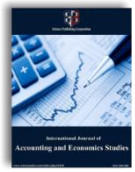
International Journal of Accounting and Economics Studies, 12 (6) (2025) 764-773

International Journal of Accounting and Economics Studies

Website: www.sciencepubco.com/index.php/IJAES
https://doi.org/10.14419/j49pxb59
Research paper



The Relationship between Customer Loyalty, Customer Satisfaction, Customer Perceived Value, and Service Quality of SF Express in The Context of Artificial Intelligence

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Received: August 18, 2025, Accepted: September 12, 2025, Published: October 20, 2025

Abstract

This study seeks to examine the correlation between SF Express's service quality and perceived value, consumer satisfaction, and customer loyalty within the framework of AI technology utilization. SF Express has had considerable difficulties in preserving its current customer base due to the swift advancement of artificial intelligence and e-commerce, along with heightened industry competition. This study used a questionnaire to collect data and analyzed it with SPSS and AMOS software to closely look into this issue. The results demonstrate that service quality significantly and directly improves customer loyalty and positively affects it through the mediation of customer satisfaction. Subsequent analysis indicates that the five characteristics of express service quality—timeliness, security, responsiveness, tangibility, and empathy—substantially improve overall express service quality. The findings indicate that the implementation of artificial intelligence technology can substantially improve the service quality of SF Express, thereby increasing consumer perceived value and fostering customer loyalty, which is crucial for the enduring success of businesses. This study highlights the significance of express delivery services from the customers' perspective and examines how several characteristics of service quality affect customers' perceived value, satisfaction, and loyalty.

Keywords: *Use about five keywords or phrases in alphabetical order, separated by a Semicolon.*

1. Introduction

The rapid growth of global e-commerce has resulted in a considerable increase in the express delivery industry, making it an essential component of the modern economic structure. Logistics Management forecasts that the global express delivery market will attain 433.82 billion euros by 2022. Pitney Bowes projects a compound annual growth rate of 5.5% to 12.5% worldwide during the forthcoming five years.

The fast growth of the Internet of Things and artificial intelligence technologies is changing the express delivery industry by making it more digital, automated, and smart, which is greatly affecting how services are provided and how efficiently they operate. (Zhang et al., 2022; Zhong, 2024). SF Express, a leading player in China's express delivery industry, constantly ranks among the top corporations for technical implementation and service quality improvement. Customer loyalty and service quality are essential to the success of the express delivery industry, and the application of AI technology offers innovative opportunities for the improvement of these two factors. AI helps in sustainable fabric sourcing, reducing errors, and selecting suppliers based on ethical and environmental criteria. AI analyzes social media data and consumer sentiment to predict trends, linking forecasts directly to production and shortening lead times.

Customer loyalty is a crucial metric for companies to sustain their market share in the context of intensifying market rivalry, and it is directly linked to their long-term profitability. Simultaneously, service quality, as a fundamental determinant of customer satisfaction and perceived value, is crucial in influencing corporate brand image and fostering consumer trust. Utilizing artificial intelligence technology, SF Express has optimized resource allocation in order processing, logistics scheduling, and customer service, thereby enhancing service efficiency and quality, more effectively addressing customer needs, and increasing customer loyalty.

However, the effectiveness of these technologies in improving customer satisfaction and loyalty necessitates further examination.

Considering artificial intelligence technologies, this essay will investigate the relationship between SF Express's perceived value, customer satisfaction, loyalty, and service quality.

2. Literature Review

2.1. Service quality and customer perceived value

The balance between the benefits received and the sacrifices made, such as cost, time, and effort, determines the perceived value. (Woodside et al., 2008). The perceived value rises when acquiring high-quality products or services at a lower cost. (Hayes, 2022). Customer-perceived service quality serves as the primary key performance indicator and is a crucial metric for assessing price rationale. (Anggreyani et al., 2023; Karim & Rabiul, 2024). Therefore, improving service quality will immediately increase the value that customers receive. The research demonstrates that service quality can positively influence perceived value. (Tu & Zhang, 2022).

Five dimensions categorize the quality of express delivery services: timeliness, security, responsiveness, tangibility, and empathy. (Hongxing et al., 2023; Idayati et al., 2020; Meng et al., 2022; Zhipeng, 2023). Timeliness is a fundamental aspect of Express Firms' core operations and is considered a critical metric influencing service quality in the field of Express Services (Biscaia et al., 2021). Service security is consistently considered the most critical determinant of rapid delivery service excellence. Consequently, superior service security can bolster consumer trust, thereby increasing perceived value. The tangible aspect of express service responds to consumer feedback in a more intuitive manner. (Dai, 2021). Psychological theory posits that an optimal physical environment is essential for eliciting excitement, pleasure, and relaxation in customer interactions; hence, it augments perceived value. (Ali et al., 2016). The express service's responsiveness highlights that consumers can receive prompt responses or solutions when necessary, alleviating negative feelings, particularly in urgent situations. (Hasan Emin & Ramazan, 2024). Empathy in express delivery services involves providing specific customer care. (Qi et al., 2020). Therefore, this research suggests the following hypothesis:

Hypothesis 1(H1): Service quality positively influences customer perceived value.

2.2. Service quality and customer loyalty

In light of intense market rivalry, customer satisfaction should serve merely as a benchmark index and not as the ultimate objective of sustainable enterprise development; otherwise, businesses must prioritize enhancing customer loyalty (Ebele et al., 2024). Customer loyalty in the express delivery sector signifies trust in a particular brand and a favorable emotional inclination, encompassing both the customers' readiness to actively endorse the brand to others (Cao, 2020), thereby fostering emotional loyalty and their commitment to consistently utilizing the brand's services and making frequent repeat purchases (Chauhan, 2023). The quality of service is a vital component of the performance of express delivery firms. Setiawan and Fauziah (2020) Underscore the significance of assessing key performance indicators through the PQCDSME methodology, which incorporates delivery and service as fundamental elements. Jiang et al. (2020) Bolster this concept by presenting a comprehensive technique for assessing service quality in rural last-mile delivery, emphasizing the importance of defining critical evaluation indices for enhancement (Ma, 2024).

This section should now state that SF Express and similar firms should leverage AI not just for operational gains, but to operationalize specific service improvements like timeliness and empathy. The paper also suggests addressing broader policy implications, such as regulatory considerations for AI adoption in logistics.

Leong et al. (2015) Found that the reliability, tangibility, and responsiveness of services positively influence consumer loyalty. Patrons of premium delivery services exhibit a higher propensity for repeat purchases and referrals. (Lin et al., 2023). The timeliness of express delivery services is a fundamental performance metric for delivery companies, directly influencing customer wait times and satisfaction levels. Enhancing timeliness can not only bolster customer trust in the organization but also augment customer loyalty to the Express brand. (Xin, 2021). The tangible aspect of express service quality can evoke consumer enthusiasm and satisfaction, which is essential in shaping their intentions to repurchase and refer. (Molinillo et al., 2020). Rapid responses and effective problem-solving can alleviate customer apprehensions, boost faith in the organization, and increase the propensity for repeat purchases. Simultaneously, addressing the individualized requirements of customers is essential for fostering an emotional bond between consumers and express delivery firms. (Neele Inken et al., 2023). Therefore, this research suggests the following hypothesis:

Hypothesis 2 (H2): Service quality positively influences customer loyalty.

2.3. Customer perceived value and customer loyalty

In express delivery services, a notable positive association exists between enhanced perceived value and customer loyalty (Correa et al., 2021). Perceived value is described as the customer's subjective assessment of the disparity between the usefulness and the cost of express delivery services, considered a crucial factor influencing customer satisfaction. (Uzir Hossain et al., 2021). Belgin et al. (2020) Discovered that consumers show more satisfaction with service providers when they perceive a high value, in contrast to their actual service providers. Enhancing consumer satisfaction can further enhance customer loyalty toward express delivery firms.(Taqi & Muhammad, 2020). Therefore, this research suggests the following hypothesis:

Hypothesis 3 (H3): Perceived value positively influences customer loyalty

2.4. Service quality and customer satisfaction

Customer satisfaction is essential for the growth of express delivery companies. It pertains to the market competitiveness and profitability of businesses. The service quality of express delivery significantly influences customer satisfaction, as evidenced by numerous recent studies.

Fuzzy Analytic Hierarchy Process (AHP) and hierarchical regression analysis were used in a study that used the SERVQUAL and CCSI models to look at what makes customer satisfaction and loyalty. The findings indicate that popularity, credibility, commitment to delivery time, and mailing security are the primary elements influencing customer satisfaction and loyalty. (Zheng et al., 2022). Permatasari and Indayani (2022) Investigated the influence of service quality, brand image, and trust on consumer satisfaction within delivery services, underscoring the significance of these elements in shaping customer satisfaction.

AI-powered customer service greatly improves customer satisfaction and perceived efficiency, which in turn strengthens customer loyalty (Singh & Singh, 2024). These developments highlight the transformative role of AI in logistics. By incorporating insights from behavioral economics, AI-driven personalization can better align services with customer preferences and decision-making patterns, further enhancing

satisfaction and loyalty (Mohsin, 2024). Additionally, technologies such as predictive analytics and automation optimize delivery routes and minimize delays, improving service quality and fostering long-term customer trust and loyalty.
Therefore, this research suggests the following hypothesis:
Hypothesis 4 (H4): Service quality positively influences customer satisfaction.

2.5. Perceived value and customer satisfaction

Numerous studies indicate that perceived value significantly enhances customer satisfaction. Li et al. (2020) Examined the selection of logistics service modes for last-mile delivery, considering customer utility and delivery service costs. They emphasized the importance of selecting an appropriate logistics service model to lower delivery costs and improve customer satisfaction. Uzir et al. (2021) Examined the impact of service quality, perceived value, and trust in home delivery workers on customer satisfaction in a developing nation. They emphasized the significance of these aspects in improving customer satisfaction.
Therefore, this research suggests the following hypothesis:
Hypothesis 5 (H5): perceived value positively influences customer satisfaction.

2.6. Customer satisfaction and customer loyalty

Express delivery firms strive to achieve a high level of customer satisfaction, to enhance consumer loyalty to optimize earnings. Consumer pleasure is crucial in fostering consumer loyalty. (Lin et al., 2023) Examined the correlation between logistics service quality, customer satisfaction, and customer loyalty within China's e-commerce sector, using SF Express (Group) Co., LTD. as a case study. The findings indicate that customer satisfaction positively influences consumer loyalty. The net name examines its impact on customer satisfaction and loyalty, subsequently developing a customer satisfaction evaluation model for logistics distribution services. We applied this approach to analyze inhabitants in the primary urban region of Chongqing, revealing that customer satisfaction is a critical determinant of customer loyalty. (Guoling, 2020).
Therefore, this research suggests the following hypothesis:
Hypothesis 6 (H6): Customer satisfaction positively influences customer loyalty.

2.7. Customer satisfaction serves as a mediator

Many intermediary factors, such as perceived value (Anisah & Andri, 2024) and satisfaction (Yasa & Anak Agung Diah Tarama, 2021), mediate the indirect impact of service quality on behavioral intention in the service sector. In Logistics, superior service quality can substantially elevate customers' perceived value, fostering brand loyalty. (Anisah & Andri, 2024). Zaato et al.'s (2023) research demonstrates the mediating function of customer satisfaction in the relationship between logistics service quality and customer loyalty. The primary research in the express delivery service sector centers on customer satisfaction as the mediating variable. This study posits the following hypothesis: to investigate the relationships:
Hypothesis 7 (H7): Service quality positively influences customer loyalty through customer satisfaction.
Hypothesis 8 (H8): Service quality positively influences customer loyalty through perceived value.
Hypothesis 9 (H9): Service quality positively influences customer loyalty through perceived value and customer satisfaction.

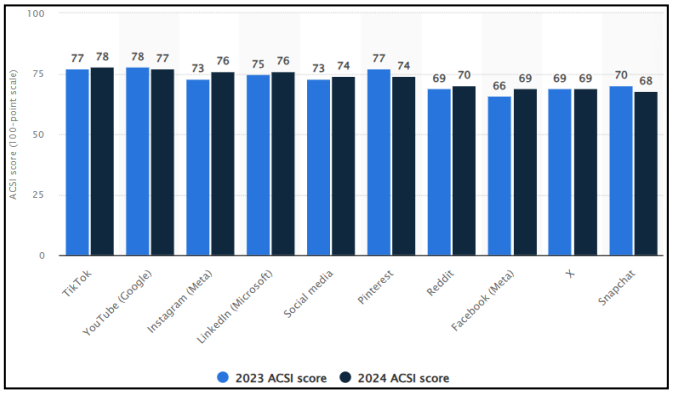

Fig. 1: American Customer Satisfaction Index (ACSI) Of Selected Online Networks from July 2023 to June 2024.

Source: (Stacy Jo Dixon, 2025).

From July 2023 to June 2024, TikTok and YouTube led in customer satisfaction (78), while Facebook, X, and Snapchat scored lower (68–70), showing slight year-to-year variations across most platforms.

2.8. Policy implications

The integration of AI into logistics, as seen with companies like SF Express, brings about critical policy implications that extend beyond operational efficiency. A primary concern is the lack of robust regulatory frameworks specifically tailored for AI's role in the industry. Governments and regulatory bodies must develop guidelines that address data privacy and ethical oversight. This includes setting clear standards for how companies can use customer data collected by AI systems, ensuring transparency, and protecting against potential misuse. Furthermore, policies are needed to ensure fair competition and prevent market monopolies. As AI provides a significant technological advantage, it could create barriers for smaller firms. Therefore, regulations should promote an environment where all businesses can innovate responsibly. Lastly, policies should address the impact on the workforce, encouraging employee reskilling and providing support for those affected by automation. This proactive approach ensures a smoother transition for the labor force as the industry evolves.

2.9. Limitations

A specific limitation of this research is the reliance on self-reported questionnaires distributed primarily to urban SF Express customers, which may introduce response bias and limit the generalizability of findings to rural regions or other logistics providers with different operational models and AI adoption levels.

3. Method

3.1. Sample

The study was conducted in China's express delivery industry, using SF Express under artificial intelligence technology as an example. The express delivery industry's global market attained $481.5 billion in 2022, reflecting a 7.5 percent increase from the preceding year, as reported by Logistics Management. The 2023 report from the China Post Management Conference indicates that express delivery volume reached 110.58 billion in 2022, reflecting a 2.1% year-on-year increase, while business revenue amounted to around $0.158 trillion, representing a 2.3% year-on-year growth. According to its 2022 annual report, SF Express announced an operational revenue of $39.86 billion, reflecting a year-on-year increase of 29.11 percent. SF Express's 2022 annual report indicated 585 million distinct consumers.
We created the questionnaire on the Questionnaire Star platform and randomly distributed it through various channels such as WeChat Friend Circle, QQ Space, and Xiaohongshu.

3.2. Measures

This study utilizes considerable service marketing literature for its metrics. Nur Dwi (2023) Suggested that there are parallels between express services and other service sectors. Express delivery services exhibit typical features of the service business, specifically information search, experience, and credibility, which are essential criteria for consumers in evaluating and selecting services. Consumers get information via search, develop judgments based on personal experience, and disseminate their reputation through word of mouth. These three stages collaboratively influence consumers' impressions and assessments of the quality of express delivery service. (Ahmed et al., 2024; Yu et al., 2023). This study posits that the perceived basis metrics derived from other service sectors are similarly relevant to the delivery services examined. We employed a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree) from analogous perception studies to assess the pertinent items.
In numerous service sectors, SERVQUAL aligns with the five perception-based dimensions of service established by Berihu Asgele Siyum (2024). The measurement section lacks specific details on the SERVQUAL scale items and their validation, such as reliability and validity metrics, which hurts transparency and replicability. The dimensions encompass tangibility, reliability, responsiveness, assurance, and empathy, collectively forming the index system for assessing functional quality. The service scale demonstrates exceptional dependability, convergent validity, and discriminative validity, leading to its widespread adoption in practical applications (Cheung et al., 2023). This study selects timeliness (Meng et al., 2022), security (Hongxing et al., 2023), tangibility (Feng et al., 2007), responsiveness (Zhipeng, 2023), and empathy (Shan et al., 2021) As evaluation markers to effectively assess the technical level of express service quality. These metrics thoroughly represent the technical quality of Express Delivery Services, encompassing aspects of service outcomes and professional competencies.
The perceived value of express consumers pertains to the subjective assessment of the benefits received relative to the costs incurred. The notion encompasses two dimensions: functional value and social value (Mason et al., 2023). The scales developed in this study aim to represent both the monetary and non-monetary aspects of value.
This study defined customer satisfaction with express service as the overall satisfaction from the express service experience, which includes the specific details of service interactions. This concept emphasizes the emotions of customers towards specific encounters and experiences during the service process, rather than solely focusing on their satisfaction with the results. (Miguel Daniel Ramirez Del et al., 2023). This study employs a two-dimensional analysis method to completely assess the satisfaction of express service customers for material and social factors. (Shantanu Shrinivas & Najla, 2022; Shiva & Euihark, 2022).
The customer loyalty of the delivery service indicates the likelihood of customers repeatedly selecting the service or endorsing it to others. Fog (2022) introduced the two-dimensional model, which encompasses behavioral loyalty and emotional loyalty, as a measurement instrument.
The study's results section provides a thorough analysis of the reliability of the scales used to measure service quality, customer perceived value, customer satisfaction, and customer loyalty.

3.3. Data collection

This study intends to investigate the SF Express user demographic that has utilized AI technology for parcel delivery services, specifically focusing on people aged 18 and older. We created the questionnaire and uploaded it to the Questionnaire Star website. We simultaneously used QQ Space, WeChat Talk, and Little Red Book for promotion and publicity. The questionnaire was randomly completed by the scientists using the questionnaire star. The questionnaire description states that participation is voluntary, respondent information is confidential, and the survey is solely for academic research purposes.
As a result, we successfully obtained 503 valid response samples. We deemed the sample size adequate for conducting multivariate statistical analysis because the final model encompassed 39 independent indicators, adhering to the criteria established by Abdelkader & Hayam Hassan Wahba (2024) and achieving factor ratios near 10. Among the respondents, there were 245 males, constituting 48.7% of the total population. Among these, 449 persons utilized SF Express to mail parcels more than four times, accounting for 89.3 percent of the total.

4. Analysis and results

4.1. Factor analysis and validity tests

This study's measures of reliability include standardized factor loading, Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE). The acceptability requirements are as follows: the standardized factor load must be above 0.50 (Pandolfi et al., 2010); α must be greater than 0.70 (Zhong et al., 2017); CR must exceed 0.60 (Doğruyol & Zerey, 2024); and AVE must be greater than 0.50 (Celimuge et al., 2017). Table 1 displays the outcomes of the factor analysis and the collected data. Standardized factor loading charge varied from 0.69 to 0.82, α from 0.79 to 0.89, CR from 0.80 to 0.86, and AVE fluctuated between 0.52 and 0.63.
The questionnaire demonstrates strong validity and reliability. Consequently, this study presents a model that is both valid and dependable, indicating a favorable fit.

Table 1: Scale Variables and Reliability Indicators

	Variable	FL	α	CR	AVE
Service quality					
	The SF Express staff delivers packages on time and uses artificial intelligence technology for image identification.	0.74			
	The SF Express Company uses artificial intelligence technology for intelligent sorting and timely transfers.	0.77			
TI	The SF Express company excels in artificial intelligence sorting, delivery route planning, and timely deliveries.	0.72	0.89	0.86	0.55
	Within the realm of artificial intelligence, the timeliness of SF Express's response to the consumer.	0.76			
	SF Express uses artificial intelligence to send notifications about deliveries and receipts and to keep track of logistics timelines.	0.73			
	With the assistance of AI technology, SF Express guarantees the precise delivery of deliveries and effectively prevents property damage.	0.69			
	SF Express has guaranteed the security of consumer information within the context of artificial intelligence.	0.73			
SE	The SF Express company offers delivery services that are both secure and dependable in the context of artificial intelligence.	0.73	0.86	0.81	0.52
	The SF Express personnel will ensure that customers experience relaxation and ease by providing services with the assistance of AI technology.	0.74			
	The SF Express can accurately educate consumers about the service time with the use of artificial intelligence.	0.70			
	The SF Express staff uses artificial intelligence to assist consumers in resolving problems.	0.77			
TA	The SF Express has done well in dealing with complaints and problem-solving with the assistance of artificial intelligence.	0.75	0.87	0.84	0.56
	The SF Express can precisely satisfy the many special needs of its clientele with the use of artificial intelligence technologies.	0.77			
	The workers at SF Express have clean, neat, and tidy uniforms.	0.77			
RE	The SF Express company has up-to-date maintenance tools.	0.73	0.87	0.83	0.55
	The stores of SF Express are neat, clean, and orderly.	0.74			
	The portrayal of the Sf Express brand is crucial.	0.70			
	The SF Express employees employ artificial intelligence technology to actively address customer issues and fulfill their requirements.	0.74			
EM	It is very convenient to use SF Express to mail parcels.	0.75	0.85	0.83	0.549
	The employees at SF Express prioritize the interests of their customers.	0.74			
	The SF Express staff utilizes artificial intelligence technology to augment their efforts to fulfill the specific needs of their consumers.	0.73			
Perceived value					
	SF Express service quality is trustworthy.	0.79			
FV	SF Express is superior in service quality compared to other express services.	0.77	0.83	0.83	0.62
	It is a good value for money to use SF Express to send parcels.	0.80			
	It makes me happy to use SF Express to send parcels.	0.79			
SV	SF Express makes me feel good about sending parcels compared to other courier companies.	0.78	0.84	0.84	0.63
	I get social recognition when I use SF Express to send parcels.	0.82			
Customer satisfaction					
	Using SF Express to send parcels makes you more confident in social situations.	0.81			
MS	Using SF Express to send parcels has met my expectations.	0.75	0.82	0.82	0.60
	The price of sending parcels with SF Express is consistent with the quality of service provided.	0.76			
	I am very satisfied with using SF Express to send parcels.	0.79			
SS	I feel very happy using SF Express to send parcels.	0.74	0.79	0.81	0.58
	I am very content utilizing SF Express for parcel delivery.	0.77			
Customer loyalty					
	I will continue to use SF Express to mail the packages.	0.80			
EL	In the future, I will faithfully use SF Express to send parcels.	0.76	0.84	0.82	0.59
	I still use SF Express to send parcels even though the shipping cost of SF Express has increased.	0.75			
	I prefer to use SF Express to send parcels.	0.81			
BL	I prefer to use SF Express to send parcels.	0.71	0.81	0.80	0.57
	I still insist on choosing SF Express to send parcels even though my friends and relatives have recommended other courier companies to me.	0.74			

Notes: TI = Timeliness; SE = Security; TA = Tangibility; RE = Responsiveness; EM = Empathy; FV = Functional Value; SV = Social Value; MS = Material Satisfaction; SS = Social Satisfaction; EL = Emotional Loyalty; BL = Behavioral Loyalty.

Table 2: Pearson's Product-Moment Correlation Coefficient

	TI	SE	TA	RE	EM	FV	SV	MS	SS	EL	BL
TI	1										
SE	0.567**	1									
TA	0.499**	0.505**	1								
RE	0.517**	0.514**	0.547**	1							
EM	0.503**	0.418**	0.491**	0.465**	1						

FV	0.339**	0.336**	0.348**	0.339**	0.396**	1					
SV	0.396**	0.375**	0.332**	0.319**	0.418**	0.481**	1				
MS	0.362**	0.350**	0.384**	0.421**	0.407**	0.364**	0.368**	1			
SS	0.336**	0.380**	0.360**	0.394**	0.397**	0.321**	0.328**	0.462**	1		
EL	0.432**	0.419**	0.430**	0.394**	0.415**	0.420**	0.353**	0.406**	0.412**	1	
BL	0.408**	0.394**	0.392**	0.453**	0.347**	0.396**	0.364**	0.406**	0.413**	0.460**	1

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

Notes: TI = Timeliness; SE = Security; TA = Tangibility; RE = Responsiveness; EM = Empathy; FV = Functional Value; SV = Social Value; MS = Material Satisfaction; SS = Social Satisfaction; EL = Emotional Loyalty; BL = Behavioral Loyalty.

Table 2 reveals a P value below 0.05, signifying a significant connection between the two analyzed variables; the correlation coefficient ranges from 0.319 to 0.567, demonstrating a constant positive correlation among all observed variables. (Biau et al., 2010).

In this investigation, we derived the rotation factor loading matrix in Table 3 using the Kaiser standardized orthogonal rotation method. (Shigeo, 1965). The results indicate that the diverse elements possess distinct theoretical relevance. We categorized the questionnaire items according to theoretical predictions, and there was minimal cross-loading among them. Moreover, the factor loads of each observed variable in the scale surpassed the minimum permissible threshold of 0.5, signifying the strong convergent validity of this measuring scale.

Table 3: Rotation Factor Component Load Matrix

	1	2	3	4	5	6	7	8	9	10	11
Timeliness2	0.767										
Timeliness4	0.764										
Timeliness1	0.741										
Timeliness5	0.732										
Timeliness3	0.717										
Tangiblity4		0.773									
Tangiblity2		0.766									
Tangiblity3		0.747									
Tangiblity1		0.704									
Responsiveness3			0.768								
Responsiveness1			0.767								
Responsiveness2			0.731								
Responsiveness4			0.696								
Empathy2				0.753							
Empathy3				0.74							
Empathy1				0.737							
Empathy4				0.734							
Security4					0.738						
Security2					0.732						
Security3					0.726						
Security1					0.694						
Functionalvalue3						0.802					
FunctionalValue1						0.791					
FunctionalValue2						0.77					
Socialvalue3							0.817				
Socialvalue1							0.787				
Socia value2							0.778				
Emotionalloyalty1								0.801			
Emotionalloyalty2								0.758			
Emotionalloyalty3								0.753			
Materialsatisfaction1									0.805		
Materialsatisfaction3									0.757		
Materialsatisfaction2									0.752		
Socialsatisfaction1										0.785	
Socialsatisfaction3										0.769	
Socialsatisfaction2										0.738	
Behaviorloyalty1											0.814
Behaviorloyalty3											0.744
Behaviorloyalty2											0.709

4.2. Hypothesis testing

4.2.1. SEM and path relationship analysis

The structural equation model (SEM) is employed to analyze the relationships among the constructs pertinent to the hypothesis. (Tingzhong et al., 2005). By estimating both the measurement model and the structural models, SEM can more precisely delineate the relationships between constructs and mitigate the effects of measurement error. This enhances the reliability of the research findings and more accurately represents the actual phenomenon. (Alexander, 2022; Rosseel & Loh, 2022). Structural Equation Modeling (SEM) is a powerful tool for managing complex models. It is especially useful for testing multiple hypotheses at the same time and telling the difference between the direct and indirect parts of an effect.(Shruti & Robert, 2016).

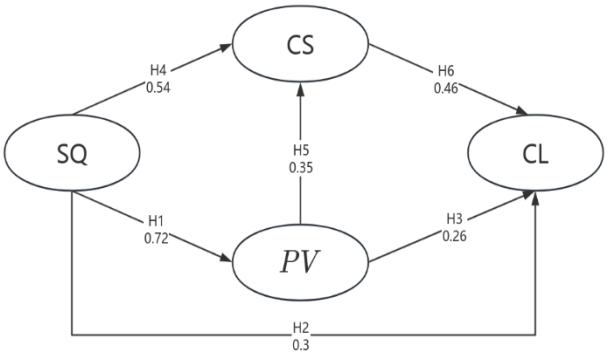

Fig. 1 Illustrates That the Goodness-of-Fit (GOF) Statistics, Encompassing Both Absolute and Incremental Fit Indices, Exhibit Commendable Characteristics. The Results, Which Included Both Absolute and Incremental Fit Indices, Were Satisfactory (Cmin/Df = 1.32, RFI = 0.91, GFI = 0.92, TLI = 0.98, CFI = 0.98, PNFI = 0.85, and RMSEA = 0.03).

Table 4: Relationships Among BL, CS, PV, and SQ

Hypothesis	Path	Estimate	S.E.	C.R.	P	Results
H1	PV <--- SQ	0.725	0.07	10.336	***	Significant
H2	CL<--- SQ	0.295	0.125	2.506	0.012	Significant
H3	CL<--- PV	0.263	0.122	2.297	0.022	Significant
H4	CS<--- SQ	0.537	0.098	5.255	***	Significant
H5	CS<--- PV	0.35	0.103	3.254	0.001	Significant
H6	CL<--- CS	0.463	0.168	3.051	0.002	Significant

Notes: SQ = service quality, PV = perceived value, CS = customer satisfaction, CL = customer loyalty.
*** $P \leq 0.001$.

Table 4 delineates the intricate interactions among the variables inside the structural equation model.
The standardized correlation coefficient between perceived value and service quality was 0.725, indicating a positive impact of service quality on customer perceived value, thereby validating hypothesis H1.
The standardized correlation coefficient between customer loyalty and service quality was 0.295, with a P-value of 0.012, indicating a positive impact of service quality on customer loyalty, thus validating hypothesis H2.
The standardized correlation coefficient between customer loyalty and perceived value was 0.263, with a p-value of 0.022, indicating a positive impact of perceived value on customer loyalty, thus validating hypothesis H3.
The standardized correlation coefficient between customer satisfaction and service quality was 0.537, with a P-value of less than 0.001, indicating a positive influence of service quality on customer satisfaction, thus validating hypothesis H4.
The standardized correlation coefficient between customer satisfaction and perceived value was 0.350, with a P-value of 0.001, indicating a positive influence of perceived value on customer satisfaction, thus validating hypothesis H5.
The standardized correlation coefficient between customer loyalty and customer satisfaction was 0.463, indicating a positive impact of customer satisfaction on customer loyalty, thereby validating hypothesis H6.

4.2.2. Perceive value and customer satisfaction as a mediation

We evaluated the models using the bias-corrected percentile bootstrap approach, which involved 2000 iterations of random sampling and established a 95% confidence interval. Table 5 displays comprehensive results. intersection

Table 5: Mediation Analysis

Path	Estimate	Bias-Corrected 95% CI		P-value	Results
		Lower	Upper		
SQ->CS->CL	0.248	0.084	0.563	0.001	Significant
SQ->PV->CL	0.191	-0.016	0.449	0.063	Not significant
SQ->PV->CS->CL	0.117	0.043	0.335	0.002	Significant
Total	0.556				

Table 5's data analysis results show that the P value exceeded the 0.05 threshold, and the interval encompassed a value of 0. This suggests that perceived value is not a viable mediating variable between service quality and customer satisfaction. Consequently, hypothesis 8 is dismissed. Customer satisfaction can function both as an independent intermediary variable between service quality and customer loyalty and, in conjunction with perceived value, as a composite intermediary variable between service quality and customer loyalty. Therefore, we affirm Hypotheses 7 and 9.

5. Conclusion

This paper developed a conceptual model of customer loyalty based on data from the SF Express customer questionnaire. The structural equation model validates the pertinent hypotheses through data analysis. This study utilized perceived value and customer satisfaction as mediating variables and developed a chain mediation model to examine their mediating effect on customer loyalty. The study yielded the following findings:
Artificial intelligence technology significantly influences service quality, perceived value, and customer satisfaction, all of which impact customer loyalty. Customer satisfaction (0.46) exerted the most substantial influence on loyalty, succeeded by service quality (0.3), but perceived value (0.26) had a comparatively minor effect.
The direct influence coefficient of service quality on customer loyalty is 0.3, whereas its indirect influence coefficient via perceived value and customer satisfaction is 0.556. This signifies that service quality directly influences loyalty and indirectly fosters it by improving

perceived value and customer satisfaction. Customer satisfaction can function as both an independent intermediary variable and a component of a chain intermediary effect with perceived value, so collectively enhancing its positive influence on loyalty.

6. Implication and Future Research

6.1. Theoretical implication

This study is important because it examines how SF Express service quality, customer satisfaction, perceived value, and loyalty interact, especially when AI technology is applied. The study explores how AI technology affects customer experiences and behavior by examining how these variables influence each other. In express delivery logistics, the implementation of AI technology enhances service efficiency and may redefine client expectations for service quality. (Fan & Ye, 2017).

This study addresses deficiencies in the current literature. Currently, there is a lack of research regarding the influence of AI in the service sector, particularly in specialized contexts, such as the fast delivery industry. Consequently, this research can furnish significant empirical evidence that enhances existing theoretical frameworks, particularly about the correlation between service quality and client loyalty. (Zheng et al., 2022).

In conclusion, examining the correlation between SF Express's service quality, customer satisfaction, perceived value, and customer loyalty within the framework of artificial intelligence can enhance our comprehension of this domain and yield significant insights for future research and development trajectories.

6.2. Managemental implications

Even though SF Express is a leading company in China's logistics sector, competition in the market is still very strong. The findings guide logistics providers to offer customized services that meet customer needs, which improves satisfaction and loyalty. The study highlights the importance of service quality and customer satisfaction and suggests the best way for SF Express to allocate resources to improve performance.

7. Recommendation

Operationalizing AI to Enhance Service Quality:

SF Express can use AI, including predictive analytics and chatbots, to optimize deliveries, personalize services, and improve responsiveness. Real-time tracking and proactive notifications enhance timeliness and reliability, boosting customer satisfaction, loyalty, and overall operational efficiency.

Policy and Regulatory Considerations:

SF Express should ensure AI use follows data privacy, ethical, and legal standards. Regular audits, staff training, and transparent practices balance cost, service quality, and trust, reducing risks while supporting sustainable, responsible AI integration.

Expanding Research Scope:

Future studies should explore AI across diverse logistics companies and regions, using mixed methods and longitudinal designs, to understand service quality, satisfaction, and loyalty trends, ensuring findings are generalizable and relevant across sectors and cultures.

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