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The impact of mobile-wallet factors on customer satisfaction and customer loyalty: A study of B-schools in Hyderabad

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ABSTRACT: This empirical study investigates the impact of mobile-wallet usage dimensions on customer satisfaction and loyalty. The study determined the effect of M-wallet service on customer satisfaction and assessed the mediating role cost on the relationship between customer satisfaction and customer loyalty. This empirical research ascertains the significance of mobile wallets in contributing to financial inclusion, evaluates the impact of M-wallet services on the satisfaction of customers, and assesses the consequential impact on customer loyalty. The data were gathered from mobile-wallet users from B-school students in Hyderabad city, India, via a structured questionnaire that has 24 items to measure seven reflective constructs: service quality, ease of use, usefulness, cost, security, loyalty, and customer satisfaction. Purposive sampling was used to maintain the characteristics of the respondents, as the empirical study focused on B-schools in and around Hyderabad. The valid responses of 500 participants were subjected to exploratory and confirmatory factor analysis and SEM analysis. The survey instrument was reliable and consistent as revealed by reliability statistic Chronbach's alpha, and that the constructs-maintained discriminant validity. The measurement and structural models and model fit statistics indicate that data fit the model well. The five factors of service quality, ease of use, usefulness, cost, and security are statistically significant and influence the customer satisfaction of mobile wallet users. However, the impact of security and ease of use on customer loyalty was not statistically significant. Perceived cost partially mediates the nexus between customer satisfaction and the loyalty of mobile wallet users. The study assessed the long-term impact of mobile wallet services on customer allegiance and contributes nuanced insights into the dynamic landscape of mobile wallet services. Customer satisfaction, trust, and ease of use are critical for increasing customer loyalty and satisfaction. The study suggests that m-wallet providers should enhance control over their technological tools, improve service quality, reduce costs, enhance security, foster customer relationships, and understand their aspirations. Electronic services, such as mobile wallets, have transformed businesses, simplified operations, provided information, and fostered customer relationships. Organizations must improve service quality and specifications to ensure customer satisfaction, leading to increased market share, competitive capabilities, and customer growth. The research indicates that companies can encourage the use of m-wallets by informing customers about their creation, password configuration, and safeguarding. It emphasizes the need for businesses to learn from developed countries' experiences in payment channels and electronic financial transactions. It also emphasizes enhancing technology management for service efficiency, cost reduction, customer relationship building, and security. This empirical research investigates the long-term impact of mobile wallet services on customer loyalty, customer satisfaction, and customer satisfaction. This suggests that managers should prioritize trust and satisfaction to increase loyalty and value, thus fostering enduring customer relationships. Digital wallets could facilitate transformative innovation in central bank digital currencies (CBDCs), despite their significant impacts, by enhancing their relationship with digital wallet applications.

Keywords: mobile wallet, customer satisfaction, loyalty, usefulness, ease of use.

I. INTRODUCTION

Globalization has significantly impacted people's lives through information and communication technology, enhancing social, economic, and cultural aspects. This sophisticated infrastructure facilitates communication, information discovery, and internet use, significantly affecting service production and delivery [69]. Technology advancements have revolutionized services, starting with modern electronic methods to wireless communication revolution [70]. These advancements have led organizations to provide high-quality services to their beneficiaries [71]. Organizations are prioritizing the provision of high-quality service to increase customer satisfaction and confidence [72]. Technological innovations, particularly M-wallets, have led to the rise of cashless societies in numerous countries, expanding consumer payment options [73]. Mobile wallets are a widely used and crucial type of electronic payment system [74]. COVID-19, digital currencies, and electronic payment systems led to the development of mobile wallets, which use electronic devices for internet payments [75]. M-wallet is a payment method that does requires only phone and ID numbers eliminating the need for customers to open bank account and carry cash [76]. M-wallets are mobile phone-based transactions for secure and simple money transfers between individuals facilitated by mobile browsers and applications [77]. M-wallets allow users to securely send and receive money, pay bills, perform transactions, book travel and hotel reservations, and manage their accounts [78].

Mobile wallets have become revolutionary financial tools in the modern digital age, changing the way consumers interact with financial institutions and conduct financial transactions. The rapid evolution of technology has facilitated the integration of mobile wallets into everyday life, providing users with convenient and secure means of managing their financial transactions. Mobile wallets, which are digital wallets, are applications that enable users to store and manage various forms of payment information, such as credit and debit cards, in a secure electronic format on their smartphones. These digital repositories have become instrumental in the way individuals conduct financial transactions, moving beyond conventional methods toward a more streamlined and tech-savvy approach.

The significance of mobile wallets transcends mere convenience; they offer a plethora of functionalities ranging from facilitating online purchases and in-store transactions to utility payments, ticket bookings, and recharges. Mobile wallets, which are increasingly used by smartphone users, are transforming the way individuals engage in financial transactions, demonstrating both technological innovation and societal shifts. The shift toward digitalization is an undeniable trend that no industry can avoid. Regardless of the industry's scale, nature, or consumer orientation, the digital wave is set to impact every sector, ushering in a transformation of the economic landscape. The widespread use and influence of mobile phones have significantly altered global telephony, surpassing other technical devices in their capacity to promote, sell, create, and distribute goods and services more effectively than previous technological devices do. Both service providers and retailers stand to gain greatly from this paradigm change [1]. In addition to revolutionizing traditional banking payment services, the widespread use of smartphones has opened new markets for nonfinancial companies such as Google. These companies have been able to expand their customer base and explore unexplored avenues by diversifying their offerings, particularly in the area of alternative and inventive payment solutions [2]. Financial transactions have become immediately accessible to us in our homes and pockets due to the development of digital financial services, which have bypassed traditional banking systems. This change has expanded the user base and improved the ease of financial transactions [3]. The increasing acceptance of digital payments is being propelled by technological developments in mobile devices and banking apps [4].

The mobile wallet, essentially a modern replacement for conventional wallets, expands the functionality of smartphones, essentially turning them into virtual debit cards and facilitating on-the-go financial transactions [5]. This evolution allows retailers to tap into new avenues for connecting with consumers and boosting sales, as customers can make spontaneous purchases with quick and easy access to their funds.

Prominent mobile wallets such as Apple Pay, Samsung Pay, Google Pay, PayPal, Amazon Pay, Paytm, PhonePe, and PayZapp offer a diverse range of services, including utility payments, ticket bookings, and recharges. Customers using mobile payments more frequently do so because of the ease of use and transparency that these technological developments have brought about [6].

1. IMPORTANCE OF THE STUDY

In 2020, the COVID-19 pandemic disrupted the economy and caused job losses, highlighting the importance of m-wallets in facilitating payment operations. The Jordanian government has urged people to use m-wallets and cashless payment transactions to combat COVID-19, following the World Health Organization's recommendation for such measures [79, 80]. In the last four years (2019--2023), approximately 17000 billion

mobile wallet transactions have occurred in India [81] (Statistica/Source from RBI, India). Therefore, the research's significance lies in the novelty of mobile wallets, a new electronic payment system, which is one of the few topics related to post-COVID-19.

Other researchers reported the use of mobile wallets in general, Gen Z and Millennials in particular; however, the research on the use of mobile wallets in the context of B-schools is scanty, as most younger generation students (18--35 years old) who extensively use mobile wallets and other mobile applications for most financial transactions have not been explored. This study makes an attempt to close that gap.

II. LITERATURE REVIEW

Dhaigude et al. [7] investigated the influence of perceived customer value and loyalty on mobile-wallet customers via structural equational modeling analysis. The included satisfaction and trust are catalysts for customer loyalty. The nexus among customers' perceived value and their loyalty to mobile wallets is mediated by their level of trust and satisfaction, according to the authors. Ajina et al. [8] investigated the influence of mobile factors on the satisfaction and loyalty of mobile wallet customers. The hypotheses in this study were tested via SEM analysis with IBM AMOS. A statistically significant positive effect of the factors of service quality, perceived usefulness, and ease of use on the satisfaction and loyalty of mobile wallet customers was observed.

Over ⅔s of global mobile wallet users are concentrated in China and India, which is driven primarily by the preference of middle-class consumers for the convenience of mobile options over traditional cards. The surge in popularity of mobile wallets in these regions is attributed to their ability to circumvent underdeveloped financial infrastructure, as highlighted by [9].

According to IMARC, a renowned market research firm, the worldwide mobile payment industry surpassed US$ 1,146 billion in 2019, and a strong increase is predicted from 2020--2025 ('Mobile payment market', n.d.). According to projections, in 2020, there will be more than one billion mobile payments made in-store globally [10]. Notably, mobile wallet transactions in India have experienced a remarkable 40-fold increase over a five-year period, growing at a rate twice as quickly as the world average. The digital economy in India currently constitutes approximately 8% of the GDP, with expectations of it expanding to as much as 30% of the GDP by 2025 [11].

Furthermore, smaller mobile wallet companies are unable to compete with industry giants, mostly because of the hegemony of cashback offers in the mobile wallet market [12]. Prominent internet behemoths such as Amazon are aggressively pushing e-wallet transactions through the introduction of a variety of alluring incentives, such as return-friendly bonuses [13].

The authors adopted the Ajina et al. [8] model, as this model examines the effects of mobile wallet service factors on customer satisfaction and loyalty. The study also indicated that the relationship between customers' perceived value and their loyalty to mobile wallets is mediated by their level of trust and satisfaction, according to the authors. This study further investigated the impact of mobile dimensions on the satisfaction and loyalty of mobile wallet customers. The hypotheses in this study were tested via SEM analysis with IBM AMOS. Several researchers have carried out their respective studies and tested their respective hypotheses with structural equation modeling via AMOS/PLS-SEM using nonnormal and normal data. Furthermore, via SEM analysis, a researcher can easily comprehend the behavioral and psychological aspects of mobile wallet use among B-school students.

The study's main contribution lies in advancing research on m-wallet usage by testing the extended expectation-confirmation model (EECM) within the Indian context. This was achieved by integrating the preadoption paradigm of the extended unified theory of acceptance and use of technology (UTAUT) with individual mobility and postadoption dynamics of the ECM. The role of certain demographic variables is also supported by the framework study under consideration. The study's conclusions are meant to significantly advance practice, research, and policy. On the basis of the theory of reasoned action (TRA), this study adds "intention to recommend" as a logical extension of "usage intention" for mobile wallets, making it a unique contribution to the literature on mobile wallet adoption and usage. Objectives of this study are given as:

- Investigate whether, from the standpoint of users, m-wallet services affect customer satisfaction and loyalty offered by financial institutions.
- Ascertain how m-wallet services affect client satisfaction.
- To evaluate how m-wallet services affect patron loyalty.
- Customer satisfaction is used to gauge how m-wallet services affect patron loyalty.

The importance of mobile wallets in fostering financial inclusion is a central focus of this study. The research targets to uncover the specific ways in which M-wallet services contribute to the broader goal of making financial services accessible to a wider population. In addition, this research delves into the realm of customer satisfaction,

seeking to determine how the provision of M-wallet services influences the overall satisfaction levels of users. The study evaluates various factors, including ease of use, security, and the range of services offered, to gauge their impact on customer contentment. However, this area of M-wallet and its related factors have not been researched by authors across the globe. Therefore, the researcher carried out this study through a survey of B-school pupils in Hyderabad and its environments.

The study focuses on customers and m-wallet companies, with customers placing greater importance on receiving higher-quality service from these companies. The study aimed to answer questions about the quality of services provided by M-wallet companies, ensuring customer satisfaction.

1. RESEARCH GAP

The nexus among M-wallet services and customer loyalty has been under researched. The authors' comprehensive literature survey to uncover the factors that contribute to the establishment of a loyal customer base within the realm of mobile wallet services is not fully sourced. This research employs quantitative research, incorporating surveys and data analysis to derive meaningful insights. The outcome of this empirical research are anticipated to provide valuable perspectives for enhancing the effectiveness and adoption of mobile wallet services, ultimately contributing to financial inclusion and fostering customer satisfaction and loyalty. Thus, this empirical study was conducted to uncover the structural relationships among the factors that affect M-wallet services and their customer satisfaction and loyalty. Specifically, the study investigates the nexus among mobile-wallet service dimensions on customer satisfaction and loyalty.

Most of the studies explored mobile wallet use and its consequences for small and large businesses, e-retaining, markets, online shopping, and other industrial sectors. However, not a single study has been carried out by past researchers on mobile wallet use intentions in Gen Z and Millennials. Therefore, to fill this gap and complement the literature, we conducted this study by surveying business school students, who are research scholars in the Hyderabad Metro. The students and research scholars of business schools fall under Gen Z and Millennials. Therefore, this study is the first of its kind and unique in the context of mobile wallet use.

2. RESEARCH QUESTIONS

The following questions were addressed in the study:

- Are the mobile factors influencing the loyalty and satisfaction of mobile wallet customers?
- Does the perceived cost mediate the relationship between the satisfaction and loyalty of mobile wallet customers?
- Are consumers' m-wallet services deemed sufficient and capable of meeting their needs?
- What is the impact of m-wallet service characteristics such as cost, security, usefulness, and ease of use on user satisfaction?
- What is the impact of m-wallet service factors like service quality, cost, usefulness, ease of use, and security on customer loyalty?
- Is there a nexus among m-wallet service and customer loyalty that is mediated by customer satisfaction?

III. THEORETICAL FRAMEWORK

As mobile wallets have become more prevalent in a cashless society, this study examines the effects of service quality dimensions on customer satisfaction and loyalty, with a focus on cost, security, usefulness, and ease of use. The advent of digital wallets, e-commerce, mobile payments, and other novel payment methods has advanced the world economy toward a cashless society. The Ajina et al. [8] model served as the inspiration for the conceptual model. The authors used factors like service quality, ease of use, usefulness, cost, security, loyalty and customer satisfaction. The authors used this seven-factor model in which 5 factors service quality, ease of use, usefulness, cost, and security are independent variables impacting the loyalty and customer satisfaction of mobile wallet customers. Following this model, the authors developed the framework presented in Figure 1. The mediation model is presented in Figure 2.

With the help of this study, government regulators and mobile wallet service providers can develop a comprehensive framework that will increase the uptake and use of wallets by merchants and traders. In regard to mobile wallets, this group is comparatively understudied. Addressing the gap in the literature, the research model offered in this study may be helpful to academics and scholars doing additional research on the adoption of m-payments, particularly in the case of mobile payments, where studies are few and still in the early stages.

Additionally, this study is the first to specifically examine mobile payments by polling B-school students, the majority of whom are Gen Z and Millennials.

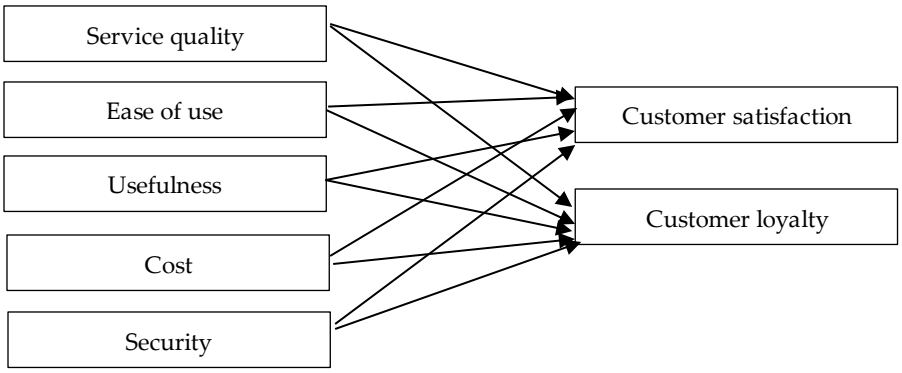

FIGURE 1. Conceptual model (authors creation).

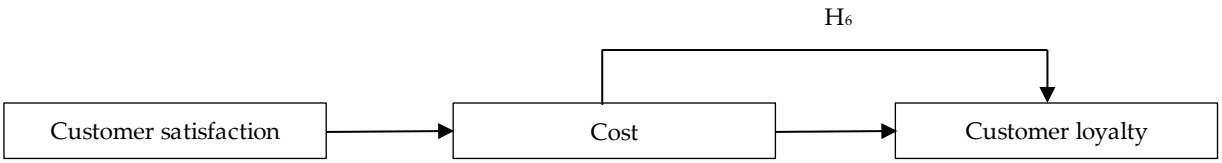

FIGURE 2. Conceptual mediation model (authors creation).

IV. METHODOLOGY

1. *RATIONAL FOR THE CHOICE OF VARIABLES*

This study evaluates the quality of m-wallet service by considering various dimensions, aiming to improve customer satisfaction and loyalty, and assesses the impact of the service on business satisfaction and loyalty.

1.1 Perceived service quality

This factor is the level of service provided by an organization, with a focus on benefits that enhance individual life and increase customer satisfaction and loyalty. Perceived service quality was defined by [14, 15] as an overall assessment or attitude connected to the superiority of the service. Grönroos' Technical and Functional Quality Model suggests that perceived service quality is determined by customers comparing their expectations with the service they receive [16-19]. Thus, hypothesis H1 is formulated:

H1: Perceived service quality is statistically significant and impacts the loyalty and satisfaction of mobile wallet customers.

1.2 Perceived ease of use

The usability of an application is referred to in this study as perceived ease of use. It is among the most important factors affecting the assessment of the quality of an electronic service [20-22]. Perceived ease of use is defined by [23, 24], the creators of the Technology Acceptance Model (TAM), as the conviction that a system or application is simple to use, easy to comprehend, and can be managed by user without requiring much physical or mental effort. Perceived ease of use refers to the speed and simplicity of navigation through an application, which is believed to enhance performance and encourage customers to adopt simpler systems over complex ones. Thus,

H2: Ease of use is statistically significant and impacts the loyalty and satisfaction of mobile wallet customers.

1.3 Perceived usefulness

System acceptance is hindered by the absence of clear advantages and benefits, as users develop a favorable attitude toward a system or application, assuming that it offers value. Perceived usefulness, according to [24], refers to how much users think that using a specific system will enhance the performance. Perceived usefulness

significantly influences the usage of technological systems, particularly m-wallet desire, and is crucial in understanding customer acceptance of a particular application or service [25, 26].

H3: Perceived usefulness is statistically significant and impacts the loyalty and satisfaction of mobile wallet customers.

1.4 Perceived security

New technologies typically carry some risks in addition to their apparent benefits [27]. The customer's perception of the safety of sharing private and confidential information via the service is related to the security dimension. It could be necessary to request sensitive financial and personal information when using electronic services, especially financial services [28, 29]. Perceived security significantly impacts customer satisfaction and loyalty, affecting the quality of mobile wallet services. However, potential risks like theft, account takeover, fraudulent transactions, and data breaches can pose challenges [30]. Therefore, H4 was formulated:

H4: Perceived security is statistically significant and impacts the loyalty and satisfaction of mobile wallet customers.

1.5 Perceived cost

The perceived cost and the extent to which this cost is justified by the value of the service provided are both key considerations when determining whether to utilize a specific technology, technical product, or service. According to the pricing value is considered positive when the benefits of using e-technology are believed to surpass the costs involved [31-33]. A service's worth must be reasonable and commensurate with a person's income and capacity to pay because excessive prices can deter users and have a detrimental effect. Mobile technology adoption thus requires service providers to control costs [34]. Therefore,

H5: Perceived cost is statistically significant and impacts the loyalty and satisfaction of mobile wallet customers.

H6: Perceived cost mediates the nexus between the satisfaction and loyalty of mobile wallet customers.

1.6 Customer satisfaction

According to Chang et al. [35], customer satisfaction is the psychological state that results from contrasting the actual outcomes with what the customer anticipated. Freihat et al. [36] conceptualize customer satisfaction as the recognition of the company's competence to deliver products and services that meet their needs and wants.

. Customer satisfaction is influenced by perceived and expected performance, and if it not meets the expectations, customers may disengage. Research indicates that satisfaction is crucial for positive service quality perception and that assessing satisfaction levels is vital for long-term success [37-40].

1.7 Customer loyalty

According to Thakur [41], the act of a customer showing their commitment to a sustainable product by making a purchase is known as customer loyalty. In other words, loyalty is a sign of a customer's preference to purchase a particular product from a business over others [42]. Customer loyalty is crucial for an organization's growth, as it leads to increased profits, a positive reputation, improved product image, and new production lines, attracting new customers and integrating with other dimensions.

2. MEASURES

The data were gathered via the model of [8]. The authors used factors like service quality, ease of use, usefulness, cost, security, loyalty and customer satisfaction. The questionnaire has 24 items to measure seven reflective constructs: service quality (4 items), ease of use (4 items), usefulness (4 items), cost (4 items), security (4 items), loyalty (3 items), and customer satisfaction (3 items). Purposive sampling method was employed to maintain the characteristics of the respondents, as the empirical study concerned B-schools in and around Hyderabad. Purposive sampling enables researchers to concentrate on specific population characteristics relevant to their research questions, such as studying vegan reactions to a new mock meat product. Purposive sampling helps researchers gain a comprehensive understanding of a phenomenon from a specific perspective or context. Purposive sampling aids researchers in identifying unique or exceptional cases that are not easily observed in the broader population and is time- and cost-effective. However, because participants are selected using researcher's subjective assessment, purposive sampling may be vulnerable to research bias. The questionnaire was published on Google Forms and was distributed to B-school students through WhatsApp via email. The study targeted an age group of 18--35 years of B-schools, including undergraduate, graduate,

postgraduate and PhD research scholars. All the variables are continuous variables, and the data were collected via a 7-point Likert-type scale. The authors adopted the model of Ajina et al. (2023) [8] and used all the constructs "service quality, ease of use, usefulness, cost, security, loyalty", who tested and validated the constructs and published results in this paper.

Purposive sampling, also known as opportunity or availability sampling, is a nonprobability method used in this study to select easily accessible subjects. Sample bias was mitigated by collecting samples from different business schools around Hyderabad with diverse cultures and educational backgrounds. The sample was collected by setting up quotas for identified demographics. This allowed us to evenly sample people from different demographic groups within the study. A target population and a sampling frame (the list of individuals from which the sample will be drawn) were defined by the study. The study later aligned the sampling frame with the target population as closely as possible to mitigate the risk of sampling bias. In some cases, non-responders were followed up. The data were collected during the January–April 2024 survey of business school students and scholars in Hyderabad. The authors removed incomplete questions and questionnaires with respondents' misbehavior. The questionnaire-maintained consistency, discriminant validity, and reliability, as revealed by the reliability and validity statistics. Another limitation is that the data were collected from employees of business school students and research scholars in and around Hyderabad. However, as the sample size increases, the results can be replicated with further studies of our domains, such as the healthcare and banking sectors. The potential reported biases were mitigated by collecting data from various business schools with diverse educational and cultural backgrounds and limiting the number of samples gathered at a particular school. However, the sample size is very large, and the research instrument maintains consistency, discriminant validity, convergent validity and model fit indices, indicating excellent mode fit. Therefore, the results can be generalized to some extent.

2.1 Rationale behind the sample size

According to Anderson and Gerbing [43], the sample size for maximum likelihood estimation with multivariate normal data should be between 200 and 400, maintaining a case-to-free parameter ratio of 5:1. This suggests that the needed sample is for just one indicator/statement. Moreover, adhering to the criterion of [40] for SEM analysis, 50+5x was used, with x representing the number of statements. As this study 27 statements, and the required sample size according to this criterion is 185. The legitimate sample of 500 subjects in this empirical investigation exceeded the needed sample size. Furthermore, the sample size employed exceeds what [45] recommended for SEM analysis. This work employed Monte Carlo data simulation techniques to determine the sample size required for frequently used SEMs. The authors also ran a power analysis to validate the sample size.

2.2 Justification of the sample size

The authors spent a substantial amount of time obtaining data. The response rate was 80%. Among 600 respondents, 500 responses were received. Twenty-four incomplete responses and the issue of respondents' misbehavior (i.e., picking the same answer as responses) were excluded from the analysis. Given the situation and the nature of the study, the 80% response rate is great. Power analysis justified the use of a larger sample size. The data were subjected to exploratory and confirmatory factor analyses, with hypotheses tested via structural equation modeling (SEM).

2.3 Power test

A power analysis was performed to determine the power of the study sample [46], and the alpha value is 0.05. The standard deviation of the sample was 1.017. The outcome reveals an actual power value of 0.985 for the 500 samples, and effect size of 0.8, suggesting a strong and significant link between the variables. Thus, a sample size of 500 is more than sufficient to evaluate the study hypotheses [47, 48].

3. INTERNAL CONSISTENCY AND VALIDATION OF THE STUDY

To avoid bias, the samples were collected from various business schools in the Hyderabad Metro. The reliability and internal consistency of the questionnaire were measured by assessing the Cronbach's alpha statistics of the constructs. The construct validity was assessed via discriminant validity and average variance extraction. The assessed Cronbach's alpha measures are as follows: service quality, 0.939; loyalty, 0.900; satisfaction, 0.849; ease of use, 0.902; security, 0.920; usefulness, 0.897; and cost, 0.866. The survey received 500 correct responses that were subjected to exploratory and confirmatory factor analyses and SEM analysis. The variance inflation factor (VIF) for all the constructs is < 10, indicating that there are no multicollinearity issues

among the independent variables [82]. The convergent validity values are >0.7 for all the constructs, suggesting above benchmark levels [83]. The average factor loading for the constructs is .7, as indicated by [49], indicating excellent internal consistency and validity. The respondents' details are presented in Table 1.

Table 1. Respondents' details and characteristics.

Item	N
Gender	
Male	298
Female	202
Age group (In Years)	
18-24	250
25-30	151
30-35	99
Education	
Graduate	285
PG	155
Others	60

Source: Primary data processed

The reason for targeting the age group between 18 and 35 years is that almost all business school students and scholars fall into this age group, with the age group of Gen Z ranging from 12--27 years and some being Millennials. These people actively use mobile wallets for their daily transactions. Furthermore, another reason is the nature of the study, considering the sampling frame of business schools around Hyderabad, and most of the students automatically fall under this age group.

V. DATA ANALYSIS AND RESULTS

To test the researcher's theoretical and hypothetical framework, exploratory and confirmatory factor analysis and structural equation modeling (SEM) analysis were performed on the valid data via SPSS ver. 29 and IBM AMOS version 28. There are four reflective constructs with 19 indicators in the proposed study. In several studies on organizational psychology, researchers have evaluated absolute path coefficients via IBM-AMOS software with both large and small sample sizes as well as both normal and nonnormal data [49].

The rationale for choosing iBM SPSS and AMOS for data analysis to test hypotheses is to use IBM AMOS. In the field of organizational psychology, researchers have developed methods to measure absolute path coefficients across various research studies, encompassing both small and large sample sizes, as well as nonnormal and normal data.

Exploratory factor analysis (EFA) yielded the 27 study variables into 7 components based on their common variance. The seven factors have a cumulative variance of 82%, which is greater than the threshold value of >50%. Therefore, further analysis was carried out. However, 3 variables with factor loadings <0.50 were excluded from the study. The reason for this is based on the average variance extracted, and factor loadings less than 0.5 indicate a violation of the convergent validity assumption. These items should be removed from the scale if there is no violation of the content validity of the scale. The measured KMO value of 0.904 and Bartlett's test of sphericity value <0.001 indicate that the data are suitable for further analysis.

The inclusion of sufficiently correlated variables is one of the underlying assumptions of EFA to produce a trustworthy factoring solution. We call this sufficient correlation "adequacy." KMO and Bartlett's test: The Kaiser–Meyer–Olkin (KMO) value of 0.904 indicates that the data are suitable for factor analysis (Table 3).

In factor analysis, the "sphericity" was assessed using the p value from Bartlett's test that is low (typically less than 0.05) indicates that the correlations between variables are significantly different from zero, and the data are appropriate for factor analysis and further analysis was carried out. For example, the factor loading of 0.926 in the table for SQ1 indicates that loading is strongly associated with the variable of the employee performance construct. The six factors explain a large proportion of the variance (82%), which is greater than the threshold value of 0.5, indicating that further analysis can be carried out.

The factors loadings should be >0.5 for all the items so the outcome of the factor analysis can be utilized for doing structural equational modeling to assess the relationships among the variables. However, some studies use 0.30 [44]. The reasons for this study having >0.5 loadings are that the indicators are very close to each other's supposed variables and result in higher loading. The direction and strength of the relationships between each variable and its component parts are shown by these factor loadings (Table 2). Higher factor loadings indicate

stronger associations between variables and components, and they guide the interpretation of each component's underlying theme.

Table 2. Factor loadings of the study variables.

Code	Factor Loading	Code	Factor Loading
Service quality α = 0.939, CR = 0.940, AVE = 0.796			
SQ1	.926	Satisfaction α = 0.849, CR = 0.921, AVE = 0.744	
SQ2	.917	SAT1	.901
SQ3	.903	SAT2	.855
SQ4	.829	SAT3	.869
Security α = 0.920, CR = 0.921, AVE = 0.744		Loyalty α = 0.900, CR = 0.905, AVE = 0.705	
SE1	.904	LO1	.826
SE2	.878	LO2	.915
SE3	.917	LO3	.829
SE4	.893		
Ease of use α = 0.902, CR = 0.905, AVE = 0.705		Cost α = 0.866, CR = 0.940, AVE = 0.796	
EA1	.858	COST1	.590
EA2	.901	COST2	.930
EA3	.910	COST3	.956
EA4	.840		
Usefulness α = 0.897, CR = 0.900, AVE = 0.751			
US1	0.877		
US2	0.889		
US3	0.941		

Source: Primary data processed

1. MEASUREMENT MODEL

The results of SEM analysis, the measurement model, the structural model, the model fit statistics, and the mediation are provided in the following section. The study included seven reflective constructs, and it was determined whether they were suitable for additional analysis by evaluating their validity and reliability as well as their reflective measurement [50]. The seven reflective constructs, validity and reliability were assessed to assess the fitness of the constructs for further analysis [50].

CFA was performed using AMOS version 28, and the measurement model was tested. The measurement model is assessed by examining the factor loadings of the study constructs. An average factor loading >0.7 indicated the best model [51]. One item loading was <<0.7 (Table 2) but was included in the analysis, as the average loading of the respective constructs was >0.7 and the AVE was >0.5 [49].

The seven-factor model (SQ: Service quality; SE: Security, EA: Ease of use, US: Usefulness, SAT: Satisfaction, LO: Loyalty, and COST: Perceived cost) fit the data well, as indicated by CMIN/df 1.997, CFI 0.975, GFI 927, TLI 0.970, IFI 0.975, NFI 0.950, SRMR 0.032, RMSEA 0.045. PClose 0.929 [52-54]. The factor loadings are excellent, and all are >0.5, with average factor loadings >0.7 for all four constructs. The above model fit indices indicate that the model has an excellent fit [55, 56] (Table 2).

We report the above fit indices when structural equation modeling (SEM) is used; fit indices aid researchers in assessing how best the model fits the intended data. Their significance lies in guaranteeing that the model precisely mirrors the data. Nevertheless, fit indices may have certain drawbacks; for example, researchers may misuse fit indices to justify models that do not fit well or to selectively report indices that suggest the best fit. Even when a model has poorly fit portions, fit indices can indicate that the model is generally well fit. In addition to fitting well, a model should be theoretically sound, comprehensible, and frugal. One nonnormed fit index that is less impacted by sample size is the Tucker–Lewis index (TLI). Therefore, we reported fit indices where several researchers reported their cutoff values.

For every construct, the Cronbach's alpha statistics were higher than the advised threshold of >0.70 [57], and the composite reliabilities for all the constructs are >0.70, ranged from 0.849 to 0.940 [58], and the constructs were reliable meeting the benchmark values (Table 3).

To evaluate the convergent validity of the scale items, the average variance extracted (AVE) was calculated according to the standard of [59]. All values exceeded 0.50, demonstrating that the scales fulfilled the criteria for convergent validity (see Table 4). The Fornell and Larcker criterion states that if the square root of a construct's

AVE exceeds its correlation with other constructs in the studied population, discriminant validity is established. Discriminant validity was evaluated using the heterotrait–monotrait (HTMT) ratio, with all ratios falling beneath the requisite threshold of 0.85 [60], thereby confirming discriminant validity (Tables 3 and 4).

Table 3. Discriminant validity: Fornell and Larcker Criterion.

	SERQ	SECU	EASE	USEF	COST	SATIS	LOYAL
SERQ	0.892						
SECU	0.262***	0.862					
EASE	0.482***	0.337***	0.840				
USEF	0.372***	0.237***	0.285***	0.867			
COST	0.453***	0.257***	0.333***	0.394***	0.837		
SATIS	0.489***	0.318***	0.420***	0.328***	0.364***	0.812	
LOYAL	0.693***	0.261***	0.396***	0.489***	0.748***	0.496***	0.872

Source: Primary data processed
SERQ: Service quality; SECU: Security, EASE: Ease of use, USEF: Usefulness, SATIS: Satisfaction LOYA: Loyalty, and COST: perceived cost.

Table 4. Discriminant validity: HTMT analysis.

	SERQ	SECU	EASE	USEF	COST	SATIS	LOYAL
SERQ							
SECU	0.244						
EASE	0.450	0.315					
USEF	0.342	0.216	0.257				
COST	0.409	0.232	0.304	0.361			
SATIS	0.437	0.277	0.370	0.278	0.313		
LOYAL	0.646	0.236	0.361	0.443	0.678	0.438	

Source: Primary data processed.

2. *STRUCTURAL MODEL*

The structural model was used to test the relationships among the constructs and has excellent performance according to the standards of [54, 58, 61] and (Figure 3).

The R2 was 0.33 for customer satisfaction, which indicates that 33% of the variance is accounted for in customer satisfaction, and 0.74 for customer loyalty indicates that 74% of the variance is accounted for in customer loyalty by the following five factors: service quality, ease of use, usefulness, cost, and security.

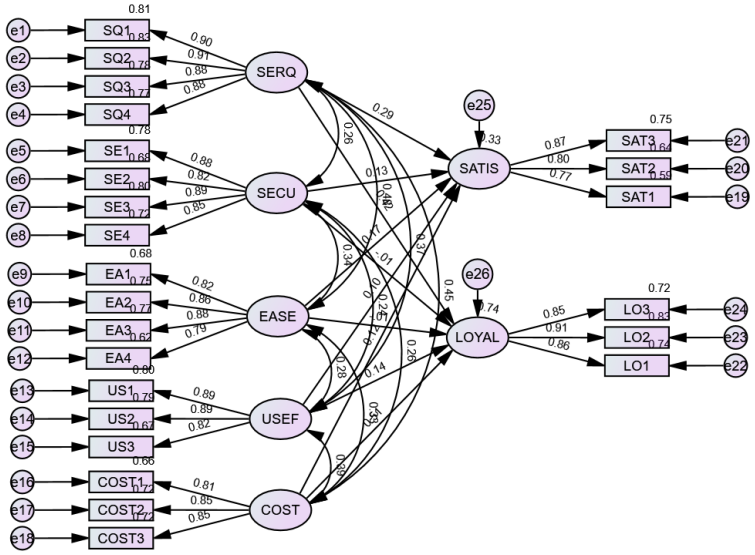

FIGURE 3. Structural model and the associations among the constructs.
SERQ: Service quality; SECU: Security, EASE: Ease of use, USEF: Usefulness, SATIS: Satisfaction, LOAL: Loyalty, and COST: perceived cost

3. TESTING OF HYPOTHESES

This study measured the impact of service quality, security, ease of use, usefulness, and cost on the satisfaction and loyalty of mobile wallet customers (Table 5).

The impact of service quality on the satisfaction of mobile wallet customers is positive and statistically significant ß=0.241 t=5.156, p<0.001, indicating that for a one-unit increase in service quality, 0.241 units of satisfaction are enhanced for mobile wallet customers. Similarly, the effects of service quality on loyalty are positive and statistically significant for mobile wallet customers (ß=0.319, t=10.391, p<0.001). Thus, H1 is supported. Similarly, the impact of security on satisfaction is positive and statistically significant (ß=0.111, t=2.795, p<0.005); however, the impact of security on the loyalty of mobile wallet customers is negative and nonsignificant (ß=-0.006, t=-0.253, p=0.800); hence, H2 is partially supported.

The influence of ease of use on satisfaction is positive and statistically significant (ß=0.182, t=3.198, p<0.001); however, the impact of ease on the loyalty of mobile wallet customers is negative and nonsignificant (ß=-0.011, t=-308, p=0.758); hence, H3 is partially supported. Furthermore, the influence of usefulness on the satisfaction of mobile wallet customers is positive and statistically significant (ß=0.068, t=2.000, p<0.05), and that for loyalty is positive and statistically significant for mobile wallet customers (ß=0.087, t=3.901, p<0.001); hence, H4 is supported. Similarly, the influence of cost on the satisfaction of mobile wallet customers is positive and statistically significant (ß=0.114, t=2.191, p<0.05), and that of loyalty is positive and statistically significant for mobile wallet customers (ß=0.453 t=11.952, p<0.001); hence, H5 is supported. The hypothesis testing results are presented in Table 5.

Table 5. Estimates of SEM analysis (Hypothesis Testing).

Relationship	ß	SE	t value	p value	Result
Satisfaction ← Service quality	.241	.047	5.156	***	Supported
Satisfaction ← Security	.111	.040	2.795	.005	Supported
Satisfaction ← Ease of use	.182	.057	3.198	.001	Supported
Satisfaction ← Usefulness	.070	.035	2.000	.040	Supported
Satisfaction ← Cost	.114	.052	2.191	.028	Supported
Loyalty ← Service quality	.319	.031	10.391	***	Supported
Loyalty ← Security	-.006	.025	-.253	.800	Not Supported
Loyalty ← Ease of use	-.011	.036	-.308	.758	Not Supported
Loyalty ← Usefulness	.087	.022	3.901	***	Supported
Loyalty ← Cost	.453	.038	11.952	***	Supported

4. MEDIATION ANALYSIS

The authors investigating the mediating role of perceived cost on the relationship among customer satisfaction and customer loyalty; (ß=0.579 (direct effect), p<0.001; & 0.154 (indirect effect), t=13.371, p<0.001). As the direct and indirect effects are statistically significant, the cost partially mediates the nexus among customer satisfaction and the customer. Therefore, H6 is partially supported (Figure 4, Table 6 and Table 7).

Table 6. Results of mediation analysis.

Relationship	Direct effect	Indirect effect	Confidence Interval		p value	Conclusions
			Lower bound	Lower bound		
Customer Satisfaction → Cost → Customer Loyalty	0.579 (p<0.001)	0.154	0.287	0.001	<0.001	Partial mediation

Table 7. Mediation analysis – direct relationship.

Relationship	Estimate	SE	t value	P
Satisfaction → Cost	.367	.053	6.990	<0.001
Cost → Loyalty	.579	.042	13.771	<0.001

Satisfaction→ Cost	.232	.037	6.306	<0.001

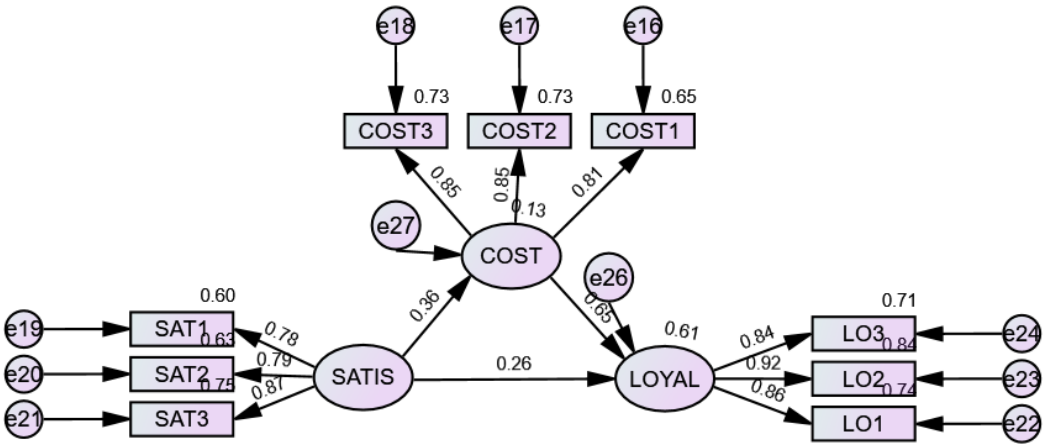

FIGURE 4. Mediation analysis.

SATIS: customer satisfaction; COST: Perceived cost; LOYAL: Customer loyalty

VI. DISCUSSION

This empirical investigated the impact of m-wallet service on satisfaction of the customer and loyalty, examining its dimensions and their mediating effects on customer satisfaction. A quantitative method was used to collect primary data from customers, with 500 respondents completing a questionnaire, which was analyzed via SPSS and AMOS. This study examines the impact of m-wallet service on customer satisfaction and loyalty via a quantitative method and questionnaire. Five hundred respondents completed the survey, and the data were analyzed via SPSS and AMOS. This study aimed to explore the factors influencing customer loyalty and satisfaction in the context of mobile wallet services. The hypotheses proposed were tested with a sample size of 500 respondents, comprising 298 males and 202 females, across various age groups and educational backgroun ds. The reliability of the questionnaire, measured through Cronbach's alpha, demonstrated high internal consistency. The data collection employed a quantitative approach, utilizing a questionnaire divided into demographic and variable measurement sections. The independent variables, including perceived service quality, ease of use, perceived usefulness, and perceived security, were assessed through a survey questionnaire developed on the basis of previous studies. The study sample, drawn from diverse backgrounds, positions, and experiences, provided valuable insights into the relationships between the variables.

The study revealed that customers are aware of m-wallets and their security risks and focus on the source rather than the services provided, effects customer satisfaction and loyalty. The outcome of the study indicated that m-wallet service influences customer loyalty through satisfaction, but customer attitudes toward ease of use, usefulness, and security do not significantly impact satisfaction. The study revealed that m-wallets, a popular payment method in Jordan, gained popularity during the COVID-19 pandemic, with young, low-income customers becoming more reliant on them, despite the lack of impact on user loyalty.

According to the study, users are aware of the security risks associated with m-wallets and how they work. By serving as a middleman, the m-wallet service affects client loyalty and satisfaction. Additionally, the study revealed that security, usefulness, and ease of use have no effect on customer satisfaction. Throughout the COVID-19 pandemic, the idea became more well known, especially with younger, lower-class consumers. The study reveals that m-wallet service significantly impacts customer satisfaction and loyalty, with high-quality services being more desirable than those deemed low-quality, difficult to use, or unsafe. This confirms previous findings [62-65] that service characteristics affect the uptake of m-wallets as a payment method.

Improving service quality, particularly in m-wallet service, increases customer confidence and encourages the adoption of the required services from the same organization. Security is crucial, as it affects perceived service quality, as it refers to the application's reliance on secure passwords and ease of change. The present findings corroborate previous findings by [36, 37, 40, 66], which collectively demonstrated the influence of superior m-wallet services on increasing customer content.

The study revealed that perceived service quality, ease of use, usefulness, and security significantly influence customer loyalty and satisfaction in mobile wallet services. The confirmatory factor analysis (CFA) results confirmed the measurement model's validity and dependability, with factor loadings exceeding 0.5 for all the items, demonstrating excellent fit statistics (Table 2).

Dhaigude et al. [7] reported that satisfaction and trust significantly enhance customer loyalty, with satisfaction and trust acting as mediating factors in the relationship between loyalty and perceived customer value. Ajina et al.'s [8] study utilized structural equation modeling with IBM AMOS to examine the influence of mobile factors on user loyalty and satisfaction. The study revealed a statistically significant positive correlation between the satisfaction and loyalty of mobile wallet customers and the factors of service quality, perceived usefulness, and ease of use. Our results also supported the hypotheses tested by these authors.

Using e-customer satisfaction as a mediating variable [67], the effects of e-service quality and e-trust on mobile mallet application on e-customer loyalty were investigated. The outcome that e-customer satisfaction positively and fully mediates the relationship between e-customer loyalty and satisfaction, with cost playing a partial mediating role. Furthermore, the reputable market research firm IMARC reported that the global mobile payment market exceeded US$ 1,146 billion in 2019 and is expected to grow significantly between 2020 and 2025 [68].

VII. CONCLUSIONS

This research investigated the role of mobile wallets in promoting financial inclusion and customer satisfaction. It examines how M-wallet services increase accessibility to financial services and evaluates factors such as ease of use, security, and service range. This paper explores the nexus among mobile wallet services and customer loyalty via quantitative research and data analysis. The findings aim to improve the effectiveness and adoption of mobile wallet services, promoting financial inclusion and customer satisfaction. The study suggests that improving service quality, ease of use, usefulness, and security in mobile wallet services can increase customer loyalty and satisfaction, with practical implications for businesses.

The study investigated the role of mobile wallets in financial inclusion, their widespread adoption, and their impact on customer satisfaction. It also explores factors influencing their adoption and identifies key functionalities that enhance positive experiences with mobile wallets. The study reveals that m-wallet service significantly impacts customer satisfaction and loyalty. Customers are generally uninterested in organizations that provide low-quality, challenging-to-use, and unsafe services. This finding corroborates other studies [30, 62, 63, 65, 84] that discovered that service characteristics affect the uptake of m-wallets as a mode of payment.

One special kind of mobile payment that has many advantages is the use of mobile wallets, which save time, effort, and money and provide security and convenience. However, because of the vulnerability of mobile networks, their adoption is not very widespread in emerging markets. Mobile wallets and other electronic services have completely changed how businesses operate by streamlining processes, supplying data, and building relationships with clients.

Organizations must improve service quality and specifications to ensure customer satisfaction, leading to increased market share, competitive capabilities, and customer growth. This study informs electronic service payment businesses about service acceptance dimensions, enabling marketing plans. The results show that perceived service quality, ease of use, utility, cost, and security positively influence customer satisfaction and loyalty, with subhypotheses having varying effects. The study revealed that perceived ease of use, usefulness, and security did not affect customer satisfaction, but service quality and cost positively affected customer loyalty.

The study suggests that businesses should educate customers on m-wallets, their benefits, and usage, drawing on developed countries' experiences in payment channels and electronic financial transactions. To increase service efficiency, lower costs, foster customer relationships, and comprehend customer needs—with an emphasis on cost, security, usefulness, and ease of use—organizations that provide m-wallets must improve technology management.

1. IMPLICATIONS

This study explores the long-term impact of mobile wallet services on customer loyalty, customer satisfaction, and customer satisfaction. This suggests that managers should prioritize trust and satisfaction to increase loyalty and value, thus fostering enduring customer relationships. The authors also propose that to increase service quality, lower costs, increase security, and pinpoint the aspirational needs of mobile wallet users, reliable m-wallet providers must support m-wallets. However, one thing is certain: both the Eastern and Western Hemispheres will be greatly impacted by the growing use of digital wallets. These effects include but are not limited to accelerating the shift in society away from cash transactions, altering the way consumers give to friends and family, and making financial services more accessible to a larger group of people. Improving service quality,

particularly in m-wallet service, increases customer confidence and encourages the adoption of similar services from the same organization. This high-quality service level ensures security, reducing potential risks for customers. Security is crucial for perceived service quality, encompassing applications' reliance on passwords, secure password changes, service policy declarations, customer rights, data encryption, and preventing unauthorized access. The present discovery bolsters previous findings by [36],[37],[40],[66] that collectively demonstrated the impact of superior m-wallet services on increasing customer content.

The European Commission's legislation on digital IDs and digital wallets highlights the potential impact on banking and financial services. Interoperability with digital wallets could improve customer checks, anti-money laundering duties, and other regulatory responsibilities. Digital wallets could facilitate transformative innovation in central bank digital currencies (CBDCs), despite their significant impacts, by enhancing their relationship with digital wallet applications.

2. *LIMITATIONS AND FUTURE DIRECTIONS*

The authors surveyed postgraduate B-scholl students and scholars in Hyderabad city, an Indian Metro. The reason for selecting this sample frame is that the students and scholars use mobile wallets extensively for business transactions. Although the sample size of 500 is very high, and to some extent the outcome can be generalized. Conducting cross-sectional studies in different cultures and age groups, including rural populations, will provide more insights into the use of mobile wallets and help researchers generalize the outcomes. Another limitation is that self-selection bias can occur in online surveys because respondents with preconceived notions might decide to participate. Bias may be introduced if the survey's sample is not representative of the intended audience. However, our results on reliability, convergent validity and discriminant validity did not indicate a serious bios, which is a concern in reporting results. Even common method bias results reveal that although some bias exists, this bias does not affect the outcome of the study.

The authors suggest carrying out similar types of research surveying the agriculture sector and healthcare sector. Information technology and information technology enable industry and banking sector employees to dissect more insights into the use and acceptance of mobile wallets.

- Respondents may provide biased responses, either consciously or unconsciously, leading to inaccuracies in self-reported data.
- If the respondents are not representative of the overall mobile wallet user population, the empirical research may be biased by its sample. If the sample consists primarily of members of a particular demographic or geographic area, the results might not be generalizable to the whole user population.
- The study may not account for individuals who do not have access to mobile wallet services due to digital literacy issues, lack of smartphones, or resistance to technology adoption. This creates a potential bias toward tech-savvy respondents.

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Authors Contribution

All the authors made equal contributions to the development and planning of the study.

Conflict Of Interest

The authors have no potential conflicts of interest or such divergences linked to this research study.

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