

# Exploring the relationship between customer experience and loyalty in digital-only banking

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The rapid development of fintech during the pandemic, has led to advancements in digital-only banking. However, the technology-driven innovation has created a gap between technological services and customer experience. Even with the constant improvement of fintech, current banking services are still poorly differentiated. Digital Branding is not yet fully effective to increase customer loyalty.

The purpose of this study is to investigate the impact of digital-only banking experience on customer loyalty. The research process applied a quantitative approach. First, establishing the research model for digital-only banking based on the S-O-R theory by previous studies. Second, the quantitative questionnaires were executed to discuss the correlation between service quality, perceived value, and loyalty. To validate the hypothesis, Partial Least Squares Structural Equation Modelling analysis was employed. Furthermore, a cross-sectional analysis based on Net Promoter Scores were conducted to examine the difference between three customer loyalty levels. The results showed that Functional and Spiritual values of digital-banking services significantly influence customer loyalty. In addition, Service and Environment experience has a strong influence on perceived value. The importance of this research includes the establishment of the framework to explore customer experience, loyalty and deepen insights into customer's internal needs. From a practical perspective, the NPS cross-section analysis could guide companies considering the customer loyalty conversion strategy and reflecting on the appropriateness of the offerings design with limited resources.

**Keywords:** *digital-only banking; customer loyalty; customer experience; perceived value*

## 1 Introduction

The advancement in information and communication technology has changed the service delivery system. This technological innovation wave has also swept the financial industry, leading to the rapid growth of fintech in recent years. Nowadays, customers can access a wider range of banking services through digital channels (Shankar & Jebarajakirthy, 2019). Digital-only banking establishes its brand and provides financial services with an 'omni-digital-channel'. It has the strong ability to integrate technology and to adopt and expand its services quickly. The development of digital banks can



enhance customer experience (PwC, 2018). It has had significant growth in recent years, especially in the Asian region, which shows that this industry is still growing (Harvard Business Review, 2022). People's digital adaptation brings high service expectations that pose challenges for banks to attract and retain customers. The low switching costs, service differentiation, and the focus on TTM (Time To Market) can easily lead to technology-led service innovation, which makes it difficult for companies to foster brand value or even build a loyalty loop.

There are only a few studies focusing on customer experience of digital-only banking in the academic fields. Prior research mainly focused on the business aspect of online banking and evaluating service from a functional perspective. However, the context of digital-only banking is different from online banking, and the experience can also be influenced by factors beyond physical performance, especially at the experience economic stage. Therefore, this study aims to conduct a systematic exploration of experience context for digital-only banking. Moreover, since digital capability is important for people to choose financial institutions (Harvard Business Review Analytic Services, 2022; Deloitte, 2021; McKinsey & Company, 2018), the appropriate integration of technology and user experience will add value to the service correspondingly. This phenomenon shows that there is still room for improvement in the customer experience of digital-only banks in practical and academic perspectives.

Based on the problems above, the purpose of this study is to investigate the key experience factors that can enhance customer loyalty in digital-only banking and to analyse the impact of external stimuli on customers' internal perceptions and how they further affect loyalty with the S-O-R theory model. Therefore, this study deconstructs the context of customer loyalty development that contributes to the highly technology-influenced banking industry to systematically examine their offering weaknesses, value creation, and customer needs at different loyalty levels. The finding is expected to assist brands in accurately clarifying the service gaps, building a positive loyalty relationship, and finally improving their competitiveness.

## **2 Literature review**

### **2.1 S-O-R Theory**

The S-O-R model is transformed from the concept of the S-R model. American behaviourist psychologist Waston (1913) proposed the Stimulus-Response (S-R) theory to analyse the impact of the external environment on behaviour. As people's understanding of psychology improved, the literature began to focus on the process of how humans understand information. However, the S-R model lacked observations on organisms and human beings. Believing that behavioural response is formed by internal perception, the environmental psychologists Mehrabian & Russell (1974) therefore added the concept of emotional cognition to the S-R theory as a mediator between stimuli and behavioural response, to present the initiative and complexity of organisms; and suggested the Stimulus-Organism-Response (S-O-R) theory, see Figure 1.

The S-O-R model consists of three components, Stimulus (S), Organism(O) and Response (R). 'Stimulus' refers to stimuli in the external environment. 'Organism' stands for the internal cognition after receiving the stimuli, including emotional state, pleasure, arousal and dominance. 'Response' is the manifestation of cognition, which can be divided into approach and avoidance response. External stimuli cause intrinsic perspective and derive specific behaviours (Chopdar & Balakrishnan, 2020). This

theory highlights the importance and interrelationship between intrinsic perception and behaviour and is often used to evaluate customer experience in different contexts (Waqas et al., 2021).

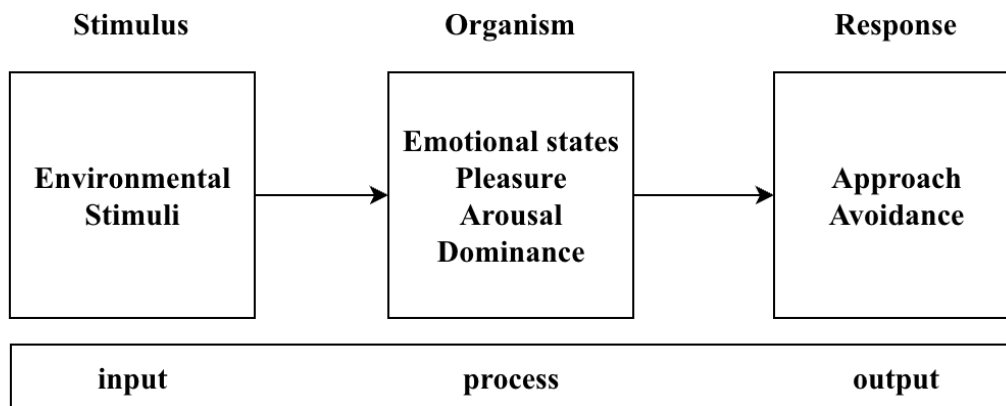


Figure 1. S-O-R theoretical model (Mehrabian & Russell, 1974).

This model provides a progressive stage for investigating the motivation of behaviour in the external environment, analysing the impact of psychological changes on behaviour, and disassembling how service stimuli affect loyalty behaviour. Correspondingly, the purpose of this study is to examine how brand experiences impact customers' internal feelings and can further influence loyalty behaviour. It is appropriate for this study to use the S-O-R theory to explore the factors that influence customer loyalty by viewing the service in brand interaction as an external stimulus.

## 2.2 Customer loyalty

Financial brands nowadays are facing a common industry problem - low loyalty. Customer loyalty is an important competitive strategy that helps firms build a competitive advantage (Dick & Basu, 1994; Oliver, 1999; Mehmood et al., 2012). Customer loyalty can be divided into 'attitudinal loyalty' and 'behavioural loyalty'. The attitudinal aspect focuses on maintaining the relationship with the service provider (Zeithaml, 2000). The behavioural side emphasises specific purchase performance, comparing the frequency with which customers purchase a specific product or service across a range of choices (Neal, 1999). Complete loyalty contains both attitudinal and behavioural loyalty, both of which will influence the brand's commitment to a long-term relationship with the customers (Prus & Brandt, 1995).

Customer loyalty can be measured in three dimensions. First, intent to repurchase, a measure of the customer's willingness to buy a product or service again in the future. Second, primary behaviour, customer's recent purchase behaviour, such as the number of purchases, purchase frequency, purchase amount, purchase quantity, and purchase intention. Third, secondary behaviour, customer's willingness to recommend, refer and build positive word-of-mouth (Jones & Sasser, 1995). The other measurement metric by Gronholdt et al. (2000) consists of four indicators: repurchase will, price tolerance, recommending company or brand to others, and cross-purchase. Subsequently, the research found that the possibility of 'repurchase will' and 'recommending to others' were the best measures for loyalty.

In addition to the measures mentioned above, the Net Promoter Score (NPS) first introduced by Reichheld of Bain & Company (2003), is now widely used in business, including those in the financial sector, and has led to greater business growth. Net Promoter Score is based on asking customers a single question: 'How likely would you be to recommend this company/service to a friend or colleague?' is used to evaluate a company's relationship with its customers. The degree of recommendation is eleven levels, and customers are identified and classified as promoters, passives and detractors by score.

NPS may not have the same effectiveness across industries. Some scholars question its ability to reflect customer loyalty, while also proposing alternative metrics (Grisaffe, 2007; Stahlkopf, 2019). However, numerous studies have shown a strong correlation between NPS and business growth, as well as future customer behaviour, indicating its predictive capabilities (Rajasekaran & Dinesh, 2018; Baehre et al., 2022). The simplicity and ease of grouping and comparison make NPS a valuable tool, particularly for companies with limited resources and time. When discussing the complex issue of customer loyalty, this measurement method assists companies in gaining an overall perspective, understanding customer relationships quickly, prioritising improvement of business, and formulating detailed plans.

Taking the above, this study considers that NPS is suitable and applicable to the research topic. It provides a comprehensive top-down view that enables a quick and general assessment of the brand's competitive position in the industry. Moreover, it enables a bottom-up investigation of how customers feel after receiving services (Reichheld & Markey, 2011), aiding in predicting customer behaviour and supporting future strategy.

### **2.3 Perceived value**

Understanding customers' perceived value can determine whether customers' needs and expectations are aligned (Ji, 2012). It has become an important indicator that affects customers' repurchase will (Parasuraman & Grewal, 2000). Its measurement benefits have widely attracted the attention from many companies, and several scholars have proposed different measurement metrics. As Table 1 shows, Sheth et al. (1991) put forward the theory of consumer value, explaining that customers choose products, services, and brands based on Emotional value, Functional value, Social value, Epistemic value, and Conditional value. Parasuraman and Grewal (2000) argued for measuring perceived value in four dimensions: acquisition, transaction, in-use and redemption value. Petrick (2002) developed the SERV-PERVAL scale from a literature review of five perceived value metrics centred on 'service', including quality, emotional response, monetary price, reputation and behavioural price. Sweeney and Soutar (2001) developed the PERVAL scale based on the measures proposed by Sheth et al. (1991), which includes four metrics: Functional value(quality), Functional value(price), Emotional value, and Social value.

### **2.4 Service quality in the era of experience economy**

Service quality is generated in the interaction between the service provider and the receiver in the service delivery process and is the gap between what customers expect (expected quality) and what they feel (perceived quality) (Parasuraman et al., 1985). This gap will lead to different levels of satisfaction, which in turn will influence repurchase behaviour (Grönroos, 1982; Keaveney, 1995). Therefore, good service quality is regarded as the best strategy to build customer loyalty (Brun et al., 2014). And from the perspective of Service Profit Chain theory, service quality affects chain responses such as customer loyalty and satisfaction, while good service quality can contribute to a firm's profits

(Heskett et al., 2008). Measuring service quality helps businesses to understand whether their service offerings meet customer needs (Lewis & Mitchell, 1990), align to the supply and demand of value for both parties and enable beneficial value exchange.

Table 1. Perceived value measures

Scholar	Metrics
<b>Sheth, Newman &amp; Gross (1991)</b>	Emotional value, functional value, social value, epistemic value, conditional value
<b>Babin &amp; Attaway (2000)</b>	Utilitarian value, hedonistic value
<b>Parasuraman &amp; Grewal (2000)</b>	Acquisition value, transaction value, in-use value, redemption value
Sweeney & Soutar (2001)	Functional value(quality), functional value(price), emotional value, social value.
Petrick (2002)	Quality, emotional response, monetary price, reputation, behavioural price
Smith & Colgate (2007)	Functional value, experiential value, symbolic value, cost value
Balakrishnan & Shamim (2013).	Hedonistic value, social value, emotional value, information value

With the transition from physical to digital services, various measurement frameworks have evolved, and there are similarities and differences in the past theoretical perspectives. In the E-service, Zeithaml et al. (2002) developed the e-SERVQUAL to measure digital services. Parasuraman et al. (2005) revised the framework by dividing it into two scales: the core service-related E-S-QUAL (E-core Service Quality Scale) and the remedial service-related E-Res-QUAL (E-recovery Service Quality scale). In e-commerce and retail, Bressolles (2006) proposed NetQual, which contains information, usability, aesthetic elements, reliability, security and privacy. For service quality in online banking, Akinci et al. (2010) building on the framework by Parasuraman et al. (2005), suggested that service quality includes efficiency, system reliability, fulfilment, privacy, responsiveness, compensation and contact. Although there have been many discussions on the service quality of online banking (EBSQ) in previous studies, most service quality indicators, whether physical and digital, are still assessed for 'tangible' service offerings.

The form of value exchange in the marketplace first shifted from a goods-dominant logic to a service-dominant logic. It emphasised that value comes from the interactive process of service exchange, so service supplies move from tangible to and intangible operant resources (Vargo & Lusch, 2008). Besides, today's economic stage is shifting from Service Economy to Experience Economy (II & Gilmore, 1998). The core of offerings is shifting towards experience, so the medium of service delivery is gradually disappearing and the service encounter becomes complex, intangible and highly pervasive (Huang & Lai, 2020). That implies existing service quality measures are yet perfect for the assessment of intangible and complex services at the Experience Economy stage.

Experience is the feeling of a customer's interaction with a business (Tsai & Liu, 2021). Interaction includes multiple aspects, such as customer, company, brand, product, service, etc., a multi-subject interaction results (Grönroos, 2008; Rojas & Camarero, 2008). In other words, the experience is

constructed from the interaction of diverse offerings. When the products, services and values are consistent, it can bring positive perceived value (Farnham & Newbery, 2013).

### **3 Research Model**

#### **3.1 Customer loyalty and perceived value**

The focus of the discussion of loyalty shifted from the earlier 'behavioural aspect' to the 'attitudinal aspect', concentrating on loyalty behaviour which starts with internal attitudes (Wu et al., 2011). Later research then points to levels of customer loyalty (Oliver, 1999; Narayandas, 2005) with the most representative model, the Cognitive-Affective-Conative-Actional loyalty model (Oliver, 1999). The loyalty relationship can be seen as a cumulative process, with the positive perceived value generated by customers when receiving products and services that can build cognitive loyalty, the first stage of loyalty model (Wu et al., 2011). Therefore, perceived value can be considered an important factor influencing loyalty.

Perceived value is the customer's evaluation of the product or service received based on their perceptions (Zeithaml, 1988). Individuals have different levels of needs (Maslow, 1954) and the need system influences the value evaluation, especially when stimuli are invisible or equivocal (Carter & Schooler, 1949). From a commercial perspective, Almquist et al. (2016) analogized the value created by businesses for customers to Maslow's hierarchy of needs. Also, regarding human-centred thinking, the perspective of this study is that an individual's need system influences value evaluation, and value is built on meeting human's needs. Accordingly, this study modifies the measurement model based on Sweeney and Soutar (2001) perceived value measure and Maslow's (1943) hierarchy of needs theory.

Social Value in perceived value corresponds to the Esteem Needs and Social Needs in the hierarchy of needs. Monetary Value and Functional Value focus on the utility of customers' time costs and service function. In correspondence, Safety Needs and Physiological Needs target basic needs such as personal safety and limited resources. Emotional Value stands for the customers' personal experience and feelings during their interaction with the products and services, partially corresponding to Safety Needs. Although Emotional Value does not correspond to any needs directly, it is still the key factor regarding perceived values in previous studies, thus it is selected as one of the three dimensions of perceived value in this study. To sum up, this study uses 'Spiritual Value', 'Emotional value', and 'Functional Value' as the measurement dimensions of perceived value, as Table 2 shows.

#### **3.2 Perceived value and service quality**

In the Experience Economy, the concept of offering shifts from providing service to immersive experience, which is composed of interaction of various aspects of the offering. Referring to Huang & Lai's Experience Dimensions (2020), Grove et al's Theatre theory (1992), and Grace & O'Cass' Service Experience (2004), there are correspondences of service or experience between three literatures in Table 3.

Table 2. Reference theory

Sweeney & Soutar (2001)	Maslow (1943)	Definition of This study
<b>Perceived value</b>	<b>Hierarchy of Needs Theory</b>	<b>Perceived value</b>
Social value: The ability of the products and services increases customers' social self-concept and individual's socialisation process.	Self-actualization: Developing and achieving the potential that reaches and transforms into an ideal self.	Spiritual value: The extent of gain a sense of belonging and self-worth improvement includes establishing external images and connections, realising internal expectations and so on.
Emotional value: The utility of feelings or affective states caused while interacting with products and services.	Esteem needs: Self-worth such as reputation and achievement.	Emotional value: The extent of establishing a positive emotion includes providing fun, reducing anxiety, safety and so on.
Functional value: The utility of efficiency performance of products and services that reduce cost.	Love and belonging needs: Interpersonal relationships, affiliation with groups, social emotions, etc.	Functional value: The extent of reducing the cost of use includes reducing complexity, improving efficiency, diversity and so on, to achieve the basic needs of use.
Monetary value: The extent of reduction of its perceived short term and longer term costs(price).	Safety needs: Security provide by law and order such as personal and property safety.	–
–	Physiological needs: Basic survival needs, such as water and sleep.	–

Experience consists of four dimensions, Product, Environment, Service and Communication (Huang & Lai, 2020), Product refers to something provided by an enterprise, acquired and used by customers to meet its needs at various levels, including tangible and intangible, digital and physical (Huang & Lai, 2020; Swaminathan, 2021). Service can be seen as the act of service provided by company and service received by customer. It shortens the distance between the customer and the product, and can be provided through manual and digital channels (Huang & Lai, 2020; Keller, 2021). The environment is the area where businesses interact with their customers, including the physical and digital space. For example, the reward systems, platforms, service ecosystem of LINE bank (Huang & Lai, 2020; Keller, 2021). Communication is the medium for the firm to directly or indirectly convey brand messages to their customers to build relationships. In this research, for instance, debit card design, promotion language, and brand image are part of Communication (Huang & Lai, 2020; Keller & Swaminathan, 2019).

Theatre theory sees actors and audiences as the providers and receivers of services; performances as the action of providing services; and scenes as the venues where services are provided (Grove et al., 1992). The definitions of the setting and performance are similar to the environment and service dimensions in the Experience Dimension proposed by Huang and Lai (2020). Then, in the book *The Experience Economy*, stage goods as props and service as stage (Pine & Gilmore, 1998). The above

interpretations approximate the service, environment and product dimension in the Experience Dimension. Grace & O'Cass (2004) on the other hand, suggested that the Service Experience consists of servicescape, employee service and core services, which are defined in line with the environment, service and product of the Experience Dimension.

Based on the preceding discussion, the Experience Dimension demonstrates alignment with numerous significant studies in the field. Notably, the Communication Dimension, nestled within the Experience Dimension, places greater emphasis on the intangible aspects of the offering. As a result, in this study, we have embraced the Experience Dimension, which comprises four facets referred to as "stimulus" within the research model. These facets can also be viewed as channels in a service system that influence customers' experiences.

During this investigation, the term "Product" encompasses a diverse array of financial products and features, such as deposit plans, quick credit options, and free transfers. The aspect of "Service" pertains to the actions involving applications, transactions, and receiving notifications, as discussed in this paper. The dimension of "Environment" encompasses the reward systems, platforms, and the broader service ecosystem of LINE bank. Lastly, the term "Communication" incorporates elements like debit card design, promotion language, and brand image.

Table 3. Reference theory

<b>Theatre theory (Dramaturgy Theory)</b>		<b>Service experience (Service Experience)</b>	<b>Experience dimensions</b>
<b>Goffman (1959) Grove et al. (1992)</b>	<b>Pine, B. J., &amp; Gilmore, J. H. (1988).</b>	<b>Grace and O'Cass (2004)</b>	<b>Huang and Lai (2020)</b>
Setting	Stage - Service	Servicescape	environment
Performance	Props - Goods	Employee service	service
Actor		Core service	products
Audience			communicate

In conclusion, we investigate the impact of customer experience on customer loyalty in digital-only banking, using the S-O-R model as the theoretical foundation for our research model. Through a comprehensive literature review, we highlight the significance of service quality as a primary stimulus, influencing perceived value and, consequently, customer loyalty.

Our research model incorporates four dimensions (product, service, environment, and communication) as stimuli, addressing functional, emotional, and spiritual needs, as organisms. The Net Promoter Score (NPS) serves as the response variable, shedding light on the relationship between experience domains, customer needs, and loyalty.



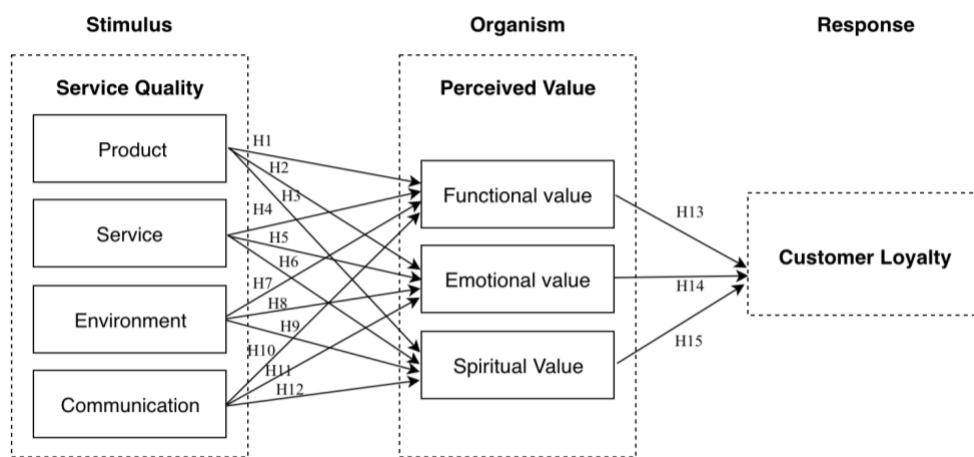


Figure 2. Research Framework Model between service quality, perceived value and customer loyalty.

## 4 Methodology

### 4.1 Data Collection

This research examines the customer experience of the digital-only bank, LINE Bank, between 2022 and 2023. LINE, the leading social platform in Taiwan and Korea, offers LINE Bank as their digital banking service, promoting the concept of 'banking in your hand.' Through its app, customers can access financial services conveniently and securely anywhere anytime, eliminating the need for time-consuming traditional offline processes.

Built on the LINE messaging software, LINE Bank connects various services within the LINE ecosystem, providing a holistic banking experience that aligns closely with customers' daily lives. As Taiwan's most prominent digital-only bank, LINE Bank boasts a young customer base, a sophisticated digital interface, and a well-established service system, making it an ideal subject for investigating both its potential for innovation and existing constraints.

Based on the research framework, an online questionnaire was developed to examine the relationship between the variables of the research framework, including service quality, perceived value, and customer loyalty. Correspondingly, the questionnaire consisted of four sections. The first section investigated customer satisfaction with the key factors in the four experience dimensions of the service quality. The second section looked at the functional, emotional and spiritual value that customers perceived. In the third section, customer loyalty was surveyed through loyalty behaviour, repurchase will, and the NPS question. Last section examined respondents' background information.

The questionnaire used a 7-points Likert scale from 1 (strongly disagree) to 7 (strongly agree), with the exception of the Net Promoter Score (NPS) used the 11 levels official measure. Data was collected by an online platform, and respondents were required to have used LINE Bank. A total of 437 responses were collected, of which 370 questionnaires were valid, yielding an 84.67% return rate. The sample structure is presented in Table 4.

Table 4. Sample structure

Variable	Specification	N	%
Gender	Female	263	71.1%
	Male	107	28.9%
Age (year)	20 years old	20	5.4 %
	21-30	260	70.3 %
	31-40	56	15.1 %
	above 40	34	9.2 %
NPS	9-10	98	26.49 %
	7-8	153	41.35 %
	0-6	119	32.16 %

## 4.2 Measures

To measure the constructs, the questionnaire items were adapted from previous studies. Table 5 displays all questionnaire items. The scales were adopted from several sources and modified to suit our research purpose. The variables of service quality are composed of Product, Service, Environment and Communication, and they were named experience domains (Huang & Lai, 2020).

The Product Domain was measured by four items adopted from Kaabachi et al. (2022) and Kotler and Armstrong (2013). The Service Domain was operationalized using five items taken from Shankar and Jebarajakirthy (2019) and Parasuraman et al. (2005). Five items taken from Windasari et al. (2022) and Kaabachi et al. (2022) were used to measure The Environment Domain. The Communication Domain consisted of four scales from Windasari et al. (2022) and Kao et al. (2020).

The variables of Perceived value are composed of Functional, Emotional and Spiritual value. Functional Value was measured by three items, taken from Windasari et al. (2022) and Babin et al. (1994). Emotional Value consisted of three scales from Windasari et al. (2022) and Yang et al. (2004). Spiritual Value was operationalized using three items adopted from Windasari et al. (2022) and Schuitema et al. (2013). Finally, three items taken from Grønholdt et al. (2000) and Reichheld (2003) were used to measure customer loyalty. Table 6 displays all questionnaire items.

Based on the questionnaire and structures mentioned above, we measure the relationship between service experience, perceived value, and loyalty of digital banking. The followings are the results.

## 5 Result

This section performed data analysis by structural equation modeling (SEM) on SmartPLS4 and presented our key findings including measurement model and hypothesis testing with two sample structures, all samples and samples categorised by NPS score.

Table 5. Questionnaire items -Service Quality

Variable	Label	Statement	References
<b>Product</b>	PR1	LINE Bank provides a wide range of products.	<ul style="list-style-type: none"> <li>• Kaabachi, S., Ben Mrad, S., &amp; Barreto, T. (2022)</li> <li>• Kotler &amp; Armstrong, 2013</li> </ul>
	PR2	LINE Bank provides me with a suitable selection of products, e.g., Time deposits, Quick loans.	
	PR3	LINE Bank provides the products with the features I want, e.g., free transfer fee.	
	PR4	LINE Bank provides the product that fulfills what I core need.	
<b>Service</b>	SE1	I can open an account in LINE Bank easily.	<ul style="list-style-type: none"> <li>• Shankar &amp; Jebarajakirthy (2019)</li> <li>• Parasuraman, A., Zeithaml, V. A., &amp; Malhotra, A. (2005).</li> </ul>
	SE2	I can deposit money in LINE Bank easily.	
	SE3	I can complete transactions in LINE Bank easily.	
	SE4	I can retrieve the accurate transaction details on my account.	
	SE5	I can receive notifications immediately after transactions or receive the reward.	
<b>Environment</b>	EN1	LINE Bank has a great reward system.	<ul style="list-style-type: none"> <li>• Windasari et al. (2022)</li> <li>• Kaabachi et al. (2022)</li> </ul>
	EN2	The app design that includes user interface and user experience between LINE Bank and Line Ecosystem are consistent.	
	EN3	I can seamlessly move between LINE Bank and Line Ecosystem, e.g., LINE Pay, and LINE TV.	
	EN4	I can seamlessly move between LINE Bank and other platforms or channels, e.g., online stores, and department stores.	
	EN5	LINE Bank provides various service scenarios that fulfill what I need.	
<b>Communication</b>	CO1	Debit Card provided by LINE Bank shows a novelty brand image, different from other banks.	<ul style="list-style-type: none"> <li>• Windasari et al. (2022)</li> <li>• Kao et al. (2020).</li> </ul>
	CO2	Information and interface provided by LINE Bank about its services is simple and consistent.	
	CO3	Financial products provided by LINE Bank show a novelty brand image, different from other banks.	
	CO4	The promotion provided by LINE Bank attracted me to use LINE Bank.	

### 5.1 Measurement model

To validate the measurement model, the reliability and construct validity were conducted. First, Cronbach's  $\alpha$  and Composite Reliability (CR) values were used to measure the construct reliability. The results are presented in Table 7. The CR values were all above 0.8, above the rigorous criteria of 0.7 (Hair et al., 2013). The Cronbach's  $\alpha$  were all above 0.8, above the threshold (Nunnally, 1978). Based on these analyses, the questionnaire in this study has good construct reliability and consistency between latent variables.

Table 6. Questionnaire items-Perceived Value and Loyalty

Variable	Label	Statement	References
<b>Functional Value</b>	FV1	LINE Bank saves my time and cost.	<ul style="list-style-type: none"> <li>• Windasari et al. (2022)</li> <li>• Babin&amp; Darden &amp; Griffin (1994)</li> </ul>
	FV2	LINE Bank is convenient.	
	FV3	LINE Bank provides what I need.	
<b>Emotional Value</b>	EV1	Using LINE Bank makes me feel safe.	<ul style="list-style-type: none"> <li>• Windasari et al. (2022)</li> <li>• Yang et al., (2004)</li> <li>• LINE Bank Official Website</li> </ul>
	EV2	LINE Bank is easy to use.	
	EV3	Using LINE Bank is interesting.	
<b>Spiritual Value</b>	SV3	Opinions and usage from people around me lead me to use LINE Bank.	<ul style="list-style-type: none"> <li>• Windasari et al. (2022)</li> <li>• Schuitema et al. (2013)</li> </ul>
	SV1	LINE Bank has a good reputation.	
	SV2	Brand Image of LINE Bank suits me better compare with the other digital-only banks in Taiwan.	
<b>Loyalty</b>	LO1	I intend to continue using LINE Bank.	<ul style="list-style-type: none"> <li>• Grønholdt, Martensen &amp; Kristensen (2000)</li> <li>• Reichheld (2003)</li> </ul>
	LO2	I would like to say positive things about LINE Bank to other people.	
	LO3	How likely are you to recommend LINE Bank to a friend or colleague?	

Table 7. Construct reliability and convergent validity

Variable	Indicator	Loading	Cronbach's Alpha	CR (rho_a)	AVE
<b>Product</b>	PR1	0.863	0.873	0.886	0.725
	PR2	0.764			
	PR3	0.870			
	PR4	0.903			
<b>Service</b>	SE1	0.820	0.880	0.882	0.676
	SE2	0.778			
	SE3	0.876			
	SE4	0.817			
	SE5	0.815			
<b>Environment</b>	EN1	0.745	0.876	0.884	0.669
	EN2	0.823			
	EN3	0.819			
	EN4	0.837			
	EN5	0.862			
<b>Communication</b>	CO1	0.789	0.852	0.860	0.692
	CO2	0.860			

	CO3	0.866			
	CO4	0.810			
<b>Functional Value</b>	FV1	0.933			
	FV2	0.909	0.918	0.919	0.859
	FV3	0.938			
<b>Emotional Value</b>	EV1	0.873			
	EV2	0.925	0.876	0.883	0.804
	EV3	0.891			
Spiritual Value	SV1	0.896			
	SV2	0.887	0.843	0.852	0.761
	SV3	0.831			

Convergent validity was tested by factor loadings and AVE. The results showed that the factor loadings for each variable are above 0.7, above the threshold of 0.5 (Nunnally, 1978). The average variance extracted (AVE) values were above 0.7. Therefore, the samples in this study have good convergent validity.

The discriminant validity was tested using Fornell & Larcker criterion. The results presented in Table 8 show that all correlation coefficients were less than 0.85 and ranged from 0.8 to 0.66. The square root of the AVE values on the diagonal was above the correlation off-diagonal (Fornell & Larcker, 1981). It is confirmed that the questionnaire has good discriminant validity. The three variables of perceived value were confirmed to be unaffected by collinearity ( $VIF < 5$ ) after passing the VIF test (Hair et al., 2011).

Table 8. Discriminant validity of constructs

	PR	SE	EN	CO	FV	EV	SV	LO
<b>PR</b>	<b>0.851</b>							
<b>SE</b>	0.7	<b>0.822</b>						
<b>EN</b>	0.698	0.685	<b>0.818</b>					
<b>CO</b>	0.68	0.716	0.731	<b>0.832</b>				
<b>FV</b>	0.745	0.771	0.763	0.743	<b>0.927</b>			
<b>EV</b>	0.691	0.753	0.681	0.729	0.805	<b>0.897</b>		
<b>SV</b>	0.662	0.697	0.689	0.768	0.729	0.798	<b>0.872</b>	
<b>LO</b>	0.705	0.673	0.676	0.641	0.773	0.722	0.737	<b>1</b>

## 5.2 Hypothesis testing

Hypothesis testing was performed by structural equation modelling (SEM) to test the model and the path coefficients. In this study, the R-squared value is used to evaluate the proportion of variance in the dependent variable that can be explained by the independent variable first. R-squared values

range from 0 to 1 and a higher r-squared indicates more variability is explained by the model. R2 values of 0.75, 0.50, or 0.25 can be respectively described as substantial, moderate or weak. (Hair et al., 2014).

The results are shown in Table 9. R-squared of Functional value is 0.738 indicating that 73.8% of variance of Functional value is explained by the variance of the service quality. R-squared of 66.7% of variance of Emotional Value, and 65.5% variance of Spiritual Value is explained by the variance of the service quality. Besides, r-squared of 66.7% of variance of Loyalty is explained by the variance of perceived values. The independent variables in this study have moderate to substantial explainability.

Table 9. R-Square Score

Variable	R2
Functional Value	0.738
Emotional Value	0.667
Spiritual Value	0.656
Loyalty	0.664

The hypotheses were tested by the Bootstrap Method on 5000 subsamples. The results shown in Table 10 reveal that 13 out of 15 hypotheses are held ( $p$ -value < 0.05). Among these, only H8 and H14 did not hold. Between service quality and perceived value, the product, service, environment and communication dimensions were all related to functional, emotional and spiritual values, but the environment was not related to emotional values. In the relationship between perceived value and customer loyalty, functional and spiritual values have a significant effect on customer loyalty in digital-only banking.

### 5.3 NPS section – Measurement model

To explore the impact between service quality and customer loyalty, differences in loyalty performance between customers should be identified. The Net Promoter Score (NPS) was used to segment customers and examine the differences between tiers of loyal customers, which can help organisations to examine customer needs systematically and shift the level of customer loyalty strategically. Across the customer segments, NPS of 9-10 were classified as promoters, 7-8 as passives and 0-6 as detractors (Reichheld, 2003). Same analysis phase as above, model testing was conducted to ensure the applicability, followed by hypothesis testing to examine the paths across the three customer segments.

In the reliability test, the CR values for the promoter, passive and detractor were all above 0.7, meeting the strict criteria (Hair et al., 2013). The Cronbach's alpha coefficients were all above 0.7, passing the recommended criteria (Nunnally, 1978), giving the questionnaire good reliability. In the convergent validity test, the factor loadings for all three samples were above 0.5, meeting the standard value of 0.5 (Nunnally, 1978). The AVE values were above 0.5, meeting the standard criteria of 0.5 (Fornell & Larcker, 1981) giving the questionnaire good convergent validity. In terms of discriminant validity, the correlation coefficients were all less than 0.85, and the square root of the AVE on the diagonal was above the correlation coefficient or the off-diagonal. It is confirmed that the questionnaire has good discriminant validity (Fornell & Larcker, 1981). Finally, the VIF values in the collinearity analysis were all less than 5 so the study model did not have collinearity issues (Hair et al., 2011)

Table 10. Hypothesis result

Paths	Paths <sup>1</sup>	Path Co-efficient	t-Value	p-Value <sup>2</sup>	Results
H1	PR → FV	0.224	4.061	0.000***	Supported
H2	PR → EV	0.178	2.596	0.009**	Supported
H3	PR → SV	0.126	2.296	0.022**	Supported
H4	SE → FV	0.303	5.259	0.000***	Supported
H5	SE → EV	0.358	5.408	0.000***	Supported
H6	SE → SV	0.196	3.220	0.001**	Supported
H7	EN → FV	0.271	5.044	0.000***	Supported
H8	EN → EV	0.117	1.730	0.084	Not Supported
H9	EN → SV	0.152	2.276	0.023**	Supported
H10	CO → FV	0.176	2.988	0.003**	Supported
H11	CO → EV	0.266	4.105	0.000***	Supported
H12	CO → SV	0.432	6.491	0.000***	Supported
H13	FV → LO	0.462	6.200	0.000***	Supported
H14	EV → LO	0.085	1.049	0.294	Not Supported
H15	SV → LO	0.333	4.211	0.000***	Supported

### 1.1 NPS section - Hypothesis testing

Each model has medium to high explanatory power depending on the variable ranging from 0.53 to 0.77 as shown in Table 11. In the promoter model, R-squared of 63.8% of variance of Functional value, 61.9% of variance of Emotional value, and 61.8% of variance of Spiritual value is explained by the variance of the service quality. In the passive model, R-squared of 59.6% of variance of Functional value, 59.9% of variance of Emotional value, and 52.5% of variance of Spiritual value is explained by the variance of the service quality. In the detractor model, R-squared of 77.1% of variance of Functional value, 62.3% of variance of Emotional value, and 64.7% of variance of Spiritual value is explained by the variance of the service quality. R-squared of 72.7%, 55.6% and 53.1% of variance of Loyalty is explained by the variance of perceived value between three models.

The results of the path test are displayed in Table 12. The promoter's experience of the service and environment dimensions were related to various perceived values ( $p < 0.05$ ); the experience of the communication dimension was related to spiritual values only ( $p = 0.000$ ); and between perceived values and loyalty, functional, emotional and spiritual values were all related to loyalty. For passives, product and the environmental experience were only related to functional value; the service dimension was related to various perceived values; communication was the same as for promoters and was only related to spiritual value; functional value and emotional value are related to loyalty.

<sup>1</sup> PR=Product; SE=Service; EN=Environment; CO=Communication; FV=Functional Value; EV=Emotional Value; SV=Spiritual Value; LO=Loyalty

<sup>2</sup>  $p < 0.001$ ; \*\* $p < 0.05$

Finally, product experience for detractors is related to perception; service is only related to functional and emotional values, significantly different from the other two levels of loyalty; environment and communication are related only to functional and spiritual values; functional and spiritual values are related to loyalty. In summary, different results were presented among three customer groups in terms of the relationship between perceived values and loyalty.

Table 11. R-Square Score-Promoters, Passives, Detractors

Variable	R2		
	Promoters	Passives	Detractors
Functional Value	0.638	0.596	0.771
Emotional Value	0.619	0.599	0.623
Spiritual Value	0.618	0.525	0.647
Loyalty	0.727	0.556	0.531

Table 12. Hypothesis results- for Promoters, Passives, Detractors

Hypothesis	Paths <sup>3</sup>	Promoter		Passive		Detractors	
		p-Value <sup>4</sup>	Results <sup>5</sup>	p-Value <sup>4</sup>	Results <sup>5</sup>	p-Value <sup>4</sup>	Results <sup>5</sup>
H1	PR → FV	0.363	NS	0.006**	S	0.001**	S
H2	PR → EV	0.585	NS	0.151	NS	0.023**	S
H3	PR → SV	0.717	NS	0.812	NS	0.001**	S
H4	SE → FV	0.002**	S	0.002**	S	0.000***	S
H5	SE → EV	0.000***	S	0.000***	S	0.005**	S
H6	SE → SV	0.005**	S	0.002**	S	0.600	NS
H7	EN → FV	0.004**	S	0.046**	S	0.000***	NS
H8	EN → EV	0.019*	S	0.942	NS	0.091	NS
H9	EN → SV	0.034*	S	0.719	NS	0.064	NS
H10	CO → FV	0.079	NS	0.071	NS	0.166	NS
H11	CO → EV	0.059	NS	0.000***	S	0.097	NS
H12	CO → SV	0.017**	S	0.000***	S	0.000***	S
H13	FV → LO	0.001**	S	0.000***	S	0.002**	S
H14	EV → LO	0.011**	S	0.023**	S	0.911	NS
H15	SV → LO	0.029**	S	0.233	NS	0.022**	S

<sup>3</sup> PR=Product; SE=Service; EN=Environment; CO=Communication; FV=Functional; Value EV=Emotional Value; SV=Spiritual Value; LO=Loyalty

<sup>4</sup> p<0.001; \*\*p<0.05

<sup>5</sup> S= Supported NS=Not Support



## 6 Discussions

The purpose of this study is to investigate the impact of customer experience on their loyalty in digital-only banking service, and the research is divided into two parts based on the research framework. The first part explored how service quality as an external stimulus affects customers' internal value perceptions. The results show that Environment has no significant impact on Emotional value, but Products, Services, and Communication have impacts on Functional, Emotional, and Spiritual value for LINE Bank. The second part examined the influence of perceived values on customer loyalty, and the results indicate that both functional and Spiritual value have an impact on customer loyalty. Overall, meeting users' Functional needs, such as reducing complexity, saving time and lowering cost, could satisfy their basic needs. If a brand can build up deep connections with customers and influence their self-identity, it can meet human's higher-level spiritual needs and strengthen loyal relationships.

The results are consistent with the current state of the financial industry mentioned earlier, where brands attract customers mostly with functional value, such as monetary rewards and product features. Therefore, providing experiences with spiritual value that satisfy customers' deeper needs has a positive impact on building long-term relationships. Firms can shift their focus towards satisfying customers' spiritual needs and offering differentiated service, furthermore, to build closer relationships and increase customer value over time.

Using NPS to segment customers data provides deeper insights into the research topic. The analysis results indicate the distinctions in service quality, perceived value, and loyalty between three groups: promoters, passives, and detractors. There are four insights worth discussing that can reinforce existing promoters, convert passives into promoters, and ultimately increase a company's profitability. First, among all the three groups, Communication has a significant influence on Emotional value. This phenomenon indicates that the company's existing Communication experience has an impact on both high and low-loyalty customers, and can trigger positive or negative responses. It is important to clarify the impact on promoters and detractors to adjust and optimise the benefits from meeting high-level needs accordingly to strengthen long-term relationships. Second, regarding the influence of perceived value on loyalty, Emotional value has an impact on loyalty for promoters, but not for passives. The only difference in the internal value perception between these two groups lies in Emotional value. Therefore, providing passives services with emotional value can narrow their gap in perceived value and enhance the possibility of converting passives into promoters.

Third, only the promoters' Environment experience has an impact on all perceived value items. Promoters place relatively greater emphasis on the environmental section, which can therefore make a greater impact on promoters' internal feelings. On the other hand, passives' internal needs have not yet been fully satisfied by that. From the above, it is evident that the environment has both significant benefits and potentials for improvement. It would be advantageous to explore how the environment can positively influence promoters and meet the passives' expectations and clarify strategic orientation. Environmental service can be coordinated with the reward ecosystem that LINE Bank actively constructed and consider customer needs in the stage of setting service regulations and partners. Accordingly, the company is able to build positive customer relationships through precise environmental experiences and in the meantime refine service systems.

Last, Service has impact on multiple perceived items across all levels of customer loyalty especially for promoters and passives. In this regard, service has the maximum significance paths and the value produced by Service can be perceived by most customers. This can mean that Service is the most influential factor in perceived values, but also a mature and valuable offering type in terms of universality. In addition, Service gets an important place in both promoters and passives, which provides discussions of how the Service can meet the customers' needs of individual loyalty levels and how to apply the well-developed Service features in better ways or results in synergy. Service as an act of delivery and reception, plays a critical role in bridging customers and products, especially in digital-only banking where services are delivered through digital channels, so its experience is relevant.

## **7 Conclusion**

Based on the current industry development and existing literature, this study explores and deepens the understanding of the brand experience of digital-only banks, examines and proposes service strategies for customer loyalty relationships. The research topic will have an impact beyond digital-only banking to related digital financial services, breaking through the existing financial innovation study and contributing to both practice and theory.

### **7.1 Theoretical contributions**

This study makes three academic contributions. Firstly, prior literature has mainly focused on business management. However, as digitization is getting mature, omni-digital service will become the industry trend. Therefore, this study targets the industry of digital-only banks, providing this new type of bank with a differentiated discussion and reinforcing the publications relevant to the customer experience. Secondly, prior study on banking customer experience has mainly focused on evaluating performance based on functional aspects such as security, efficiency, and accuracy. However, in the current experience economy, the influential factors are getting complex. This study takes the economic context into account when adopting the multidimensional experience in current services and customers' internal needs, as a research framework.

Finally, this study applies the S-O-R theory in the research context of customer experience. Through the theoretical framework, the complex relationship between stimulus and response is discussed, and it verifies that multidimensional experiences and value have different degrees of influence on customer loyalty. This unveils the customers' invisible internal perceptual state from receiving services to loyalty response. This study demonstrates that the S-O-R theory can be applied to human-centred research topics such as user experience to clarify how touchpoints affect customers' perceptions, explores behaviour motivation, and expands innovative perspectives.

### **7.2 Practical contributions**

First, the findings could assist digital-only banks and related providers in understanding customer expectations under high digital adaptation. Meanwhile, they could comprehensively identify optimisation by employing experience dimensions. These outcomes could lead banks to think beyond physical offerings and provide a more holistic brand experience with technical support. However, due to the rapid development of technology, experience has not been properly integrated yet. Technology-oriented innovation has caused a mismatch between service and customer needs. The second contribution in design practice corresponds to the second theoretical contribution. By taking economic stages and user experience context into consideration, this study sharpens insights into

customer needs. Therefore, the results and discussions have higher authenticity and completeness, which is beneficial to develop strategies that meet service scenarios and customers' expectations. Also, it bridges the gap between technology and customer experience and transitions from technology-oriented to user-oriented innovation.

Finally, due to limited resources, it is crucial to distribute resources precisely. Analysis classified samples into loyalty levels that highlighted their distinction and gained concrete insights into the different demands between groups. This will guide companies to focus on target customers, reflect customer loyalty transformation possibilities, and current offerings. This paper provides references for improving customer loyalty to digital-only banking and related industry. Service Providers can establish positive value perception by systematically optimising services. Ultimately, this leads to an improvement in customer loyalty and a better competitive ecology among financial brands.

### **7.3 Limitations and future research**

This study suggests some limitations and potential future research. First, this research methodology can be replicated in other cities or extended with other fintech companies. Although the research was conducted in Taiwan, the results may differ in different countries due to cultural characteristics, financial industry development, economic stages, bank regulations, and others. Such differences are reasonable and can highlight customer characteristics in various countries. A larger sample size or cultural variety might be beneficial to gaining a better understanding of customer experiences in digital-only banking and uncovering interesting topics. In the meantime, valuable insights can be gained by comparing service strategies and effectiveness between regions.

This study analysed customer loyalty levels horizontally, focusing on different levels of customer loyalty. In future research, ethnography analysis and interviews can be conducted to probe the diverse emphasis experiences and to explore the reasons behind the statistically verified hypotheses. Based on different analysis data, the results generated by this research framework can contribute to different phases of strategies. It is worth noting that long-term or short-term customer loyalty may influence evaluation results. However, due to the difficulty in tracing back the joining date, it is difficult to obtain correct data for longitudinal analysis, which means, the impact of service familiarity could not be observed. Future studies can cooperate with enterprises to obtain more accurate customer data with their consent. Also, the researcher can query the data during interviews and help them in locating the information. Consequently, the study could observe the changes in the customer lifecycle and identify its high and low points. It may encourage the research further by investigating the customer relationship with a longer-term perspective beyond the customer journey.

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