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The role of perceived risk as a moderating variable: Customer data, IndiHome Telkom Surabaya city

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Abstract

This study aims to find out how perceived risk acts as a moderating variable, and how the quality of information systems, service quality, and perceived trust affect customer satisfaction of IndiHome Telkom users in the city of Surabaya. This study employs a structural equation model data collected from 385 respondents who were selected using a purposive sampling method. The respondents were drawn from the population of IndiHome Telkom users residing in the city of Surabaya. The sample criteria are customers who have used IndiHome for at least 3 months, and are at least 17 years old. The findings indicate that the perceived risk is with a positive moderator. Perceived trust serves as a constructive mediating factor in the association between information system quality and service quality which ultimately influence customer satisfaction. Research also proves that information system quality, service quality and perceived trust make a positive contribution to customer satisfaction. This study concludes that perceived risk with a transactional process does not harm consumers rather it strengthens consumer's satisfaction. These findings can be used to attract more Indihome Telkom customers in Surabaya, by increasing perceived trust and reducing perceived risk. It is recommended that Telkom improves network quality and computer hardware quality. This will have a positive impact on the satisfaction of IndiHome Telkom users.

1. Introduction

As the world transitions to digital technology, PT. Telkom Indonesia (Telkom) aims to provide all Indonesians, with access to digital telecommunications including those who live in Surabaya. Telkom offers high-speed internet access via the IndiHome Fiber service. Since communication is one of the ways that people engage with one another and their surroundings as social creatures. The internet is one of the communication mediums that are expanding widely. One of the companies offering internet connectivity is Telkom. Telecommunications service providers are under pressure from the competition to discover the best possible way to please their clients. User satisfaction with Telkom applications is influenced by the service quality provided by media (Nugroho, 2015). Agani and Azis (2021), suggest that users' happiness with the Telkom application is positively impacted by its information and service quality. In contrast, Amarin and Wijaksana (2021) demonstrate that there is no connection between system quality and customer happiness.

The evolution of information technology has been significantly impacted by the COVID-19 pandemic's propagation. The pandemic has impacted nearly all of the business people's activities across the world, and in order to survive, they must be able to adapt. The health, culinary, e-commerce, and information and communication technology (ICT) sectors are among several industries that exhibit promising potential to

offer valuable services to society. The health, culinary, e-commerce, and information and communication technology (ICT) sectors are among several industries that exhibit considerable potential to provide valuable services to society. Telkom, a government-owned telecommunications firm, is one of the ICT industry participants that must adjust to the Covid-19 pandemic. The COVID-19 pandemic has created a context of digital acceleration, compelling Telkom to expedite its efforts to turn into a digital telecommunications company after announcing its intention to do so. Digital adoption in society has accelerated as a result of the pandemic's indirect changes on lifestyles and basic needs. The government of Indonesia has enforced a programme of home-based learning and employment in order to reduce the transmission of the virus. The disease has led to a shift in individuals' needs, with a current and significant demand for internet access. Telkom takes advantage of this opportunity by supporting all community activities through its digital infrastructure, platforms, and services.

The perceived risk among Telkom consumers, in accordance with .Bakkara and Wijayaangka (2020), has a positive and significant impact on customer happiness. Risk perception is negatively impacted by consumer trust (Anwar & Adidarma, 2016). The enhancement of customer satisfaction is associated with increased commitment and decreased perceived risk, whereas commitment has a favorable impact on both factors (Johnson, Sivadas, & Garbarino, 2008). Ghotbabadi, Feiz, and Baharun (2016), found an association between service quality and customers' perceptions of risk. The impression of danger has no impact on consumer happiness, according to Bernarto and Purwanto (2022), who present different evidence. Al-Zu'bi and Ahmad (2011), provided empirical evidence illustrating the impact of a pessimistic risk perception on consumer satisfaction and trust. There findings from earlier studies suggest that this study's empirical gap analysis has not been able to reconcile. Although numerous researchers have studied perceived risk in the past, no one has ever used perceived risk as a moderating variable, thus rendering the approach of this study innovative. The results of this study are expected to contribute to the development of marketing knowledge, especially in the field of telecommunications.

2. Literature Review and Hypothesis Development

The consumer is the most crucial element in business as without them things won't go according to plan. Customer satisfaction should be one of your main priorities in any business, no matter how big or little. Customer satisfaction is a metric that gauges the extent to which a company's product or service meets or exceeds the expectations of its customers. Kotler and Keller (2016), define a person's feeling of happiness or dissatisfaction are based on how well the product performed compared to what was anticipated. Consumers won't be happy if the service or product performs poorly compared to their expectations, but they will be happy and satisfied if the performance meets or surpasses their expectations.

2.1. Relationship of Information System Quality to Customer Satisfaction and Perceived Trust

Quality is a state that can meet or exceed expectations for a product, service, person, process, or environment. A corporation must take into account the quality of many different elements, including the quality of its employees, facilities, products, services, and information systems. If the company's various possessions are of high quality, they will be able to add value that is lucrative for the business (Goetsch & Davis, 2010). If the information provided has good information qualities and is helpful to inform users, the information system's quality is high. An effective information system possesses the capability to be utilised in accordance with the users' preferences, thereby facilitating the generation of accurate, timely, relevant, and comprehensive information. (Gürkut & Nat, 2017).

Wahyudi and Astuti (2015), established a link between customer happiness and the caliber of information systems. According to Laely (2016) and Edo and Hendayani (2023), the presence of perceived risk is found to have a detrimental effect on the intention to continue, whereas perceived trust is associated with a positive influence. The relationship between acceptance and satisfaction is mediated by trust, which is determined by the information's quality and ease of use (Kassim, Jailani, Hairuddin, & Zamzuri, 2012). According to Duy Phuong and Dai Trang (2018), the electronic service quality of information systems is a significant determinant of the overall perceived service quality. According to research Putra, Aprila, Marietza, and Hatta (2020), the quality and perceived utility of an information system have an impact on satisfaction. Customers' commitment is influenced by perceived value and perceived value is influenced by customer trust (Cahaya, Mursitama, Hamsal, & Tjhin, 2022). The following theory is proposed in light of this description:

H_1: *Customer satisfaction is significantly impacted by information system quality.*
H_2: *Perceived trust is significantly influenced by the effectiveness of the information system.*

2.2. The Relationship between Service Quality and Perceived Trust and Customer Satisfaction

The timely fulfilment of customer expectations, along with the adherence to demands and standards, is essential for delivering high-quality service. According to Panjaitan and Panjaitan (2021) and Roseline, Doss, Jayapal, Ganesan, and Michael (2023), service quality encompasses all the services provided by a business during the customer's engagement. According to Horsu and Yeboah (2015), continuous service, convenience, accessibility, and dependability, exert a favourable and significant influence on customer satisfaction. Customer

happiness is influenced by service performance, as demonstrated by Nugroho and Sudaryanto (2013). In addition to demonstrate how e-service quality affects e-satisfaction, Purnamasari (2023) discovered that e-trust can mediate the connection between e-service quality and e-repurchase intention. Uzir et al. (2021), argues that customer happiness is influenced by service quality and trust. Service quality and accounting information systems have an effect on client happiness and confidence, in the opinion of Widyani and Wijayanti (2022), Fida, Ahmed, Al-Balushi, and Singh (2020), state responsiveness and characteristics of empathy significantly improved customer satisfaction. Roseline et al. (2023) claimed that the only factor that had a substantial impact on customer satisfaction were dependability, responsiveness, and tangibles. This description leads to the following theory, which is proposed:

H₃: Perceived trust is significantly influenced by service quality.
H₄: Customer satisfaction is significantly impacted by service quality.

2.3. The Relationship between Perceived Trust and Customer Satisfaction and Perceived Risk

According to Mowen and Minor (2012) and Priansa (2017), trust is the expectation that words, promises, oracle or written assertions from people will come true. According to Pavlou (2003), trust can be defined as the assessment of an individual's interpersonal connections with others, specifically in situations characterised by uncertainty, where these individuals are expected to fulfil certain transactions in line with predetermined expectations. Repeated impressions, together with experience and learning, lead to the development of trust. A strong desire to keep up a long-term relationship is strongly influenced by trust. If each party has faith in the other, a business transaction involving two or more parties will take place. This trust must be established from the very beginning of the business and should be demonstrated; it cannot simply be accepted by other parties.

As stated by Raiyan and Siregar (2021), trust affects consumer happiness. It also claims that customer trust and satisfaction are significantly harmed by perceived risk. Customer trust and happiness are significantly enhanced by perceived security (Kim, Chung, & Lee, 2011). Satisfaction is influenced by perceived trust and value (Hasan, Kiong, & Ainuddin, 2014). Afwa, Samsir, and Sulistyowati (2014), claim that the trust serves as a mediator between perceptions of risk and technology as well as online shoppers' happiness. Customer trust and satisfaction are adversely affected by the perceived risk (Muis, Fahmi, Prayogi, & Jufrizen, 2021).

In contrast to service quality, perceived risk has a considerable impact on consumer happiness, as demonstrated by Bahar, Hadi, and Febrianto (2020), perceived risk has significant impact on consumer satisfaction whereas service quality has little bearing on it. Mulyono (2012), further establishes the impact of perceived risk on client satisfaction. Customer satisfaction is impacted by the perceived risk (Ambarwati & Isnugroho, 2018). This description leads to the following theory, which is proposed:

H₅: Customer happiness is significantly impacted by perceived trust.
H₆: A substantial moderator of the relationship between perceived trust and customer happiness is perceived risk.

The research framework, which specifies the relationship between research variables, is depicted in Figure 1. It was developed based on an analysis of the literature and earlier conversations.
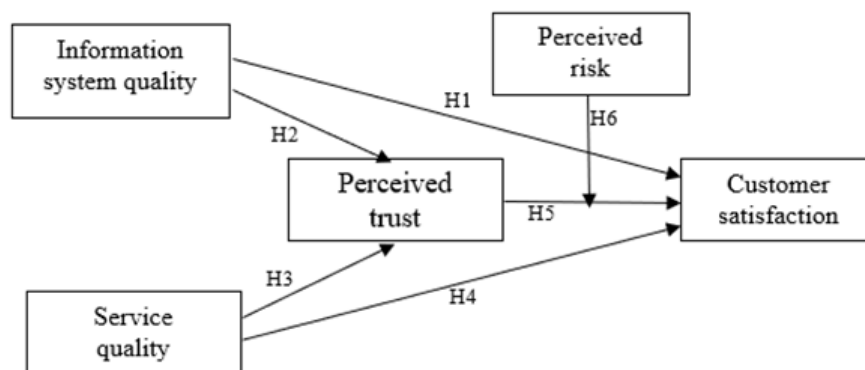

Figure 1. Framework for research.

3. Research Methodology

The present study utilises a causal methodology. The research population comprises exclusively of customers of IndiHome Telkom in Surabaya. A large number of samples are obtained by using the Lameshow formula approach due to Its unrestricted nature of the population (Lemeshow, Hosmer Jr, Klar, & Lwanga, 1997). The purposive sampling technique is used for 385 sample size. In order to be eligible, customers are required to satisfy the specified sample criteria, which entail being a minimum of 17 years of age and having a minimum usage period of three months with IndiHome. Warp PLS (Warp Partial Least Square) software is used in the analysis technique, which employs structural equation modelling (SEM). SEM is a statistical technique used to build and test statistical models which are usually in the form of causal models (Byrne, 2010). The questionnaire used in this study was a 5-level Likert scale with two statement items for each

indicator. These are the individual variable indicators. Accessibility, system flexibility, system integrity, and response time are the four metrics used to measure variable information system quality (Bailey & Pearson, 1983). The five indicators listed by Parasuraman, Zeithaml, and Berry (1994), are used to assess the changeable service quality of an organisation: tangibles, reliability, responsiveness, assurance, and empathy. Reliability, honesty, concern, and credibility are the four factors that make up the perceived trust variable (Purnamasari, 2023). Three indicators product risk, transaction risk, and psychological risk are used to measure the perceived risk variable (Suresh & Shashikala, 2011). Three indicators perceived quality, perceived value, and customer expectations are used to measure the customer satisfaction variable (Oliver, 2014).

4. Result

4.1. Descriptive Statistical Analysis

Table 1 lists the demographics of the respondents, including their gender, age, marital status, degree of education, and length of time using IndiHome Telkom.

Table 1. Characteristics of respondents (N = 385).

Characteristics	Respondents	Frequency	Percentage (%)
Gender	Male	216	56.1
	Female	169	43.9
Age	17-30 years	178	46.2
	31-45 years	127	32.9
	Over 45 years	080	20.8
Education level	High school level	204	53.0
	Bachelor	102	48.5
	Master	079	20.5
Status	Mate	106	27.5
	Single	279	72.5
Been a customer for a long time	Less than 1 year	086	22.3
	1– 2 years	147	38.2
	3 – 4 years	097	25.2
	More than 4 years	055	14.3

Table 1, shows that there were 56.1% men and 43.9% women among the respondents between the age of 17 to 30 years, and the dominating respondent's age was 46.2%, while in the range of 31 to 45 years, it reached 32.9%. 53.0% of respondents have a high school diploma, 48.5% have a bachelor's, and 25.0% have a master's. A total number of 22.3% of the respondents have used IndiHome for a period of less than one year, while 38.2% indicated a usage period ranging from one to two years. Additionally, 25.2% of the respondents reported using IndiHome for a period between three and four years, while 14.3% reported a usage period exceeding four years.

4.2. Measurement Model

Validity test results for research variables. According to Table 2, each indicator's loading factor value and AVE (Average Variances Extracted) value are both more than 0.5. The research variables' convergent validity is thus fully demonstrated by all indications and assessments.

Table 2. Loading factor values, and AVE.

Research variables	Indicator	Outer loading factor value	AVE
Information system quality (In_sys_Q)	X1.1	0.752	0.603
	X1.2	0.814	
	X1.3	0.878	
	X1.4	0.643	
Service quality (Ser_qual)	X2.1	0.702	0. 545
	X2.2	0.797	
	X2.3	0.715	
	X2.4	0.779	
	X2.5	0.692	
Perceived trust (Per_trust)	Z1.1	0.568	0.556
	Z1.2	0.829	
	Z1.3	0.767	
	Z1.4	0.790	
Perceived risk (Per_risk)	M1.1	0.651	0.628
	M1.2	0.746	
	M1.3	0.692	
	M1.4	0.679	
Customer satisfaction (Cus_sat)	Y.1	0.750	0.666
	Y.2	0.665	
	Y.3	0.762	

The AVE, s (Square Roots Of Average Variance Extracted) value indicates discriminatory validity if the expected value is higher than the correlation value in the same block and the AVE,s value is diagonally positioned on the correlations among latent variables output by WarpPLS. According to Table 3, the value within the diagonal block exhibits a higher magnitude compared to the value within the corresponding block. Therefore, each variable satisfies the requirements for discriminatory validity.

Cronbach's alpha and composite reliability were used to evaluate the research variable reliability test. The Cronbach alpha value for each variable is more than 0.6, as shown in Table 4. The composite reliability value is higher than 0.7 as well. As a result, every construct complies with the specifications.

Table 3. Correlations among latent variables.

Variable	In_sys_Q	Ser_qual	Per_trust	Per_risk	Cus_sat
In_sys_Q	0.776	0.337	0.283	0.407	0.267
Ser_qual	0.337	0.738	0.443	0.246	0.089
Per_trust	0.283	0.443	0.745	0.352	0.300
Per_risk	0.407	0.246	0.352	0.727	0.507
Cus_sat	0.267	0.089	0.300	0.507	0.605

Table 4. Reliability test results.

Cut off value		In_sys_Q	Ser_qual	Per_trust	Per_risk	Cus_sat	Notes
Cronbach's alpha	> 0.6	0.775	0.790	0.726	0.752	0.759	All items meet the requirements
Composite reliability	> 0.7	0.857	0.857	0.831	0.770	0.749	

Note: In_sys_Q = Information system quality; Ser_qual = Service quality; Per_trust = Perceived trust; Per_risk = Perceived risk; Cus_sat = Customer satisfaction.

The average path coefficient, average R squared, and average variance inflation factor (AVIF) values are used to evaluate the goodness of fit of the model. The analysis' results are displayed in Table 5. In this instance, AVIF and APC demonstrate the multicollinearity of the independent variables and their connections. The evaluation's findings demonstrate that the study model is appropriate.

Table 5. Goodness of fit model.

Result	Value	P-value	Criteria	Description
Average path coefficient	0.225	0.000	acceptable if P < 0,001	Supported
Average R-squared	0.264	0.000	acceptable if P < 0,001	Supported
Average block VIF	1.222	0.000	acceptable if Value < 5.000	Supported

4.3. Hypothesis Testing

On the basis of the study model parameters indicated in Table 6's predicted significance value, hypothesis testing is done.

Table 6. Hypothesis testing.

H	Relationship	Standardized coefficient	P	Decision
H1	In_sys_Q → Cus_sat	0.306	0.006	Accepted
H2	In_sys_Q → Per_trust	0.185	0.000	Accepted
H3	Ser_qual → Per_trust	0.394	0.000	Accepted
H4	Ser_qual → Cus_sat	0.121	0.043	Accepted
H5	Perceived risk → Cus_sat	0.224	0.001	Accepted
H6	Per_risk *(Per_trust → Cus_sat)	0.119	0.045	Accepted

Note: → Influence; *Moderation.

There is a 0.368 influence of information system quality on customer satisfaction with a value of p = 0.06. The effect of information system quality on perceived trust is 0.185, with a p-value of 0.006. This demonstrates that H1 and H2 are recognized.

A value of p = 0.000 indicates a relationship between service quality and perceived trust of 0.394. There is a 0.121 influence of service quality on customer satisfaction with a p value of 0.043; this demonstrates that H3 and H4 are recognized.

The perceived risk, with a significance level of p = 0.001, demonstrates a significant impact of 0.224 on customer satisfaction. This demonstrates that H5 is approved.

The relationship between perceived trust and customer happiness exhibits a moderation effect of 0.119, as indicated by a statistically significant p-value of 0.045. This finding provides evidence of the approval of H6.

5. Discussion

This study reveals that the variables of information system quality, service quality, perceived trust, and perceived risk greatly contribute to the explanation of customer satisfaction among IndiHome Telkom customers in Surabaya. Additionally, this study establishes that the relationship between perceived trust and customer happiness is moderated favourably by perceived risk. For the sake of clarity, each conversation and discussion of study findings are conducted in turn as follows:

5.1. Information System Quality has a Significant Effect on Customer Satisfaction and Perceived Trust

The results of this study show that the quality of an information system significantly affects customer happiness and perceived trust. Thus, perceived trust and consumer happiness are strengthened by the quality of information systems. According to the respondents, this evidence demonstrates that IndiHome Telkom's information system in Surabaya is of high quality and dependability. The participants' responses indicate that Telkom's information system can be modified to meet specific requirements, enabling it to function effectively and be easily accessible to users. The system produces information very quickly in response to user requests.

Furthermore, it is worth noting that a significant proportion of respondents in Surabaya, specifically 38.2%, have reported using IndiHome Telkom products for a duration of 1-2 years. This demonstrates that respondents have long-term benefits from Telkom's IndiHome products. Whilst, 46.2% of the respondents are still between the ages of 17 and 30, they still appear to be young if we focus on their age-related traits. Similarly, if we consider the degree of education, 53.0% have a bachelor's degree. This study supports the findings of Wahyudi and Astuti (2015); Agani and Azis (2021) and Putra et al. (2020), research.

The contribution of the reaction time on the development of variables related to information system quality variables is significantly lower than that of the system integrity indicator. As a result, the issue of response time requires continued attention. The IndiHome system can be upgraded to boost speed and response time in order to provide this attention. The quality of the information system had a large indirect impact on user satisfaction in this study via perceived trust. This shows that the relationship between the quality of an information system and user happiness is well mediated by perceived trust. As a result, improving the quality and perceived reliability of the information system has the potential to enhance user satisfaction.

5.2. Service Quality has a Significant Effect on Perceived Trust and Customer Satisfaction

According to the study's findings, perceived trust and customer happiness are greatly influenced by service quality. As a result, customer happiness and perceived trust are strengthened by service quality. This data demonstrates that IndiHome Telkom's service quality is good and acceptable to clients. The responses of respondents who expressed satisfaction with the service quality and positive customer feedback are indicative of this. Telkom is strategically situated in close proximity to the central hub of activities within Surabaya City. The establishment of a network for IndiHome Telkom is being proposed. Employees at Telkom are competent in offering customers satisfactory services that are tailored to their demands. The results of this investigation support the findings of Uzir et al. (2021) and Fida et al. (2020).

The empathy indicator has the least impact on the elements that determine service quality, whereas the reliability indicator has more influence. As a result, empathy still requires significant focus. This attention can be achieved by teaching Telkom staff to respect all customers when interacting and speaking with them. In this study, it was also discovered that perceived trust had a large indirect impact on customer satisfaction through service quality. This shows that the relationship between service quality and customer pleasure is best explained by perceived trust, a good intervening variable. As a result, it is feasible to enhance the service quality and the perceived trust while simultaneously augmenting user satisfaction.

5.3. Perceived Trust has a Significant Effect on Customer Satisfaction

The results of this study show that customer satisfaction is influenced by perceived trust. This demonstrates how perceived trust increases client satisfaction. This study demonstrates that IndiHome Telkom consumers' perceptions of trust are positive and beneficial for users in Surabaya. This is seen in the responses of participants who claimed that Telkom is dependable in the telecoms industry due to its considerable experience. Because, Telkom's management genuinely cares about its clients, it constantly provides excellent client service and prioritise clients' satisfaction. The elevated client confidence can be attributed to the high quality of Telkom's network infrastructure. According to research on the impact of perceived trust on customer satisfaction, there will be a rise in the value of customer satisfaction if perceived trust is raised. The results of this investigation support the findings of Hasan et al. (2014), as well as Kim et al. (2011).

The reliability indicator has minor influence on the development of the perceived trust variable, whereas the honesty indicator demonstrates the most substantial impact. Consequently, the issue of reliability continues to demand careful consideration. This focus may be achieved by asking Telkom's management to regularly manage and enhance the network as well as the telecommunications system. Given its extensive experience, Telkom should strive to establish itself as a reliable entity within the communications industry.

5.4. Perceived Risk Significantly Moderates the Effect of Perceived Trust on Customer Satisfaction

The study's findings show that the large and positive association between perceived trust and customer satisfaction is moderated by perceived risk. This demonstrates how perceived risk can boost influence and perceived trust's worth in terms of consumer happiness. Consumers experience perceived risk when they are unable to foresee the outcomes of their buying decisions. Customers should be extremely cautious when purchasing a brand-new item. The aforementioned cautionary notice is also extended to prospective clients seeking to initiate their subscription with IndiHome Telkom. In light of the magnitude of the perceived risk inherent in customers' perceptions, it is imperative to maintain a substantial level of confidence in the products offered by IndiHome Telkom. The results of this study corroborate with those of Bahar et al. (2020) and Ambarwati and Isnugroho (2018). The findings of this study differ from the findings of Raiyan and Siregar (2021); Bernarto and Purwanto (2022) and Al-Zu'bi and Ahmad (2011).

Product risk indicators have the least impact on the formation of perceived risk variables, while transaction risk indicators have the highest impact. Product risk therefore still requires careful consideration. This focus can be achieved by ensuring that all transactions made by clients are transparent and safe from harm. According to the presence of a positive moderation effect, an escalation in customer perceived risk will result in an augmentation of the impact of perceived trust on customer satisfaction. Therefore, perceived risk and perceived trust can be used to raise the value of customer happiness.

6. Research Implications

This research shows several implications for researchers and added value for science. The study examines the impact of information system quality, service quality, and perceived trust on customer satisfaction. Among these factors, service quality emerges as the dominant influence on customer satisfaction. Second, the moderating effect of perceived risk can greatly affect customer satisfaction. Customer satisfaction is a key factor in the growth of customers which contributes to company profits. Hence, the enhancement of information system quality, service quality, perceived trust, and the reduction of risk perception are expected to positively influence customer satisfaction, thereby potentially attracting a larger customer base. This research model is a new model that is effective in risk perception and customer satisfaction.

7. Conclusions, Limitations and Suggestions

Based on the survey findings, the majority of IndiHome Telkom customers in the city of Surabaya were men, between the ages of 17 and 30 with a high school diploma, who were not yet married and had been using the company's goods for one to two years and who are aware of the use of information technology in labor and in creativity and who are critical thinkers in this regard.

The IndiHome Telkom system offers user-friendly accessibility while maintaining robust security measures to prevent un authorized access. It is anticipated that users will persist in utilizing IndiHome for an extended duration due to the provision of this response, which effectively instills them with a sense of assurance in the system. .

Perceived trust and customer satisfaction are positively and significantly impacted by service quality. The IndiHome Telkom network is reliable, and it rarely experiences operational issues. Customers replied by having faith in IndiHome Telkom services.

Customer happiness is positively and significantly impacted by perceived trust. The relationship between the quality of the information system and the quality of the services and satisfaction is moderated by perceived trust. A high-quality internet network called IndiHome is produced by the government-owned Telkom Indonesia. Customers of IndiHome therefore trust the company to be truthful in its product information and to fulfill all of its commitments.

The relationship between the quality of the information system and the quality of the services and satisfaction is moderated by perceived trust. The credibility of Telkom may potentially contribute to an increase in customer confidence. .

The positive and large impact of perceived trust on customer satisfaction is moderated by perceived risk. Customer satisfaction can be enhanced when the perception of risk, specifically in terms of uncertainty, is predictable during the decision-making process of utilising IndiHome.

As a limitation, this research was conducted only on IndiHome Telkom users in the city of Surabaya, therefore it is suggested for the following researchers to expand the scope of their research area, for example to the province, also consider other variables that have not become a topic of research, which can affect customer satisfaction.

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