

A Hybrid of PLS-SEM-Artificial Neural Networks for Predicting Customer Satisfaction and Loyalty: A Case Study in a Beauty Clinic in Indonesia

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ABSTRACT

The study uses the stimulus-organism-response (SOR) model and relationship marketing theory to assess the impact of price, service quality, and product quality on customer satisfaction and loyalty in beauty clinics in Indonesia. The study employs a quantitative methodology, utilizing a structural equation model with partial least squares structural equation modeling to assess the hypotheses and an Artificial Neural Network. Two hundred replies were obtained by distributing questionnaires to people who visited the M.B.C. Beauty Clinic in Indonesia. In contrast to prior research, this study discovered that pricing, service quality, and product quality all have a role in influencing consumer satisfaction and loyalty. However, not all variables substantially impacted customer satisfaction as initially expected. The mediation results indicate that customer satisfaction significantly impacts customer loyalty. An Importance-Performance Map (I.P.M.) analysis was conducted on the gathered responses, revealing that the quality of the product is the primary factor influencing customer satisfaction and loyalty. Therefore, Beauty Clinic establishments should prioritize these characteristics to maintain customer satisfaction and loyalty. Prior research has chiefly examined the individual impacts of the marketing mix on customer satisfaction and loyalty, employing Structural Equation Modeling (S.E.M.). The authors have expanded the methodology by including a combined structural equation model (S.E.M.) to test hypotheses and use artificial neural networks (ANN) to forecast the significance of contributing variables concerning satisfaction and loyalty. The study's findings contribute to a more comprehensive understanding of the literature on the connection between customer loyalty and satisfaction, consumer behavior, and service marketing in the beauty care industry.

Keywords: Loyalty, Customer, Satisfaction, Determinant, Beauty Clinic, Business Success

INTRODUCTION

Growing and staying in business depends on a company's ability to attract new clients while retaining its existing customers; obviously, the healthcare industry is not an exception. This is because consumers are the driving force behind a company's success, profitability, and continued existence. Customer satisfaction and loyalty are essential to a company's long-term viability. Customers who consistently buy the company's wares are valuable assets. They will be a loyal customer and consistently buy because they are satisfied. Therefore, a firm must actively manage and sustain its loyal client base. Business leaders must focus on what makes customers return (Abekah-Nkrumah, Yaa Antwi, Braimah, & Ofori, 2020; Ulkhaq, Adyatama, Fidiyanti, Rozaq, & Raharjo, 2020). To maximize their competitive performance, healthcare companies must align customers' expectations (Liu, Li, Liu, & Hongwei, 2021) and fit the perceived performance that reflects their satisfaction.

Numerous variables affect customer loyalty who are willing to attend repeat visits and spend on healthcare services. Studies on customer loyalty in health clinic services can be broadly categorized into two primary categories. (1) customer loyalty as the dependent variable, which is influenced by the independent variables

indirectly, through customer satisfaction as the mediating variable (Gonzalez, 2019). On the other hand, (2) customer loyalty is influenced by independent variables without mediating customer satisfaction (Abekah-Nkrumah et al., 2020; Haque, Rahman, & Kow, 2020; Pratama & Hartini, 2020; Siripipatthanakul, 2021a; Suharyanto & Damayanti, 2022). However, results from earlier studies have tended to be inconsistent. For instance, the research found that Patient loyalty is not considerably influenced by how well patients perceive the quality of the healthcare services they receive. On the other hand, the correlation between patient satisfaction and how well healthcare services are seen as providing excellent care is also considerable and favorable (Liu et al., 2021; Mubarak, Kurniawan, Hidayat, Hia, & Bandawaty, 2022; Setyawan, Supriyanto, Ernawaty, & Lestari, 2020). Meanwhile, a previous study's result confirms a positive relationship between customer satisfaction and customer loyalty (Pratama & Hartini, 2020). Besides, an investigation found that patient satisfaction is directly related to a patient's commitment to the hospital (Dubey & Sahu, 2019); reasonable patient satisfaction will create loyalty (Meesala & Paul, 2018), and customer satisfaction has a significant impact on customer loyalty. Yet, the variable of Price made it insignificant to customer loyalty (Aryati & Syah, 2018). Diverse findings contradict one another, suggesting that there are gaps in our knowledge that would benefit from investigation as a novel aspect of this paper.

Another exciting aspect in the study of loyalty and customer satisfaction and their antecedent variables lies in the method of data analysis used. The strategy commonly used is the dependent predictive technique in various models. Using regression, researchers generally place independent, dependent, and mediator or moderator variables. In addition, some authors use regression, a statistical procedure to examine the relationship between one or more independent variables and one or more dependent variables targets (predictors) (Suharyanto & Damayanti, 2022). It makes it possible to readily determine the intensity of the association between these two variable types to model the future relationship between them. The most generic way of presenting a regression model is by writing the explained or response variable Y_i as a function of the independent variable(s) X_i , bound by coefficients β . An additional error term, ϵ , is usually added to represent uncaptured information that may or may not relate directly to the response variable. For instance, Hashem and Ali (2019), Abekah-Nkrumah et al. (2020), and Haque et al. (2020) (Iqbal, 2021). Although regression analysis helps assess observations and conclusions, it may also be intimidating. This is especially true when the objective is to devise new equations to describe a novel scientific event comprehensively. Furthermore, since data availability is skewed in most situations, making generalizations about the results of the developed models and using them across platforms would be difficult. On the other hand, regression can help in conditions of directly measured variables (Hashem and Ali (2019). Even though, in reality, variables such as satisfaction or loyalty cannot be measured directly. Researchers who use regression assume or simplify as if the variables are calculated instantly, usually by adding up or averaging the variable indicator item scores.

Structural Equation Modeling (S.E.M.) is also a statistical tool commonly used to explain the phenomenon of the customer satisfaction and loyalty relationship. For example, S.E.M. (Structural Equation Modeling) is supported by the SmartPLS application. Some authors use S.E.M. with AMOS or LISREL (Akob, Yantahin, Ilyas, Putra, & Hala, 2021; Boadi, Wenxin, Bentum-Micah, Asare, & Bosompem, 2019; Mubarak et al., 2022; Suharyanto & Damayanti, 2022). S.E.M. helps explain the relationship between unobservable variables, such as loyalty and customer satisfaction. These two variables cannot be measured directly except with items or indicators. In addition, the built model can explain the construction of variable measurements and the structural relationships between the studied variables (Aryati & Syah, 2018; Dubey & Sahu, 2019; Elizar, Indrawati, & Syah, 2020; Liu et al., 2021; Meesala & Paul, 2018).

Artificial neural networks (ANN) are algorithms that can execute nonlinear statistical modeling. ANN is one practical approach to machine learning using neural networks that provides a novel option for logistic regression to build predictive models. It has some advantages compared with S.E.M.: the ability to implicitly detect complex nonlinear relationships between dependent and independent variables, the ability to see all possible interactions between predictor variables, and the availability of multiple training algorithms. However, several drawbacks are associated with this method, including the fact that it is a black box, the fact that it places a heavier demand on computational resources, the fact that it is prone to overfitting, and the empirical nature of model development. Therefore, it is possible to employ a hybrid technique incorporating the best features of both regression and structural equation modeling and neural network modeling. Furthermore, it could lead to the best

possible outcome prediction model because S.E.M. and neural network modeling have their strengths and weaknesses (Alavifar, Karimimalayer, & Anuar, 2012; Hair et al., 2010; Nunkoo & Ramkissoon, 2012). Therefore, this paper uses the hybrid method of Structural Equation Modelling and Artificial Neural Networks.

LITERATURE REVIEW AND HYPOTHESES

Customer Satisfaction and Customer Loyalty

Customer happiness and loyalty are closely interconnected in the service industry, such as the beauty clinic company. Service providers' provision of treatment and services to their consumers can generate customer loyalty through the influence of satisfaction. Satisfied customers who receive the required level of service are more likely to engage in repeat transactions and make repeat purchases. Multiple extant studies demonstrate a robust correlation between customer satisfaction and customer loyalty. Customer loyalty is the consistent patronage and consumption of a company's products or services. Company success hinges on loyalty as it serves as a revenue generator. Consumer loyalty is contingent upon meeting or exceeding their expectations. Therefore, customer satisfaction can foster customer loyalty (Tu, 1996). Multiple studies indicate a robust correlation between customer satisfaction and loyalty. Patient satisfaction is directly related to patients' loyalty to the hospital (Anabila, Kumi, & Anome, 2019; Astarini & Fachrodji, 2023; Fuad, Tamtomo, & Sulaeman, 2019; Suharyanto & Damayanti, 2022; Zhou, Wan, Liu, Feng, & Shang, 2017); the quality level of Jordanian dental clinic services has a statistically significant positive impact on customer loyalty (Kim, Koo, Shin, & Lee, 2017; Meesala & Paul, 2018; Pratama & Hartini, 2020), and the level of satisfaction plays a crucial role in shaping the loyalty of international medical tourists towards a medical clinic (Hashem & Ali, 2019). The quality of service, clinic image, and price/tariff substantially affected patient loyalty, while trust did not significantly affect patient loyalty (Kim et al., 2017). Customer trust substantially mediates the effect of service quality on customer loyalty.

In contrast, customer satisfaction cannot be mediated at the pediatric polyclinic of Private Hospitals, where National Health Insurance members are (Mubarak et al., 2022; Purwanto, 2022; Suharyanto & Damayanti, 2022). The survey's outcome shows that the behavior of hospital staff and especially doctors' attitudes toward patients profoundly impacts patients' Satisfaction and Loyalty (Elizar et al., 2020). The results showed a strong and moderate correlation between patient satisfaction and loyalty in private and public primary healthcare centers, respectively (Haque et al., 2020). Based on the research mentioned above, it is evident that a correlation exists between customer satisfaction and loyalty. Customer satisfaction may foster customer loyalty. Therefore, the hypothesis may be explicitly expressed.

H1. Customer satisfaction has a notable and beneficial impact on customer loyalty.

Price, Quality of Product, Quality of Service, and Customer Satisfaction

The cost spent by customers for the items or services they acquire contributes to the assessment of customer satisfaction. Customers will verify the correspondence between the amount paid and the benefits, advantages, or worth of the items and services received. Customer satisfaction is contingent upon the price being commensurate with the product or service's perceived benefits or value. If the benefits fall short in terms of price, customers may experience dissatisfaction or disappointment. Numerous studies examining the relationship between Price and Satisfaction have consistently found that pricing is a crucial factor influencing customer satisfaction with services or products; for instance, Asma, Baha Dine, Wafaa, and Redouan (2018), Anabila et al. (2019), Fuad et al. (2019), Ferry Cahaya, Siswanti, Mihadi Putra, and Pattiwael (2023), and Naini, Sugeng, Andriani, Claudia, and Nurfadillah (2022).

Offering reasonable and commensurate prices for the products' quality can enhance the value proposition for clients. Customer satisfaction can be improved when customers receive proportional value in exchange for the price (Asma, Baha Dine, Wafaa, and Redouan, 2018). Product quality is also crucial in determining consumer happiness (Mohammed et al., 2017). Superior products not only fulfill client expectations but also foster loyalty. An optimal balance between competitive pricing and excellent product quality can foster a favorable perception of value, ultimately leading to heightened customer satisfaction (Mohammed et al., 2017). The quality of service

significantly influences customer satisfaction (Albari, 2019; Surya & Kurniawan, 2021; Ying & Kim, 2021). Providing amiable, prompt, and effective service can create a delightful customer experience. Customer trust and loyalty can be enhanced through favorable interactions between customers and service providers (Ahmed, Duah, & Owusu, 2017; Boadi et al., 2019; Prakoeswa, Hidayah, & Dewi, 2022; Shin & Shin, 2022; Siripipatthanakul, 2021b; Suharyanto & Damayanti, 2022). Indeed, excellent service quality can significantly influence consumers' perception of being esteemed and content. Hence, maintaining a harmonious correlation among competitive pricing, superior product quality, and excellent service quality helps foster an atmosphere conducive to consumer contentment. Contented clientele not only tend to sustain a commercial connection but can also serve as conduits of favorable communication, bolstering a company's standing and fostering expansion through referrals to others.

The service marketing mix includes people, Price, place (location), promotion, and product (services) (Lienata & Pink Berlianto, 2023). The results reveal that process is the most significant predictor, followed by people, Price, product (services), physical evidence, and place (location), respectively. Only promotion does not significantly influence patient satisfaction (Ferry Cahaya, Siswanti, Mihadi Putra, & Pattiwael, 2023). Reliability and responsiveness (not empathy, tangibility, and assurance) impact patients' satisfaction (Chana, Siripipatthanakul, Nurittamont, & Phayaphrom, 2021); in light of such results, the researchers recommend improving the quality level of dental care services by providing services that meet or exceed the customers' expectations (Meesala & Paul, 2018). The result of this study shows that the variables of e-service quality and price have made a significant impact on customer satisfaction; the variable of e-service quality has an impact on customer loyalty; customer satisfaction has a significant effect on customer loyalty, yet the variable of Price has no significant impact on customer loyalty (Hashem & Ali, 2019). Service quality and price/tariff significantly affected trust, and the clinic image did not significantly affect patient trust. The quality of service, clinic image, and price/tariff significantly affected patient loyalty, while trust did not significantly affect patient loyalty (Suharyanto & Damayanti, 2022). Previous research developed a theoretical model to test the relationship between patient satisfaction, trust, and loyalty. The findings indicate that trust is an essential antecedent of Loyalty and Satisfaction, but trust has no direct relationship with loyalty. It is worth noting that satisfaction can lead to loyalty, with trust as the mediating variable. The survey results will help public hospital managers formulate effective strategies and provide a basis for studying customer loyalty (Kim et al., 2017; Mubarak et al., 2022). Customer trust significantly mediates the effect of service quality on customer loyalty, while customer satisfaction cannot mediate the effect of service quality on customer loyalty at the pediatric polyclinic of Private Hospital (Liu et al., 2021). (Elizar et al., 2020). Based on the research mentioned above, it is evident that a correlation exists between customer satisfaction and factors such as Price, product quality, and service quality. Consequently, the hypothesis can be formulated in a formal manner.

H1. Price has a notable and beneficial impact on customer satisfaction.

H2. Product Quality has a notable and beneficial impact on customer satisfaction.

H3. Quality of Service has a notable and beneficial impact on customer satisfaction.

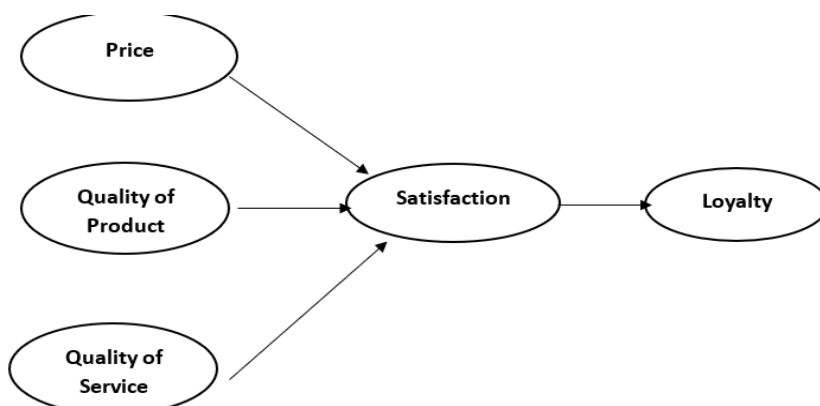


Figure 1. Conceptual Framework

Source: researcher's own work

METHODOLOGY

The population of this study is beauty clinic consumers in the Malang Region, East Java Province, Indonesia. From a number of existing beauty clinics, it is determined purposively that the "M.B.C." beauty clinic is a place of research. The investigation was carried out at the "M.B.C." beauty clinic, located in Malang Regency, within the province of East Java. The clinic was selected due to its location in a peripheral rural area with an urban lifestyle. The place is between Malang City and Malang Regency and is classified as a peripheral area. A quantitative approach is used to predict the Satisfaction and Loyalty of the clinic's customers. Data regarding the variables studied were collected using a questionnaire. In addition, questionnaires were given to respondents who were met by accident at the clinic's location. The instrument contained Inform Concern (I.C.) and respondents' willingness to participate in research projects. The indicators are shown in Table 1 in detail.

Table 1. Indicators of Latent Variables

Variable	Indicators
Quality of Service (Mubarok et al., 2022; Purwanto, 2022; Suharyanto & Damayanti, 2022)	1. Employee demeanor and behavior when interacting with customers (QOS1) 2. Employees who maintain a professional appearance(QOS2). 3. Employee eagerness to assist and support the customers (QOS3). 4. Employees' ability to effectively communicate information to customers (QOS4). 5. Employees demonstrate respect and friendliness when serving customers(QOS5).
Product Quality (Albari, 2019; Aryati & Syah, 2018; Asma et al., 2018; Boadi et al., 2019; Meesala & Paul, 2018; Naini, Sugeng, Andriani, Claudia, & Nurfadillah, 2022)	1. Ensuring the raw materials used are safe and free from any harmful substances. (QPROD1) 2. Guaranteeing that the product does not cause any negative effects or adverse reactions. (QPROD2) 3. directly influence the overall performance of the product. (QPROD3)
Price (Albari, 2019; Dhasan & Aryupong, 2019; Naini et al., 2022)	1. Cost-effective pricing for consumers (PRICE1) 2. Appropriateness of Price concerning product quality (PRICE2) 3. Appropriateness of Price concerning benefits (PRICE3) 4. Price competitiveness (PRICE4)
Satisfaction (Albari, 2019; Asma et al., 2018; Dhasan & Aryupong, 2019)	1. Meeting consumer expectations (SATISF1) 2. Providing service that aligns with consumer expectations (SATISF2) 3. Consumer satisfaction with the product (SATISF3) 4. Consumer satisfaction with the service (SATISF4) 5. Having a satisfying experience with the product(SATISF5) 6. Having a satisfactory experience with the service (SATISF6)
Customer Loyalty (Dubey & Sahu, 2019; Fuad et al., 2019; Gonzalez, 2019)	1. intend to revisit the M.B.C. clinic to procure skincare products once more (LOYAL1) 2. will be attending the M.B.C. clinic for ongoing medical care (LOYAL2) 3. will persist in utilizing M.B.C. skincare products and refrain from transitioning to an alternative beauty clinic (LOYAL3) 4. shall persist in utilizing the services of M.B.C. and refrain from transitioning to an alternative beauty clinic (LOYAL4) 5. highly endorse M.B.C. skincare products and would confidently refer them to others(LOYAL5) 6. highly endorse M.B.C. treatments to others(LOYAL6.)

Source: researcher's own work

The instrument provided contained Inform Concern (I.C.) and respondents' willingness to participate in research projects. In detail, the indicator is shown in Table 2.

Table 2. Indicator and Scale

Variable	Indicators	Measurement
Quality of Service	QOS1-QOS5	Likert Scale 1-5
Product Quality	QPROD1- QPROD3	Likert Scale 1-5
Price	PRICE1-PRICE4	Likert Scale 1-5
Satisfaction	SATISF1-SATISF6	Likert Scale 1-5
Customer Loyalty	LOYAL1-LOYAL6	Likert Scale 1-5

Source: researcher's own work

In addition, the respondents have a demographic identity, including age, last education, occupation, and various measuring items. Data were collected from respondents (n=200) and analyzed using Structural Equation Modeling based on Partial Least Squares. Structural Equation Modeling (S.E.M.) is also a statistical tool commonly used to explain the phenomenon of customer satisfaction and loyalty relationships. For example, S.E.M. (Structural Equation Modeling) is supported by the SmartPLS application (Albari, 2019; Asma et al., 2018; Dubey & Sahu, 2019; Meesala & Paul, 2018). S.E.M. helps explain the relationship between unobservable variables, such as loyalty and customer satisfaction. These two variables cannot be measured directly except with items or indicators. In addition, the built model can explain the construction of variable measurements and the structural relationships between the studied variables (Akob et al., 2021; Boadi et al., 2019; Mubarak et al., 2022; Suharyanto & Damayanti, 2022). S.E.M. is carried out to identify the significance of the variables contributing to customer satisfaction and loyalty, namely service and product prices, products used, and customer perceptions of the services received. Dalam pengumpulan data, responden mengisi secara mandiri (self-assessment). So there is a possibility of bias. Therefore, identification is carried out so that measurement bias does not occur or is minimized. There are two ways to identify measurement bias, namely: Statistical Remedies (Ex-Post) and Procedural Remedies (Ex-Ante), which are implemented during survey design to avoid bias throughout the data collection phase. We must incorporate statistical testing to show that the bias is not distorting our results because procedural treatments cannot completely eradicate CMB. One of the most popular techniques for identifying CMB used in this study is Harman's single-factor test. This straightforward statistical technique entails applying Confirmatory Factor Analysis (CFA) to every study variable (Alavifar et al., 2012; Hair et al., 2010; Nunkoo & Ramkissoon, 2012). Based on the Confirmatory Factor Analysis (CFA) results (Table 3), all indicators for each construct demonstrated high factor loading values, ranging from 0.745 to 0.942. The factor loading values were as follows: Quality of Service (0.872–0.942; mean = 0.899), Product Quality (0.894–0.935; mean = 0.919), Price (0.803–0.931; mean = 0.886), Satisfaction (0.900–0.927; mean = 0.911), and Customer Loyalty (0.745–0.847; mean = 0.792). All factor loading values exceeded the recommended threshold of 0.50—with most surpassing 0.70—indicating that each indicator possesses excellent convergent validity and effectively represents its respective construct.

Table 3. Loading Factor of Indicator Items (Confirmatory Factor Loading)

Variable	Indicators	Loading Factor		
		Max	Min	Mean
Quality of Service	QOS1-QOS5	0.942	0.872	0.899
Product Quality	QPROD1- QPROD3	0.935	0.894	0.919
Price	PRICE1-PRICE4	0.931	0.803	0.885
Satisfaction	SATISF1-SATISF6	0.927	0.900	0.911
Customer Loyalty	LOYAL1-LOYAL6	0.847	0.745	0.792

Source: researcher's own work

These results suggest that the measurement model is of adequate quality and shows no significant indication of common method bias based on the single-factor CFA approach, as no single dominant factor accounted for the majority of the indicator variance. Consequently, the data are suitable for proceeding to the structural model testing stage. We report that CMB is not an issue if all Variance Inflation Factor (VIF) values for all latent variables (Table 9).

In addition, there is a demographic identity of the respondents, including age, last education, occupation, and various measuring items. Data were collected from respondents (n=200) and analyzed in two stages. The first stage, Structural Equation Modeling based on Partial Least Squares, is carried out to identify the significance of the variables that contribute to customer satisfaction and loyalty, namely service and product prices, products used, and customer perceptions of the services received. The output at this stage is used as input at the next step. The second stage, the prediction of customer loyalty, involves an Artificial Neural Network. The information at this stage is obtained from the structural model output (S.E.M.), produced in the first stage. ANN modeling has one hidden layer, one output, and four inputs.

RESULT

Respondent Demography

The research contained a total of 200 customers as the sample respondents. Regarding the demographic composition of the respondents, it is evident that the majority are women, while a minority of only 4.5% are men. It is inherent for women to possess a strong inclination to be aesthetically pleasing compared to men. Only a select group of guys consistently prioritize facial grooming to maintain a clean and aesthetically pleasing appearance. Most individuals are within the age bracket of 21 to 30 years. Just 31.5% of the population falls into the elderly age category of over 40. Most individuals (69.5%) were younger than 40 years old.

Meanwhile, in terms of employment, the status of business professionals and employees in private organizations is similar, standing at 34%. The percentage of college students is relatively high, approaching 20%. Table 4 contains a more comprehensive explanation of the demographic characteristics of the respondents.

Table 4. Respondents' Demography and Visiting Clinic Intensity

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Female	191	95.5
	Male	9	4.5
Age Group (Years)	<20	26	13.0
	21–30	81	40.5
	31–40	30	15.0
	>40	63	31.5
Job Status	Student	40	20.0
	Businessmen/women	68	34.0
	Army/Police	10	5.0
	Civil Servant	12	6.0
	Employee	69	34.5
	Others	1	0.5
Last Visit During the Past Three Months (in times)	1–2	29	14.5
	3–4	102	51.0
	More than 4	69	34.5
Visit Intensity	Once a week	0	0.0
	Once every two weeks	153	76.5
	Once every three weeks	37	18.5
	Once a month	10	5.0

Sources: Primary Data

The research focuses on analyzing the frequency of visits to the clinic for beauty treatments, which is a crucial issue under investigation. During the recent month when the research was carried out, it is evident that a majority (51%) of the participants had visited 3-4 times. Indeed, 34% of the respondents had visited more than four times. The frequency of visits by nurses is also really intriguing. Most respondents visit beauty clinics biweekly. Respondents frequently visit clinics for cosmetic care, beauty treatments, and health procedures. More detailed information regarding the frequency of these visits may be seen in Table 7.

Structural Equation Model

This study employs Partial Least Squares structural modeling utilizing the SmartPLS program. During the early phase, Loyalty and Satisfaction are mediating variables, with Loyalty being the dependent variable. The resulting model exhibits strong performance, as indicated by R-square and Adjusted R-Square values over 0.6 (Kamakura, 2010; Kock, 2021). The model that links the variables Price, Service Quality, and Product Quality to Satisfaction is highly suitable. Based on the analysis of the relationship between the latent predictor factors and the dependent variable (Table 4), not all connections between the predictor variables have a meaningful impact, as supported by p-values that are higher than 0.05, and T-statistic values are less than 1.96.

The Customer Loyalty variable produced an R-square value of 0.609 and an adjusted R-square value of 0.605 based on the coefficient of determination study (Table 5). These findings show that the exogenous variables in the model account for 60.9% of the variation in customer loyalty, with factors outside the study model influencing the remaining 39.1%. The model has strong stability and is not prone to overfitting, as evidenced by the small difference (0.004) between the R-square and adjusted R-square values. The model's strong capacity to explain the variation in customer loyalty is thus demonstrated by the R^2 value of 0.609, which falls into the moderate-to-strong (moderate-substantial explanatory power) category according to the criteria.

Table 5. Coefficient Determinasi Variable Loyalty and Satisfaction

Latent variable	R-square	R-square adjusted
LOYALTY	0.609	0.605
SATISFY	0.693	0.689

Source: researcher's own work

Multiple pathways exhibited substantial impacts. For instance (Please see Table 6), the path links the price variable to the Loyalty T-stat value. The value of 2.640 is more than the critical value of 1.96, indicating a significant difference. The coefficient value for Customer Satisfaction (SATISFY) on loyalty is 0.315. The t-statistic value for this relationship is 4.928, with a corresponding beta value of 0.702 and a p-value of 0.000. In the Price to Satisfy line, the t-stat value is 3.12 (with a beta coefficient of 0.303 and a p-value of 0.001).

Additionally, the t-stat value for the relationship between the quality of the product variable (QPROD) and customer satisfaction (SATISFY) is 4.185 (with a beta coefficient of 0.584 and a p-value of 0.000). The relationship between the quality of service variable, the Quality of the product, and Loyalty is not statistically significant, as indicated by a T-stat value below the critical T-value (1.96) and a P-value over 0.05. The relationship between the quality of service variable and customer satisfaction (SATISFY) is not statistically significant, indicated by the t-stat value (0.373) being smaller than the critical t-value (1.96) and the P-value being bigger than 0.05.

The variables Price and Product Quality have a significant and positive impact on satisfaction, whereas Product Quality alone does not have a meaningful impact. The Price and Quality of the products largely influence customers' loyalty to beauty clinics. However, service quality does not have a substantial effect on fostering loyalty. Customer loyalty is influenced by customer satisfaction, which is affected by both the Price and the Quality of the product. The impact of the Price and product quality factors is substantial and positive. This condition implies that client happiness increases as the Price becomes more affordable and the product utilized

in the clinic improves. Similarly, contentment positively impacts loyalty, indicating that as customer satisfaction increases, their loyalty to the beauty clinic also increases.

Table 6. Coefficient Determinasi Variable Loyalty and Satisfaction

Latent Relationship	Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
PRICE → LOYALTY		0.315	0.326	0.120	2.640	0.008
QOS → LOYALTY		-0.084	-0.080	0.106	0.800	0.424
QPROD → LOYALTY		-0.066	-0.078	0.160	0.411	0.681
SATISFY → LOYALTY		0.702	0.701	0.142	4.928	0.000
PRICE → SATISFY		0.303	0.306	0.094	3.217	0.001
QOS → SATISFY		0.048	0.045	0.129	0.373	0.709
QPROD → SATISFY		0.584	0.586	0.140	4.185	0.000

Source: researcher's own work

Table 7. Coefficient Determination of Variable Loyalty and Satisfaction

Validity Latent Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
LOYALTY	0.881	0.888	0.910	0.628
PRICE	0.908	0.909	0.936	0.785
QOS	0.947	0.948	0.959	0.824
QPROD	0.908	0.911	0.943	0.845
SATISFY	0.959	0.959	0.967	0.830

Source: researcher's own work

The reliability of the five latent variables examined in this study was highly satisfactory. The presence of this situation is denoted by the dependability coefficient value (Table 7) exceeding 0.7(Henseler, Hubona, & Ray, 2016). Except for the Loyalty variable, all other variables have an Average Variance Extracted (AVE) value of 0.628, indicating their reliability and usability.

Table 8. Value of Heterotrait-monotrait ratio (HTMT) Variable

Relasi Variable Latent	Heterotrait-monotrait ratio (HTMT)
PRICE ↔ LOYALTY	0.732
QOS ↔ LOYALTY	0.595
QOS ↔ PRICE	0.693
QPROD ↔ LOYALTY	0.677
QPROD ↔ PRICE	0.721
QPROD ↔ QOS	0.837
SATISFY ↔ LOYALTY	0.814
SATISFY ↔ PRICE	0.757
SATISFY ↔ QOS	0.747
SATISFY ↔ QPROD	0.843

Source: researcher's own work

The Heterotrait-monotrait ratio (HTMT) value (Table 8), which ranges from 0.595 to 0.843, is used as a criterion to assess discriminant validity in the table. An HTMT value below 0.90 signifies that the two reflective constructs possess discriminant validity (Henseler et al., 2016).

Table 9. Cross-Loading Value of Items Indicator of Latent Variables

No	Indicators of Latent Variable	LOYALTY	PRICE	QOS	QPROD	SATISFY
		(1)	(2)	(3)	(4)	(5)
1	LOYAL1	0.791	0.667	0.530	0.599	0.708
2	LOYAL2	0.785	0.531	0.463	0.442	0.636
3	LOYAL3	0.845	0.516	0.493	0.512	0.630
4	LOYAL4	0.740	0.404	0.420	0.392	0.554
5	LOYAL5	0.800	0.502	0.345	0.477	0.520
6	LOYAL6	0.789	0.498	0.336	0.456	0.513
7	PRICE1	0.644	0.905	0.602	0.567	0.648
8	PRICE2	0.566	0.925	0.618	0.579	0.618
9	PRICE3	0.566	0.897	0.599	0.647	0.629
10	PRICE4	0.577	0.814	0.458	0.528	0.609
11	QOS1	0.481	0.536	0.917	0.665	0.629
12	QOS2	0.521	0.537	0.876	0.688	0.658
13	QOS3	0.548	0.672	0.941	0.740	0.681
14	QOS4	0.454	0.559	0.889	0.722	0.611
15	QOS5	0.504	0.612	0.915	0.705	0.650
16	QPROD1	0.567	0.545	0.743	0.893	0.697
17	QPROD2	0.543	0.620	0.692	0.928	0.710
18	QPROD3	0.581	0.639	0.707	0.937	0.763
19	SATISF1	0.694	0.612	0.663	0.748	0.908
20	SATISF2	0.681	0.653	0.712	0.707	0.906
21	SATISF3	0.700	0.712	0.636	0.693	0.901
22	SATISF4	0.662	0.594	0.616	0.667	0.899
23	SATISF5	0.699	0.614	0.635	0.775	0.926
24	SATISF6	0.712	0.678	0.631	0.713	0.925

Source: researcher's own work

In Table 9, the cross-loading values of the latent variable indicators are displayed, reflecting the alignment with the structure of each variable. Cross-loading evaluation is conducted by comparing the dominant loading value of each variable indicator in every column (Henseler et al., 2016; Henseler, Ringle, & Sarstedt, 2014). If the loading value for each indicator/item is greater than 0.6, it shows that the indicator is a component of the variable in the respective column. This indicates that the item serves as an indicator of the variable's building structure. The variable in question has the highest cross-loading value, indicating that it remains a reliable measure of the hidden variable. For instance, in rows 1-6 (LOYAL1-LOYAL6), the value in column 1 for the LOYALTY variable is the highest among the values in columns 2-5. The LOYAL1 loading value of 0.791 is the highest among the loading values in the following columns, which only vary from 0.708 to 0.667. The subsequent row presents the accuracy of the latent variable construction with the highest cross-loading value. In column (2), the indicators PRICE1-PRICE4 represent price indicators with loadings ranging from 0.814 to 0.905. Column (3) consists of indicators QOS1-QOS5, defining the Quality of Service, with loadings ranging from 0.889 to 0.941. In column (4), the indicators QPROD1-QPROD3 represent the product quality, with loadings ranging from 0.893 to 0.937. Finally, in column (5), the indicators SATISF1-SATIS6 measure the level of satisfaction, with loading values ranging from 0.899 to 0.925. Figure 2 represents the model of measurement and structure. The measurement model reflects that all latent variable indicators are valid and indicated by a loading factor higher than 0.6.

Table 10. Value of the Inflated Factor of Indicators of Latent Variables

Measurements Item of Variable	VIF
LOYAL1	2.032
LOYAL2	2.187
LOYAL3	2.991
LOYAL4	2.669
LOYAL5	3.682
LOYAL6	3.375
PRICE1	3.429
PRICE2	5.742
PRICE3	4.185
PRICE4	1.967
QOS1	4.258
QOS2	2.987
QOS3	6.000
QOS4	3.431
QOS5	4.277
QPROD1	2.467
QPROD2	3.525
QPROD3	3.689
SATISF1	4.569
SATISF2	4.497
SATISF3	3.923
SATISF4	4.156
SATISF5	6.339
SATISF6	6.032

Source: researcher's own work

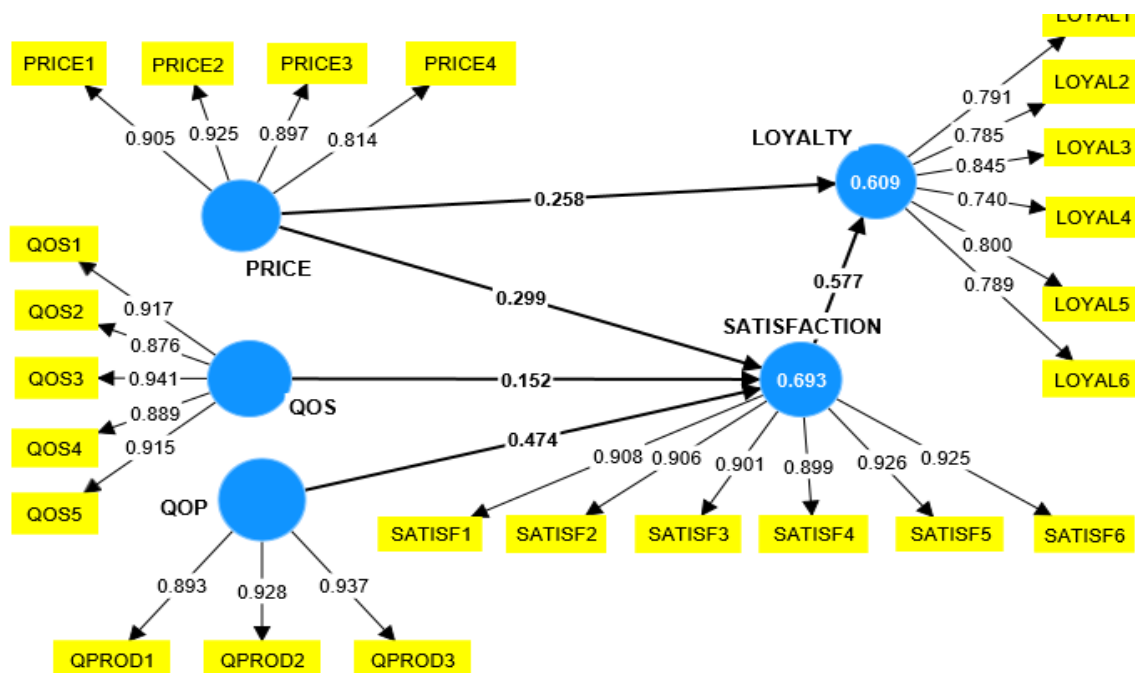


Figure 2. Final Structural and Measurement Model

Source: researcher's own work

Artificial Neural Network

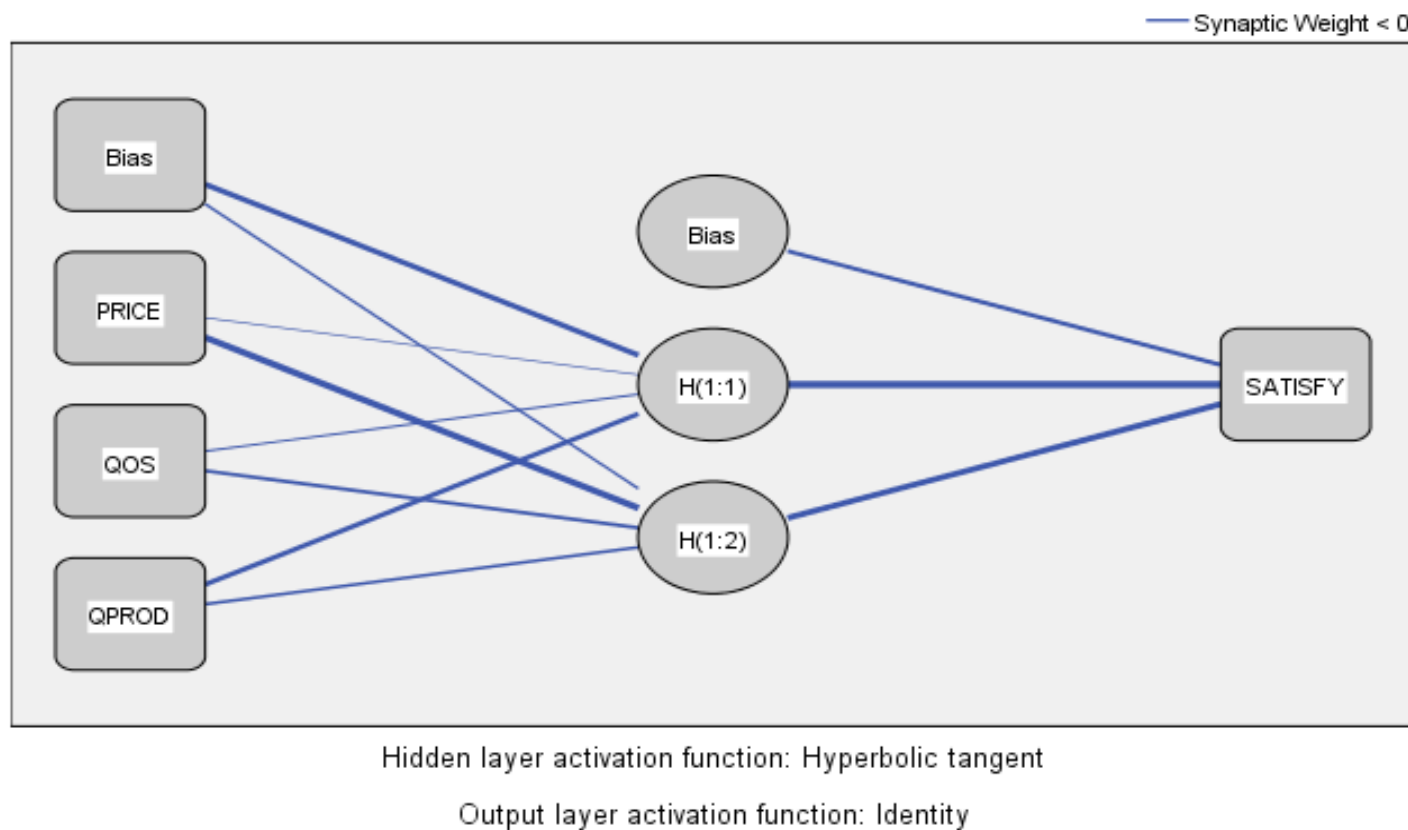


Figure 3. ANN Model 1, Satisfaction as Dependent

Source: researcher's own work

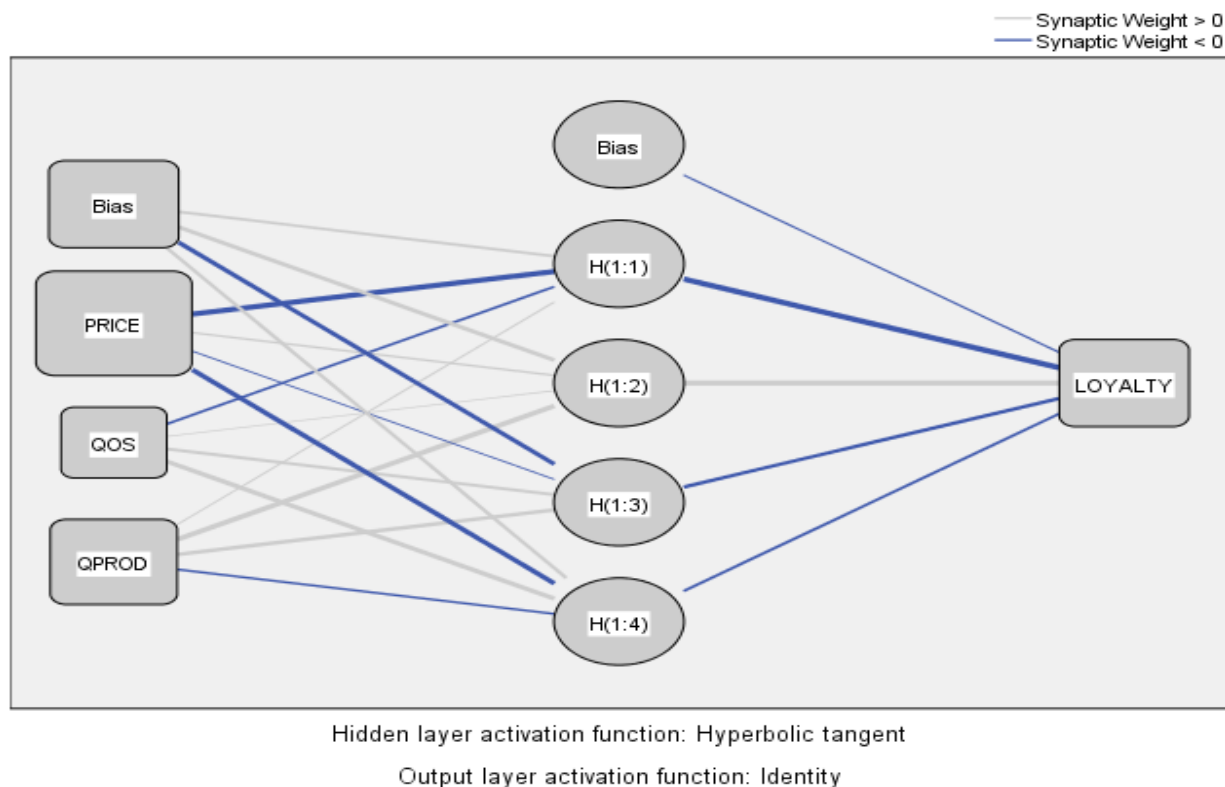


Figure 4. ANN Model 2, Loyalty as Dependent

Source: researcher's own work

Table 11. Value of S.S.E., RMSEA

ANN	Total Sample	Testing				Training			
		n	S.S.E.	Relative Error	RMSEA	n	S.S.E.	Relative Error	RMSEA
1	200	24	1.754	0.194	3.699	176	31.829	0.364	2.351
2	200	39	7.148	0.479	2.336	161	25.776	0.322	2.499
3	200	48	10.438	0.475	2.144	152	20.756	0.275	2.706
4	200	65	12.158	0.372	2.312	135	19.179	0.286	2.653
5	200	83	11.210	0.376	2.721	117	19.252	0.332	2.465
6	200	86	18.882	0.402	2.134	114	15.322	0.271	2.728
7	200	90	16.030	0.452	2.369	110	13.772	0.253	2.826
8	200	93	15.581	0.406	2.443	107	15.070	0.284	2.665
9	200	95	13.368	0.279	2.666	105	19.121	0.367	2.343
10	200	124	21.602	0.377	2.396	76	7.710	0.206	3.140
Mean					2.522				2.638

Source: researcher's own work

Table 12. Importance Level of Antecedent Variables

ANN	Importance Level			Normalized Importance Level		
	PRICE	QOS	QPROD	PRICE	QOS	QPROD
1	0.408	0.294	0.298	1.000	0.722	0.729
2	0.432	0.133	0.435	0.995	0.306	1.000
3	0.348	0.202	0.449	0.775	0.450	1.000
4	0.378	0.165	0.457	0.827	0.361	1.000
5	0.429	0.230	0.341	1.000	0.537	0.795
6	0.415	0.203	0.382	1.000	0.488	0.919
7	0.460	0.168	0.372	1.000	0.366	0.807
8	0.305	0.291	0.405	0.753	0.718	1.000
9	0.363	0.195	0.442	0.822	0.442	1.000
10	0.251	0.146	0.603	0.417	0.241	1.000
Mean	0.3789	0.2027	0.4184	0.8589	0.4631	0.9250

Source: researcher's own work

Table 12 displays the significance of Price, service, and product quality in establishing satisfaction and loyalty. Ten simulations yielded diverse outcomes. In the initial simulation, Price is the dominant variable (0.408) compared to other factors with lesser magnitudes, as well as in the 5th, 6th, and 7th simulations. In the second simulation, product quality is the variable that holds the highest importance. This information is also the case in the third and fourth simulations, with importance levels of 8.9 and 10, respectively. The Product Quality variable (QPROD) had the most incredible average level of relevance among all scenarios. This fact suggests that pricing is not the primary factor in determining consumer loyalty and happiness. The fundamental factor in cultivating consumer loyalty and joy is the caliber of the product bestowed upon.

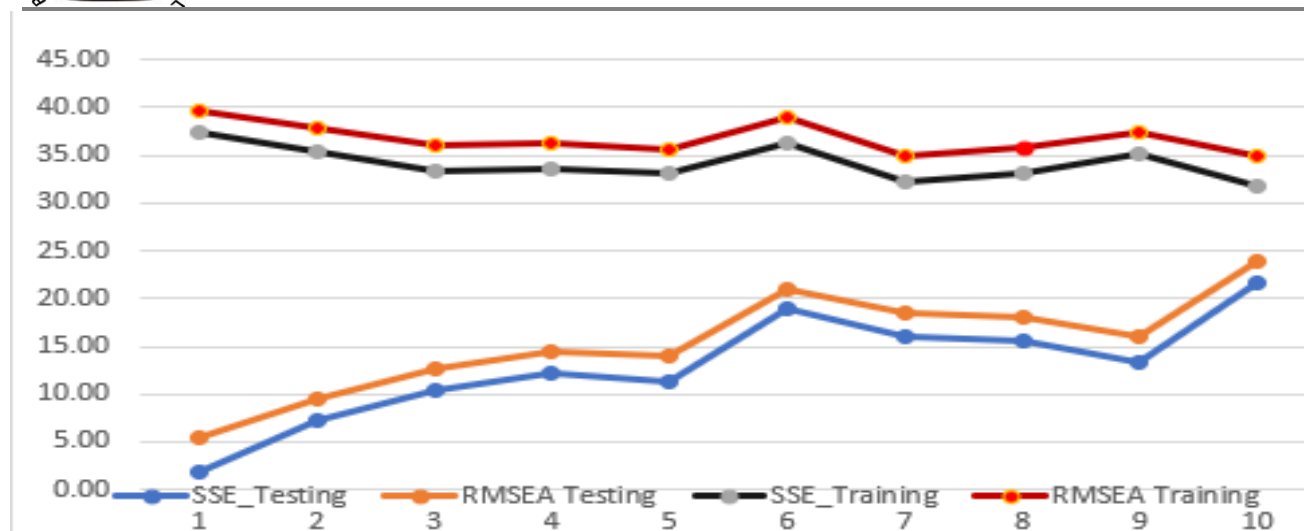


Figure 3. SSE-RMSEA Sensitivity-based ANN

Source: researcher's own work

DISCUSSION

In a progressively aggressive business within the beauty sector, prosperous beauty clinics prioritize delivering top-notch procedures and recognizing the paramount significance of cultivating customer contentment to foster enduring loyalty. Client pleasure encourages a favorable experience and establishes a robust basis to guarantee client loyalty and frequent patronage. The clinic's quality of service is a crucial factor affecting customer satisfaction. Each stage of the process, from the initial reception to the execution of cosmetic operations, must be approached meticulously and attentively. High customer satisfaction often correlates with customers perceiving respectful treatment, being listened to, and receiving adequate care. Prior research has consistently yielded comparable findings, indicating that customer happiness significantly impacts customer loyalty. The outcomes of this study are consistent with earlier research results. Previous research on beautiful clinics consistently demonstrates that service quality determines customer happiness. For instance, surveys conducted by Naini et al. (2022), Asma et al. (2018), Aryati and Syah (2018), Astarini and Fachrodji (2023), Suharyanto and Damayanti (2022), Siripipatthanakul (2021b), Lienata & Pink Berlianto (2023), and Chana et al. (2021).

In this research, quality of service is measured by employee demeanor and behavior when interacting with customers, employees who maintain a professional appearance, employees' eagerness to assist and support customers, employees' ability to communicate information effectively, and employees who demonstrate respect and friendliness when serving customers. A comprehensive structural model includes these elements in accurate measurements. The variable that adds to the construction of the model is the level of Employee willingness to assist and support the clients. Meanwhile, customer satisfaction is assessed based on the extent to which the clinic's products and services meet the customers' needs and expectations. Measurement of Satisfaction included: clinic customer satisfaction is assessed based on the extent to which consumer expectations are met, delivering a service that meets consumer expectations, product satisfaction among consumers, customer satisfaction with the service, enjoying a gratifying experience with the goods, and experiencing a satisfactory level of service, even if the composite quality of service variable does not significantly impact customer happiness. Consequently, the clinic's services are deemed poor, failing to enhance consumer pleasure or foster loyalty. Several prior studies yielded convergent outcomes compared to the findings of this investigation. Research conducted by Mohammed et al. (2017) revealed that the quality of service has no direct impact on customer satisfaction, but studies undertaken by Aryati and Syah (2018), Albari (2019), and Lienata and Pink Berlianto (2023) showed that good service quality will create patient satisfaction.

Customer loyalty is not solely based on occasional visits but on establishing enduring relationships. Beauty clinics must have a comprehensive plan to ensure ongoing customer satisfaction and provide attentive care to their clients throughout their experience. For instance, loyalty programs, special incentives, or even adequate

after-sales support can significantly influence the retention of client loyalty. Therefore, a prosperous beauty clinic must offer superior technical service and possess a thorough comprehension of and attentiveness to consumer demands and expectations. By integrating these elements, beauty clinics may cultivate a devoted clientele and guarantee their attractiveness in the ever-changing beauty sector. Customer satisfaction with beauty treatment products, facial care, and service Quality will foster client loyalty, ensuring continued patronage and potential referrals. Satisfied customers who appreciate the clinic's service and benefits are inclined to share pleasant anecdotes and invite others to visit the clinic.

Considering the dynamic nature of the beauty business, the Price of services plays a pivotal role in determining client happiness at beauty clinics. The analysis revealed a strong correlation between pricing and client happiness. Prior studies have also demonstrated that pricing plays a crucial role in influencing the satisfaction of consumers, for instance, Ferry Cahaya et al. (2023), Astarini and Fachrodji (2023), Park et al. (2017), and Albari (2019). Prices are determined not only by the figures shown on the service list but also by the value and perspective that clients have regarding the level of service that they are providing. Competitive prices generally attract prospective clients. The price variable in this study is determined based on the customers' ability to afford the product used for therapy, taking into account its quality and benefits. It is comparatively more affordable than the pricing offered in other clinics. Accessible pricing may be a crucial catalyst in expanding access to professional beauty services for a wider demographic. Customer satisfaction is not just dependent on low prices. The efficacy of service and the ultimate outcomes of cosmetic operations also significantly influence. Hence, it is crucial to maintain an equilibrium between the quality of service and its corresponding Price. Customers may be more willing to pay a higher price if they believe they will receive substantial additional benefits or advantages. Several prior studies examining the impact of pricing, product quality, and service quality have yielded findings consistent with the present research, as exemplified by Murpraptomo, Yuliati, and Sartono (2019), Suharyanto and Damayanti (2022), Astarini and Fachrodji (2023), and also Prasetyo, Sholichah, Adil, Soelistya, and Rosyihuddin (2022).

This study demonstrates that the quality of a product directly impacts customers' satisfaction at a clinic, and based on the analysis conducted using Artificial Neural Networks (ANN), reveals that product quality holds the utmost significance when compared to pricing and service quality. The previous research also presents non-contradictory findings, exemplified by Ferry Cahaya et al. (2023), Albari (2019), Meesala and Paul (2018), Murpraptomo et al. (2019), Pane and Fikri (2023), and Astarini and Fachrodji (2023). Previous similar research found that perceived service quality was significantly linked to patients' happiness and their plans to change their behavior, which in turn was affected by patients' satisfaction with healthcare (Ahmed et al., 2017; Dhasan & Aryupong, 2019). Previous studies substantiate this research. Services of outstanding Quality encompass the maintenance procedure and the utilization of superior items. This beauty shop solely offers skin care products that have undergone scientific validation to ensure their effectiveness and safety. In addition, this beauty center maintains rigorous standards of hygiene and sanitation in all sections. Customers experience a sense of ease and assurance as they perceive the clinic as secure and hygienic, enhancing their confidence and trust. The impact of this exemplary service is readily apparent in the degree of customer contentment.

The loyalty of the M.B.C. Beauty Clinic customer was assessed based on the intention to revisit the clinic for product purchases, ongoing medical care, and continued use of skincare products. It also considered the commitment to exclusively using services and products and strongly endorsing M.B.C. skincare products and treatments to others. As seen in the illustration, these items are deemed genuine and credible. Statistical test results indicate a significant relationship between customer happiness and customer loyalty. Prior relevant studies in the beauty clinic industry show that customer satisfaction contributes to developing client loyalty. Numerous studies have demonstrated a substantial correlation between customer pleasure and loyalty, encompassing Asma et al. (2018), Meesala and Paul (2018), Rosyidah, Mudayana, and Hastuti (2018), Albari (2019), Astarini and Fachrodji (2023), and also El Dalatony et al. (2023). Therefore, it may be inferred that the results of this investigation align with prior studies. Satisfied customers often develop loyalty and may even become advocates, enthusiastically referring the beauty clinic to their friends and family. Therefore, this beauty clinic serves as more than just a location for skin care; it functions as a hub that provides consumers with top-

notch products, instructs them in self-care practices, and ensures enduring customer happiness throughout their beauty journey.

CONCLUSION

The research findings indicate that the model establishing a connection between Price, service quality, product quality, and customer satisfaction is highly effective. However, not all of the variables studied exhibit a statistically significant impact. Satisfaction is greatly affected by the product's Quality and Price, whereas the effects of service Quality are not considerable. Customer satisfaction at a beauty clinic is crucial in determining customer loyalty. According to this study's findings, numerous recommendations can be made to clinic management. One suggestion is to enhance customer loyalty by ensuring customers visit the clinic often to preserve their attractiveness.

Additionally, promoting consumer pleasure may be achieved by encouraging the purchase of the clinic's supplied goods. Satisfaction may be achieved by providing superior services, competitive pricing, and alignment with the advantages offered to clients. Beauty clinics can enhance satisfaction by offering inexpensive costs and utilizing high-quality goods for treatment that align with consumers' preferences and requirements. The level of satisfaction experienced by consumers can influence their likelihood of consistently visiting and returning in the future, thereby preserving the aesthetic appeal of the clinic.

LIMITATION AND RECOMMENDATIONS

This research only involves the variables of product quality, price, and service quality. In terms of theory and empirical evidence, there are potentially influential factors such as brand image, trust, customer experience, perceived value, and digital engagement that were not included. Therefore, in the next study, other variables can be used as explanations for consumer loyalty. This study was conducted by cross-sectional survey design. Future research could incorporate variables such as trust, perceived value, brand image, customer experience, and social media engagement. Consider Longitudinal Research; a longitudinal design would provide stronger evidence regarding customer satisfaction and loyalty development over time.

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