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Research Article

Evaluating the Impact of Robo-Advisor Services on Customer Loyalty in the Chinese Fintech Sector: The Mediating Role of Customer Trust

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ABSTRACT

The following research aimed at evaluating how Robo-advisor services impact customer loyalty in the context of the fintech sector in China while investigating the mediating role of customer trust in the relationship between factors of these services. In order to achieve this aim, 351 eligible individuals who have experience in using Robo-advisors are recruited as samples to survey. Since Robo-advisor service providers in China face dilemmas and risks of breaching compliance requirements, which leave users concerned about the privacy of their funds, researching this area is crucial. The analysis of the survey findings with the help of SmartPLS has revealed that factors like perceived anthropomorphism and information quality of Robo-advisors and service commitment of fintech companies directly impact customer loyalty, whereas factors such as perceived autonomy of Robo-advisors and the quality of their service do not have any impact on the loyalty of customers. Additionally, trust has proved to be a mediator in the relationship between a few of these variables. These findings can help fintech companies provide the best quality Robo-advisor services to customers and build a loyal customer base. Users of Robo-advisors will also become aware of the factors that ensure the best possible service. However, future researchers are suggested to use a mixed method to get deeper qualitative and generalised quantitative findings, along with cross-country or cross-industry analysis to understand the impacts of cultural or industrial factors respectively.

Keywords: Robo-advisor, Customer loyalty, Customer trust, Consumer behaviour, Fintech

1. INTRODUCTION

A fast-growing realm of discussion within the fast-progressing digital transformation of financial services is the Robo-advisor services of fintech companies. A Robo-advisor is defined as a virtual financial advisor powered by artificial intelligence (AI) that employs an algorithm to offer an automated selection of financial advisory services (Hong et al., 2023). A typical Robo-advisor asks key questions about the financial situation and future goals of an individual through an online survey and then uses that data to deliver advice and automatically invest for the particular individual. Tao et al. (2021) stated that a Robo-advisor is an example of a software robot and not a physical one. On the other hand, as per Wexler and Oberlander (2021), the software similar to AI that supports Robo-advisor functions might be driven by a robot. It means the role of a robot in Robo-advisor services is integral. The communication between investors and Robo-advisors generally occurs through smartphone apps or over the web. The reason Robo-advisor services are available at a lower cost than conventional investment management options are the automation involved in the process (Abbas, 2024). This less expensive nature along with the requirement of a very low opening balance makes Robo-advisor services available to retail investors.

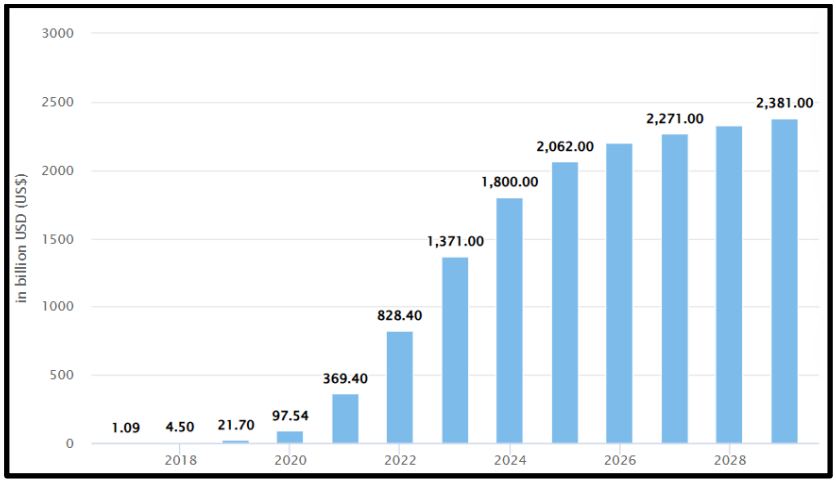

Figure 1. Assets under management in the Robo-advisor market

(Source: Statista, 2024)

In the ever-evolving landscape of financial technology, the Robo-advisor platform has been one path-breaking innovation. Darskuviene and Lisauskiene (2021) believe that in an era when businesses seek to adapt and leverage innovative solutions to compete with each other, investing in the development of a Robo-advisor platform has become much more than just an option of strategic imperative. There is more than one reason behind this such as the enhancement of operational efficiency, the automation of financial decision-making, and the optimisation of wealth management strategies (Ajiga et al., 2024). This is why this innovative technology, besides transforming investment methods, is also set to revolutionise the entire financial industry. As seen in Figure 1, assets under management in the Robo-advisor market, with an expected annual growth rate of 3.66% in CAGR 2025-2029, are projected to reach US$2,062 billion in 2025 (Statista, 2024). This suggests that the number of users of Robo-advisor services is also going to increase rapidly in the coming years.

In this era of the digital economy, China is trying its best to develop fintech that can drive digital transformation in the financial industry. Robo-advisors in the country have experienced rapid improvements lately due to factors like low market access standards and limited financial regulations (Di, 2022). Regulators in China have taken every useful measure to promote the industry since 2016. In 2022, the Robo-advisor market in China generated a revenue of US$504.5 million and is expected to generate eight times more than this by 2030 at a CAGR of 20.4% in the coming six years (Grand View Research, 2022). Bu et al. (2022), however, found that the market in China has not been prosperous in the past few years and assumed it to be a side effect of financial supervision. Reasons like risks and dilemmas faced by Robo-advisors to breach compliance requirements also cannot be ignored. In this regard, Bu et al. (2022) commented that Robo-advisors often provide support solely for technical and account-related issues, which leaves no path for an individual to inquire about his or her investments. This means despite the requirement to maintain a minimum account balance or pay a higher management cost; a specialised advisor might not be available in most cases. As a result, consumers do not know whether it is effective and are afraid of its damage. Thus, it is important to understand how they affect loyalty so that factors such as trust that drive long-term customer relationships can be thoroughly understood. For this purpose, this study has selected the Chinese fintech sector to explore which human-like characteristics and service-related factors develop the trust of people in Robo-advisor services and drive their loyalty towards them.

The current research aims to evaluate the impact of Robo-advisor services on customer loyalty in the context of the Chinese fintech sector while examining the mediating role of trust.

Objectives

- To examine the impacts of human-like characteristics of Robo-advisors on customer loyalty to Robo-advisor services in the Chinese fintech Sector
- To investigate the impacts of service-related factors of Robo-advisors on customer loyalty to Robo-advisor services in the Chinese fintech Sector

- To assess the mediating effects of customer trust in the relationship of human-like characteristics, service-related factors, and their loyalty to Robo-advisor services in the Chinese fintech Sector

2. LITERATURE REVIEW

Human-like characteristics of Robo-advisors impacting customer loyalty towards them

Anthropomorphism is defined as the use of human-like features in entities that affect human perception of non-human objects like cars, robots, and others (Qamar-un-Nisa & Nisa, 2023). Brands make organizations valuable and anthropomorphism is an effective way to promote the value of organizations. According to Wan and Chen (2021), regarding the reconstruction of consistent and conventional values, consumers have become immensely interested in human-like objects and they interact with them the same way they interact with human beings. The success of a brand that has faced lower trust over time than other reputable ones, assigning human characteristics or anthropomorphism proves useful in increasing the power of consumer awareness of the intrinsic value of the brand. Anthropomorphized products occur in different ways of the external appearance of a product, its perception regarding self-congruity developed through characteristics and behaviour such as physical appearance, mental state and motivations, and emotional attachment (Zhang & Wang, 2023). However, Balakrishnan et al. (2022) stated that the appeal of anthropomorphism is not well-perceived in marketing and brand managers need a better understanding of the way a brand should be anthropomorphized, built, and managed as a human-like brand. This suggests that the two perceptions through which the effect of anthropomorphism deals, namely the appearance of a product and its self-congruity, need to be evaluated well to make people towards it. Hence, the following hypothesis can be assumed:

H1: *"Perceived anthropomorphism" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor."*

Consumers usually want to be more autonomous when dealing with a brand. Schüßler et al. (2021) defined autonomy as the capability of a product that involves performing tasks independently and with no user interference. Autonomous products may be integrated with smart features like voice activation and personalized communication with the user in this regard. There are four different levels of autonomy, namely manual, bounded, supervised, and symbiotic. As per Lucia-Palacios and Pérez-López (2023), manual autonomy is the lowest level of autonomy, while bounded autonomy involves the act of the product after the user decides on all necessary options. Subsequently, supervised autonomy allows the product to interact with the user and help complete the proposed activity, whereas symbiotic autonomy means the interaction between two smart devices (Lucia-Palacios & Pérez-López, 2023). Therefore, interactivity proves to be a key consequence of autonomy and an integral part of autonomous products. This also means if users find any product autonomous, irrespective of its level, they are likely to be loyal towards it in the long term. Thus, the following hypothesis can be formed:

H2: *"Perceived autonomy" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor."*

Service-related factors of Robo-advisors impacting customer loyalty towards them

In the opinion of Beatrix (2022), the quality of the content presented in an application is what refers to information quality. However, the information presented in the application needs to be relevant, complete, easy to understand, and secure if it carries out transaction activities as Hallencreutz and Parmler (2021) termed information quality the most vital factor in determining the level of customer satisfaction and loyalty in the long term. Similarly, Patel (2021) stated that the features of the information along with its timeliness, relevance, and correctness may also be used to determine whether or not it is of high quality. It suggests that the validity of the information, its availability, and the completeness of its output are the three major factors to consider when evaluating the quality of the information. In the context of Robo-advisors, a user might determine its information quality by evaluating if it can successfully do its work, namely wealth management. A positive output in this regard would make the user loyal towards Robo-advisor services. This leads to the formation of the following hypothesis:

H3: *"Information quality" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor."*

The significance of service quality in fostering loyalty among customers is a well-established concept in marketing research. It pertains to the degree of customer satisfaction during interactions with the services of an organization, encompassing entities such as service reliability, empathy, tangibles, responsiveness, and assurance (Aras et al., 2023). These factors are considered essential in shaping customer perceptions of service quality and eventually making customers loyal to a brand. As per Rane et al. (2023), customers are bound to remain loyal to brands that

fulfil their satisfaction with high-quality services because the positive service experience creates a favourable image for them, leading to enhanced trust and satisfaction in the brand. Moreover, these customers are inclined to recommend that brand to others. Pina and Dias (2021), however, highlighted by stating that a single negative experience with a brand can mar the perception of customers, resulting in diminished loyalty. It proves that service quality plays a key role in shaping customer loyalty and companies that prioritize this factor are more likely to offer positive experiences for their customers. Therefore, the following hypothesis can be developed:

H4: *"Service quality" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor."*

Commitment is an integral part of a long-term valued relationship. It is viewed as a psychological attachment, concern for future welfare, and personal identification that results in customer loyalty (Van Rossenberg et al., 2022). In their study, Kalia et al. (2021) reported the strong impact of commitment on loyalty by stating how customers in the current generation are more demanding, more informed, and less forgiving than ever before, meaning an inadequate commitment to serve will drive customers to competitors in no time even if they had been loyal for years. Customers expect effective and timely support along with commitment from organizations from whom they are taking the service. In case, the experience does not meet their expectations, they will share their grievances online and others will also see those. As per the findings of Volberda et al. (2021), the failure to resolve issues of customers quickly and efficiently signifies the lack of commitment from an organization, due to which customers lose faith in their ability to meet their needs. These bad customer service experiences also create long-lasting negative perceptions. Hence, the following hypothesis can be generated:

H5: *"Service commitment" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor."*

The mediating effect of customer trust

Trust is considered a sentiment or belief that is generated from reliability. Pescetelli and Yeung (2021) stated that trust is perceived to create confidence based on reliability and integrity and is also a key driver to create a loyal customer base. Wu et al. (2023) also emphasized the significance of trust in improving loyalty among customers and facilitating value creation as it acts as a powerful mediator and direct measurement tool of customer loyalty. More trust in a brand automatically leads to less loyalty to other service providers. Subsequently, anthropomorphism increases trust in a component and proves an important factor when evaluating the willingness of a person to use that (Chen & Park, 2021). Consequently, brands design their systems in a way that can increase their perceived anthropomorphism and positively influence the intention of customers to experience the service. In case that anthropomorphism succeeds in creating trust among customers, loyalty follows shortly. This is why the following hypothesis can be formulated:

H6: *"Customer's trust" significantly mediates the relationship between the "perceived anthropomorphism" of Robo-advisor services and "customer loyalty to Robo-advisor."*

In marketing research, the role of trust is believed to be closely associated with consumer expectations from the capacity of a firm to project its obligations and keep its promises (Islam et al., 2021). These expectations are usually based on the competence, honesty, and benevolence of the firm. Lopes et al. (2021) defined competence as expertise and the capacity of the firm to carry out activities and live up to the expectations of consumers, whereas honesty is linked to the fulfilment of promises made by the firm and benevolence represents its willingness to consider consumer interests when making marketing decisions and planning for engagement. The established reputation of a firm based on these factors represents an indicator of trust among consumers in that firm. Additionally, when a firm successfully offers autonomous products that can perform every task on their own, the relationship of trust between customers and the firm strengthens further, which eventually translates into loyalty. Such expected strong relationships lead to the following hypothesis development:

H7: *"Customer's trust" significantly mediates the relationship between the "perceived autonomy" of Robo-advisor services and "customer loyalty to Robo-advisor."*

Loyalty is referred to as a very strong commitment to repurchase or replace a certain product or service consistently in the coming times, leading to repeat purchases despite situational influences to influence behaviour switch (Krishnan, 2021). In other words, customer loyalty is a mindset of consumers with favourable attitudes towards service providers, who are bound to repurchase and recommend their services to others. Subsequently, building trust can be considered as the process of first setting up the behavioural standards that individuals will hold one another

to and then deciding whether or not those standards have been addressed (Shao et al., 2022). In this regard, expectations play the part of cognitive filtering by influencing an individual to perceive the actions of others in a way that is consistent with his or her actual expectations. Akoglu and Özbek (2021) mentioned that the concept of trust is one of the key factors in developing long-term relationships with users, especially in the context of ensuring the privacy of any information related to them and the dedication to providing the most superior product and service every time. In case, a firm meets these along with maintaining the confidentiality of user information, it is bound to be successful in building a loyal customer base. Hence, the following hypothesis can be generated:

H8: *"Customer's trust" significantly mediates the relationship between the "information quality" of Robo-advisor services and "customer loyalty to Robo-advisor."*

According to Swart and Broersma (2022), most customers usually opt for a brand that they believe is more trustworthy and reliable than others in the market. On the contrary, Uzir et al. (2021) stated that consumers perceive the quality of the service provided by the brand as its overall service quality. The authors argued that the actual service quality is the difference between the expectations of consumers about it and how they perceive its performance. Zhang et al. (2022) further mentioned that there are slight differences between expectations and perceived performance, which are also the best indicators of customer satisfaction, ultimately fostering trust among them. Service quality is sufficient when the perception of customers about a brand equal or exceeds. This sense of trust in customers generated from service quality makes them believe that the particular brand will live up to their expectations at all times and as a result, they keep experiencing its services. Therefore, the following hypothesis can be developed:

H9: *"Customer's trust" significantly mediates the relationship between the "service quality" of Robo-advisor services and "customer loyalty to Robo-advisor."*

The primary aim of a business is to satisfy its customers and loyalty is affected by factors like satisfaction, trust, and commitment. As a reason behind this, Dam and Dam (2021) mentioned that customer satisfaction has a significant and positive impact on customer loyalty. They stated that this relationship is formed because customers are loyal to a brand as long as they are satisfied with its product or service. This means customer loyalty will be formed if customers feel satisfied with the performance of the service. While exploring the reasons behind keeping customers satisfied from the point of view of an organization, Beuren et al. (2022) mentioned that the occurrence of customer satisfaction brings huge benefits to organizations including a harmonious relationship with customers that translates into word-of-mouth recommendations, directly related to revenue generation. All these motivate an organization to stay committed to delivering the service perceived by customers so that they remain loyal. Hence, the following hypothesis can be generated:

H10: *"Customer's trust" significantly mediates the relationship between the "service commitment" of Robo-advisor services and "customer loyalty to Robo-advisor."*

3. THEORETICAL UNDERPINNING

This research is based on the technology acceptance model (TAM), an information systems theory that describes how to encourage individuals to accept and utilise new technology. Developed by Fred Davis in 1986, TAM suggests that the decision of an individual to perform a behaviour is the outcome of the analysis of the benefit that he or she expects from the behaviour compared to the efforts they put in to perform the behaviour (Murillo et al., 2021). This means the use of some technology is determined based on the evaluation of the trade-off between its perceived usefulness and the perceived ease of using it. Hence, two key factors are highlighted here, namely perceived usefulness and perceived ease of use. Perceived usefulness is defined as the degree to which a user believes that the use of a particular system or technology would enhance job performance, whereas the degree to which a user finds the system or technology difficult to understand or believes that using it would be effort-free is called perceived ease of use (Al-Nuaimi & Al-Emran, 2021). According to the model, these two factors are the primary determinants of the intention of an individual to use any technology, which in turn predicts the actual usage behaviour. In short, if people believe that the system or technology is useful and easy to use, they are more likely to adopt and use it. The adoption of this model in the current research proves useful in this regard as it explains how trust in using Robo-advisor services can be generated in people. With the help of this theoretical underpinning, factors that foster loyalty among people regarding Robo-advisor services in the context of the Chinese fintech industry are thoroughly evaluated.

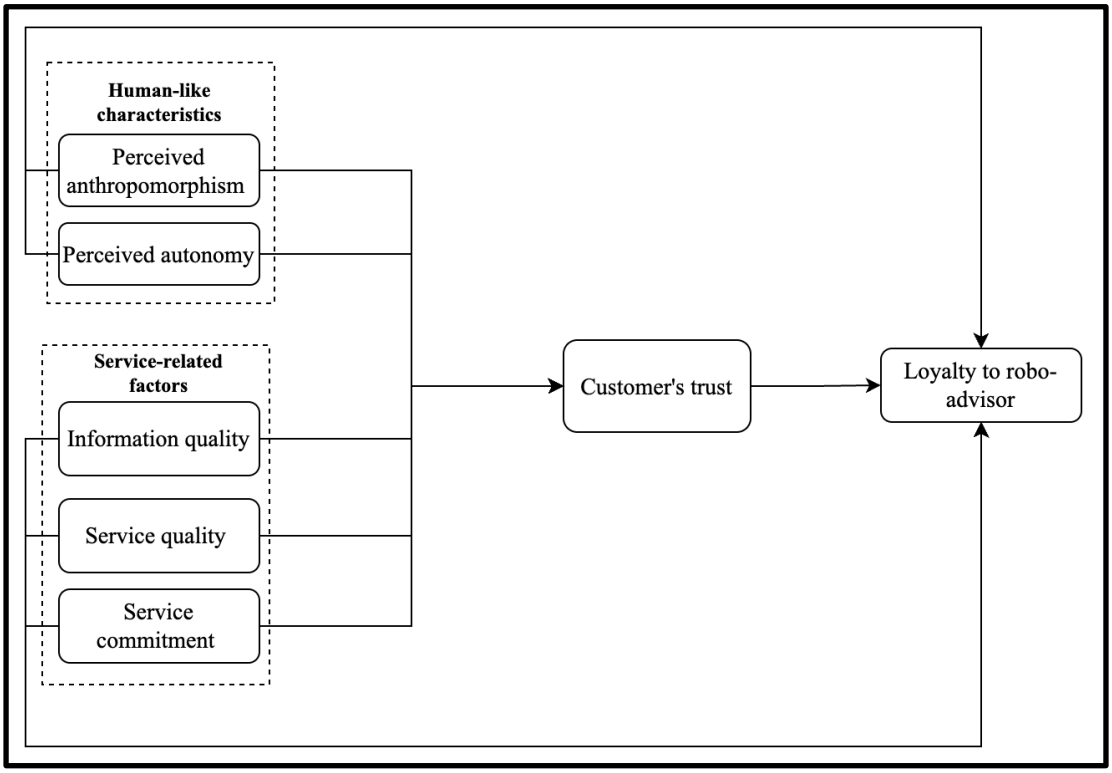

Figure 2: Conceptual framework

4. LITERATURE GAP

Although past studies have extensively explored the concept of trust and loyalty and how these are influenced by certain factors such as anthropomorphism, autonomy, service quality, and others of a product or brand (Qamar-un-Nisa & Nisa, 2023; Schüßler et al., 2021; Hallencreutz & Parmler, 2021, Aras et al., 2023), most of them are based on a general context and fail to provide an overview of a specific industry. Furthermore, how the said factors influence customer loyalty and the explanation of the mediating role of trust in the context of Robo-advisor services are also missing in the past literature. As a result, neither a clear picture of the Chinese fintech sector nor Robo-advisor services has been derived. Hence, these gaps need to be filled by empirical research.

5. METHODOLOGY

Since the current research deals with factors associated with human beings such as trust and loyalty towards a certain component, the primary quantitative or an online survey method has been followed to complete it. Based on the aim of the study to evaluate how Robo-advisor services impact customer loyalty in the context of China and the mediating role of trust in this, the adoption of the quantitative method has been beneficial in collecting key numerical insights. Islam and Aldaihani (2022) stated that researchers adopt the quantitative method for their research to obtain the best possible results based on objectives developed using measuring instruments. In this research, seven key variables along with measurement items for each one are adopted from past studies. Completing this study directed towards a social phenomenon using the primary quantitative method has helped the researcher reach the projected meaningful outcome from the large amount of data collected from samples.

In this regard, 351 people were selected as samples for the survey. A large sample size selection helps the researcher generalise the gained information (Lakens, 2022). Another reason behind selecting these many samples for the research is the 10-times rule, which posits that the sample size needs to be at least 10 times more than the research variables or arrowheads (Wagner & Grimm, 2023). In this research, the target population was all potential users of Robo-advisor services in China, among which only those who had experience using these services were selected as samples. The researcher adopted one of the widely used sampling techniques, namely convenience sampling to recruit eligible people. In this sampling method, people who are easily available to the researcher or those who can be easily got in touch with are recruited (Golzar et al., 2022). The researcher, with the help of this technique, recruited eligible participants for the survey by posting some content such as posters and stories related to the research on

Weibo first and then adding those who reached out to him in a WeChat group. There, the researcher further elaborated on the purpose of the survey and how their identity will be confidential during the course of action. Upon their agreement, 351 individuals were selected and each of them received a consent form and a participant sheet on their email. When they informed the researcher about successfully filling those out, the researcher shared the survey link with them which had a validity of one week.

The survey consisted of close-ended questions related to the demographic information of participants such as age, gender, and experience with Robo-advisor services and descriptive ones related to service-related factors and human-like characteristics of Robo-advisor services. Questions were developed on the five-point Likert scale, in which '1' denoted 'Strongly disagree' and '5' meant 'Strongly agree.' In this regard, this study can be termed a cross-sectional one, as data from participants has been collected only once and at a single point in time (Chirico, 2023). This cross-sectional approach along with the adoption of a primary quantitative research method has been immensely helpful for the researcher in collecting the required amount of data to reach the outcome in time. The data was cleaned before being analysed statistically using SmartPLS through the Structural Equation Modelling (SEM) method. As a part of this, tests like descriptive statistics, correlation, and regression have been conducted to assess the validity and reliability of the collected data and the relationship between the research variables. Then, the results are discussed in comparison with recently published literature related to the current subject matter. Besides maintaining the anonymity of survey participants by not collecting any personal details like their age or contact information, the privacy of the collected data is also ensured by storing it in a password-protected drive that only the researcher can access.

6. MEASUREMENT SCALES

'Perceived anthropomorphism' and 'Perceived autonomy' are designed based on the 5-item scale and 4-item scale respectively provided by Aw et al. (2023), whereas 'Perceived autonomy,' 'Information quality,' and 'Service quality' have been adopted from 3-item scales developed by Cheng et al. (2019). 'Customer trust' and 'Customer loyalty' are adopted from 3-item scales provided by Xia et al. (2023) and Zhang et al. (2023) respectively [Refer to Appendix].

7. RESULTS

Table 1: Demographic characteristics of respondents

Category	Value	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	169	48.1	48.1	48.1
	Female	178	50.7	50.7	98.9
	Prefer not to say	4	1.1	1.1	100.0
Age	<18	131	37.3	37.3	37.3
	18-24	56	16.0	16.0	53.3
	25-34	88	25.1	25.1	78.3
	35-44	76	21.7	21.7	100.0
Education	High school or below	130	37.0	37.0	37.0
	Bachelor's degree	144	41.0	41.0	78.1
	Master's degree	77	21.9	21.9	100.0
Occupation	Student	89	25.4	25.4	25.4
	Employed	136	38.7	38.7	64.1
	Self-employed	78	22.2	22.2	86.3
	Retired	39	11.1	11.1	97.4
	Unemployed	9	2.6	2.6	100.0
Income	Below ¥5,000	89	25.4	25.4	25.4
	¥5,000 - ¥10,000	184	52.4	52.4	77.8
	¥10,001 - ¥20,000	63	17.9	17.9	95.7
	Above ¥20,000	15	4.3	4.3	100.0
Fintech Service Experience	<1 year	143	40.7	40.7	40.7
	1-3 years	135	38.5	38.5	79.2

	3-5 years	37	10.5	10.5	89.7
	>5 years	36	10.3	10.3	100.0
Usage	Daily	97	27.6	27.6	27.6
	Weekly	146	41.6	41.6	69.2
	Monthly	103	29.3	29.3	98.6
	Rarely	5	1.4	1.4	100.0
	Total	**351**	**100.0**	**100.0**	**100.0**

Table 1 represents key demographic characteristics of Robo-advisor service users who participated in the research survey. It is seen that most participants are females (50.7%). With a 48.1% distribution, males are also not behind. In terms of the age group, the majority of participants are seen to be under 18 years (37.3%), followed by those aged between 25 and 34 years (25.1%). Regarding education, 41% hold a bachelor's degree, whereas 37% qualify for high school or below. In terms of occupation, a significant number of respondents are employed (38.7%), which is closely followed by students (25.4%) and self-employed individuals (22.2%). The income levels of respondents reflect that 52.4% have earnings between ¥5,000 and ¥10,000, while the distribution drops down to 25.4% for those who earn below ¥5,000. When asked about their experience with fintech services, it is seen most respondents have less than 1 year (40.7%) or 1-3 years (38.5%) of experience, representing a less-experienced group of participants. Most importantly, their usage frequency reflects active engagement as 41.6% and 29.3% of the total respondents use fintech services weekly or monthly respectively.

Table 2: Reliability

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
Customer loyalty	0.585	0.585	0.783	0.546
Customer trust	0.828	0.835	0.897	0.745
Information quality	0.742	0.747	0.852	0.658
Perceived anthropomorphism	0.791	0.807	0.859	0.555
Perceived autonomy	0.852	0.864	0.901	0.695
Service commitment	0.651	0.655	0.811	0.589
Service quality	0.720	0.763	0.845	0.651

Table 2 demonstrates the reliability statistics for the constructs measured in the research. With a Cronbach's alpha of 0.828 and an average variance extracted (AVE) of 0.745, customer trust showcases the highest reliability and indicates strong internal consistency. With a Cronbach's alpha of 0.852 and an AVE of 0.695, perceived autonomy closely follows this. Conversely, customer loyalty is the least reliable as its Cronbach's alpha and AVE values are 0.585 and 0.546 respectively, suggesting moderate consistency. Cronbach's alpha values of 0.742 and 0.720 demonstrate adequate reliability for information quality and service quality respectively. Overall, the robustness of the measurement model is ensured in this study as most constructs meet the acceptable standards for reliability.

Table 3: Discriminant validity

	Customer loyalty	Customer trust	Information quality	Perceived anthropomorphism	Perceived autonomy	Service commitment	Service quality
Customer loyalty							
Customer trust	0.989						
Information quality	0.876	0.495					
Perceived anthropomorphism	0.970	0.754	0.724				
Perceived autonomy	0.888	0.613	0.706	0.877			
Service commitment	0.883	0.553	0.529	0.665	0.685		
Service quality	0.878	0.626	0.765	0.791	0.723	0.560	

The discriminant validity of the constructs exhibited in Table 3 suggests that with a value of 0.989, customer trust is highly discriminant valid as it exceeds its correlations with all other constructs in the study. Similarly, with values of 0.970 and 0.888, perceived anthropomorphism and perceived autonomy also show strong discriminant validity respectively. Constructs such as service commitment, service quality, and information quality are also moderately correlated with others and support standard discriminant validity. On the whole, results suggest sufficient distinct constructs.

Table 4: Loadings

	Customer loyalty	Customer trust	Information quality	Perceived anthropomorphism	Perceived autonomy	Service commitment	Service quality
CL1	0.750						
CL2	0.724						
CL3	0.742						
CT1		0.864					
CT2		0.905					
CT3		0.818					
IQ1			0.828				
IQ2			0.812				
IQ3			0.794				
PA1					0.737		
PA2					0.876		
PA3					0.905		
PA4					0.807		
PANTH1				0.524			
PANTH2				0.834			
PANTH3				0.855			
PANTH4				0.752			
PANTH5				0.712			

SC1	0.746	
SC2	0.813	
SC3	0.741	
SQ1		0.892
SQ2		0.882
SQ3		0.617

Factor loadings presented in Table 4 show that the values for customer loyalty range from 0.724 to 0.750, with CL1 being the strongest. In the cases of customer trust and information quality, CT2 and IQ1 demonstrate strong loadings with values of 0.905 and 0.828. All these constructs reflect good reliability as they exceed the threshold loading value of 0.7. However, the loadings of perceived anthropomorphism vary from 0.524 to 0.855, which also reflects a weaker reliability for PANTH1 with 0.524. With loadings ranging between 0.741 and 0.813, the constructs of service commitment indicate adequate reliability. Regarding service quality, only SQ3 is seen to be a weak construct as it has a loading of 0.617. Although minor revisions for weaker loadings would enhance the measurement model, it can be safely said that the sufficient reliability of most indicators supports the robustness of the model in this study.

Table 5: Direct effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Customer trust -> Customer loyalty	0.386	0.383	0.048	8.021	0.000
Information quality -> Customer loyalty	0.190	0.193	0.052	3.694	0.000
Perceived anthropomorphism -> Customer loyalty	0.115	0.116	0.054	2.120	0.034
Perceived autonomy -> Customer loyalty	0.100	0.098	0.055	1.821	0.069
Service commitment -> Customer loyalty	0.182	0.183	0.050	3.643	0.000
Service quality -> Customer loyalty	0.080	0.081	0.047	1.679	0.093

Table 6: Indirect effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Information quality -> Customer trust -> Customer loyalty	-0.006	-0.004	0.022	0.261	0.794
Perceived anthropomorphism -> Customer trust -> Customer loyalty	0.162	0.160	0.034	4.718	0.000
Perceived autonomy -> Customer trust -> Customer loyalty	0.029	0.026	0.035	0.830	0.407
Service commitment -> Customer trust -> Customer loyalty	0.043	0.044	0.020	2.136	0.033
Service quality -> Customer trust -> Customer loyalty	0.062	0.062	0.022	2.875	0.004

Direct and indirect effects presented in Table 5 and Table 6 respectively reveal quite distinctive results. For instance, it can be observed in Table 5 that, with an original sample (O) value and a *p-value* of less than 0.001, customer trust

significantly influences customer loyalty. Subsequently, information quality, perceived anthropomorphism, and service commitment also exhibit direct effects. However, with O and *p-values* of 0.100 and 0.069 respectively, perceived autonomy and, with O and *p-values* of 0.080 and 0.093 respectively, service quality do not demonstrate strong direct effects on customer loyalty. Indirectly, Table 6 represents that perceived anthropomorphism, service commitment, and service quality indirectly impact customer loyalty via customer trust, while information quality and perceived autonomy do not. Thus, the vital role of customer trust as a mediator is established.

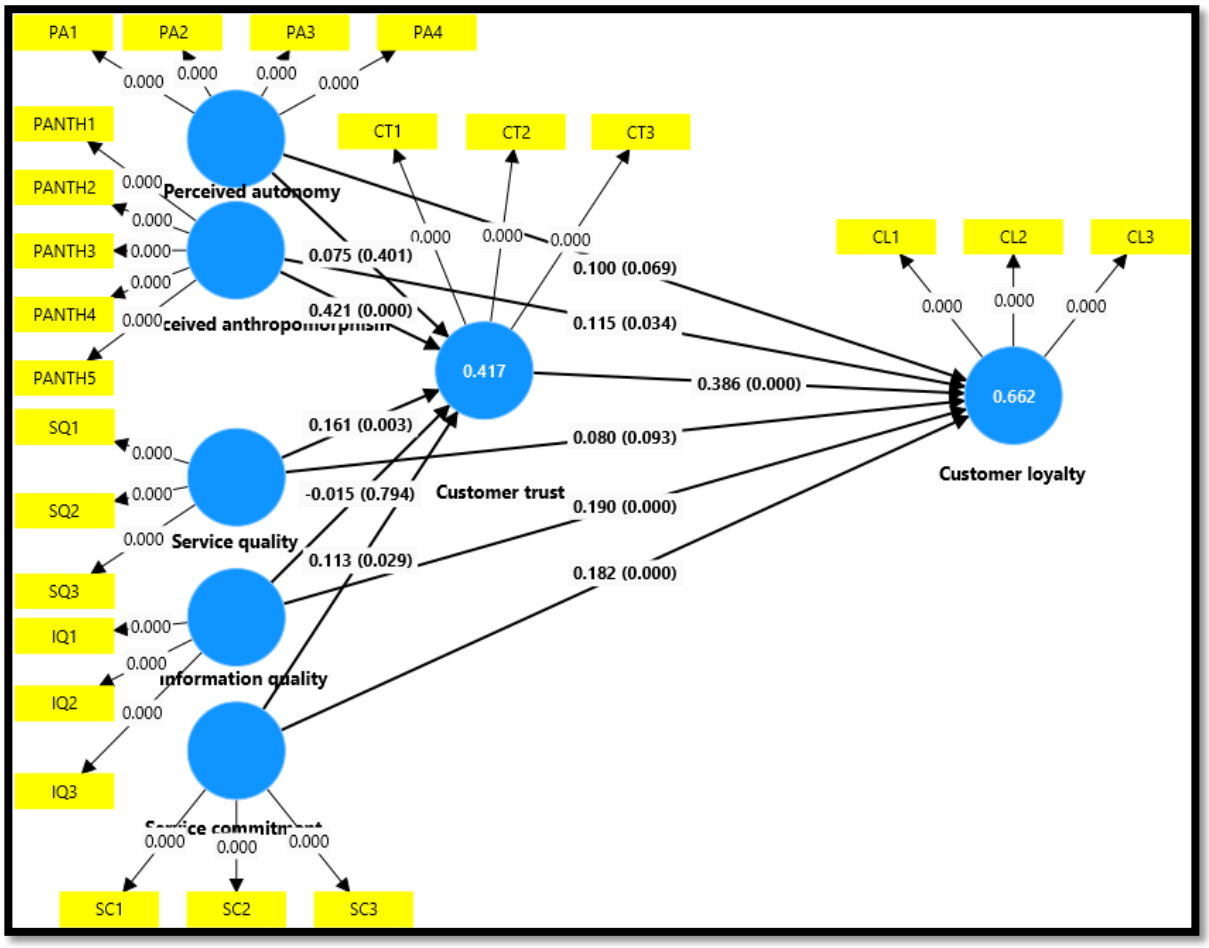

Figure 3. Structural model

The structural model of the data in Figure 3 showcases the connections between latent constructs and their respective indicators in the study. In short, it highlights the mediating role of customer trust, supported by strong construct reliability and validity.

8. DISCUSSION

As presented in Table 7, the hypothesis results suggest that perceived anthropomorphism, information quality, and service commitment significantly impact customer loyalty to Robo-advisor services, whereas factors like perceived autonomy and service quality fail to do so. Moreover, in terms of the mediating role of customer trust, it can be seen that although it significantly mediates the relationship of perceived anthropomorphism, service quality, and service commitment with customer loyalty to Robo-advisor services, it does not do so in the relationship between customer loyalty to Robo-advisor services and perceived autonomy and information quality. These findings are quite contrasting with some of those found by reviewing the recently published literature in this field. Regarding the first hypothesis related to the impact of perceived anthropomorphism on customer loyalty, it has been found in the literature review section that consumers interact with human-like objects and human beings in the same way due to their traditional and consistent values (Wan & Chen, 2021). The study by Aw et al. (2023a) also revealed perceived anthropomorphism as one of the core conditions to accept Robo-advisory services. This resemblance drives loyalty among customers for anthropomorphized products and services in the long term. The current findings are also

similar to these, which helped address the gap regarding how certain factors influence customer loyalty for Robo-advisor services and led to the acceptance of the hypothesis.

It has been stated by Schüßler et al. (2021) that consumers love dealing with an autonomous brand or product as it can perform tasks independently without their interference. It led to the conclusion that consumers remain loyal if they find any product or service autonomous. However, with an O value of 0.100 and a *p-value* of 0.069, perceived autonomy is found to have no positive impact on customer loyalty as these values are below the threshold. This means if other factors like perceived anthropomorphism are not there, only autonomy cannot make users loyal to Robo-advisor services. This directly relates to the principle of TAM that says individuals do not use a technology that they believe cannot enhance performance. As a result of these findings, the second hypothesis related to perceived autonomy and customer loyalty is rejected. According to Patel (2021), relevant, complete, and secure information presented in the application is one of the key factors that determines the level of customer satisfaction and loyalty. Similarly, in their study, Wu et al. (2023) also emphasized the impact of technological characteristics of robots in their use. Hence, the similarity between the past findings and the current ones has led to the acceptance of the third hypothesis related to information quality and customer loyalty.

In the case of the fourth hypothesis associated with the relationship between service quality and customer loyalty to Robo-advisor services, it has been seen that a positive service experience creates a favourable image of brands for customers, due to which their satisfaction level remains high and they remain loyal to those brands. However, with an O value of 0.080 and a *p-value* of 0.093, service quality is found to have no positive impact on customer loyalty, meaning the quality of service provided by Robo-advisors is not adequate to make customers loyal to fintech companies in China. Besides, authors like Dang et al. (2023) have also talked about the role of cognitive drivers in fostering satisfaction and loyalty among consumers. Hence, the hypothesis is not accepted. Opposite to this, the fifth hypothesis, in which a positive impact of service commitment has been assumed on customer loyalty, is true as per the current findings. In the literature review section as well, Kalia et al. (2021) emphasized how strongly commitment impacts the loyalty of customers of the current generation. Thus, similar findings have led to the acceptance of the hypothesis.

Subsequently, trust is found to have significantly mediated the relationship between perceived anthropomorphism and customer loyalty as well as the between service commitment and customer loyalty, which has led to the acceptance of the sixth and tenth hypotheses. In the case of the relationship between perceived autonomy and customer loyalty, trust fails to mediate it, which means the autonomy of a fintech company or its Robo-advisor services cannot generate trust and loyalty among customers. Moreover, Aw et al. (2023b) mentioned in their study that most consumers are not ready to adopt the new Robo-advisor service for reasons like privacy concerns. This is why the seventh hypothesis is rejected. As it has been seen that the information quality of Robo-advisor services has a positive impact on customer loyalty to Robo-advisor services, trust does not mediate does not mediate the relationship between these two. As a result, the eighth hypothesis is also rejected. However, the ninth hypothesis related to the mediating role of trust in the relationship between service quality and customer loyalty to Robo-advisor services is accepted as the *p-value* is calculated as 0.004. While reviewing the literature, it has been found that the sense of trust generated by the quality of service keeps a user loyal to a brand for a long time (Swart & Broersma, 2022). Thus, the similarity in both findings, which also serves the main principle of TAM regarding the usefulness of a system, resulted in the acceptance of the hypothesis.

Table 7: Hypotheses testing

Hypotheses	Description	Summary
1	"Perceived anthropomorphism" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor"	Accepted
2	"Perceived autonomy" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor"	Rejected
3	"Information quality" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor"	Accepted
4	"Service quality" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor"	Rejected
5	"Service commitment" of Robo-advisor service positively impacts "customer loyalty to Robo-advisor"	Accepted

6	"Customer's trust" significantly mediates the relationship between the "perceived anthropomorphism" of Robo-advisor services and "customer loyalty to Robo-advisor"	Accepted
7	"Customer's trust" significantly mediates the relationship between the "perceived autonomy" of Robo-advisor services and "customer loyalty to Robo-advisor"	Rejected
8	"Customer's trust" significantly mediates the relationship between the "information quality" of Robo-advisor services and "customer loyalty to Robo-advisor"	Rejected
9	"Customer's trust" significantly mediates the relationship between the "service quality" of Robo-advisor services and "customer loyalty to Robo-advisor"	Accepted
10	"Customer's trust" significantly mediates the relationship between the "service commitment" of Robo-advisor services and "customer loyalty to Robo-advisor"	Accepted

9. CONCLUSION

It has been observed while evaluating the impact of Robo-advisor services on customer loyalty and the mediating role of trust in the context of the Chinese fintech sector that factors like perceived anthropomorphism, information quality, and service commitment of fintech firms and Robo-advisor services positively impact the loyalty of users towards Robo-advisor, whereas human-like characteristics of Robo-advisors such as perceived autonomy and service-related factors such as its quality do not impact the loyalty of users. The mediating role of trust is also seen to vary largely across these variables. These results have been derived after surveying 351 eligible Robo-advisor service users in China and analysing their responses using SmartPLS. Overall, the findings suggest that when fintech companies successfully create a relationship of trust with customers through their Robo-advisor services, customers are bound to remain loyal to those companies.

Theoretically, the research findings contribute to the field of knowledge using TAM that was not deeply explored by most researchers, namely how different human-like characteristics and service-related factors of Robo-advisors make users loyal to fintech companies in China. With TAM as the theoretical underpinning, the study has helped identify how the usefulness of Robo-advisors can be enhanced with the inclusion of different factors and trust and loyalty can be fostered among customers. Managerially, product development managers of fintech companies in China can take note of these key findings and try to enhance the quality of their Robo-advisor services so that a loyal customer base can be built and competitors can be beaten. Subsequently, users will also gain awareness about how to choose the appropriate Robo-advisor that enhances performance.

Despite these positive sides, one of the key limitations of this study has been the adoption of the primary quantitative research method, which is a survey. This may lead to self-reported biases, limiting the depth and contextual understanding of the findings. Moreover, the study focuses solely on the Chinese fintech sector, which may restrict its applicability to other countries or industries. Thus, future research could expand the scope to include cross-country or cross-industry comparisons to explore cultural differences in customer trust and loyalty. Additionally, integrating qualitative methods, such as interviews or focus groups, could offer deeper insights into customer perceptions. As qualitative research itself has criticism of lack of generalizability, a mixed-method approach is recommended to future researchers to provide a comprehensive understanding by combining generalised quantitative insights with in-depth qualitative outcomes.

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Appendix 1: Measurement Items

Variable	Constructs	Source
Perceived anthropomorphism	• Robo-advisors are natural. • Robo-advisors are humanlike. • Robo-advisors are conscious of their actions. • Robo-advisors feel lifelike and their interactions with users are not arti cial. • Robo-advisors are elegant in engaging with users.	Aw et al. 2023
Perceived autonomy	• Robo-advisors determine how they conduct tasks by themselves. • Robo-advisors make decisions by themselves. • Robo-advisors take the initiative. • Robo-advisors do things by themselves.	Aw et al. 2023
Information quality	• The Robo-advisor can provide me with high-yield information. • The Robo-advisor can provide timely information for me. • The Robo-advisor can accurately provide customized investment information for me	Cheng et al. 2019
Service quality	• The Robo-advisor can provide me with a convenient and smooth experience • The Robo-advisor can meet my financial needs • The robo-advisor can provide staff service access and help me deal with problems through staff when necessary	Cheng et al. 2019

Service commitment	• The service agreement of this robo-advisor guarantees user privacy, capital security and so on • The service agreement of this Robo-advisor guarantees the technical basis • Overall, the service agreement of this Robo-advisor convinces me that they can provide a secure transaction environment.	Cheng et al. 2019
Consumer trust	• I trust the services of Robo-advisor to retain my private information securely and safe • In total I am sure that Robo-advisor services are trustable. • This Robo-advisor provides good products and services. • I trust in my financial security whenever using Robo-advisor services.	Zhang et al. 2023
Loyalty to Robo-advisor	• I will share positive things regarding Robo-advisor service with other individuals • I will definitely recommend the Robo-advisor service to other individuals • I will definitely continue using Robo-advisor service	Karim et al. 2022