

## The Clinical Information System That Effects The Patients' Satisfaction Of The Healthcare Services

Sri Hartono<sup>1</sup>, Yanto Ramli<sup>2\*</sup>, Rina Astini<sup>3</sup>, C. Catur Widayati<sup>4</sup>, and Anees Janee Ali<sup>5</sup>

<sup>1,2,3,4</sup> Universitas Mercu Buana

<sup>5</sup>Universiti Sains Malaysia

### Email Address:

sri.hartono@mercubuana.ac.id, [yanto.ramli@mercubuana.ac.id](mailto:yanto.ramli@mercubuana.ac.id),  
rina\_astini@mercubuana.ac.id, [catur.widayati@mercubuana.ac.id](mailto:catur.widayati@mercubuana.ac.id), [aneesali@usm.my](mailto:aneesali@usm.my)

\*Corresponding Author

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**Abstract:** This research intends to understand and investigate how to increase patients' satisfaction by implementing the clinical information system and by looking at the service quality, green environment, and patients' perceptions to provide better patient satisfaction concerning healthcare services. The data collection is done through the distribution of questionnaires in Jakarta, Indonesia. This research is based on descriptive and verification methods; the sample is determined through Purposive Sampling, and the method analysis technique is Partial Least Square (PLS). The research results show that patients' perception significantly influences clinical system information compared to quality services and a green environment to achieve patient satisfaction. Healthcare clinics need to implement the clinical system information to assist the healthcare workers in providing quality patient services.

**Keywords:** Service Quality; Green Environment; Patients' Perception; Clinical System Information; Patients' Satisfaction.

**Abstrak:** Tujuan dari penelitian ini adalah untuk memahami dan menyelidiki bagaimana meningkatkan kepuasan pasien dengan menerapkan sistem informasi klinis dan juga dengan melihat kualitas pelayanan, lingkungan hijau dan juga dari persepsi pasien untuk memberikan kepuasan pasien yang lebih baik tentang layanan kesehatan. Pengumpulan data dilakukan melalui penyebaran kuesioner di Jakarta, Indonesia. Penelitian ini berdasarkan metode deskriptif dan verifikatif; penentuan sampel dilakukan melalui Purposive Sampling dan metode teknik analisis menggunakan Partial Least Square (PLS). Hasil penelitian menunjukkan bahwa persepsi pasien memiliki pengaruh paling signifikan terhadap sistem informasi klinik dibandingkan kualitas pelayanan dan lingkungan hijau untuk mencapai kepuasan pasien. Klinik kesehatan perlu menerapkan sistem informasi klinik untuk membantu petugas kesehatan memberikan pelayanan yang berkualitas kepada pasien.

**Kata Kunci:** Kualitas Pelayanan; Lingkungan Hijau; Persepsi Pasien; Sistem Informasi Klinis; Kepuasan Pasien.

## INTRODUCTION

Indonesia is one of the Southeast Asian countries that crosses the equator and is located between the continents of Asia and Australia, which cross between the Pacific and the Indian Ocean. Indonesia is also classified as one of the world's largest archipelago countries, surrounded by around 13,466 islands and 34 provinces. Indonesia is also one of the countries with the largest area in the world, with a total area of 5,193,250 kilometres covering the land and ocean. Healthy can be defined as the wellbeing of the human body,



soul, and society, enabling human beings to live productively, socially and economically. Healthcare maintenance provides services to overcome and prevent health problems requiring examination, medication and treatment. Health is one of the essential aspects of the population for creating a prosperous country. Therefore, the healthcare system continues to be developed and improved to serve the community, especially people experiencing poverty. Due to public awareness of healthcare treatment, healthcare service requirements tend to increase.

According to Law Number 36 in 2009 regarding health, the healthcare services facility is a tool/or place used by the government or the community to carry out healthcare services to promote promotive, preventive, curative, or rehabilitative services. Based on the above regulation, the government and the private sector provide adequate and quality healthcare facilities, such as clinics and hospitals.

The difference between hospitals and healthcare clinics is that hospitals provide more extensive and complete healthcare services. In contrast, healthcare clinics provide more straightforward healthcare services but are more concise and further prioritise promotive and preventive efforts to achieve better public healthcare. Healthcare clinics can only provide first-level healthcare services and facilities; if the illness and disease are considered more severe, then the healthcare clinics must refer these patients to the nearest hospital for further services and treatments.

In line with economic growth, people's lifestyles and the high awareness of healthcare treatment demands have changed, and people will yearn for better, adequate and quality healthcare services. Healthcare maintenance is an effort to overcome and prevent health problems that require examination, treatment and medication; in this case, people will choose better healthcare services and facilities.

(Ramli et al., 2023) Environmental concern indicates a sincere devotion, a high-level commitment and truthful emotions associated with environmental issues and climate complexities. This is why simultaneously handling climate changes and sustainable usage of existing resources to mitigate harmful emissions has become quite challenging for nations.



**Figure 1.** Reason of High Healthcare Demand

Source: Based on Various Research



The author designed **Figure 1** based on several research types that have been reviewed using several resources. The research concludes that there is increasing demand for healthcare clinics due to the population density, the increase in load, the increase in stress and the awareness of health treatment.

Even though there is a high demand for healthcare services, satisfaction still needs to be improved. Many patients still complain about the healthcare services provided by clinics and hospitals. Most complaints concern the slow response of services, taking a long time to search for patients' medical records, an unpleasant environment, and patients' low perception of the slow healthcare services provided by most clinics. Medical staff are often considered not working professionally, service level agreement times are also shallow, and sometimes, no doctors are on duty at the healthcare clinics.

Individuals and the private sector have built many healthcare clinics to provide healthcare services, and most clinics are trying to provide better patient services. The medical personnel and doctors are trained to work professionally and provide better and faster patient services. Many healthcare clinics have put much effort into providing better services by implementing service quality and a more comfortable environment. Some healthcare clinics even implement clinical information systems to support their patient services.

**Table 1.** Number of Clinics in Jakarta

No.	Types of Clinics	Quantity
1.	Main Clinics	207
2.	First Line Clinics	651

Source: Indonesia Ministry of Health, 2019

**Table 1** shows that the regulation of the Minister of Health of the Republic of Indonesia Number 9 of 2014, healthcare clinics are divided into two types: the first-line and the main. A first-line clinic is a clinic that provides only essential medical services, both for general and unique treatments. Meanwhile, the leading clinics are the clinics that provide specialist medical services or primary services to the patients. According to the data the Minister of Health of the Republic of Indonesia mentioned, several first-line and primary clinics in Jakarta consist of 207 leading clinics and 651 first-line clinics serving the patients in Jakarta.

Based on the explanation above, the purpose of this research is to understand and find out how to increase patients' satisfaction by implementing the clinical information system and also by looking at the service quality, green environment and the patient's perceptions in order to provide better patients' satisfaction concerning the healthcare services provided by the healthcare clinics.

This research intends to understand and find out how to increase patient satisfaction by implementing the clinical information system and by looking at the service quality, green environment, and patients' perceptions to provide better patient satisfaction concerning healthcare services provided by healthcare clinics.

**Research Gap.** According to the discussions from various previous research, (Izugami & Takase, 2016) discussed the response to the medical services perception targets suggested that medical service consumers are involved in the various perception



targets. (Hincapie et al., 2016) Stated that a multifaceted constructed development measured healthcare quality by using Rasch techniques. The study's results emphasise the importance of guaranteeing integrated care. (Kamimura et al., 2016) Health education programs for free clinic patients should focus on increasing knowledge and changing behaviour. (Damen, 2017) concluded that there is an impact of perceived healthcare service quality on overall patient satisfaction. (Moghaddam et al., 2019) Explained that most patients had a positive experience visiting the clinics and perceived the service provision as good. Patients' perceptions of physician consultation, the provision of information to patients, and the environment of delineations are all considered the most critical determinants of service quality in clinics. (Hu et al., 2019) expressed that the magnitude and direction of the public perceptions on the healthcare services in China's hospitals have pointed out that the possibility of monitoring healthcare service improvement is using readily available data in social media. (Sujatha et al., 2020) Stated that patients' perception of healthcare is related to the treatments at hospitals in Hyderabad and the usage of CRM.

Based on the discussion from several previous research studies concerning the quality of healthcare services and patients' perceptions of experience getting healthcare services, these studies have yet to explicitly explain the benefits of implementing a management information system from healthcare services in hospitals and healthcare clinics. The research gap in this research is to perform an empirical study of patient's perceptions and experiences in obtaining healthcare services that apply clinical information systems to prevent manual services.

## THEORETICAL REVIEW

**Quality Services.** (Naini et al., 2022) explained that service quality is defined as satisfying customer needs and desires and the accuracy in its delivery in balancing customer expectations. Service quality is an effort the company makes to meet customer expectations for the services it receives to survive in the market and gain customer trust. (Kotler & Keller, 2016) Quality is the total explanation of the features and the characteristics of a product or service that results in the ability to meet the customers' needs. This is a consumer-centered definition. The seller has provided quality services for their products or services that meet or exceed consumers' expectations.

**Green Environment.** (Enjang, 2019) explained in the research that maintaining environmental sustainability is not a seasonal trend but is only highlighted as a short or medium-term goal. Environmental quality is influenced by various factors, including the rapidly increasing world population.

According to (Kotler & Armstrong, 2018), a green environment includes internal and external greening activities that will generate results for the company and the environment in the short and long term. These results also concern greening activities outside the company or organisation.

**Patient's Perception.** According to (Nes et al., 2021), perception and cognition have been assigned quite different roles. Perceptions have, for example, been held to justify beliefs without themselves requiring justification, a privilege rarely extended to mere beliefs. Perception has been held to enable reference to particulars or provide content to certain concepts, such as colour concepts, in a way that thought alone could not.



(Robbins & Judge, 2022) states that perception is the process where individuals organise and interpret their sensory impressions to provide meaning to their understanding. What can be felt is sometimes very different from the objective reality. Perception is vital to organisational behaviour because people's behaviour is based on their perception of reality, not reality itself.

**Clinical System Information.** According to (Lestari & Handriani, 2019), the importance of health service information is including the clinic. Because fast, precise, and accurate information will provide better patient service results, which will provide patient satisfaction, using computers will make it effective and efficient in processing data. Data processing done manually takes a long time and causes data invalidity and data confidentiality to not be adequately maintained.

(Laudon & Laudon, 2018) Explain that to understand information systems fully, you must understand the broader dimensions of the organisation, management and information technology of the system and its strengths to provide solutions to overcome challenges and problems in the business environment. We will refer to a broader understanding of information systems, including the management organisation and systems' analytical and technical dimensions.

**Patients' Satisfaction.** (Prianggoro & Sitio, 2019) In their research, they explained that satisfaction is the feeling of being happy or disappointed by someone who will compare the perceptions/impressions of the performance or the results of a product with expectations. Consumers will feel satisfied if their expectations are met or will be very satisfied if the consumer expectations have exceeded their expectations.

(Kotler & Armstrong, 2018) explain that consumer satisfaction depends on product performance perceived by buyer expectations. If the product's performance is not as expected, the consumer will not be satisfied. If the performance of a product is in line with expectations, the consumer will be satisfied. If the performance of a product exceeds expectations, consumers will be delighted.

**The effect of service quality on clinical system information to serve the patients who visit the healthcare clinics.** (Naini et al., 2022) explained that service quality is defined as satisfying customer needs and desires and the accuracy in its delivery in balancing customer expectations. According to (Lestari & Handriani, 2019), the importance of health service information is including the clinic. Because fast, precise and accurate information will provide better patient service results, based on the argument above, service quality positively influences the clinical system information. Thus, the hypothesis that will be formulated in this research is as follows:

**H1:** The effect of service quality towards clinical system information to serve the patients who visit the healthcare clinics.

**The effect of a Green environment towards Clinical system information to serve the patients who visit the healthcare clinics.** (Enjang, 2019) explained in the research that maintaining environmental sustainability is not a seasonal trend but is only highlighted as a short or medium-term goal. Environmental quality is influenced by various factors, including the rapidly increasing world population. According to (Lestari & Handriani, 2019), the importance of information for health services includes the clinic. Fast, precise,



and accurate information will provide better patient service results, which will provide patient satisfaction. Based on the argument above, a green environment might positively influence the clinical system information. Thus, the hypothesis that will be formulated in this research is as follows:

**H2:** The effect of a green environment on clinical system information to serve the patients who visit healthcare clinics.

**The effect of Patients' perception towards Clinical system information to serve the patients who visit the healthcare clinics.** According to (Nes et al., 2021), perception and cognition have been assigned quite different roles. Perceptions have, for example, been held to justify beliefs without themselves requiring justification, a privilege rarely extended to mere beliefs. According to (Lestari & Handriani, 2019), the importance of health service information is including the clinic. Fast, precise, and accurate information will provide better patient service results, which will provide patient satisfaction. Based on the argument above, patients' perceptions might positively influence the clinical system information. Thus, the hypothesis that will be formulated in this research is as follows:

**H3:** The effect of patients' perception towards clinical system information to serve the patients who visit the healthcare clinics.

**The effect of service quality on patients' satisfaction who visit healthcare clinics.** (Naini et al., 2022) explained that service quality is defined as satisfying customer needs and desires and the accuracy in its delivery in balancing customer expectations. (Prianggoro & Sitio, 2019) Their research explained that satisfaction is the feeling of being happy or disappointed by someone comparing the perceptions/impressions of the performance or results of a product with expectations. Based on the argument above, service quality positively influences patients' satisfaction. Thus, the hypothesis that will be formulated in this research is as follows:

**H4:** The effect of patients' perception towards patients' satisfaction who visit the healthcare clinics.

**The effect of a Green environment towards Patients' satisfaction when visiting healthcare clinics.** (Enjang, 2019) explained in the research that maintaining environmental sustainability is not a seasonal trend but is only highlighted as a short or medium-term goal. Environmental quality is influenced by various factors, including the rapidly increasing world population. (Prianggoro & Sitio, 2019) Their research explained that satisfaction is the feeling of being happy or disappointed by someone comparing the perceptions/impressions of the performance or results of a product with expectations. Based on the argument above, a green environment might positively influence patients' satisfaction. Thus, the hypothesis that will be formulated in this research is as follows:

**H5:** The effect of a green environment towards patients' satisfaction who visit the healthcare clinics.

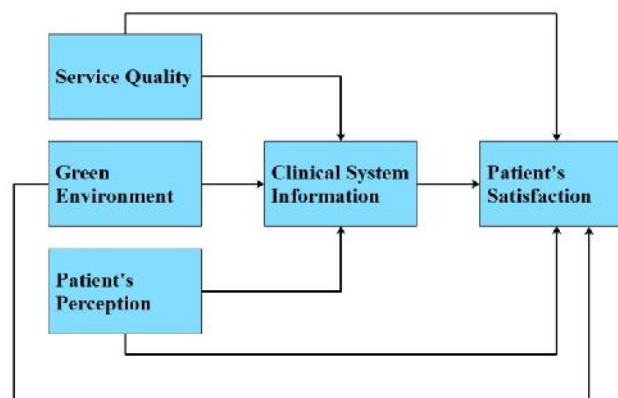


**The effect of Patients' perception towards Patients' satisfaction when visiting healthcare clinics.** According to (Nes et al., 2021), perception and cognition have been assigned quite different roles. Perceptions have, for example, been held to justify beliefs without themselves requiring justification, a privilege rarely extended to mere beliefs. (Prianggoro & Sitio, 2019) Their research explained that satisfaction is the feeling of being happy or disappointed by someone comparing the perceptions/impressions of the performance or results of a product with expectations. Based on the argument above, patients' perceptions might positively influence the patient's satisfaction. Thus, the hypothesis that will be formulated in this research is as follows:

**H6:** The effect of patients' perception towards patients' satisfaction who visit the healthcare clinics.

**The effect of clinical system information on patients' satisfaction when visiting healthcare clinics.** According to (Lestari & Handriani, 2019), the importance of health service information includes the clinic. Fast, precise, and accurate information will provide better patient service results, which will provide patient satisfaction. (Prianggoro & Sitio, 2019) Their research explained that satisfaction is the feeling of being happy or disappointed by someone comparing the perceptions/impressions of the performance or results of a product with expectations. Based on the argument above, clinical system information might positively influence patients' satisfaction. Thus, the hypothesis that will be formulated in this research is as follows:

**H7:** The effect of clinical system information towards patients' satisfaction when visiting the healthcare clinics.



**Figure 2.** Researcher's Model

Source: Author's Construct

**Figure 2** shows that the researcher has constructed the model into three independent variables, one dependent variable and one intervening variable. Based on the constructed model, the researcher tries to determine which of the three independent variables has the most decisive influence through the intervening variable of clinical system information to achieve the patients' satisfaction based on the quality of services, green environment and the patient satisfaction of the healthcare services.



## METHODS

**Design Research.** This research is based on marketing strategy approaches, which will include operationalisation variables, methods of collecting data and respondent information, defining the population, calculating sample size and sampling techniques together with the design of analysis that will be carried out in order to test the research hypothesis, by conducting the study of implementing the clinical information system that may influence the patients' satisfaction who come to the healthcare clinics for treatment. The research will be conducted in Jakarta from November 2020 until April 2021.

The design of the research is to use the causality analysis method. The causality analysis determines the effect of one or more independent variables against the dependent variable through intervening variables. The research will also be using descriptive and verification methods. The causal research intends to ensure that the clinical system information will enhance patient satisfaction in seeking treatment at healthcare clinics.

**Populations and Sample.** The population determination in this research is the combination of all elements in the form of events, things or people who have similar characteristics, which become the researcher's attention to find out the result of the research. The population used in this study are the patients of the healthcare clinics in Jakarta, Indonesia. This research uses purposive sampling, in which the researcher will assign the sampling by determining the specific characteristics that are required for the research objectives so that it is expected to solve the research problems. (Sugiyono, 2017)

The population used in this research is the patients who have randomly visited the healthcare clinic in the Jakarta province. This research is based on purposive sampling, in which the researcher assigned the sampling by determining specific characteristics that are by the research objectives so that it is expected to be able to answer the research problems.

The sample used in this research is non-random sampling, considering that the data obtained may represent the number of samples used against the 183 respondents in Jakarta. The determination of respondents in this research is also based on gender.

**Table 2.** Operational Variables

Variable	Dimension	Indicator	Scale of Measurement
Service Quality	1. Differentiation	a. Differentiated services b. Services different from competitors	Ordinal
	2. Quality	a. Provide quality services b. Better services compare to competitors	
	3. Productivity	a. Provide productive services b. Productivity with better services	
Green Environment	1. Cleanliness	a. Clean environment b. Better atmosphere environment	Ordinal
	2. Comfortable	a. Comfortable environment b. Patients feel comfortable	





		3. Plants Layout	<ul style="list-style-type: none"> <li>a. Provide green plants inside the area</li> <li>b. Provide green plants outside the area</li> </ul>	
		1. Interpretation	<ul style="list-style-type: none"> <li>a. Customer's way of thinking</li> <li>b. Thinking by oneself</li> </ul>	
Patient's Perception		2. Situation	<ul style="list-style-type: none"> <li>a. Perception based on the situation</li> <li>b. Perception based on the mood</li> </ul>	Ordinal
		3. Target	<ul style="list-style-type: none"> <li>a. Targeted mindset</li> <li>b. The way of thinking about a particular situation</li> </ul>	
Clinical Information	System	1. Organisation	<ul style="list-style-type: none"> <li>a. Shareholder involved</li> <li>b. Employees involved</li> </ul>	
		2. Management	<ul style="list-style-type: none"> <li>a. Top management involved</li> <li>b. First-line management involved</li> </ul>	Ordinal
		3. Technology	<ul style="list-style-type: none"> <li>a. Hardware readiness</li> <li>b. Software readiness</li> </ul>	
Patient's Satisfaction		1. Expectation	<ul style="list-style-type: none"> <li>a. Services meet the expectation</li> <li>b. Services do not meet the expectation</li> </ul>	
		2. Assessment	<ul style="list-style-type: none"> <li>a. Customer assessment of services</li> <li>b. Customer's way of assessing certain services</li> </ul>	Ordinal
		3. Perception	<ul style="list-style-type: none"> <li>a. Positive perception of the services</li> <li>b. The negative perception of the services</li> </ul>	

Source: Author's Construct

**Table 2** defines the variable, dimensions, and indicator to seek the relationship between the variables based on the indicator, which is being developed as a questionnaire and given to the respondents to answer the questions. The operational variable is also used to determine the reliability and validity of the indicators used in the research methodology process.

**Data Analysis.** The analysis of data is using the tools of Smart PLS version 3.2.7. PLS is the structural equation modelling (SEM) software used to analyse the significance of each pair of relationships between all the research variables. According to the variance of the statistical algorithm, the fit indices do not necessarily need to be conducted (Hair et al., 2019). There are two steps in conducting the data analysis: (1) outer model, which analyses the testing of composite reliability (CR), discriminant and convergent validity, outer loading, and collinearity assessment; (2) inner model, which analyses the evaluation of t-value for hypotheses testing, coefficient of determination (R<sup>2</sup>), effect size (f<sup>2</sup>), and predictive of relevance (Q<sup>2</sup>).



## RESULTS

**Results.** The results of the descriptive analysis, which are conducted in this research, are to examine and understand the necessity of putting the clinical information system to speed up the quality healthcare service, provide better patients' perception of the healthcare clinics and also improve the patient's satisfaction concerning the healthcare clinics.

**Table 3.** Gender of Respondents

		Frequency	Per centage	Valid Percentage	Cumulative Percentage
Valid	Male	85	46	46	61.049
	Female	98	54	54	38.946
	Total	183	100	100	

Source: Primary Data Processing-PLS, (2021)

**Table 3** shows that of the 183 respondents, 85, or 46 per cent of the total respondents, are male. Moreover, the rest of the 98 respondents or 54 per cent of the total respondents are female. So, the majority of respondents in this study were female.

**The Description of Variable.** The measurement of the variable using Likert scale technique to measure the variables based on the respondents' assumptions using a scale of five that allows the individual to express how they start with the lowest Strongly Disagree, Disagree, Neutral, Agree or Strongly Disagree with a particular statement.

**Table 4.** Description of Variable

Questionnaire	Service Quality					Average Indexes
	SD	DA	N	A	SA	
SQ1	0	8	76	85	14	3.568
SQ2	0	11	90	74	8	3.427
SQ3	0	2	85	91	5	3.536
SQ4	0	3	61	115	4	3.652
SQ5	0	3	157	19	4	3.131
SQ6	0	4	142	33	4	3.386

Questionnaire	Green Environment					Average Indexes
	SD	DA	N	A	SA	
GE1	0	6	71	99	7	3.572
GE2	0	4	71	102	6	3.598
GE3	0	10	50	119	4	3.632
GE4	0	5	132	40	6	3.248
GE5	0	7	89	81	6	3.457
GE6	0	4	121	55	3	3.311

Patient's Perception



Questionnaire	SD	DA	N	A	SA	Average Indexes
PP1	0	3	112	66	2	3.358
PP2	0	10	76	92	5	3.503
PP3	0	6	83	90	4	3.502
PP4	0	0	85	97	1	3.537
PP5	0	3	91	88	1	3.465
PP6	0	12	86	83	2	3.397

Clinical System Information

Questionnaire	SD	DA	N	A	SA	Average Indexes
CSI1	0	4	90	87	2	3.468
CSI2	0	0	90	91	2	3.514
CSI3	0	6	58	116	3	3.628
CSI4	0	7	55	114	7	3.657
CSI5	0	1	75	99	8	3.619
CSI6	0	6	73	99	5	3.562

Patients' Satisfaction

Questionnaire	SD	DA	N	A	SA	Average Indexes
PS1	0	16	60	102	5	3.522
PS2	0	6	40	127	10	3.768
PS3	0	5	68	99	11	3.629
PS4	0	5	62	102	14	3.682
PS5	0	1	107	73	2	3.414
PS6	0	6	74	98	5	3.549

Source: Primary Data Processing-PLS, (2021)

**Table 4** shows the result of the service quality variable. Out of the six indicators above, the most widely agreed by respondents is the SQ5 indicator, with 142 respondents who agree with the differentiated services. The SQ4 had 115 respondents who strongly agreed with the better healthcare services. From this survey, most of the respondents agreed with the healthcare clinics.

The data processing results show the respondents' answers to the indicators in the green environment variable. Out of the six indicators above, the most strongly agreed upon by respondents is the GE1 indicator, with seven respondents strongly agreeing with the clean environment. The GE3 with the indicator shows that the respondents agreed with 119 respondents to the questionnaire about a comfortable environment. Most respondents agree with the provided questionnaire concerning the clean and comfortable environment from this survey.

The data processing results show the respondents' answers to the indicators in the patient's perception variable. Out of the six indicators above, the most strongly agreed by respondents is the PP2 indicator, with five respondents strongly agreeing with the patients' mindset. The PP4 with the indicator shows that the respondent is agreed with 97



respondents agreed with the questionnaire on patients' moods. From this survey, most respondents agreed with the provided questionnaire that the patient's perception of the healthcare clinics is still low.

The data processing results show the respondents' answers to the indicators in the clinical system information variable. Out of the six indicators above, the most strongly agreed by respondents is the CSI5 indicator, with eight respondents strongly agreeing with the readiness of hardware to support the clinical information system. The CSI3 with the indicator shows that the respondents read with 116 respondents who agreed to the healthcare clinical staff questionnaire involved systems. From this survey, most respondents agree with the provided questionnaire that developing a clinical information system to support healthcare clinic services is very important.

The data processing results show the respondents' answers to the patient satisfaction variable indicators. Out of the six indicators above, the most strongly agreed upon by respondents is the PS4 indicator, with 14 respondents strongly agreeing with the understanding of patients' access to the system. The PS2 with the indicator shows that the respondents agreed with 127 respondents who agreed to the questionnaire of patients' expectations. From this survey, most of the respondents agreed with the provided questionnaire that patients have a positive perception towards the services of the healthcare clinics.

**The Evaluation of Outer Model.** The outer model is analysed to ensure the measurements used are valid and reliable. The Outer Model is a measurement model which consists of indicators and the paths connecting them for their respective factors. Analysis of the outer model can be seen from the following indicators:

**Validity Test.** Convergent validity testing of each construct indicator is valid if the value is greater than 0.700, while the loading factor of 0.500 to 0.600 can be considered sufficient. Based on these criteria, if there is a loading factor below 0.500, it will be dropped from the model.

**Table 5.** Convergent Validity Testing Result

Variable	Indicator	Outer Loading	Description
Service Quality	SQ1	0.746	Valid
	SQ2	0.625	Valid
	SQ3	0.715	Valid
	SQ4	0.722	Valid
	SQ5	0.819	Valid
	SQ6	0.783	Valid
Green Environment	GE1	0.724	Valid
	GE2	0.832	Valid
	GE3	0.705	Valid
	GE4	0.704	Valid
	GE5	0.869	Valid
	GE6	0.830	Valid
Patient's Perception	PP1	0.671	Valid
	PP2	0.759	Valid
	PP3	0.867	Valid
	PP4	0.794	Valid
	PP5	0.750	Valid
	PP6	0.729	Valid
Clinical System Information	CSI1	0.762	Valid



Variable	Indicator	Outer Loading	Description
Patients' Satisfaction	CSI2	0.739	Valid
	CSI3	0.723	Valid
	CSI4	0.724	Valid
	CSI5	0.664	Valid
	CSI6	0.743	Valid
	PS1	0.762	Valid
	PS2	0.885	Valid
	PS3	0.813	Valid
	PS4	0.748	Valid
	PS5	0.888	Valid
PS6	0.826	Valid	

Source: Primary Data Processing-PLS, 2021

**Table 9** shows that all indicators have a loading factor value above 0.500, meaning all indicators are considered valid. If any indicator is less than 0.500, this indicator will have to be removed from this table and considered invalid.

**Reliability Test.** In order to make sure that all the indicators used in this research are by the result and not biased, the next step is to evaluate the outer model to test the reliability of the model. The Composite Reliability and Cronbach's Alpha indicators will perform the reliability test.

Composite Reliability and Cronbach's Alpha testing aim to test the instrument's reliability in a research model. This is to measure the internal consistency of the indicator, and the value must be above 0.600. Suppose all latent variable values with Composite Reliability or Cronbach's Alpha are above and equal to 0.700. In that case, it means that the constructed variables are reliable, and the questionnaire used in this research uses proper tools that are considered reliable and consistent.

**Table 6.** Composite Reliability and Cronbach's Alpha Testing Result

Variable	Composite Reliability	Cronbach's Alpha	Description
Service Quality	0.918	0.821	Reliable
Green Environment	0.921	0.857	Reliable
Patient's Perception	0.887	0.913	Reliable
Clinical System Information	0.927	0.926	Reliable
Patients' Satisfaction	0.916	0.896	Reliable

Source: Primary Data Processing-PLS, 2021

**Table 10** shows, it shows that the results testing composite reliability and Cronbach's alpha indicate both the values of composite reliability and Cronbach's alpha are above and equal to 0.700, which means that all the values are acceptable and with the assumption that all the questionnaires in the research are considered reliable and consistent.

**Evaluation of Inner Model.** The second model of evaluation after the outer model is the testing of the structural model (inner model). Inner model testing is developing a model based on concepts and theories to analyse the relationship between exogenous and endogenous variables described in a conceptual framework. The testing phase of the structural model (inner model) is carried out through the following steps:



**R-Square (R<sup>2</sup>).** R-squared is the statistical measurement that indicates how much the variation of a dependent variable is explained by an independent variable in a regression model.

**Table 7.** R-Square (R<sup>2</sup>) Testing Result

Variable	R-Square (R <sup>2</sup> )
Clinical System Information	0.563
Patients' Satisfaction	0.539

Source: Primary Data Processing-PLS, 2021

In principle, this research model uses 2 (two) constructed variables that are influenced by other constructed variables, the clinical system information constructed, which is influenced by service quality, green environment, and patient perception. The patients' satisfaction is influenced by service quality, green environment, patient perception and clinical system information.

**Table 7** above indicates that the R-Square (R<sup>2</sup>) value or the coefficient of determination of the clinical system information constructed is 0.563, and for the organisational awareness constructed, it is 0.539. These results indicate that 56.300 per cent of the clinical system information constructed can be influenced by the constructs of service quality, green environment, and patient perception, and the remaining 43.700 per cent can be explained by other causes. 53.900 per cent of the patients' satisfaction can be influenced by the construct of service quality, green environment, and patient perception, while other causes explain the remaining 46.100 per cent.

**Goodness of Fit Model.** The Goodness of Fit structural model's testing result in the inner model uses predictive relevance (Q<sup>2</sup>) value. Q-Square value greater than 0 (zero) indicates that the model has a predictive relevance value. According to (Garson, 2016), the Predictive Relevance (Q<sup>2</sup>) for the structural model will measure how well is the observed value in order to generate the model and also its parameter, which is estimated to include the percentage of 0.020 (small); the percentage 0.150 (moderate); and the percentage 0.350 (large).

**Table 8.** Goodness of Fit Model (GoF)

Variable	AVE	Composite Reliability	Cronbach's Alpha	R Square	Q Square
Service Quality	0.687	0.918	0.821	-	0.328
Green Environment	0.627	0.921	0.857	-	0.396
Patient's Perception	0.701	0.887	0.913	-	0.374
Clinical System Information	0.642	0.927	0.926	0.563	0.421
Patients' Satisfaction	0.763	0.916	0.896	0.539	0.404

Source: Primary Data Processing-PLS, 2021

The result of the R<sup>2</sup> value indicates that the criterion is considered vital, with a considerable Q value; this figure concludes that the proposed model is supported by empirical research, which is classified as *fit*. At the same time, the value of AVE is greater than 0.500, indicating that all constructed variables in the model are estimated to meet discriminant validity criteria. The value of Composite Reliability and Cronbach's Alpha



for each of the variables is greater than 0.700 per cent; these figures show that the constructed researched variables are considered reliable, and the outer model of this research is classified as *fit*. The table above shows that the clinical system information variable and patients' satisfaction with the R Square value greater than 0.500 are classified as fit.

The result of the data processing from the analysis model against the dimensions shows that the indicators that were constructed above are considered reliable because the value of the loading factors is greater than 0.700 per cent.

The measurement of the model, which shows the latent variables against the dimensions, explains that the reliability of the dimensions is to measure the constructed research variables. The following table shows the present results of the measurement model analysis of each variable against the dimensions.

**Table 9.** Loading Factor Between Latent Variables and Dimensions

Latent Variables-Dimensions		Loading factor ( )	Standard Error (SE)	T Statistics (  /SE )
Service Quality	Differentiation	0.347	0.041	8.396
Service Quality	Quality	0.381	0,037	10.317
Service Quality	Productivity	0.521	0,043	12.049
Green Environment	Cleanliness	0.204	0.034	6.030
Green environment	Comfortable	0.158	0.025	6.276
Green Environment	Plants Layout	0.309	0.031	10.018
Patient's Perception	Interpretation	0.446	0.031	14.484
Patient's Perception	Situation	0.314	0.026	12.078
Patient's Perception	Target	0.425	0.028	15.048
Clinical System Information	Organisation	0.770	0.052	14.685
Clinical System Information	Management	0.819	0.043	18.948
Clinical System Information	Technology	0.810	0.040	20.353
Patients' Satisfaction	Expectation	0.738	0.043	17.002
Patients' Satisfaction	Assessment	0.682	0.058	11.757
Patients' satisfaction	Perception	0.672	0.068	9.815

Source: Primary Data Processing-PLS, 2021

The loading factor is the correlation coefficient for the variable and factor. The loading factor shows that the variable on that particular factor explains the variance. In the SEM approach, as a rule of thumb, 0.700 or higher factor loading factor represents that the factor extracts sufficient variance from that variable. The results of the measurement of the model analysis from the research variables against the dimensions show that almost all dimensions are *valid*, with the value of the t count being greater than the t table (2.010 per cent). According to the verification analysis, the connection of the testing latent variables is shown below.

**Table 10.** Results of Hypothesis Testing

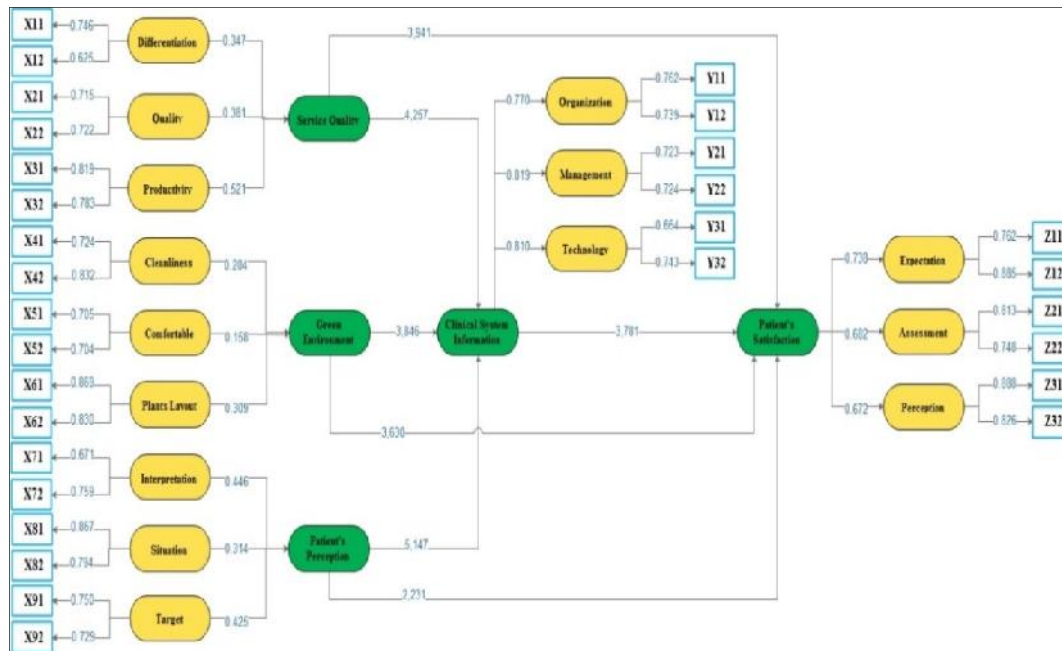
		Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Service Quality	Clinical	0.324	0.281	0.159	4.257	0.056
System Information						
Green Environment	Clinical	0.357	0.297	0.168	3.846	0.072
System Information						
Patient's perception	Clinical	0.285	0.225	0.147	5.147	0.075
System Information						
Service Quality	Patients'	0.319	0.331	0.177	3.941	0.063
Satisfaction						
Green environment	Patients'	0.217	0.191	0.185	3.630	0.078
Satisfaction						
Patient's perception	Patient's	0.195	0.156	0.158	2.231	0.056
Satisfaction						
Clinical System Information		0.273	0.226	0.146	3.781	0.052
Patients' Satisfaction						

Source: Primary Data Processing-PLS, 2021

Hypothesis testing is a form of statistical inference that uses data from a sample to conclude a population parameter or probability distribution. The result above shows that the estimated values of the path analysis in the structural model should be significant. This value can be obtained from the bootstrapping procedure. The significance of the hypothesis testing is to verify the value of the parameter coefficient and the value from the T-statistic significance in the bootstrap algorithm report. This can be observed from the T-table at alpha 0.050 (5 per cent) of 1.960 to determine whether the relationship is significant. Then, the T-table should be compared with the T-count (T-statistic) described below. According to the verification analysis, the testing latent variables are shown below as follows:







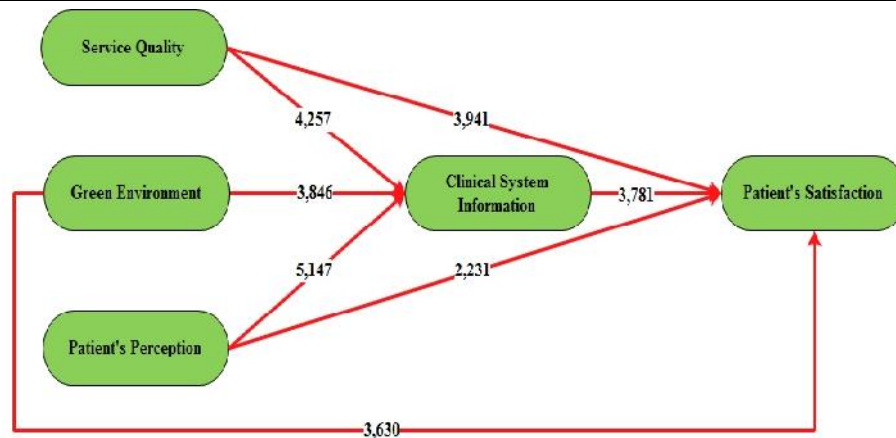
**Figure 3. Hypothesis Testing**  
 Source: Primary Data Processing-PLS, 2021

The result of the hypothesis testing quantifies an observation or outcome of an experiment under the given assumption. The testing result lets us interpret whether the assumption holds or is false. In other words, it signifies if the hypothesis can be confirmed or rejected for the observation made.

**Figure 2** shows an analysis of the hypothesis testing and the results of the Partial Least Square process concerning the independent variable of service quality, green environment, and patient perception, with the intervening variable of clinical system information and the dependent variable of patient satisfaction. The dimensions and indicators governing each variable indicated that patient perception significantly influences the clinical system information compared to service quality and a green environment. Meanwhile, the independent service quality variable significantly influences the dependent variable of patient satisfaction.

The results of the hypothesis testing revealed that the patient perception variable has the highest influence on the clinical system information variable compared to the service quality and green environment variables. The variable of Service quality has the highest direct influence against the variable of patients' satisfaction compared to the variable of green environment and patients' perception. The variable of Clinical system information is also essential in determining the effect of patient satisfaction as the intervening variable.





**Figure 4.** Testing Result

Source: Primary Data Processing-PLS, 2021

The result of the hypothesis testing can be interpreted using p-values or critical values. Given the assumption, the p-value is the probability of deducing the observed value. On the other hand, critical values are cut-off values that define regions where the test statistic is unlikely to lie.

**Figure 4** shows the testing results above show that the research variables of patients' perception have the most decisive influence against the variable of clinical system information as the intervening variable with the figure of 5.147 per cent, compared to the variable of service quality with the figure of 4.257 per cent and green environment with the figure of 3.846 per cent. The direct effect of service quality contributed the most decisive influence towards clinical system information with a figure of 3.941 per cent, compared to the direct effect of the green environment with a figure of 3.630 per cent and patients' perception with a figure of 2.231 per cent. Clinical system information as the intervening variable also generates a positive effect on patient satisfaction with the figure of 3.781 per cent, which means that the healthcare clinic must prepare and implement system information to provide better service quality and rearrange a better green environment for the comfort of the patients.

## DISCUSSION

**The influence of service quality towards clinical system information.** Based on the testing results, service quality has a significant and positive influence on clinical system information, which is the pros of implementing a clinical information system, which will provide better and faster services. The medical records can also be stored correctly and retrieved at once. The cons of this hypothesis are that the healthcare clinics must invest in the infrastructure of both hardware and software; the other possibility is that the system is web-based and relies on internet access; if no internet is available, the system cannot be accessed. The result of the above testing is also stated by (Islam et al., 2018), who state that clinical information systems (CISs) have generated opportunities for meaningful improvements both in patient care and workflow. However, there is still a long way to perfection. Healthcare providers are still facing data exchange, management, and integration challenges due to a need for more functionality among these systems.



**The influence of green environment towards clinical system information.** The testing results show that a green environment significantly and positively influences clinical system information. Based on this result, the pros indicate that the variable of the green environment has a significant and positive effect on the clinical system information, which means that implementing the clinical system information by the healthcare clinics will provide a green environment to the healthcare patients and avoid using papers to stop the deforestation. The cons of this hypothesis is that the healthcare clinics must invest in the infrastructure of both hardware and software, which is very costly and sometimes relies on the connection of the internet, which is web-based. The result of the above testing is also stated by (Zeng et al., 2020) that Information Systems (IS) play an essential role in improving the efficiency of firms' operations and supply chains, which links to sustainability. The study discovered three main research domains (sustainable competitive advantage, environmental sustainability, and sustainable online social communities).

**The influence of patients' perception towards clinical system information.** The testing results show that patients' perceptions significantly and positively influence clinical system information. This result indicates that the pros are due to implementing a clinical information system, which will provide better and faster services. Also, medical records can be stored correctly and retrieved immediately without queuing for healthcare services. The cons of this hypothesis is that the healthcare clinics must invest in the infrastructure of both hardware and software, which is very costly and sometimes relies on the connection of the internet, which is web-based. The above testing results also stated (Frimpong & Asare, 2016) that using modern information technology (IT) offers tremendous opportunities, such as reducing clinical errors and supporting healthcare professionals in providing care. This study was motivated by computerisation, which continued to grow in the hospital setting, and programs to assist nurses in charting and care planning were developed.

**The influence of service quality towards patients' satisfaction.** The testing results show that service quality significantly and positively influences patients' satisfaction. This result indicates that the pros to implementing clinical information systems will provide better and faster services. The medical records can also be stored correctly and retrieved at once. The cons of this hypothesis are that the healthcare clinics must invest in the infrastructure of both hardware and software; the other possibility is that the system is web-based, which relies on internet access; if no internet is available, the system cannot be accessed. The result of the above testing also states (Karsana & Murhadi, 2021) that service quality is essential in realising patient satisfaction and behavioural intention in the health service industry. Behavioural intention has been identified as an essential construct in measuring organisational success and affects patient visits.

**The influence of green environment towards patients' satisfaction.** The testing results show that a green environment significantly and positively influences patients' satisfaction. Based on this result, it indicates that the pros indicate that the variable of the green environment has a significant and positive effect on the clinical system information, which means that implementing the clinical system information by the healthcare clinics will provide a green environment to the healthcare patients and avoid using papers to stop the deforestation. The cons of this hypothesis is that the healthcare clinics must invest in the infrastructure of both hardware and software, which is very costly and sometimes relies on the connection of the internet, which is web-based. The result of the above testing is



also stated by (Untara et al., 2023) that the conceptual framework which explains the patients' attachment to a healthcare establishment by considering the effect of a natural/green environment as nature-based solutions (NBS), mental health value, emotional wellbeing, and satisfaction.

**The influence of patients' perception towards patients' satisfaction.** The testing results show that patients' perceptions significantly and positively influence clinical system information. This result indicates that the pros are due to implementing a clinical information system, which will provide better and faster services. Also, medical records can be stored correctly and retrieved immediately without queueing for healthcare services. The cons of this hypothesis is that the healthcare clinics must invest in the infrastructure of both hardware and software, which is very costly and sometimes relies on the connection of the internet, which is web-based. The result of the above testing is also stated by (Prakoeswa et al., 2022) that service quality is essential in health institutions that can affect patient satisfaction and loyalty. The growth in the number of patients at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, triggered the diversification of services that require periodic quality control.

**The influence of clinical system information towards patients' satisfaction.** The testing results show that clinical system information has a less significant but positive influence on patients' satisfaction. This result indicates that the pros to implementing clinical information systems will provide better and faster services. The medical records can also be stored correctly and retrieved at once. The cons of this hypothesis are that the healthcare clinics must invest in the infrastructure of both hardware and software; the other possibility is that the system is web-based and relies on internet access; if no internet is available, the system cannot be accessed. The above testing results also state that the information systems (IS) show that users' attitudes and continuance intentions are associated with their satisfaction with information systems. As such, increasing investments in clinical information systems (CIS) signifies the importance of understanding CIS end users' (i.e., clinicians) satisfaction.

## CONCLUSION

This study's constructed research hypothesis uses the five research variables: service quality, green environment and patients' perception as the independent variables, patients' satisfaction as the dependent variable and clinical system information as the intervening variable. Based on the results of the above framework, patients' perception is an essential factor that healthcare clinics need to consider to provide better service quality and influence patients' satisfaction.

This research aims to find out the patients' complaints about the healthcare services in the healthcare clinics in Jakarta, Indonesia. This study has constructed five researched variables to determine the problem's result and understand how to solve the problem. According to the hypothesis testing, it can be concluded as follows: (1) The healthcare clinics must prepare and provide clinical system information to support them in providing healthcare services to the patients. (2) The clinical system information will help the clinical staff to provide better and faster services to cut the turnaround time of the patients' queue. (3) The clinical system information may also help the healthcare clinics. Provide up-to-date patient information and provide online communication. (4) The healthcare clinics



must also provide a better, cosy, and more comfortable patient environment by implementing a green environment. (5) The healthcare clinics must also prepare to change the patients' perceptions that have poor images of the services provided.

The scope of this study is only limited to the contribution of providing clinical system information. However, the clinical system must improve many issues, such as online communication and doctor consultation appointments. The scope of research is only performed in Jakarta, whereas the rest of the province in Indonesia may also be considered for further research.

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