

The Effect of Technology Adoption and Service Quality on Patient Satisfaction (Case Study on Digital Dentistry Adoption at Densthetica Clinic West Sumatra)

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Abstract: This study aims to analyze the effect of digital dentistry service adoption and service quality on patient satisfaction at Densthetica Clinic West Sumatra. With the development of technology, the application of digital services in the field of dentistry is becoming increasingly important to improve efficiency and service quality. This study uses a quantitative method with a survey approach to collect data from Densthetica Clinic patients. The questionnaire used consisted of questions regarding the adoption of digital dentistry services, service quality, and patient satisfaction. The results showed that the adoption of digital dentistry services and service quality had a significant effect on patient satisfaction. From the multiple linear regression analysis, it is known that both independent variables contribute positively to patient satisfaction, with service quality having a more dominant influence.

Keyword: Digital Dentistry Innovation, Service Quality, Patient Satisfaction, SERVQUAL, Multiple Linear Regression, Densthetica Clinic.

INTRODUCTION

The development of information and communication technology has brought about significant changes in various sectors, including healthcare. One of the areas undergoing this transformation is dentistry. The use of digital technology in dental services covers various aspects, ranging from electronic medical records, online consultations, software-based diagnostics, to the use of advanced tools for treatment and rehabilitation.

In this digital age, digital technology offers great potential to improve health services through increased efficiency, accessibility, and quality of service. The development of technology in the future has several positive perspectives for health services or in the health sector. Some examples of the positive impact of the development of information technology in the health sector include computer technology that can search for information and develop designs for medical devices, so the impact will be able to improve the quality of medical devices. All medical information, including that generated by X-rays. The effort to use digital

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technology is part of the effort to improve quality. Based on the public satisfaction index for the first quarter of 2024 obtained from the Ministry of Health Health Service Unit (Ministry of Health Clinic), as follows:

Based on the figure above, the data interpreted that the community feels very good about the quality of facilities and infrastructure that can be provided by the Ministry of Health Health Service Unit, from the data it can be concluded that facilities and infrastructure affect the quality of Densthetica Clinic in West Sumatra is one of the dental clinics that is committed to providing the best service to its patients. This clinic has adopted digital technology to improve the efficiency and effectiveness of services, which is expected to increase patient satisfaction. The digital dentistry services at Densthetica Clinic include an online registration system, consultation via telemedicine, the use of digital imaging technology for diagnosis, as well as advanced and high precision dental treatment tools, such as the use of Intra Oral Scan and CAD CAM in the production of teeth, aligners and others for patients.

According to Joda et al. (2017), digital dentistry includes various technologies and devices such as intraoral scanning, computer-aided design and manufacturing (CAD/CAM), three-dimensional (3D) imaging, and digital reconstruction. These technologies enable dentists to make more accurate diagnoses, plan treatments in greater detail, and perform procedures with greater precision. The adoption of digital services in dentistry is the application of digital technology to improve efficiency, accuracy, and patient experience and satisfaction. It includes technologies such as computer-aided design/computer-aided manufacturing (CAD/CAM), digital forms, 3D imaging and electronic health record (EHR) systems.

The use of digital dentistry services is the application of cutting-edge technology to the process of dental treatment and diagnosis. These technologies include new tools and methods such as intraoral scanners, 3D imaging, digital treatment planning and prosthetic manufacturing using CAD/CAM.

Digital dentistry incorporates several key technologies, including:

- 1. Intraoral scanning: The use of an intraoral scanner allows the dentist to take highly accurate digital impressions of the patient's teeth. These scans replace traditional impressions, which are often uncomfortable for the patient.
- 2. Computer-aided design and manufacturing (CAD/CAM): CAD/CAM technology is used to design and manufacture dental restorations such as crowns, bridges and implants with high precision. The process is faster and the results are more accurate than traditional methods.
- 3. 3D imaging: 3D imaging technologies, such as cone beam computed tomography (CBCT), allow dentists to obtain a complete picture of the tooth and jawbone structure. This allows for more accurate diagnosis and treatment planning.
- 4. Digital Reconstruction: This technology is used in orthodontics to digitally plan the movement of teeth and to fabricate orthodontic appliances such as brackets and aligners.

However, the adoption of digital technology alone is not enough to ensure patient satisfaction. Service quality, which includes aspects such as medical expertise, staff friendliness, facility comfort, and speed and accuracy of service, also plays an important role in improving patient satisfaction. Therefore, it is important to understand how the combination of digital service adoption and overall service quality affects patient satisfaction at Densthetica Clinic.

Patient satisfaction is one of the key indicators of success in healthcare. High satisfaction can increase patient loyalty and willingness to recommend the clinic to others. Conversely, low satisfaction can damage the clinic's reputation and reduce the number of patients. Therefore, research on the influence of digital service adoption and service quality on patient satisfaction is very relevant and important.

This study was motivated by the importance of understanding the extent to which the adoption of digital dentistry services affects patient satisfaction. With increasing patient

expectations for service quality, dental clinics must continue to innovate services and adapt technology to meet the needs and desires of patients.

The purpose of this study was to determine how much influence service adoption and service quality have on customer satisfaction at Densthetica Clinic, to determine how much influence service adoption has on customer satisfaction at Densthetica Clinic, and to determine how much influence service quality has on customer satisfaction at Densthetica Clinic.

METHOD

Object of research

This study is a patient who has received services at Densthetica Clinic West Sumatra. Inclusion criteria for research subjects include:

- a. Patients who have used digital dentistry services at Densthetica Clinic.
- b. Patients who are willing to participate in this study and provide information about their satisfaction.
- c. Patients who are 18 years of age or older to ensure that they have the capacity to provide reflective and informative answers.
- d. Patients who have received services at this clinic in at least the last six months to ensure that the data collected is relevant and current.

The object of this research is the adoption of digital dentistry services and service quality at Densthetica Clinic West Sumatra. Adoption of digital dentistry services includes the use of digital technology in diagnosis, treatment planning, and implementation of dental procedures. The quality of service in question includes various aspects such as:

- a. Reliability: The clinic's ability to deliver promised services accurately and consistently.
- b. Responsiveness: The clinic's willingness and ability to assist patients and provide services promptly.
- c. Assurance: The knowledge and courtesy of clinic staff and their ability to foster patient confidence.
- d. Empathy: The individualized care and attention the clinic provides to patients. Tangible: The physical aspects of the clinic, including facilities, equipment, and cleanliness.

Research Design

The research design used in this dissertation is a quantitative research design with a survey approach. This approach was chosen to collect numerical data that can be statistically analyzed to evaluate the effect of digital dentistry service adoption and service quality on patient satisfaction at Densthetica Clinic West Sumatra.

This study uses quantitative methods with a survey approach to analyze the effect of digital dentistry service adoption and service quality on patient satisfaction at Densthetica Clinic, West Sumatra. This study aims to understand the extent to which the application of digital technology in dental services and service quality in general contribute to patient satisfaction.

The research design used is descriptive quantitative and explanatory, which is to describe the existing situation and explain the relationship between the variables studied.

- a. Independent Variable
 - Adoption of Digital Dentistry Services (X1): Includes the use of digital technology in dental services such as intraoral scanners, CAD/CAM, 3D imaging, and electronic medical record systems. The operational definition is the level of application and use of digital technology in dental services at Densthetica Clinic as perceived by patients.
 - 2) Quality of service (X2): Measured based on the five dimensions of SERVQUAL, namely reliability, responsiveness, assurance, empathy and physical aspects. The operational

definition of service quality is the extent to which patients feel that the services provided by Densthetica Clinic meet their expectations.

b. Dependent Variable

Patient satisfaction (Y): Patient satisfaction is defined as the patient's feeling of satisfaction or dissatisfaction with the services provided by Densthetica Clinic, both in terms of the digital technology used and the overall quality of the service.

Type of research

This study is a causal study that aims to identify the cause and effect relationship between the independent variables (adoption of digital dentistry services and service quality) and the dependent variable (patient satisfaction).

Population and sample

The population in this study are all patients who have received services at Densthetica Clinic West Sumatra, especially those who have experienced the adoption of digital services in dental care. The population is estimated to be in the range of hundreds to thousands of patients within the study period.

Samples were taken using purposive sampling techniques, that is, samples were selected based on certain criteria relevant to this study. The sampling criteria are:

- a. Patients who have received dental services at Densthetica Clinic.
- b. Patients who have received services involving digital technology, such as intraoral scanners or CAD/CAM technology.
- c. Patients who are willing to fill in a questionnaire about their satisfaction with the services of the clinic.

The number of samples is determined based on the Slovin formula with an acceptable error rate of 5%, so that the samples taken are representative of the population. In determining the number of samples, the researcher used the Slovin formula (Bambang Prasetyo, 2005: 136) from the total population, the researcher entered it into the Slovin formula with an error rate of 10% for the respondent.

Data collection techniques

The data in this study were collected through a questionnaire instrument that was compiled based on indicators of each variable. The questionnaire was distributed to the patients of Densthetica Clinic who met the sample criteria. The questionnaire is composed of three main parts:

a. Section I: Adoption of Digital Dentistry Services.

Questions covering patient satisfaction with the use of digital technology in services, such as accuracy, convenience, and perceived comfort.

- b. Section II: Quality of Service. Using the SERVQUAL scale to measure patient perceptions of clinic service quality in five dimensions (reliability, responsiveness, assurance, empathy, and physical aspects).
- c. Section III: Patient Satisfaction.

Questions about how satisfied patients were with the service outcomes they received, including whether the digital technology and quality of service met their expectations. Measurement is on a 5-point Likert scale, where 1 is "strongly disagree" and 5 is "strongly agree."

Data analysis technique

The data collected is analyzed using statistical methods and data analysis software. The analytical techniques used include:

- a. Descriptive Analysis: To describe the demographic characteristics of the respondents and their perceptions of the research variables.
- b. Multiple linear regression analysis: To test the effect of the independent variables (adoption of digital dentistry services and service quality) on the dependent variable (patient satisfaction).
- c. Validity and reliability test: To ensure that the questionnaire used has an adequate level of validity and reliability.

By using this research design, it is hoped to obtain a comprehensive picture of how digital service adoption and service quality at Densthetica Clinic West Sumatra affect patient experience..

RESULTS AND DISCUSSION

Validity and Reliability Test Results

1. Validity Test

To test the accuracy of the instrument based on the concept, a validity test is conducted to measure what is sought in accordance with the objectives. Questions with specific topics are answered using the SPSS 25.00 program and the Cronbach's Alpha formula. The significance test is carried out using the criteria for calculating the r table with a significance threshold of 0.05 using two-sessions. If the value is positive and r count \geq r table, the item is declared valid; if r count < r table, the item is declared invalid.

Service Adoption Variable Validity Test Results:

Variabel	r-hitung	r-tabel	Keterangan
	0,888	0,361	Valid
	0,901	0,361	Valid
Adopsi Layanan	0,900	0,361	Valid
	0,920	0,361	Valid
	0,897	0,361	Valid

Table 1. Variable Validity Test Results

The results of the calculation of r-count> r-table. Thus, the obtained r-table value is 0.361 with a significance value <0.05. This means that all the statement items in the questionnaire on the variable "Service Adoption" are declared valid.

Service Quality Variable Validity Testing Results

Variabel	r-hitung	r-tabel	Keterangan
	0,857	0,361	Valid
Kualitas Pelayanan	0,911	0,361	Valid
	0,917	0,361	Valid
	0,886	0,361	Valid
	0,896	0,361	Valid
	0,908	0,361	Valid
	0,927	0,361	Valid
	0,831	0,361	Valid
	0,913	0,361	Valid
	0,907	0,361	Valid
	0,881	0,361	Valid
	0,853	0,361	Valid
	0,881	0,361	Valid
	0,880	0,361	Valid
	0,898	0,361	Valid

The results of the calculation of r-count> r-table. So that the obtained r-table value is 0.361 with a significance value <0.05. This means that all statement items in the Service Quality variable questionnaire are declared valid.

Satisfaction Variable V	Validity Testing	Results
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Variabel	r-hitung	r-tabel	Keterangan
	0,939	0,361	Valid
	0,899	0,361	Valid
Kepuasan	0,952	0,361	Valid
	0,922	0,361	Valid
	0,934	0,361	Valid

That the calculation results r-count> r-table. So that the obtained r-table value is 0.361 with a significance value <0.05. This means that all statement items in the satisfaction variable questionnaire are declared valid.

2. Reliability test

If the measurement results can be trusted and results are obtained with good measurement consistency, a reliability test is conducted. If Cronbach Alpha is more than 0.70, all research variables are considered reliable. As shown in the following table, the results of the reliability threshold are as follows:

No	Variabel	r-alpha	r-kritis	Keterangan
1	Adopsi Layanan	0,941	0,60	Reliabel
2	Kualitas Pelayanan	0,981	0,60	Reliabel
3	Kepuasan	0,960	0,60	Reliabel

Table 2. Reliability test

The reliability coefficient of the service acceptance instrument is rll = 0.941. The service quality instrument has a coefficient of determination of rll = 0.981. The Satisfaction instrument has a coefficient of determination of rll = 0.960. These results indicate that the instrument has a "Cronbach's Alpha" value greater than 0.60, which indicates that the instrument is a more reliable or less dependent variable.

Classical Assumption Test Results

This classic assumption test is used to understand the state of the data in this research study and to determine the most appropriate analysis model to apply. The basic assumptions used in the study consist of:

1. Normality Test

The purpose of the normality test is to determine whether the regression model has a normal data distribution by testing the results of the Kolmogorov-Smirnov test with a significance level greater than or equal to 0.05. The results of the normality test in this study are as follows:

Table 3. Normality Test

One-Sample	Kolmogorov-Smirnov	Test
-	-	

		Unstandardized	Unstandardized
		Residual	Residual
Ν		114	114
Normal Parameters ^{a,b}	Mean	.0000000	.0000000
	Std. Deviation	2.75334345	1.14179731
Most Extreme Differences	Absolute	.236	.257
	Positive	.236	.257
	Negative	212	234
Test Statistic		.236	.257
Asymp. Sig. (2-tailed)		.215°	.275

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

The significance value or Asymp. Sig. (2-tailed) is greater than 0.05, namely 0.215 and 0.275, which is > 0.05. Thus, it is concluded that the data tested in this study are normally distributed.

2. Multicollinearity Test

The multicollinearity test is used to determine whether or not there is a correlation between random variables in a regression model. A good regression model should have no multicollinearity or correlation between the dependent and independent variables. The characteristics of multicollinearity are indicated by the VIF (Variance Inflation Factor) value, which is as follows:

a. If the VIF value < 10, it means that there is no multicollinearity in the data tested.

b. If the VIF value> 10 then it means that there is multicollinearity in the data tested. The results are below:

			Coefficient	S ^a		
		Unstandardize	ed Coefficients	Standardized Coefficients	Collinearity Statistics	
Model		В	Std. Error	Beta	Tolerance	VIF
1	(Constant)	8.308	1.974			
	total X1	2.655	.085	.947	1.000	1.000

Each variable has a tolerance value above 0.1 and a VIF value below 10. Thus, it can be concluded that the regression model in this study does not show multicollinearity between the dependent variables.

Multiple Regression Test Results

According to (Alfarisi & Wahyuati, 2021) In this study, which uses more than one variable as an indicator, namely service acceptance (X) and service quality (Y), which affect other variables, this study uses multiple linear regression using SPSS. Based on the calculations using SPSS 25 Statistic program, the regression results are as follows:

Multiple Regression Test X to Y1

 Table 5. Multiple Regression Test X to Y1

			Coefficients	a		
				Standardized		
		Unstandardiz	ed Coefficients	Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	8.308	1.974		4.208	.000
	total X1	2.655	.085	.947	31.242	.000
a Den	endentVariable:	total V1				

a. Dependent Variable: total Y1

Multiple Regression Test X to Y2



Based on the table above, the regression equation formed in this regression test is as follows:

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Y1 = a + b1X1 + e

Y1 = 8.308 + 2.655 + e

Y2 = a + b1X1 + e
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Y_2 = a + bTX_1 + e
Y_2 = 2.691 + 0.893 + e
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The model can be interpreted as follows:

- a. The constant (a) of 8,308 means that if the independent variable Service Adoption is constant, then the magnitude of the dependent variable Service Quality is worth 8,308.
- b. Service Adoption (X1) has a coefficient value of 2.655. This indicates that the coefficient of the variable Service Adoption (X1) has a positive (unidirectional) effect on Service Quality (Y). If Service Adoption increases by one unit, then Service Quality increases by 2.655 units. This means that the higher the value of Service Adoption, the higher the value of Service Quality.
- c. The constant (a) of 2.691 means that if the independent variable Service Adoption is constant, then the value of the dependent variable Satisfaction is 2.691.
- d. Service Adoption (X1) has a coefficient value of 0.893. This indicates that the coefficient of the variable Service Adoption (X1) has a positive (unidirectional) effect on Satisfaction (Y). If Service Adoption increases by one unit, then Satisfaction will increase by 0.893 units. This means that the higher the value of Service Adoption, the higher the satisfaction.

Hypothesis Test Results

1. t-test

This test is used to determine whether the independent variables have an independent or partial effect on the dependent variable. In addition, the t-test is used to measure the partial (individual) effect of Service Adoption and Physical Work Environment on the dependent variable Service Quality. The results of the t-test analysis using the SPSS program are as follows:

		Т	able 7. t	-test		
			Coefficients	a		
				Standardized		
		Unstandardiz	ed Coefficients	Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	2.691	.819		3.287	.001
	total X1	.893	.035	.923	25.328	.000
	total X1	2.655	.085	.947	31.242	.000



- a. The t-value is 25.328 < 1.992. Then it can be seen that the significant value of service acceptance with service quality is 0.000 > 0.05, which means that there is an influence between service acceptance and service quality.
- b. The t-value is 31.242 < 1.992. Then it can be seen that the significant value of Service Adoption with Service Quality is 0.000 > 0.05, which means that there is an influence between Service Adoption on Satisfaction. b. Calculated t-value 31.242 < 1.992.

2. Coefficient of Determination



R Square value of 0.896 or 89.6%. Assuming that the Service Adoption variable simultaneously influences the Service Quality and Satisfaction variables by 89.6%, the remaining 80.5% could be influenced by other variables not examined.

Discussion

The Effect of Digital Service Adoption on Service Quality

Based on the results of the above analysis, there is an influence between services on service quality. This explains that the acceptance of this service can greatly affect the quality of service.

These results are consistent with previous research that emphasizes the impact of service quality on customer satisfaction and loyalty (Hashem, 2021; Lebdaoui & Chetioui, 2020; Sampurna & Miranti, 2022; Talib et al., 2012).

The concept of this variable is that patient satisfaction is influenced by the extent to which patient expectations of service quality are met or exceeded. High service quality, driven by the adoption of digital services, can increase patient satisfaction and contribute to better patient satisfaction.

The influence of digital service adoption on satisfaction

Based on the results of the above analysis, there is an influence between services on satisfaction. This explains that the acceptance of this service can greatly affect customer satisfaction.

This research is consistent with the research By Borie (2013) There is a significant relationship between quality and patient satisfaction. Good human relations will contribute greatly to effective counseling, and poor human relations will reduce the effectiveness of the technical competence of health services, and patients who are treated poorly tend to ignore the advice and recommendations of health workers.

The concept of this variable is that patient satisfaction is the result of all patient interactions with the health care system and can be influenced by factors such as efficiency, communication, and clinic environment. The use of digital technology can impact patient satisfaction by reducing wait times, increasing comfort, and improving care outcomes.

CONCLUSION

Based on the above table, it proves that the t-value is 25.328 < 1.992. Then it can be seen that the significant value of service acceptance with service quality is 0.000 > 0.05, which means that there is an influence between service acceptance and service quality.

Based on the above table, it can be seen that the t-value is 31.242 < 1.992. Then it can be seen that the significant value of Service Adoption with Service Quality is 0.000 > 0.05, which means that there is an influence between Service Adoption on Satisfaction.

Based on Table 4.17, it can be seen that the R Square value is 0.896 or 89.6%. Assuming that the Service Adoption variable simultaneously influences the Service Quality and

Satisfaction variables by 89.6%, the remaining 80.5% could be influenced by other variables not examined.

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