Jurnal Manajemen
e-JM
E-ISSN: 2549-8797
ISSN: 1410-3583

How to Strengthen Customer Loyalty with Technology

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Submitted *21-08-2024* ***Reviewed*** *06-11-2024* ***Revised*** *09-11-2024* ***Accepted*** *11-11-2024* ***Published*** *19-02-2025*

Abstract*:* This research aims to investigate the antecedents of loyalty and the role of technology in the Indonesian e-commerce context based on customers' points of view. This quantitative research involves data from 317 Indonesian e-commerce customers, which is then analysed using Structural Equation Modelling with Partial Least Square method (SEM-PLS). The results show customer satisfaction, trust, and engagement significantly impact loyalty. Both Trust and Engagement act as the mediator between Satisfaction and Loyalty. Meanwhile, there are differences in how technology interacts with the equation. While it lessens the influence of Engagement on Loyalty, it will increase the influence of Trust on Loyalty. This research simultaneously adds technology into the model to test its influence on the interaction between variables. It also provides CRM research, which is conducted based on customers' points of view.
Keywords: Customer Relationship Management; Satisfaction Effects; Antecedents Of Customer Loyalty; Moderating Role Of Technology.

Abstrak: Riset ini dilakukan untuk menginvestigasi faktor-faktor yang mempengaruhi Loyalitas dan peran teknologi dalam konteks konsumen ecommerce di Indonesia. Studi kuantitatif ini dilakukan dengan sampel sejumlah 317 konsumen ecommerce, yang dianalisis menggunakan Structural Equation Modelling bermetodekan Partial Least Square (SEM-PLS). Hasil studi menunjukkan bahwa Kepuasan, Kepercayaan, dan Keterlibatan konsumen memiliki pengaruh signifikan pada loyalitas. Faktor Kepercayaan dan Keterlibatan berperan sebagai mediator antara Kepuasan dan Loyalitas. Faktor Teknologi memiliki peran moderasi yang berbeda. Peran moderasi positif diberikan Teknologi kepada Kepercayaan, sementara peran moderasi negatif diberikan Teknologi pada Keterlibatan. Riset ini menguji peran moderasi Teknologi tersebut secara bersamaan, dan menawarkan riset CRM modern dari sudut pandang konsumen.
Kata kunci: Customer Relationship Management; Efek Kepuasan Konsumen; Faktor Yang Mempengaruhi Loyalitas Konsumen; Peran Moderasi Teknologi

INTRODUCTION

The landscape of Customer Relationship Management (CRM) has been transformed, like other aspects of business, following the latest trends in technology. Like every other company that adopts Generative Artificial Intelligence (Gen-AI) capability into their business processes (McKinsey & Company, 2024), several CRM tools introduced the Gen-AI capability so clients can craft copywriting based on the prompt (Jain, 2023) or predict customer behaviour (Iterable, 2024). Those features have been predicted by (Kotler et al., 2021), where marketers can use the latest technology to set up agile marketing processes.

For years, various research has mentioned technology as one of the main pillars of CRM alongside People and Processes (Dubey et al., 2019). The technology factor those researchers mentioned has the exact definition as the one featured in (Kotler et al., 2021),

which is using data and the internet for marketing purposes. The people factor refers to the employees who do the day-to-day job, while the Process factor refers to the marketing strategy and its implementation.

Researchers need to have a degree of scepticism regarding the focus of technology as it is not the panacea for all problems. The CRM scene has seen several failed Technological implementations. (Tazkarji & Stafford, 2020). Vodafone suffered around 4,6 million pounds sterling in 2016 from the failure (agilecrm.com, 2021). (Monod et al., 2023) noted that failed CRM projects would burden employees mentally, reducing company performance. That is why, even though technology is mentioned in previous articles as the factor that drives success, those researchers also mention that a company needs to have the correct Process and People.

Technology-focused CRM research can also be identified from a company-centric point of view (Rooney et al., 2021; Yanti et al., 2024). In contrast, marketing research should shift toward a customer-centric mindset (Kotler et al., 2021).

The novelty of this research could be found in the usage of the Technology factor as the moderating variable, as mentioned in previous research (Chen et al., 2022; Rooney et al., 2021; Ruiz-Alba et al., 2022), which then combined with the research perspective based on customers' point of view following what (Kotler et al., 2021) suggested. This research also uses customer Loyalty as the ultimate end-game of any marketing efforts, including CRM (Farmania et al., 2021; Kotler et al., 2021; C. K. H. Lee & Wong, 2021). The main aim is to return the research perspective on CRM to its original usage, which is about customer and customer loyalty. CRM practitioners can afford not to fall into CRM perils, as (Tazkarji & Stafford, 2020) mentioned.

THEORETICAL REVIEW

This research bases its view on the Marketing 5.0 theory (Kotler et al., 2021), which states that marketing efforts should be built upon human-centricity with the help of technological prowess. Technology is important but not the main focus, as no machine can replace a human-level connection with customers. Thus, technology should follow a marketing strategy to establish customer Loyalty with a brand or business entity. That would be placing technology not as the main focus of this research.

The main focus, instead, lies in the relationship marketing (RM) theory, as mentioned by (Hollensen, 2019). RM is a business process for creating, maintaining, and enhancing long-term customer relationships through mutually beneficial exchange. Trust and engagement are important in creating loyalty through continuous patronage or positive Word of Mouth (WOM).

Customer **Loyalty** is a part of the post-purchase phenomenon (Kotler et al., 2021), where a customer is inclined toward a store, brand, or other business. This intangible psychological trait could be identified through the existence of positive WOM (Farmania et al., 2021), repurchase intention or attitudinal loyalty (Mustikasari et al., 2021; Surianto et al., 2020); actual repurchase behaviour, or behavioural loyalty (C. K. H. Lee & Wong, 2021). Loyalty is an underlying attitude that drives a customer to choose a specific business all over again.

Research that covers the topic of loyalty also discusses several other factors, including **satisfaction.** Satisfaction emerges in customers' minds when there is at least a symmetry if not a positive asymmetry, between their expectations towards a product and what they get

from the product they purchase (Thakur, 2019). It puts the perspective that satisfaction can only occur after users first use a product. That experience could then drive them to make another purchase from the same business entity or even promote the business by telling positive stories to their peers (Atulkar, 2020; Faraoni et al., 2019; Monferrer et al., 2019; Mustikasari et al., 2021). The hypothesis that could come from the theory is:

H1: Satisfaction has a significant influence on loyalty.

Another factor that was mentioned in the topic of loyalty is **trust**. Previous research suggested that customers who are satisfied with a business expect said business entities to consistently deliver their promises (Atulkar, 2020; Tuti & Sulistia, 2022). That belief is categorised as several degrees higher than just satisfaction as customers put their hope in a business to keep fulfilling their needs. It leads to the second hypothesis, that:

H2: Satisfaction has a significant influence on trust.

Customers then find it easier to be loyal to a business they trust (Li et al., 2020). That logic then explained another research that concluded that the emotional bond between customer and business is shown with the emergence of **trust**, which has a higher degree of positive emotion than Satisfaction (Atulkar, 2020). Even in other businesses offering the same product at a cheaper price, customers continue choosing the business they have trusted. This continued patronage logic is a form of **Loyalty** (Hollensen, 2019). Thus, the third hypothesis is:

H3: Trust has a significant influence on loyalty.

(Kustiwi & Isnalita, 2018), (Li et al., 2020), and (Yu et al., 2021) suggest a framework where **trust** connects the path of Satisfaction towards Loyalty. The influence of satisfaction gets amplified if it affects trust before it affects loyalty. Thus, trust is supported in their research **as the mediating variable** that connects the path of satisfaction to loyalty. This research will based on the following hypothesis based on those findings where:

H4: Trust significantly mediates the influence of Satisfaction toward Loyalty.

Engagement is another factor that was mentioned in other research about loyalty. It refers to how much of a connection toward a business that the customers perceive about themselves (Z. W. Y. Lee et al., 2019). It could also be shown when customers hope for a specific business to be more successful than the other (Abror et al., 2019) or when a customer contacts a customer service business without any hesitation (Bhale & Bedi, 2022). More actual interaction or perceived connections that customers think they have toward a business are attainable through the efforts of CRM (De Oliveira Santini et al., 2020; Ng et al., 2020). The concept is a level of connection and interaction between customers and a business.

(Lim et al., 2022) theorised that **Engagement** and **Satisfaction** go hand in hand since customer satisfaction results in behaviours that positively affect the business. They also theorised that the feeling of satisfaction constitutes attitudinal engagement. The theory is supported empirically through several types of research (Bhale & Bedi, 2022; Monferrer et

al., 2019) where satisfaction influences engagement. Hence, the following hypothesis in this study is based on the evidence-based theory:

H5: Satisfaction has a significant influence on engagement.

Engagement, in turn, affects loyalty, as was mentioned in previous research (Abror et al., 2019; Lim et al., 2022; Naumann et al., 2020). The more engagement happens between the customer and the business; the easier it is for the customer to become loyal to that business. That relationship strengthens the following hypothesis of this study:

H6: Engagement has a significant influence on loyalty.

(Monferrer et al., 2019) further explain how **Engagement functions in the equation between Satisfaction and Loyalty**. The research showed that engagement significantly influenced satisfaction while it significantly influenced loyalty. It is then logical to put engagement as a bridge that connects the path of the prior variable toward the subsequent variable, which is also used by (Abror et al., 2019). Thus, this study came up with the following hypothesis:

H7: Engagement significantly mediates the influence of Satisfaction toward Loyalty

(Rane, 2023) suggested that technology might boost CRM influence and gain customer loyalty. That idea had empirical evidence in the later research that put **Technology (Z) as the moderating** factor (Chen et al., 2022; Prentice et al., 2020; Rahman et al., 2020; Ruiz-Alba et al., 2022). This study measures the value of technology through customers' perceptions of it (Schmidthuber et al., 2020).

It is evident in previous research that customers who are satisfied with using a mobile app tend to give more positive WOM when they perceive the app is innovative (Ruiz-Alba et al., 2022). WOM reflects Loyalty (Kotler & Keller, 2016; C. K. H. Lee & Wong, 2021), while the customers' perception of innovation is part of the Technological concept (Kotler et al., 2021; Rane, 2023). This research is used as the basis of the following hypothesis in this study:

H8: Technology has a significant moderation effect on the relationship between Satisfaction and Loyalty.

The moderating role of technology in the relationship between Satisfaction and Trust is presented in (Alnoor et al., 2022). The research showed that the customisation feature in an app strengthens the influence of Satisfaction towards Loyalty. With that evidence, this study came up with the hypothesis:

H9: Technology has a significant moderation effect on the relationship between Satisfaction and Trust.

It is also presented in a previous study that the adoption of technology interacts with trust in building consumer patronage of online banking (Rahman et al., 2020). The research showed that adopting technology strengthens the relationship between trust and customers'

intention to continue their patronage of mobile banking. That finding is made to be the base of this study to hypothesise:

H10: Technology has a significant moderation effect on the relationship between Trust and Loyalty.

Technology also moderates the relationship between satisfaction and engagement. It is observed by (Prentice et al., 2020) that customers' perception of AI strengthens the influence of Satisfaction toward Loyalty. Based on that evidence, this study came up with the 11th hypothesis:

H11: Technology has a significant moderation effect on the relationship between Satisfaction and Engagement.

The pattern of technology as a moderator between engagement and loyalty was observed in (Chen et al., 2022). The study measured the Technology variable based on customers' perceptions of the ease of using artificial intelligence in a boarding house booking application. However, the research showed a negative moderating effect of technology on the relationship between Engagement and Loyalty. This contradicts the theory that suggests the positive moderating effects of technology within the relationship of Engagement and Loyalty (Rane, 2023), which positively impacts CRM (Pöyry et al., 2020). Both studies imply that technology influences the relationship between Engagement and Loyalty, although there are debates regarding the nature of this influence. This research seeks to address this gap by aligning with the theory to generate the following hypothesis:

H12: Technology has a significant moderation effect on the relationship between Engagement and Loyalty.

Through the theories mentioned and empirical findings, this research has developed the research concept seen in **Figure 1**. The hypotheses that have been made will be tested using a quantitative method.

Jurnal Manajemen
e-JM
E-ISSN: 2549-8797
ISSN: 1410-3583

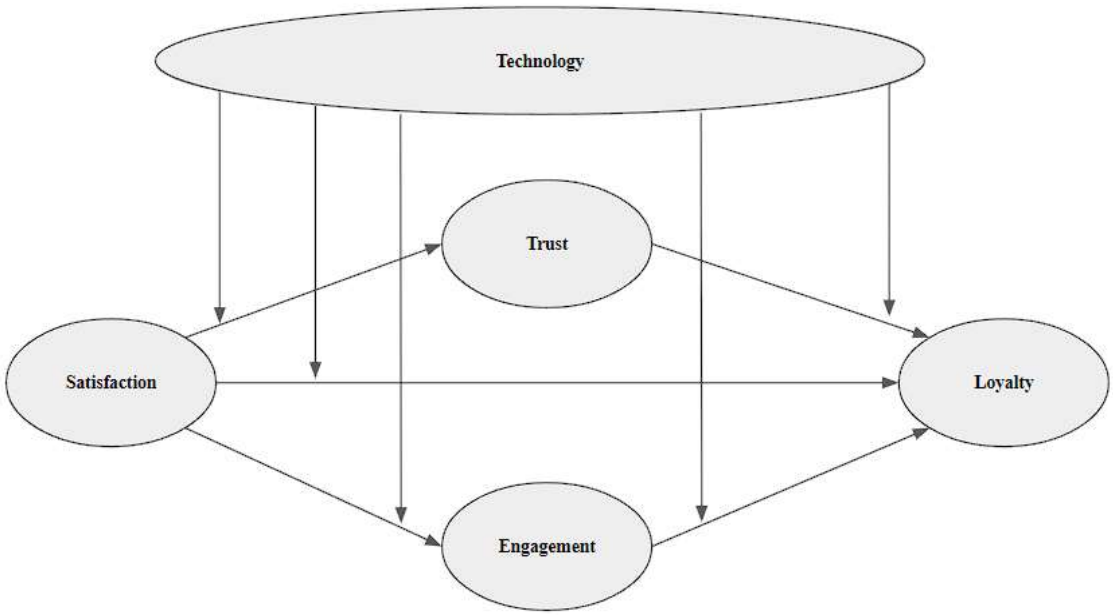

Figure 1. Research Conceptualisation
Source: Processed Data (2024)

METHODS

This quantitative research aims to explain the relationship between Satisfaction, Trust, Engagement, and Technology in building loyalty. The study's population comes from e-commerce buyers in Indonesia. A random sampling technique was used, and the survey questions were disseminated through Instagram ads. The survey questionnaire can be seen on the operationalised variable in **Table 1**.

Table 1. Operationalised Variable

Variable	Operationalised Variable
Loyalty (L)	I can envision that I would purchase other products from my preferred e-commerce platform (L1) I frequently speak positively about my preferred e-commerce platform to others (L2) I encourage others to shop at my preferred e-commerce platform (L3) I intend to continue shopping at my preferred e-commerce platform in the future (L4) If necessary, I would use other products sold by my preferred e-commerce platform (L5) If I had to choose again, I would still opt to remain a customer of that e-commerce platform (L6)
Satisfaction (S)	I am satisfied with the shopping process on my preferred e-commerce platform (S1) I am satisfied with the environment and interface of my preferred e-commerce platform's application (S2) I am satisfied with the quality of service provided by my preferred e-commerce platform (S3) I am satisfied with the speed of the ordering process on my preferred e-commerce platform (S4) I am satisfied with the products I have purchased from my preferred e-commerce platform (S5) My shopping experience on my preferred e-commerce platform has met my expectations (S6)

	My preferred e-commerce platform is an example of an ideal e-commerce platform (S7)
	I feel that my preferred e-commerce platform has a wide variety of products suitable for everyone (S8)
	I feel that my preferred e-commerce platform is very prompt in resolving any complaints I have (S9)
	I feel that my preferred e-commerce platform offers appealing and appropriate promotions (S10)
Trust (T)	My preferred e-commerce platform will always perform its work with good quality within its field (T1)
	I feel that the quality of products and services provided by my preferred e-commerce platform is always consistent (T2)
	I am confident that my preferred e-commerce platform is always capable of providing the best services and products (T3)
	I am confident that my preferred e-commerce platform is capable of fulfilling its promotional promises (T4)
	I am confident that my preferred e-commerce platform has positive intentions (T5)
	I am confident that my preferred e-commerce platform cares about consumer needs (T6)
	I am confident that my preferred e-commerce platform will always be capable of addressing consumer complaints (T7)
	I feel secure when conducting transactions on my preferred e-commerce platform (T8)
	I have no hesitation in entrusting my transaction or payment data to my preferred e-commerce platform (T9)
	I am confident that the team behind my preferred e-commerce platform will not misuse my personal, transaction, or payment data (T10)
Engagement (E)	The services and products I purchase from my preferred e-commerce platform remind me of the platform itself (E1)
	I frequently think about my preferred e-commerce platform when using its application (E2)
	The more I shop on my preferred e-commerce platform, the more curious I become about the company and its activities (E3)
	I often feel compelled to respond to discussions, whether online or offline, about my preferred e-commerce platform (E4)
	I often feel compelled to respond to my preferred e-commerce platform's activities, both online and offline (E5)
	I want my preferred e-commerce platform to continue growing and succeeding (E6)
	When there is an issue, I do not hesitate to contact my preferred e-commerce platform's representatives (E7)
	I frequently shop using promotions or discounts offered by my preferred e-commerce platform (E8)
	I participate in loyalty programmes or collect points that can be exchanged for discounts on my preferred e-commerce platform (E9)
Technology (Z)	I feel that my preferred e-commerce platform has innovative new technologies (Z1)
	My preferred e-commerce platform's application feels advanced (Z2)
	I experience the best services when using my preferred e-commerce platform's application (Z3)
	I am confident that my preferred e-commerce platform will continue to innovate within its field in the future (Z4)
	I shop on my preferred e-commerce platform because its application is easy to use (Z5)
	My preferred e-commerce platform uses artificial intelligence technology that enhances my shopping experience (Z6)
	The technology used by my preferred e-commerce platform makes it easier for me to choose products (Z7)
	I feel that e-commerce platforms generally need artificial intelligence assistance to improve the shopping experience for consumers (Z8)

Source: Processed Data (2024)

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e-JM
E-ISSN: 2549-8797
ISSN: 1410-3583

The data are analysed using Structural Equation Modelling with a Partial Least Square approach (SEM-PLS). The minimum sample size for this research follows the rule of thumb suggested by (Hair et al., 2019), which is 5 to 10 samples times the number of total indicators in the research. The early study of this research consists of 43 indicators, and thus, it has a minimum 215 sample size.

To help with the analysis, SPSS 27 is used to test the questionnaire's first validity. SmartPLS 3 is then used for the SEM-PLS analysis (Ringle et al., 2024). The questionnaire's first validity test was conducted from January to June 2024, and 244 respondents were gathered, which fulfilled the minimum sample size of 215.

Table 2. Rotated Component Matrix

	1	2	3	4	5
L1			0.887		
L2			0.876		
L3			0.933		
L4			0.940		
L5			0.922		
L6			0.910		
S1		0.796			
S2		0.828			
S3		0.813			
S4		0.792			
S5		0.768			
S6		0.796			
S7		0.827			
S8		0.809			
S9		0.794			
S10		0.655			
T1	0.832				
T2	0.848				
T3	0.901				
T4	0.880				
T5	0.846				
T6	0.786				
T7	0.835				
T8	0.851				
T9	0.889				
T10	0.857				
E1				0.814	
E2				0.787	
E3				0.591	
E4				0.670	
E5				0.784	
E6				0.792	
E7				0.773	
E8				0.712	
E9				0.578	
Z1					0.837
Z2					0.821
Z3					0.831
Z4					0.807
Z5					0.668
Z6					0.769

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e-JM
E-ISSN: 2549-8797
ISSN: 1410-3583

Z7	0.774
Z8	0.587

Source: Processed Data (2024)

The rotated component matrix in **Table 2** showed that each indicator loaded exclusively into different components and thus passed the first validity test. Even so, the copywriting of several indicators of the questionnaire contained redundant information with each other.

The study then proceeds to eliminate the redundant ones after the *face validity* process, leaving items L1, L2, L3, L6, S1, S2, S3, S5, S6, T3, T4, T5, T7, T8, E3, E4, E7, E8, E9, Z2, Z3, Z6, and Z7 as the indicators for the new set of questionnaire, which contains 23 indicators and ideally should have a minimum of 230 samples to proceed with the SEM-PLS analysis.

RESULTS

Respondent characteristics. The new questionnaire was disseminated between June and August 2024 and received 318 responses. Most respondents are women aged 26 to 35 who live on Java Island and have an average monthly income below 5 million rupiah. Table 3 presents the details of all the respondents.

Table 3. Respondent Characteristics

	Total	Ratio (in per cent)
Gender		
Male	120	37.736
Female	198	62.264
Age group		
Less than 18	2	0.629
18 to 25	42	13.208
26 to 35	170	53.459
36 to 45	80	25.157
46 to 55	19	5.975
56 to 65	1	0.314
No answer	4	1.258
Island domicile		
Nusa Tenggara Islands	1	0.314
Riau Islands	1	0.314
Island of Bali	1	0.314
Java Island	276	86.792
Island of Kalimantan	15	4.717
Madura Island	1	0.314
Sulawesi Island	4	1.258
Sumatera Island	11	3.459
No answer	8	2.516
Average monthly income		
Less than 4.600 million	160	50.314
Between 4.600 million to 19.200 million	136	42.767
Between 19.200 million to 38.500 million	17	5.346
Above 38.5 million	3	0.943

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E-ISSN: 2549-8797
ISSN: 1410-3583

No answer	2	0.629

Source: Processed Data (2024)

Factor Loading. Out of 318 respondents, one did not manage to answer all of the questions and thus got discarded from the analysis, leaving 317 samples. The sample size fulfilled the minimum sample size of 230, and thus, the data is processed using SmartPLS to get the factor loading, as seen in **Table 4.** Each indicator has factor loading above the minimum threshold of 0.708, as (Hair et al., 2019) suggested, except for E7 and E8.

Table 4. Measurement Model

Construct	Indicator	Factor Loading	AVE	CR	VIF
Loyalty	L1	0.761	0.656	0.884	1.557
	L2	0.870			2.367
	L3	0.874			2.380
	L6	0.730			1.464
Satisfaction	S1	0.867	0.730	0.931	2.581
	S2	0.827			2.258
	S3	0.871			2.841
	S5	0.871			2.793
	S6	0.830			2.187
Trust	T3	0.863	0.726	0.930	2.590
	T4	0.833			2.309
	T5	0.867			2.646
	T7	0.876			2.789
	T8	0.816			2.166
Engagement	E3	0.855	0.562	0.862	2.552
	E4	0.837			2.432
	E7	0.529			1.181
	E8	0.685			1.396
	E9	0.789			1.692
Technology	Z2	0.866	0.735	0.917	2.369
	Z3	0.861			2.330
	Z6	0.849			2.195
	Z7	0.850			2.221

Source: Processed Data (2024)

This study decided to keep them on the equation due to the latest suggestion by (Hair et al., 2022), where researchers can keep an indicator with a factor loading value between 0.400 and 0.700 if the variable measures meet the recommended threshold of convergent validity and internal consistency reliability.

Multicollinearity test. To further check the redundancy of indicators, this study relies on the Variance Inflation Factor (VIF), which should be below the threshold value of 5, as (Hair et al., 2019) suggested. **Table 4** shows that the indicators of this study have VIF between 1.181 and 2.841, indicating no redundancy in the indicators.

Reliability and validity test. This research uses a Composite Reliability (CR) value between 0.600 and 0.950 as the threshold to test reliability (Hair et al., 2022). To test the convergent validity, the Average Variance Extracted (AVE) value of a minimum of 0.500 is used as the threshold to pass the convergent validity test (Hair et al., 2019). All variables in this study have CR and AVE results within the suggested value and are thus considered good internal reliability, as seen in **Table 4.**

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E-ISSN: 2549-8797
ISSN: 1410-3583

The discriminant validity is tested using the Hetero-trait Monotrait (HTMT) ratio, which should have a maximum of 0.900 (Hair et al., 2022) as each variable should not be closely related. The result in **Table 5** suggests that all variables have met the maximum threshold within the 0.900 range. This means the correlations between variables are at an acceptable rate.

Table 5. HTMT Table

	Engagement	Loyalty	Satisfaction	Tech	Trust
Engagement					
Loyalty	0.884				
Satisfaction	0.748	0.782			
Tech	0.901	0.789	0.804		
Trust	0.838	0.831	0.893	0.863	

Source: Processed Data (2024)

Hypothesis testing. This research uses the confidence interval of 95 per cent with an α value of 0.050 to test the hypothesis through the bootstrap method in SmartPLS. The result can be seen in **Table 6**, where nine supported hypotheses have p-values less than 0.050. Meanwhile, three other hypotheses are unsupported due to having p-values above 0.050. The relationship between constructs and the loadings is seen in **Figure 2**.

H1 regarding the direct influence of Satisfaction on Loyalty is **supported** by the p-value of 0.017, below 0.050. The positive coefficient of 0.191 could be interpreted as an increment in loyalty, as satisfaction rose by one point.

H2 about the direct influence of Satisfaction on Trust is **also supported**. It is confirmed by the p-value below 0.050. The coefficient indicates that a point increase in satisfaction will result in a 0.531 increase in trust. **H3** concerning the influence of Trust toward Loyalty is supported with a p-value below 0.050. Table 8 shows that loyalty points will increase by 0.335 when trust increases by one point. The mediation role of Trust between Satisfaction and Loyalty has a p-value of 0.001, with a 0.178 coefficient, **supporting the H4**.

The data analysis generated a p-value of 0.009 for the influence of Satisfaction toward Engagement, **verifying H5** with a coefficient of 0.197. This implies that for every one-point increase in satisfaction, engagement will rise by 0.197 points. **H6** about the significant influence of engagement in creating loyalty **is also supported** with a p-value below 0.050. With that, a one-point increment in engagement will result in a 0.278 increase in Loyalty score. The result also **supports H7**, which mentions the mediating effect of engagement in the relationship between Satisfaction and Loyalty, with a p-value of 0.033 below 0.050.

Jurnal Manajemen
e-JM
E-ISSN: 2549-8797
ISSN: 1410-3583

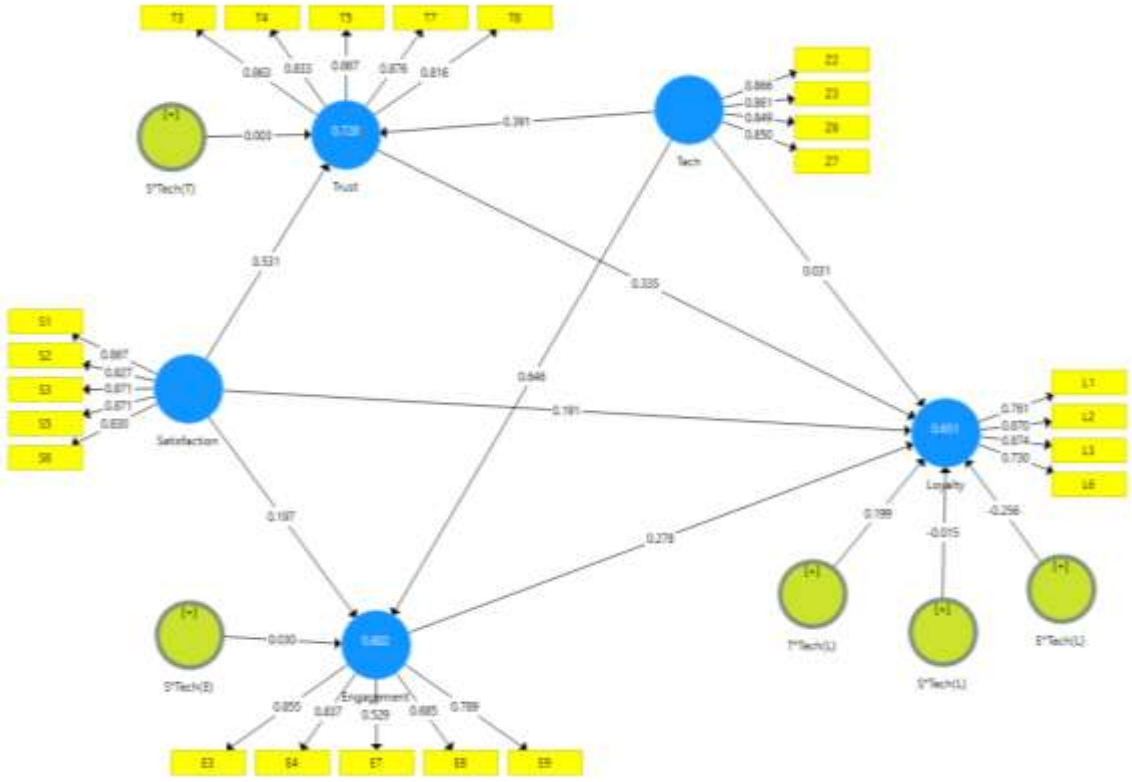

Figure 2. SmartPLS Path Result
Source: Processed Data (2024)

Table 6 also shows the total effect of Satisfaction towards Loyalty, mediated by Engagement and Loyalty. It has a significant p-value below 0.050. The total effect coefficient is higher than the direct effect coefficient. It indicates that satisfaction will significantly impact loyalty if it goes through Satisfaction and Trust.

Table 6. Hypothesis Testing

Hypothesis	Path Coefficient	P-Values	Verdict
Satisfaction -> Loyalty (H1)	0.191	0.017	Supported
Satisfaction -> Trust (H2)	0.531	0	Supported
Trust -> Loyalty (H3)	0.335	0	Supported
Satisfaction -> Trust -> Loyalty (H4)	0.178	0.001	Supported
Satisfaction -> Engagement (H5)	0.197	0.009	Supported
Engagement -> Loyalty (H6)	0.278	0	Supported
Satisfaction -> Engagement -> Loyalty (H7)	0.055	0.033	Supported
S*Tech(L) -> Loyalty (H8)	-0.015	0.859	*Not supported*
S*Tech(T) -> Trust (H9)	0.003	0.922	*Not supported*
T*Tech(L) -> Loyalty (H10)	0.199	0.036	Supported
S*Tech(E) -> Engagement (H11)	0.030	0.515	*Not supported*
E*Tech(L) -> Loyalty (H12)	-0.256	0.001	Supported
Satisfaction -> Loyalty (Total Effect)	*0.424*	*0*	

Source: Processed Data (2024)

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e-JM
E-ISSN: 2549-8797
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Technology moderates this equation, although not all of its roles are significant. Its role in the relationship between Satisfaction and Loyalty is presented in **H8**, but it is **not supported** since it has a p-value of 0.859. **Figure 3a** shows the insignificant moderation effect in the three lines not intersecting. However, the coefficient indicates that technology diminishes the influence of satisfaction toward loyalty.

H9 about the moderating role of technology in the relationship between Satisfaction and Trust is **not supported**. Its p-value is above 0.050, and the simple slope in **Figure 3b** shows no lines intersecting with each other nor showing significant slope differences. Meanwhile, the coefficient indicates that increasing technology will amplify satisfaction's influence on loyalty.

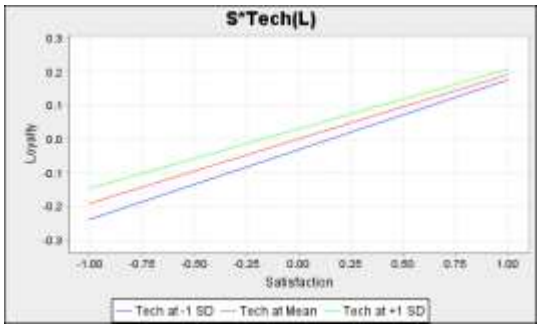

Figure 3a. Tech Moderation Effect Between Satisfaction and Loyalty
Source: Processed Data (2024)

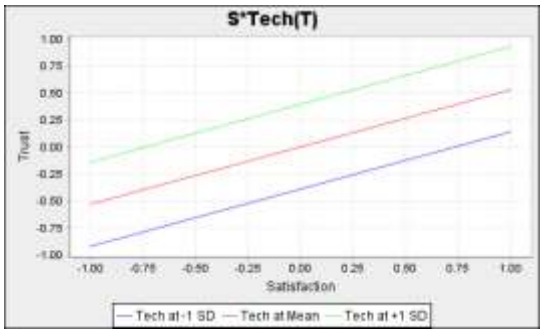

Figure 3b. Tech Moderation Effect Between Satisfaction and Trust
Source: Processed Data (2024)

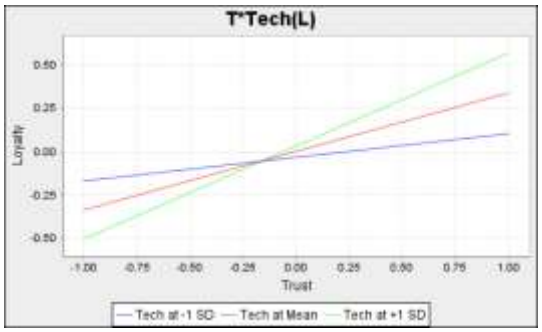

Figure 3c. Tech Moderation Effect Between Trust and Loyalty
Source: Processed Data (2024)

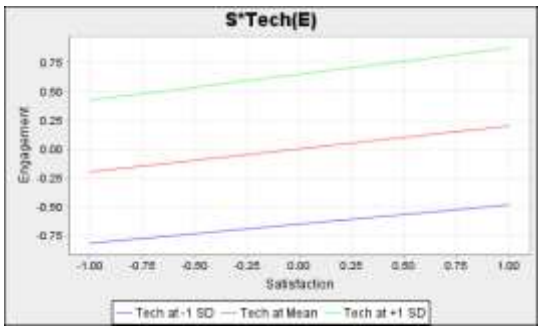

Figure 3d. Tech Moderation Effect Between Satisfaction and Engagement
Source: Processed Data (2024)

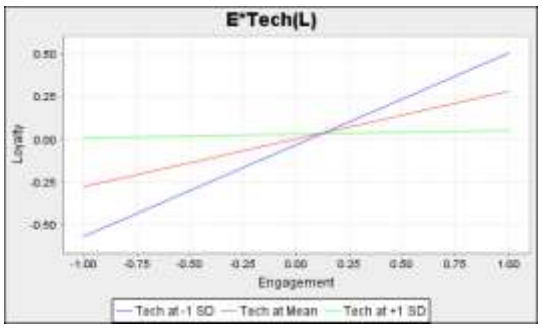

Figure 3e. Tech Moderation Effect Between Engagement and Loyalty
Source: Processed Data (2024)

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ISSN: 1410-3583

H10 of this study is **supported** by a p-value of 0.036. The coefficient indicates that technology amplifies the influence of Trust towards Loyalty. The green line on the simple slope graph in **Figure 3c** has a significantly steeper slope than the red and blue lines, indicating that technology heightens the influence of Trust towards Loyalty.

This study's **H11** is **not supported** due to a p-value above 0.050. However, the coefficient indicates a positive moderating role in the relationship between Satisfaction and Engagement. The insignificant moderation role is also seen in **Figure 3d**, where the green, red, and blue lines do not intersect.

The moderating role of technology in the relationship between Engagement and Loyalty, as mentioned in **H12**, is **supported** by a p-value of 0.001. **Figure 3e** shows that the green line decreases while the red and blue lines increase as the engagement value rises. That intersection indicates the negative significant effect of technology on engagement's influence on loyalty. That relationship is further proven by the coefficient in **Table 6**.

R^2 result. Data processing with SmartPLS 3 (Ringle et al., 2024) produced the R^2 table, as shown in **Table 7**. (Ozili, 2022) states that the R^2 value indicates how much of the dependent variable is explained by the given independent variables. The article agrees that a good R^2 value should be above 0.500 or 50 per cent. Table 9 shows that the dependent variables in this study have R^2 values above 0.500, indicating that the research model falls into the "good" category.

Table 7. R^2 Table

Variable	R^2	R^2 Adjusted
Loyalty	0.648	0.640
Engagement	0.602	0.598
Trust	0.728	0.725

Source: Processed Data (2024)

F^2 result. F^2 value represents the change in R^2 when a variable is removed from the model. (Hair et al., 2019) noted that a variable with an F^2 score between 0 and 0.020 has an inconsiderable effect in the model. A score between 0.020 and 0.150 indicates a small effect, a score between 0.150 and 0.350 indicates a medium effect, and a score above 0.350 indicates a significant effect. The impact size of each independent variable can be seen in **Table 8**. It is seen that the significant effect has a considerable effect on the model. The Satisfaction and T*Tech(L) F^2 towards loyalty could also be rounded to 0.020, marking a small effect.

Table 8. F^2 Table

Variable	Engagement	Trust	Loyalty
Satisfaction	0.039*	0.412***	0.019*
Engagement			0.062*
Trust			0.056*
S*Tech(L)			0
S*Tech(T)		0	
T*Tech(L)			0.017*
S*Tech(E)	0.004		
E*Tech(L)			0.056*

* indicates small effect; ** indicates moderate effect; *** indicates high effects
Source: Processed Data (2024)

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E-ISSN: 2549-8797
ISSN: 1410-3583

Model Fit. (Ringle et al., 2024) state that GoF in SEM analysis techniques can be assessed by examining the Standardised Root Mean Square Residual (SRMR), Normed Fit Index (NFI) or by comparing the bootstrapped analysis's Euclidean distance (d_ULS) and Geodesic distance (d_G) against the original analysis. The model presented in this study has model fit values, as seen in **Table 9** and **Table 10**.

Table 9. Model Fit Table

Fit Index	Saturated Model	Estimated Model
SRMR	0.055	0.058
d_ULS	0.849	0.914
d_G	0.490	0.502
NFI	0.841	0.840

Source: Processed Data (2024)

This study got an estimated model SRMR value of 0.058, as stated in **Table 9**, below the maximum threshold of 0.080 (Ringle et al., 2024). However, the NFI value for the estimated model does not pass the conventional threshold of a minimum of 0.900 (Ringle et al., 2024), as it is 0.060 below the acceptable value.

Tabel 10. Table of d_ULS

	Original Sample (O)	Sample Mean (M)	95 per cent	99 per cent
d_ULS				
Saturated Model	0.849	0.593	0.763	0.911
Estimated Model	0.914	0.654	0.859	0.946
d_G				
Saturated Model	0.490	0.346	0.421	0.458
Estimated Model	0.502	0.349	0.425	0.484

Source: Processed Data (2024)

Meanwhile, the d_ULS values in **Table 10** show that the estimated model has a good fit on the confidence interval of 99 per cent as the d_ULS value of that confidence interval rests above the Original Sample value, fulfilling (Ringle et al., 2024) suggestion. The d_G value of the 95 per cent confidence interval and 99 per cent confidence interval in **Table 10** is not above the estimated model original sample value. This study does not fulfil the d_G model fit within both confidence intervals. Thus, this study only fulfilled the model fil criteria using the SRMR approach.

DISCUSSION

RM at play. Product and service satisfaction indicators have the highest factor loading within the Satisfaction variable. Meanwhile, positive word-of-mouth (WOM) indicators have the highest factor loading within the Loyalty variable. Those findings imply that a company can still attain customer loyalty through positive WOM if they can satisfy that customer with their product and services, even if they are still using limited technology.

The significant positive influence of Satisfaction towards Loyalty in H1 of this research supports previous findings (Atulkar, 2020; Monferrer et al., 2019; Thakur, 2019). The WOM phenomenon is expected within RM theory. (Hollensen, 2019) suggested that

satisfied customers will circulate the news about their prior positive experiences within their community. Furthermore, it resonates with the social identity theory (SIT) (Harwood, 2020), which states that individuals have an internal psychological process that makes them feel like they belong within a group, like with their friends or family. One group tends to seek distinctiveness, which could be found through consuming the same product among the group members as a form of group activity (Willis et al., 2020).

The theory of trust explains the significantly positive influence of Satisfaction towards Trust in H2 in the economic context. Trust is defined as the perception of a customer that a business entity will satisfy the customer's needs (Atulkar, 2020; Rajaobelina et al., 2021; Singh et al., 2021; Tuti & Sulistia, 2022). This research proves that trust is attainable through customer satisfaction with or without the help of technological factors. However, within Indonesia's e-commerce context, the recent data breach issue (Ramadhan, 2022) also correlates with the indicator of trust for security to have the lowest value.

Trust, then, has significant and positive effects on customer Loyalty, as is proven and mentioned in H3. Those findings conform with previous research (Li et al., 2020; Rajaobelina et al., 2021). The Relationship Marketing (RM) Theory states that RM is an active process of maintaining long-term relationships with stakeholders through continuous mutual exchange and trust (Hollensen, 2019). Thus, that theory explained the relationship of Trust and Loyalty within this research context.

The trust indicator with the highest factor loading value is the customer's trust in the company's ability to resolve complaints. This happened due to their prior positive experience, which set their expectations high in any other aspect of the business (Atulkar, 2020; Singh et al., 2021). Thus, that logic also explains the nature of trust as the connector that brings satisfied customers into becoming loyal customers, as is proved in H4 of this research.

This research finds that engagement has a significantly positive influence on satisfaction, as stated in H5. It conforms with (Abror et al., 2019) and (Monferrer et al., 2019). Engagement has a significant favourable influence over loyalty, as mentioned in H6. These findings support what (Monferrer et al., 2019) and (Zheng et al., 2022) have proven. Then, in H7, it is also confirmed that engagement has a significant mediation role that brings Satisfaction towards Loyalty, like what previous study has found (Abror et al., 2019; Monferrer et al., 2019).

The path from Satisfaction to Engagement to Loyalty conforms to the Brand Resonance Model (Keller & Swaminathan, 2020). The model states that customer Loyalty is the result of a managed brand strategy, and it all starts with an association of brand and benefit within the customer's mind. Those associations can only happen when the customer is satisfied with the company's products and/or services.

Within the engagement variable, the indicator of brand curiosity got the highest loading factor. It indicates that when users are satisfied, they will start to get to know the company more, which could be part of the third step in the Brand Resonance Model, where the company actively elicits the customer's response to the company's business activities (Keller & Swaminathan, 2020).

The Role of Technology in RM. Interaction between Technology and Satisfaction in building loyalty that results in a negative value, as seen in H8 in **Table 6**, disproves (Ruiz-Alba et al., 2022), which finds the role is significant. It could be explained by the Choice Overload Theory (COT) (Adriatico et al., 2022). As (Kotler et al., 2021) mentioned, technology helps marketers understand what a person needs and offers the right product at

the right time with an automated process. That then results in the abundance of offers for customers, leaving them paralysed with too many "right" choices of products. It hinders them from making repurchasing decisions (Adriatico et al., 2022).

However, the insignificant moderating effect, in that sense, occurred in correlation with any CRM tools' suppression logic feature (Iterable, 2024; Jain, 2023). That feature could automatically stop marketing communications after reaching a certain threshold, thus helping prevent Choice Overload from becoming a significant situation for customers.

This research rejects the H9 regarding the insignificant role of technology as a moderator within Satisfaction and Trust. It goes against (Alnoor et al., 2022), who mentioned otherwise. On the other hand, this finding signifies the idea that (Atulkar, 2020) and (Singh et al., 2021) conveyed about the power of prior positive experience in creating Trust without Technology in their research model.

The technology could capitalise on customers' trust, amplifying loyalty. This is shown in the H10 result in **Table 6.** The feelings that the company's products and services advance nature, which is the highest scoring indicator within the Technology variable, are the ones that mainly drive them to do the positive WOM, which could also be explained by SIT (Harwood, 2020). In this case, the company can showcase its innovations to add trust, which could increase loyalty.

However, the company should be careful when adopting advanced technology. H12 shows that the more customers perceive the Technological prowess of a company, the less loyalty comes from Engaged customers. That phenomenon could be explained using the Anthropomorphism Theory (Hortensius et al., 2021). The theory states that humans tend to be drawn to other entities with human-like traits. This trait is not necessarily bodily organs but could also be feelings, intentions, and motivations. The more traits something has, the more intense the connection it could bring.

The theory could also explain the insignificant role of technology in the moderate relationship between Satisfaction and Engagement in H11. Customers perceive technology as lifeless, thus causing no significant change in engagement compared to when satisfied with the products or services.

CONCLUSION

This research concludes that loyalty is significantly affected by customer Satisfaction, Trust, and Engagement. Satisfaction is also important since it has significantly positive effects on Trust and Engagement, which could then be explained as the bridge that effectively connects Satisfaction to Loyalty. Meanwhile, technology interacts with both Trust and Engagement differently. It will amplify the effect of Trust on Loyalty while diminishing the effect of Engagement on Loyalty.

That finding is a wake-up call for managers to realise that every business entity should focus more on attaining customer satisfaction instead of attaining the most sophisticated technology. Technology might amplify customers' trust, making them more likely to become Loyal customers. Even so, a business entity needs to ensure that the applied technology is not too much "robotics" as it negatively moderates the relationship between engagement and loyalty.

When satisfaction is not met, business entities can still attract customer Loyalty if they trust the business. Creating good customer service is essential since it embodies engagement and could turn Satisfied customers into loyal customers.

This study concludes those recommendations, but managers and researchers should know its limitations. This research disseminated the questionnaire through META ads only, while it might be suitable for further research to include the respondents attained offline.

This research mainly focuses on e-commerce customers. So, it might be better for the following study to include brick-and-mortar customers. This research measures technology with a Likert scale to get customers' perceptions of how sophisticated e-commerce technology is. If the following study includes offline store customers, comparing online and offline customers with a cohort comparison might be better.

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ACKNOWLEDGEMENTS

The corresponding author would like to express the deepest gratitude to the co-authors and mentors for their invaluable guidance, support, and contributions throughout the research process. This research is conducted objectively without any conflict of interest associated.