	I am positive about using FinTech payment services for my financial transactions. (A1) Using FinTech payment services for shopping is a good idea (A2) I believe that using FinTech payment services for shopping is a low-risk decision (A3) I have a favourable opinion of FinTech payment services for conducting financial transactions (A4)
Actual Usage (Rauniar et al., 2014)	I frequently use FinTech payment services to conduct financial transactions in my daily life (AU1) I rely on FinTech payment services for many of my financial activities (AU2) My actual usage of FinTech payment services has increased over time (AU3)

Table 4
Demographic statistics.

Demographics	Total respondents	% of Total Respondents
Gender		
Male	325	55.27
Female	263	44.72
Age (Yearly)		
20–24	107	18.19
25–30	162	27.55
31–35	185	31.46
46–50	89	15.13
50 and above	45	7.65
Annual Income (in INR)		
$\leq$ 5.00 lacs	279	47.44
$\geq$5.00 lacs	309	52.55

Source: Authors' calculation.

When examining significance, if an indicator's outer weight lacked significance, but its outer loading exceeded 0.50, we retained it as significant (Aguirre-Urreta & Rönkkö, 2018). Table 7 presents the outer weights of formative indicators that were both significant and relevant in the second-order service quality construct. Moreover, we examined the outer loadings of these five constructs, all surpassing 0.50 and displaying significance at the 1 per cent level. These findings indicate their substantial and meaningful contributions to the formative assessment of the second-order service quality model for FinTech services.

4.4. Structural model valuations

In this study, we followed the guidelines of Cepeda-Carrión et al. (2022), Hair et al. (2020) to evaluate the results of the structural model, including hypothesis testing, explanatory power measured by R^2 (which indicates the variance explained in endogenous constructs), and predictive ability according to the method proposed by Hair et al. (2020) sketched model. The explanatory power, indicated by R^2, ranges from 0 to 1, with higher values indicating greater explanatory capacity within the model (Stylos & Zwiegelaar, 2019). To address collinearity concerns, we evaluated the intrinsic VIF values and ensured that they remained below the critical threshold of 3.33 following the criteria of Hair et al. (2019). Further, to assess the predictive relevance of the proposed model, we have evaluated Stone-Geisser's Q^2 values for the constructs of study. The Q^2 values have been found to be greater than 0, which establishes the model's predictive relevance. This determins that the identified constructs in the model have the ability to predict the constructs effectively (Henseler et al., 2009). The significance and magnitude of the path coefficients within the structural model have been documented and are consistent with those reported by Ghasemy et al. (2020), Saari et al. (2021). All path coefficients in Table 8 showed statistical significance ($p < 0.05$) and f^2 values corresponding to service

Table 5
Construct Reliability and Validity.

Construct	Coding	Factor loadings	Cronb bach's	Alpha rhoA	Composite	reliability AVE
Reliability	**RE1**	0.920	0.943	0.942	0.958	0.851
	RE2	0.904				
	RE3	0.919				
	RE4	0.899				
Responsiveness	**RES1**	0.883	0.935	0.938	0.953	0.836
	RES2	0.915				
	RES3	0.920				
	RES4	0.939				
Assurance	**ASS1**	0.718	0.826	0.830	0.886	0.702
	ASS2	0.836				
	ASS3	0.796				
	ASS4	0.894				
Empathy	**EMP1**	0.915	0.928	0.929	0.949	0.824
	EMP2	0.907				
	EMP3	0.900				
	EMP4	0.908				
Tangibles	**TAN1**	0.865	0.9	0.903	0.930	0.769
	TAN2	0.887				
	TAN3	0.867				
	TAN4	0.889				
Perceived Usefulness	**PU1**	0.938	0.934	0.937	0.958	0.885
	PU2	0.939				
	PU3	0.945				
Perceived ease of use	**PEU1**	0.857	0.893	0.896	0.927	0.759
	PEU2	0.907				
	PEU3	0.900				
	PEU4	0.818				
Attitude Toward Use	**A1**	0.920	0.931	0.932	0.951	0.829
	A2	0.904				
	A3	0.919				
	A4	0.899				
Actual Usage	**AU1**	0.922	0.897	0.917	0.935	0.829
	AU2	0.915				
	AU3	0.894				
Behavioural Intention	**BI1**	0.929	0.934	0.935	0.935	0.884
	BI2	0.936				
	BI3	0.954				

Source: Authors' calculation.

Table 6
Discriminant Validity (Heterotrait–Monotrait Ratio).

	A	ASS	AU	BI	EMP	PES	PU	RE	RES	SQ
A										
ASS	0.443									
AU	0.675	0.413								
BI	0.533	0.324	0.555							
EMP	0.666	0.471	0.575	0.543						
PES	0.638	0.596	0.606	0.345	0.492					
PU	0.461	0.407	0.403	0.314	0.407	0.460				
RE	0.593	0.483	0.598	0.612	0.570	0.484	0.388			
RES	0.538	0.427	0.550	0.280	0.365	0.700	0.355	0.336		
SQ	0.787	0.783	0.722	0.595	0.826	0.747	0.563	0.794	0.730	
TAN	0.538	0.407	0.398	0.360	0.472	0.394	0.511	0.420	0.343	0.759

Source: Authors' calculation.

Table 7
Higher-order construct measurement.

Higher order construct	Formative indicators	Outer weights	Outer loadings	Confidence intervals CI 0.95 Outer Weights/Outer Loading	Significance Weight/ Loading	VIF outer
Services Quality	Reliability	0.297**	0.711***	[0.179;0.411]/ [0.621;0.78]	Y/Y	1.517
	Responsiveness	0.487**	0.804***	[0.379;0.588]/ [0.720;0.868]	Y/Y	1.338
	Assurance	0.221**	0.700***	[0.12;0.324]/ [0.606;0.777]	Y/Y	1.455
	Empathy	0.202**	0.692***	[0.084;0.315]/ [0.598;0.77]	Y/Y	1.613
	Tangibles	0.170**	0.606***	[0.064;0.279]/ [0.498;0.702]	Y/Y	1.346

Source: Authors' calculation.
Note: ***= $p < 0.01$, **= $p < 0.05$.

Table 8
Relationship between variables.

Hypothesis	β	T statistics	CI 0.95	Significance	VIF Inner	Q^2	R^2	f^2
H1 SQ -> PU	0.481	7.11*	[0.354–0.618]	Yes	2.064	0.253	0.284	0.156
H2 SQ -> PES	0.718	28.82***	[0.671–0.768]	Yes	1.000	0.481	0.516	1.06
H3 PES -> PU	0.069	1.09	[−0.06–0.185]	No	2.064	–	–	0.003
H4 PU -> *A*	0.474	11.50***	[0.393–0.553]	Yes	1.000	0.201	0.224	0.289
H5 A -> BI	0.578	16.48***	[0.510–0.645]	Yes	1.000	0.319	0.334	0.503
H6 BI -> AU	0.569	17.28***	[0.503–0.632]	Yes	1.000	0.298	0.324	0.481

Source: Authors' calculation.
Note(s): Path Co-efficient (**$p < 0.05$, ***$p < 0.01$), A- Attitude; BI-Behavioural Intention; AU- Actual use; PES- Perceived Ease of Use; PU- Perceived Usefulness; SQ-Service Quality; CI-Confidence Intervals at 95 %; β - Standard beta.

quality. The primary predictors of service quality were perceived usefulness (β = 0.481, $p < 0.01$, supporting H1), followed by perceived ease of use (β = 0.718, $p < 0.05$, supporting H2). However, the study's respondents indicated that the relationship between perceived ease of use and usefulness was insignificant (β = 0.069, $p > 0.05$, H3). This shows that even if a FinTech service is perceived as easy to use, users might not consider it useful if they do not understand how it benefits them financially or otherwise. Together, these five dimensions of service quality accounted for the explained variance. Service quality was a crucial predictor of perceived ease of use (β = 0.718, $p < 0.01$, supporting H2). To assess the explanatory power of each exogenous variable within the model, we calculated the variation in R^2 if a specific exogenous construct was excluded. This metric is termed the effect size f-square (f^2). Within the structural framework, the influence of the predictor variable is characterised as substantial if f2 sur-passes 0.35, moderate if f^2 falls between 0.15 and 0.35, and minor if f^2 ranges from 0.02 to 0.15 (Cohen, 1988). The high f^2 values indicated the importance of service quality in determining perceived ease of use (R^2 −51.6 %) and attitude turning into a behavioural intention (R^2 −33.4 %). Finally, perceived usefulness emerged as a critical predictor of attitude (β = 0.474, $p < 0.01$, supporting H4), followed by behavioural intention (β = 0.578, $p < 0.01$, supporting H5). The significant predictor of behavioural intention was found to be actual use (β = 0.569, $p < 0.01$, supporting H6) (see Fig. 2).

5. Discussion

This study analysed the impact of the quality of services offered by FinTech payment services on the actual use of FinTech payment services. The quality of service provided is a measurement in itself and comprises five different constructs: reliability, responsiveness, assurance, tangibles, and empathy, which constitute the SERVQUAL model. The study uses the SERVQUAL model as an external variable and an extension to the Technology Adoption Model (TAM) to analyse the effect of service quality on the usage of FinTech payment services. With the extension in TAM, the impact of service quality can be analysed on perceived usefulness and perceived ease of use of a technology, which are fundamental constructs in the TAM model.

The results of our study show that service quality positively influences perceived usefulness (H1) and perceived ease of use (H2) in FinTech payment services usage contexts. These findings are consistent with previous research. For instance, Shaikh et al. (2015) found that system quality factors such as reliability, flexibility, and integration influence the perceived usefulness of mobile banking platforms. Similarly, Baptista and Oliveira (2015) showed that higher quality m-payment interfaces enhance functional benefits and thus increase willingness to use them for transactions. Singh et al. (2020) also found that accessibility, flexibility, and integration are essential drivers of the perceived usefulness of FinTech solutions. Regarding perceived ease of use, Stella et al. (2022) demonstrated that system quality factors such as

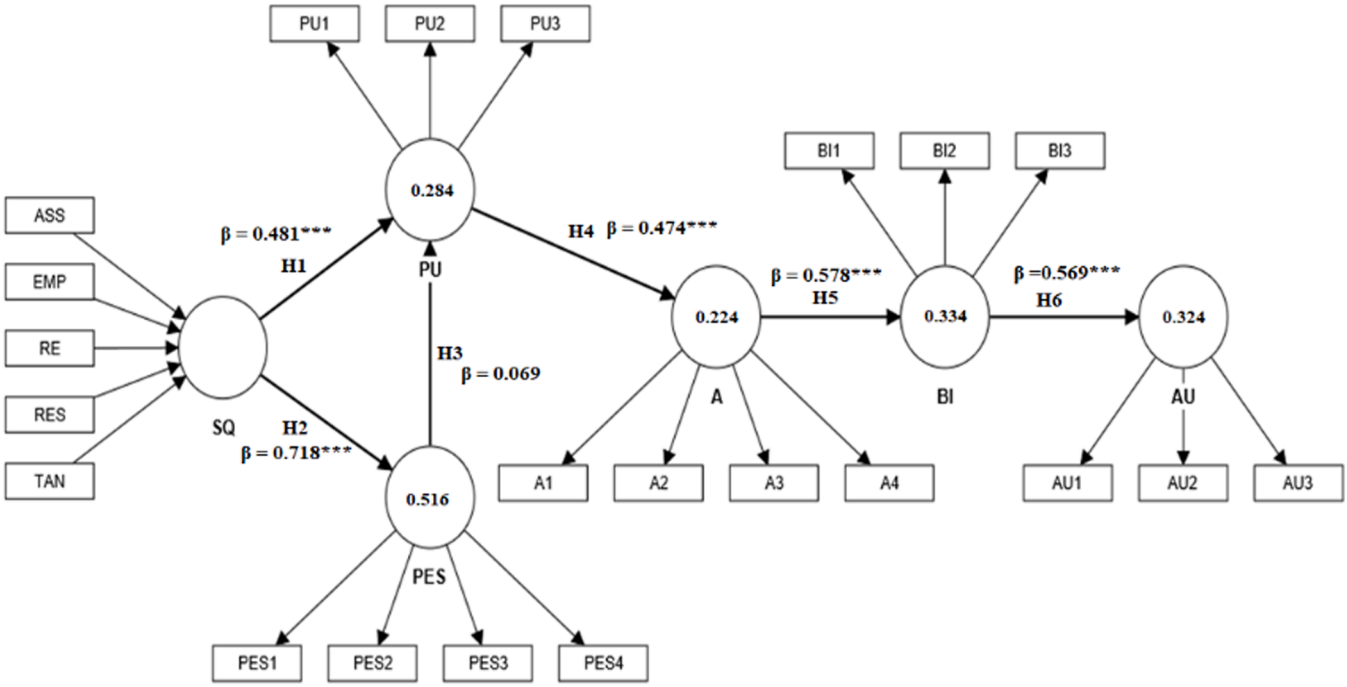

Fig. 2. A structural model with beta value, R^2, hypothesis indicators, and significant level. Source: Authors' calculation.

responsiveness, availability, reliability, and efficiency are significant determinants of perceived ease of use of mobile wallets. Kim et al. (2010) found that quality characteristics such as flexibility, integration, response time, and security positively influence the perceived ease of mobile payment service use. Hijazi et al. (2023) also showed that service quality elements such as accessibility, security, responsiveness, and assurance positively shape ease of use perceptions regarding m-payment adoption. Bapat (2022) demonstrated that usability, reliability, and functionality are salient system quality predictors of perceived ease of use driving FinTech usage in India. These results emphasise the importance of delivering seamless, secure, and user-friendly experiences to create a sense of low effort and complexity associated with FinTech payment interfaces.

Previous research on technology adoption has shown that perceived ease of use plays an important role in determining perceived usefulness. Contrary to established literature such as the Technology Acceptance Model (TAM) by Davis et al. (1989), perceived ease of use surprisingly does not significantly influence perceived usefulness (H3) in the context of FinTech payment services. This finding challenges the conventional notion that ease of use generally dictates the perceived usefulness of technology. This finding is consistent with other studies that have reported weak or non-significant effects. For example, Prastiawan et al. (2021)found that perceived ease of use did not significantly impact perceived usefulness for mobile banking adoption in Malaysia, and Caldeira et al. (2021) did not find a direct relationship between perceived ease of use and perceived usefulness in their m-payment services adoption model. Shrestha et al. (2021) also demonstrated that while perceived ease of use influenced attitudes towards blockchain payment services, it did not significantly affect perceived usefulness evaluations. Users of transaction-focused FinTech payment platforms prioritize convenience, efficiency, and utility above ease of use when evaluating a service's usefulness. This finding highlights the importance of these functional aspects for user adoption in transaction-oriented FinTech. In contrast, studies on mobile wallet adoption have shown that perceived ease of use is an important determinant that can increase perceived usefulness evaluations (Tjandra et al., 2022). The argument is that intuitive and user-friendly designs can reduce barriers to effective usage, allowing users to recognise the utility benefits of mobile wallets more easily.

To gain deeper insights into this unexpected finding, we conducted a follow-up focus group discussion (FGD) with industry professionals and academics specializing in FinTech and user behavior. The FGD discussions revealed that FinTech users tend to be more technologically adept than the average population. They are less intimidated by new technologies and are interested in what they can achieve with them. This aligns with the concept of perceived usefulness being more important than ease of use for this specific user group.

The finding that perceived usefulness positively impacts attitude (H4) aligns with previous research in the FinTech and mobile payment domains. Studies have shown that when customers recognise the benefits of FinTech payment solutions, such as convenience and efficiency, it fosters more positive mind-sets about adopting such payment modes. Similarly, attitude significantly influences behavioural intention (H5) in FinTech and mobile payment use. When users develop more favourable affective reactions towards FinTech payment solutions, their motivation to use such services gets strengthened. These studies demonstrate the importance of recognising the utility value and benefits of FinTech payment solutions, which promotes more positive user attitudes towards sustained usage over time. Previous research in the FinTech payment services field has supported the finding that an individual's intention to use a system positively impacts their actual usage behaviour (H6). To and Trinh (2021) found a strong link between behavioural intention and actual usage in their study on mobile wallet adoption. Tsai et al. (2022) identified intention as a significant factor in FinTech mobile payment use behaviour in Taiwan, which is consistent with Hossain and Gupta (2023), Kar (2021) and Laksamana et al. (2023) results in the Indian context where behavioural intention played a critical role in mobile wallet adoption and use. Verkijika (2020) extended this premise to mobile money usage in Africa, where intentions were found to be a significant driver of system utilisation levels. To and Trinh (2021) study confirmed this relationship, showing that stronger behavioural intentions led to increased adoption of mobile wallet services among customers. Gupta et al. (2023c) and Pal et al. (2021) further demonstrated that intention positively influences continued usage of payment platforms like mobile wallets in India over time. These studies collectively highlight the critical role of behavioural intention in facilitating the conversion of consumer motivations and perceptions into tangible FinTech payment system use, which is formed based on beliefs about usefulness, attitudes, and normative influences.

This study offers a novel perspective on FinTech payment services research. While previous studies have corroborated the mediating role of perceived usefulness between perceived ease of use and attitudes toward technology adoption, this research uniquely focuses on FinTech payment services. It challenges traditional TAM assumptions by emphasising factors prioritising perceived usefulness over usability, underscoring the complexity of user perceptions and attitudes toward FinTech services (Bailey et al., 2020; Sze & Chan, 2020).

Employing the SERVQUAL model, this study reveals a critical link between FinTech service quality and users' perceived usefulness and attitudes, particularly in FinTech payment services contexts. Interface design, system quality, and security guarantees significantly affect service quality, influencing perceived usefulness and user preferences (Zhou, 2021). This insight extends beyond FinTech, affecting various sectors, including hospitality, thus validating the cross-industry impact of service quality (Lenny & Kridanto, 2019).

Complementing these findings, Bailey et al. (2020) discuss the challenges of managing risks associated with FinTech, emphasising the role of artificial intelligence (AI), machine learning, and big data. They advocate for policies fostering AI innovation in finance, aligning with financial stability, market integrity, fair competition, and consumer protection. This highlights the multifaceted importance of service quality in FinTech, influencing user perceptions, attitudes, and risk management practices. Christensen (2021)) further, assert that service quality drives the adoption and use of AI-driven tools in finance. High-quality services from financial institutions increase user trust in AI tools (Mogaji et al., 2022; Rahman et al., 2023), enhancing adoption and usage. Moreover, maintaining high service quality aids in managing risks associated with AI, such as bias and discrimination, fostering user trust in AI in financial services. Integrating AI and big data fortifies financial institutions to balance service quality enhancement with proactive AI-associated risk management.

The FGD discussions further emphasized the significant impact of service quality on user perception. Experts pointed to dimensions like reliability, responsiveness, and security as being more crucial than ease of use in building user trust and satisfaction with FinTech payment services. This aligns with the SERVQUAL model's focus on these service quality dimensions.

This study highlights the pivotal role of service quality in shaping how users perceive the usefulness and trustworthiness of platforms across various industries. It offers fresh insights into applying the SERVQUAL model in FinTech payment services, challenging traditional TAM perspectives. It demonstrates that in the FinTech sector, perceived usefulness does not always dominate perceived ease of use. Moreover, it confirms the profound influence of perceived usefulness in shaping attitudes and subsequent behaviour related to technology use.

5.1. Theoretical implication

Our study yields significant theoretical implications for comprehending user acceptance of FinTech payment services within the framework of the Technology Acceptance Model (TAM) and SERVQUAL. By scrutinizing the relationships between service quality,

perceived usefulness, perceived ease of use, attitude, behavioural intention and actual use, we enhance the broader understanding of technology adoption theories in the context of emerging financial technologies. Our findings demonstrates the significance of perceived usefulness as a key determinant of users' attitudes towards FinTech payment services, highlighting the relevance of TAM in explaining user behaviour in the FinTech sector. Additionally, the significant positive impact of service quality on perceived usefulness and perceived ease of use adds a nuanced perspective to existing technology acceptance models, extending the theoretical understanding of user acceptance in the FinTech domain.

Furthermore, our research challenges traditional TAM assumptions by demonstrating that the influence of perceived ease of use on perceived usefulness may vary in transaction-focused FinTech contexts. This shows that outcome expectations may more influence users' judgments of usefulness than ease perceptions, underscoring the need for tailored theoretical models to capture the complexities of user behaviour in specific technological domains.

Additionally, our study reaffirms the predictive capability of behavioural intention in determining actual usage behaviour, affirming intentions as a critical precursor to user utilization of FinTech payment services. This highlights the foundational principles of TAM and the robustness of behavioural intention as a theoretical construct in elucidating technology usage behaviours.

5.2. Practical implications

This study emphasises the criticality of service quality in shaping customers' perceptions of FinTech payment services usefulness and ease of use. To enhance the user experience and foster positive perceptions, FinTech service providers should prioritize key quality dimensions including reliability, responsiveness, security, accessibility, and integration. Particularly in transaction-focused FinTech payments, perceived usefulness emerges as a more influential factor than ease of use in driving utilization. Hence, providers are encouraged to emphasize the utility benefits offered by their payment solutions, such as convenience, efficiency, and functional value. Establishing positive attitudes is crucial as they significantly influence customers' intentions to use FinTech payments. To cultivate favourable mind-sets among customers, providers can leverage effective marketing campaigns and user education initiatives. Given the strong predictive power of intentions in determining actual system use, FinTech payment players should identify strategies to solidify user motivations and facilitate the translation of intentions into sustained usage behaviours.

As mentioned in Section 5, our findings demonstrate that the service quality of financial technology (fintech) payment systems significantly influences how users perceive these systems' usefulness. Based on the study's findings, to ensure widespread adoption, fintech companies need to prioritize optimizing their service quality by enhancing system reliability, transaction speed, security measures, and user-friendly interfaces. By delivering superior service quality, fintech payment providers can gain a competitive edge, differentiate themselves from competitors, and attract more users who perceive these systems as highly useful. Excellent service quality also contributes to customer retention and loyalty, as satisfied users are more likely to continue using and recommending payment systems that offer a seamless experience.

However, the finding contradicts the widely accepted Technology Acceptance Model (TAM), which suggests that perceived ease of use is a significant determinant of perceived usefulness. Based on the findings, the study establishes that users prioritize other aspects, such as security, convenience, or trust, over ease of use when evaluating the usefulness of FinTech payment services. The practical implication of findings is that FinTech companies should prioritize the user's value the most when assessing the usefulness of their payment services rather than solely focusing on emphasizing ease of use. Marketing and promotional efforts should emphasize the key aspects contributing to perceived usefulness rather than primarily highlighting the simplicity of use.

Further, the study reveals that perceived usefulness positively impacts attitudes toward the use of fintech payment services, highlighting the need for FinTech companies to prioritize delivering tangible value, addressing specific user needs, and effectively communicating the benefits of their solutions to drive positive attitudes and adoption among their target audience. The findings also emphasize the significance of user attitudes in driving the adoption and success of FinTech and mobile payment services in an increasingly competitive and fast-growing market. FinTech companies should focus on strategies that positively influence user attitudes. This could involve crafting compelling narratives and messaging that highlight the benefits, convenience, and trustworthiness of their services. The findings presented in Section 5 demonstrate that when an individual intends to use a fintech payment system, it has a positive impact on their actual usage behavior. Fintech providers need to focus on generating positive intentions among potential customers to drive actual usage of their payment systems. They should create awareness about the benefits of their solutions through marketing campaigns and educational efforts.

The study highlights the importance of two key factors for FinTech companies to grow and succeed: robust security measures and continuous improvement of their services. Firstly, it is crucial for FinTech providers to have strong risk management practices in place, such as data encryption, fraud detection, and regulatory compliance, to build trust and confidence among users. Secondly, the research reveals the significance of consistently enhancing and improving the user experience to meet and exceed customer needs. Continuous improvement is essential to ensure that services remain relevant and competitive, and it can lead to increased customer satisfaction and retention, which is vital for long-term success.

Although this model primarily focuses on FinTech, its adaptability extends to other domains such as health-oriented mobile apps, real-time gaming applications, and back-end information systems (Sharma et al., 2023b; Ullah et al., 2021; Wong et al., 2022). The model's broad applicability is supported by the observation that the usage of these technologies is often contingent upon the quality of services provided.

5.3. Study limitations and future research

This study solely employed a quantitative research approach. While PLS-SEM is a quantitative analysis technique, incorporating qualitative research methods, such as interviews or focus groups, can offer a deeper understanding of users' perceptions and experiences regarding service quality in FinTech. It would be valuable for future researchers to incorporate qualitative or mixed methods approaches to address the limitations of relying solely on quantitative methods.

The sample size for this study consisted of 588 respondents. Future research efforts should explore the possibility of increasing the sample size to enhance the generalizability of the study's findings and strengthen statistical accuracy and power.

Various contextual factors, such as the specific type of FinTech service, the regulatory environment, and the level of technological infrastructure in a particular market, may impact service quality on users' intentions. Therefore, future research should investigate these contextual factors to understand better, how service quality interacts with different variables.

TAM and SERVQUAL models focus on the direct relationships between variables. However, mediating and moderating factors may influence the relationship between service quality and users' intentions. Future research could explore these factors to gain a more profound understanding of the mechanisms underlying the impact of service quality on user intentions.

CRediT authorship contribution statement

Vikas Sharma: Writing – review & editing, Writing – original draft,

Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Kshitiz Jangir:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Munish Gupta:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Ramona Rupeika-Apoga:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization.

Declaration of competing interest

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

Data availability

Data will be made available on request.

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