Measuring geospatial information system success on individual performance impact

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ABSTRACT

This research will analyze the influence of the quality of sales IndiHome information system (SIIS) on individual performance. In this research, the SIIS dashboard quality aims to accommodate them using a model that meets the updated Delone and McLean model. Individual productivity is measured through the Net Individual Benefit variable. It measures the impacts obtained after using the SIIS dashboard on work success. Indihome is Telkom Indonesia broadband retail brand. In this business, the service must be installed for each house. The challenges are to provide the best service to customers, manage the chain of resources in a series of infrastructures for providing broadband services, and maintain business performance to be sustainable. Telkom Indonesia has developed a geospatial-based Sales Information System by utilizing geospatial and spatial analytics, so the data can be viewed comprehensively in one map. The interpretation of the SIIS dashboard shows that the success rate is at a high level for the six variables (system quality, user quality, information quality, information use, user satisfaction, and net individual benefit). There is also a significant effect in increasing the work productivity of SIIS dashboard users as indicated by the correlation measure between SIIS dashboard success and net individual benefits.

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1. INTRODUCTION

Since 2015, the development of cable internet services, called fixed broadband in Indonesia has changed significantly from copper infrastructure-based services to fiber-optic infrastructure-based services. Fixed broadband is important for connecting to school, work, families, and friends [1]. The internet has changed people's lifestyles [2] and economic development and productivity [3], [4]. Thus, the competition for broadband service providers has increased dramatically [5]. In the fixed broadband internet service business, the service activation process must be installed for each house using a fiber optic cable. It is in contrast to cellular services, where one base transceiver station (BTS) tower can cover a distance of 10 km. It also covers a lot of internet data users in one area. the end to end provisioning process for broadband internet services must go through a long process because it is just a series of activities such as optical line terminal (OLT), fiber termination module (FTM), optical distribution cabinet (ODC), optical distribution point (ODP), and network terminating equipment (NTE) devices in each customer's home. This shows signs of its adoption rate stagnating as the affordability of subscriptions increases, especially in developing countries [6]. Fixed broadband providers must be able to answer customer requests and install their services quickly to create a good customer experience.

Telkom Indonesia as world-class telecommunication makes customer satisfaction one of its goals. Customer satisfaction strongly influences product competition [7] and corporate development [8]. One of Telkom's services is broadband internet retail, namely Indihome. Fiber optics includes a long-standing and simple [9] that supports many communication services, including residential, enterprise, and cellular services [10]. It allows computers and telephone lines connected using fiber optic cable [11]. Meanwhile, the performance of an optical fiber or optical fiber depends on the subtle interactions between light, the material from which the fiber is made, and the waveguide structure [12]. The fiber optic infrastructure scheme starts with FTM. There is an optical distribution frame (ODF) connected using a fiber optic feeder cable to the ODC to the distribution point closest to the customer's house, namely ODP. Each stage has an inventory capacity (occupancy). This is the most important aspect to meet the customers' demands related to broadband services. If there is no occupancy of production equipment known by the sales team and the infrastructure, the ability to penetrate sales and return on investment will be very low.

The main challenges are to provide the best service to customers, manage the chain of resources in a series of infrastructures for providing broadband services, and maintain business performance to be sustainable. It is necessary to change the implementation of the dashboard performance management system based on numerical to geospatial. By utilizing geospatial analytics which consists of geographic information system (GIS) technology and spatial analytics, the data in the broadband internet service process can be viewed comprehensively in one map. The data can also be monitored and evaluated. It can also accelerate decision-making in terms of infrastructure development and acceleration of sales penetration [13]. GIS is a digital technology that integrates hardware and software to analyze, store, and map spatial data [14]. It is a device to capture, store, manipulate, manage and visualize spatial or spatiotemporal data [15]. This is an effective information device to deal with spatial data and complex interactions in cities and state constructions [16]. It is also important in the management and planning of technology distribution including even electricity [17]. PT Telkom has developed a geospatial-based sales information system since July 2017 with only six display layers, namely the occupancy ODP layer, the technician layer, the sales force layer, the mobi layer (mobile IndiHome), the demand layer, and the work order layer for broadband internet installations. In 2021, the sales IndiHome information system (SIIS) dashboard had ten data groupings and 35 information data layers [13]. This dashboard summarizes a large amount of information and has become a topic of public interest [18]. It can support intuitive monitoring and visualization of business performance information [19].

The researcher conducts a literacy study on previous studies, especially related to the DeLone and McLean model. They include renewables related to dimension, indicators and the implementation of GIS in information systems. The researcher does not find a study with the same title. From the results of the literature reviews, the researcher combines some dimensions and indicators in DeLone and McLean suitable for this research. In previous studies, the DeLone and McLean models are used with model and attribute adjustments. These adjustments are based on the implementation of information systems in different industries.

This study cites two more studies: Eldrandaly *et al*. [20], Urbach and Müller [21]. The renewable aspect of the Delone and McLean concept was provided by Urbach and Müller [21]. It is derived from research as an alternate metric for evaluating the performance of an IT project. To evaluate the success of an information system implementation based on a geographic information system, Eldrandaly *et al*. introduced the Delone and McLean renewal model. System quality, user quality, information quality, information use, user satisfaction, and net benefits are all new additions to the measuring methodology for the success of implementing an information system.

The evaluation method uses quantitative analysis by surveying SIIS dashboard users. The quantitative analysis refers to the the journals of Eldrandaly *et al*. [20] and updated Delone and McLean model [21]. This research will analyze the influence of the quality of the SIIS on individual performance. Quality in operational excellence refers to the golden triangle (operational excellence), people, processes, and tools. In this research, the dashboard quality aims to accommodate them using a model that meets the updated Delone and McLean model. The updated Delone and McLean are those described in Eldrandaly *et al*. [20]. They are system (tool), user (people), information (process), and impact (benefits). The updated Delone and McLean model uses attributes from two journals, namely the journal of Eldrandaly *et al*. [20] and updated Delone and McLean model [21], including system quality, user quality, information quality, information use, user satisfaction, and net benefits. Individual productivity is measured through the Net Individual Benefit variable. It measures the impacts obtained after using the SIIS dashboard on work success. This is because many different people use the internet and will benefit from it [22]. The benefits may be in terms of economic, cultural, social, and personal aspects [23]. The people are different in age and educational levels [24].

2. METHOD

Delone and McLean are mentioned as modelers. The study's overarching goal is to determine what factors influence the viability of IT projects. Since 1992, the model created by DeLone and McLean has been used as a standard. Six factors-system quality, information quality, utilization, user satisfaction, individual impact, and organizational effect-are outlined in this model as ways to evaluate the performance of an information system [25] as illustrated in Figure 1.

Delone and McLean's 2002 update to their seminal work on the topic of information system deployment combines the effects on persons and organizations into a single metric they call "Net Benefit," the scope of which extends beyond local communities and even entire countries. The author of this study cites DeLone's revisions throughout. New versions of the traits are provided by Eldrandaly *et al*. [20], Urbach and Müller [21] as illustrated in Figure 2.

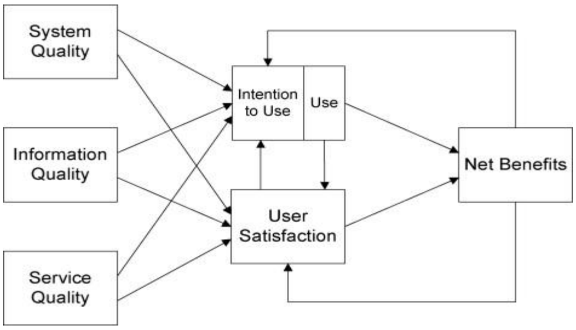

Figure 1. DeLone and McLean successful model of information system

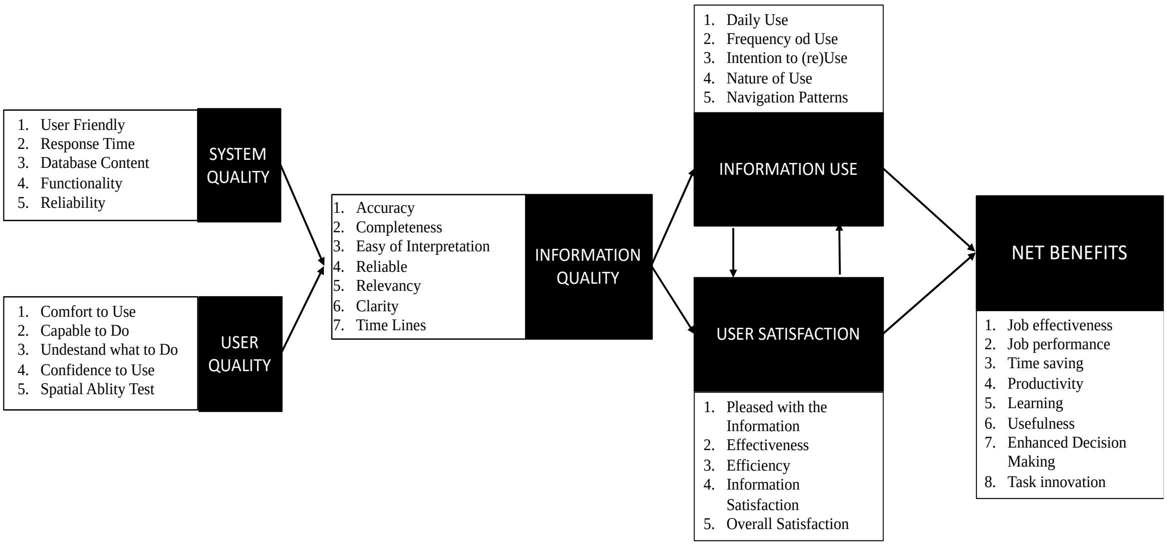

Figure 2. Updated Delone and McLean's model

The data are primarily obtained directly through filling out questionnaires. The sampling includes random sampling, simple random sampling, and cluster-based techniques. The relationship among the dimensions in the research model uses variance-based structural equation modeling (SEM) analysis techniques or component-based SEM. It is also known as partial least square (PLS). The primary data are collected using questionnaires distributed online to 808 SIIS dashboard users.

3. RESULTS AND DISCUSSION

3.1. Analysis of respondents' characteristics

The respondents' characteristics consist of gender, age, education, and SIIS certificate as displayed in Table 1. The answers to the questionnaires can describe the respondents' identities. There are 82% male respondents. The female ones are 18%. This shows that SIIS dashboard users are generally men. In general, the respondents' age is around 20-30 (38%), and there are only some who are 30-40 (17%). It means that SIIS dashboard users are generally of productive age. In terms of the level of education, most respondents have a D4/S1 (undergraduate) certificate (78%). Other respondents are graduates of the vocational/senior high school, D1, D3, master, and doctoral programs. This shows that SIIS dashboard users generally have a high level of education. Most respondents do not have an SIIS certificate (58%). Another 42% of respondents already have it. SIIS certification aims to ensure that the users understand how to use the SIIS dashboard including menus that can be accessed and combined so that they get useful information to support their daily work. Given the speed of change in the placement of employees at PT Telkom, training and certification must be carried out for new users of the SIIS dashboard.

Table 1. Demographic of the respondents

Demographic respondents (N=808)					
Characteristics	Frequency	Percent (%)	Characteristics	Frequency	Percent (%)
Gender			SIIS Certification		
Male	663	82%	Certified	339	42%
Female	145	18%	Not Certified	469	58%
Age			Education		
20-30	307	38%	High School	73	9%
30-40	138	17%	Vocational	8	1%
40-50	195	24%	Undergraduate	630	78%
> 50	168	21%	Master	97	12%

3.2. Descriptive statistical analysis of research variables

The objective of the descriptive statistical analysis is to determine the pattern of responses to the survey. Using a scale from 1 (strongly disagree) to 5 (strongly agree), it also calculates the percentage of yes/no responses for each variable. Information is compiled in a Table 2 to each variable. The tabulated data are grouped and interpreted to determine the level of value of the respondents' answers. Based on the data analysis, the system quality has an overall average value of 3.95, as shown in Table 2. It means that most respondents choose option 3 (neutral) which means that SIIS dashboard users are quite good in terms of system quality.

User quality has an overall average value of 3.86. It shows that most respondents choose option 3 (neutral) which means that SIIS dashboard users are quite good in terms of user quality. The lowest item average is uq4 (I have confidence that I can use the SIIS dashboard well) with a value of 3.19. In terms of user quality, this aspect can be further improved. Confidence in using the SIIS dashboard is the lowest among the answer values in the user quality variable. This value is influenced by knowledge and understanding in reading maps and using data layers. Telkom certifies the use of SIIS to ensure that SIIS dashboard users have an understanding and knowledge of operating it. When the researcher distributes the questionnaires, only 42% of users have received certification.

The information quality has an overall average value of 3.95. It means that most SIIS dashboard users feel that the information already has a good quality. Classification of these values shows that the information quality on the SIIS dashboard is high. The lowest item average is number iq1 (I get accurate information while using the SIIS dashboard) with an average value of 3.66. Even though the interpretation of the information quality has been good, this needs to be a concern to identify why item accuracy is rated low compared to other information quality items. Follow up information such as distribution frequency of information use, user satisfaction variable. Currently, the SIIS dashboard has ten data groupings and 35 data layers. The data are updated based on their types daily, weekly, or monthly. Based on the results related to the data accuracy, the researcher rechecked the SIIS data validation in the first week of August 2021. Meanwhile, the information used has an average value of 3.80. It means that the SIIS dashboard users feel that the information used already has good quality. Classification of these values means the information used on the SIIS dashboard is high. The lowest item average is iu5 (my frequency of using the SIIS dashboard is very often) with an average of 3.53.

User satisfaction has an average value of 3.89. It means that the respondents are satisfied with the SIIS dashboard. The lowest average item is number us5 (I am satisfied with the data and information presented on the SIIS dashboard) with an average value of 3.79. User satisfaction can be further improved.

The Individual impact has an average value of 3.95. It means that the respondents feel good in terms of net individual impact. Interpretation of values refers to the individual net impact of the high classification. The lowest average item is number ii4 (I feel my work productivity has increased by using the SIIS dashboard) with an average value of 3.81. In terms of individual impact, this aspect can be further improved.

Table 2. Frequency distribution of construct's items

Construct (mean)	Items	SD	D	N	A	SA	Mean
System quality (3.95)	sq1	5	19	81	265	207	4.13
	sq2	6	38	127	237	169	3.91
	sq3	15	71	152	227	112	3.61
	sq4	1	11	89	290	186	4.12
	sq5	5	25	132	232	183	3.98
User quality (3.86)	uq1	5	30	133	250	159	3.92
	uq2	1	20	109	273	174	4.04
	uq3	1	18	98	288	172	4.06
	uq4	10	82	274	210	1	3.19
	uq5	5	16	98	268	190	4.08
Information quality (3.95)	iq1	12	55	155	250	105	3.66
	iq2	6	36	130	265	140	3.86
	iq3	3	16	93	291	174	4.07
	iq4	3	17	93	260	204	4.12
	iq5	3	17	87	265	205	4.13
	iq6	3	20	107	282	165	4.02
	iq7	10	42	169	236	120	3.72
	iq8	2	13	95	278	189	4.11
	iq9	3	21	136	279	138	3.92
Information use (3.80)	iu1	22	42	172	208	133	3.67
	iu2	10	30	127	245	165	3.91
	iu3	6	23	113	237	198	4.04
	iu4	7	28	150	245	147	3.86
	iu5	36	54	170	201	116	3.53
User satisfaction (3.89)	us1	6	34	151	254	132	3.82
	us2	4	13	113	267	180	4.05
	us3	7	18	150	248	154	3.91
	us4	8	24	140	255	150	3.89
	us5	8	45	140	251	133	3.79
	us6	5	29	138	260	145	3.89
Individual impact (3.95)	ii1	4	18	104	286	165	4.02
	ii2	7	25	154	259	132	3.84
	ii3	6	33	120	274	144	3.90
	ii4	4	39	142	267	125	3.81
	ii5	4	22	106	261	184	4.04
	ii6	4	13	100	274	186	4.08
	ii7	4	20	107	288	158	4.00
	ii8	6	20	145	266	140	3.89

3.3. Evaluation of the reflective outer model or indicator test

3.3.1. Convergent validity test

The retrieved values of factor loading and average variance are used in the convergent validity test. If the item's factor loading value is more than 0.70, it can be considered valid. If the AVE is greater than 0.50 Ghozali and Latan [26] and the correlation between variables is less than the AVE root, then the data is satisfactory. If the item's factor loading value is greater than 0.7 and its significance value is less than 0.05, then the item can be considered genuine. Each item in each variable has a factor loading value greater than 0.7 (Table 3), as demonstrated by the results. Thus, everything is ok. The results also demonstrate that the study model's average variance extraction (AVE) value is more than 0.5 across the board for all research variables as displayed inTable 4. The AVE value for convergent validity testing is within the realm of possibility. As a result, the criterion of convergent validity has been met.

3.3.2. Discriminant validity test results

Discriminatory testing is the next step in validating a hypothesis. The construct's cross-loading value and the root of the average variance extracted are used to determine the significance of the result (AVE). The cross loading factor compares the correlation between indicators and other latent variables to determine whether the latent variable has a sufficient discriminant [26]. If the factor loading value is greater than 0.70, the indicator of factor loading in variable construction must be greater than for other indicators [27]. A greater correlation value is found between the construct and its indicators for the system quality role, as determined by the discriminant validity test. Because it can predict indicators on the system quality role better than indicators in other blocks, it follows that the latent construct has excellent discriminant validity.

3.3.3. Reliability test

If the response to a question in a survey is constant throughout time, we can conclude that the survey is trustworthy [28]. Cronbach's alpha and the value of composite reliability are used to determine the level of reliability using the PLS technique. Composite dependability, often known as alpha, is considered adequate if it is greater than 0.7. Each variable in the research model has a composite reliability value greater than 0.70, as shown by the composite reliability value in Table 5. As a result, the research model has achieved the required composite reliability value, and the results can be trusted. Furthermore, cronbach's alpha values for all variables in the research model are greater than 0.70 as shown in Table 5. Cronbach's alpha is the standard for determining the reliability of a research model, and its fulfillment indicates that the research in question may be trusted.

Table 3. Convergent validity and discriminant validity based on cross loading value

	Convergent validity on factor loading value			Discriminant validity based on cross loading value					
Item	Loading factor	P values	Note	X1	X2	Y1	Y2	Y3	Y4
sq1 ← X1	0.808	0.000	Valid	**0.808**	0.753	0.677	0.625	0.682	0.642
sq2 ← X1	0.819	0.000	Valid	**0.819**	0.709	0.659	0.589	0.683	0.618
sq3 ← X1	0.795	0.000	Valid	**0.795**	0.609	0.725	0.523	0.687	0.573
sq4 ← X1	0.820	0.000	Valid	**0.820**	0.726	0.744	0.600	0.691	0.662
sq5 ← X1	0.867	0.000	Valid	**0.867**	0.732	0.806	0.699	0.767	0.725
uq1 ← X2	0.827	0.000	Valid	0.813	**0.827**	0.771	0.658	0.787	0.708
uq2 ← X2	0.869	0.000	Valid	0.763	**0.869**	0.722	0.644	0.727	0.663
uq3 ← X2	0.860	0.000	Valid	0.680	**0.860**	0.718	0.633	0.678	0.636
uq4 ← X2	0.885	0.000	Valid	0.738	**0.885**	0.761	0.666	0.735	0.714
uq5 ← X2	0.832	0.000	Valid	0.664	**0.832**	0.720	0.620	0.675	0.659
iq1 ← Y1	0.774	0.000	Valid	0.741	0.637	**0.774**	0.549	0.717	0.600
iq2 ← Y1	0.845	0.000	Valid	0.763	0.717	**0.845**	0.634	0.765	0.689
iq3 ← Y1	0.842	0.000	Valid	0.754	0.799	**0.842**	0.649	0.739	0.690
iq4 ← Y1	0.867	0.000	Valid	0.768	0.765	**0.867**	0.719	0.766	0.777
iq5 ← Y1	0.854	0.000	Valid	0.709	0.739	**0.854**	0.715	0.743	0.767
iq6 ← Y1	0.827	0.000	Valid	0.714	0.734	**0.827**	0.643	0.736	0.706
iq7 ← Y1	0.817	0.000	Valid	0.742	0.647	**0.817**	0.562	0.743	0.634
iq8 ← Y1	0.855	0.000	Valid	0.722	0.740	**0.855**	0.717	0.739	0.767
iq9 ← Y1	0.855	0.000	Valid	0.742	0.730	**0.855**	0.674	0.769	0.723
iu1 ← Y2	0.898	0.000	Valid	0.628	0.623	0.658	**0.898**	0.678	0.728
iu2 ← Y2	0.909	0.000	Valid	0.666	0.704	0.721	**0.909**	0.726	0.779
iu3 ← Y2	0.856	0.000	Valid	0.629	0.646	0.679	**0.856**	0.666	0.737
iu4 ← Y2	0.820	0.000	Valid	0.728	0.724	0.730	**0.820**	0.748	0.726
iu5 ← Y2	0.879	0.000	Valid	0.568	0.579	0.599	**0.879**	0.641	0.705
us1 ← Y3	0.908	0.000	Valid	0.784	0.764	0.795	0.707	**0.908**	0.781
us2 ← Y3	0.883	0.000	Valid	0.760	0.760	0.802	0.749	**0.883**	0.840
us3 ← Y3	0.919	0.000	Valid	0.758	0.774	0.798	0.764	**0.919**	0.871
us4 ← Y3	0.922	0.000	Valid	0.782	0.817	0.804	0.740	**0.922**	0.835
us5 ← Y3	0.866	0.000	Valid	0.757	0.674	0.793	0.640	**0.866**	0.724
us6 ← Y3	0.922	0.000	Valid	0.799	0.782	0.839	0.705	**0.922**	0.823
ii1 ← Y4	0.918	0.000	Valid	0.751	0.759	0.807	0.794	0.850	**0.918**
ii2 ← Y4	0.913	0.000	Valid	0.714	0.711	0.760	0.782	0.835	**0.913**
ii3 ← Y4	0.929	0.000	Valid	0.745	0.752	0.786	0.791	0.855	**0.929**
ii4 ← Y4	0.933	0.000	Valid	0.731	0.725	0.782	0.796	0.851	**0.933**
ii5 ← Y4	0.908	0.000	Valid	0.713	0.717	0.768	0.758	0.813	**0.908**
ii6 ← Y4	0.904	0.000	Valid	0.708	0.731	0.772	0.775	0.802	**0.904**
ii7 ← Y4	0.913	0.000	Valid	0.704	0.708	0.767	0.749	0.804	**0.913**
ii8 ← Y4	0.845	0.000	Valid	0.636	0.645	0.686	0.680	0.721	**0.845**

Table 4. Convergent validity based on AVE

Variable	AVE	Note
System quality (X1)	0.676	Valid
User quality (X2)	0.731	Valid
Information quality (Y1)	0.702	Valid
Information use (Y2)	0.762	Valid
User satisfaction (Y3)	0.817	Valid
Individual impact (Y4)	0.825	Valid

Table 1. Composite reliability and cronbach's alpha values

Variable	Composite reliability	Prerequisite	Note	Cronbach's alpha	Prerequisite	Note
System quality (X1)	0.912	> 0,70	Reliable	0.880	> 0,70	Reliable
User quality (X2)	0.931	> 0,70	Reliable	0.908	> 0,70	Reliable
Information quality (Y1)	0.955	> 0,70	Reliable	0.947	> 0,70	Reliable
Information use (Y2)	0.941	> 0,70	Reliable	0.922	> 0,70	Reliable
User satisfaction (Y3)	0.964	> 0,70	Reliable	0.955	> 0,70	Reliable
Individual impact (Y4)	0.974	> 0,70	Reliable	0.970	> 0,70	Reliable

3.3.4. Structural model evaluation (inner model) or hypothesis testing

Coefficient of determination test/R square (R2): as illustrated in Table 2, R-squared value of 0.822 for the information quality variable can be deduced from the coefficient of determination results. This demonstrates that the quality of the system and the users can have an 82.2% impact on the quality of the information. There is an R-squared value of 0.607% for the information utilization variable. This indicates that system quality, user quality, and information quality can all have an 82.2% impact on how well information is used. In terms of reliability, the user-satisfaction metric scores a 0.819. It shows that 82.2% of user satisfaction may be attributed to system quality, user quality, information quality, and information utilization. Meanwhile, the R-squared value for the unique effect variable is 0.855. Thus, factors such as system quality, user quality, information quality, information utilization, and user happiness can have a combined 85.5% impact on user satisfaction.

Table 2. R square (R^2) values of the research model

Variable	Determinant coefficient
Information quality (Y1)	0.822
Information use (Y2)	0.607
User satisfaction (Y3)	0.819
Individual impact (Y4)	0.855

Goodness of fit index test (GoF): the GoF index turns out to be 0.764 based on the calculations. When the GoF score is more than 0.25, it can be inferred that both the measurement model (outer model) and the structural model (inner model) work satisfactorily (moderate scale). According to the group of experts' findings, the structural model is workable and provides adequate explanatory power over the population or the real situation.

Predictive relevance test (Q2): an value of 0.998 is obtained from the predictive relevance (Q2) analysis. This study's predictive relevance value (Q2) for the endogenous latent variable is greater than 0. (zero). In this sense, the external latent variable can serve as a useful explanatory variable. Additionally, it can foretell the endogenous variable (performance). In other words, it demonstrates the model's usefulness for making predictions.

Hypotesis testing: as displayed in Table 3, a correlation coefficient of 0.531 between system quality and information quality is found to be statistically significant. The corresponding T-statistic and P-calue are 11.700 and 0.0001, respectively (significance lower than 0.05). Since the coefficient value is positive, it may be inferred that there is a positive relationship between the system quality variable and the information quality variable. In turn, higher system quality will result in higher data quality. The quality of the user has a substantial impact on the quality of the information provided (correlation coefficient of 0.409). T-value=8.860 and p-value=0.000 (significance lower than 0.05). When the value of the coefficient is positive, it indicates that the user quality variable influences the information quality variable favorably. When user quality improves, data quality improves alongside it. In the meantime, the quality of the information has a 0.779 correlation with how often it is used. T-value=36.533, and the corresponding P-value is 0.000. (Significance lower than 0.05).

Since the coefficient value is positive, we can infer that there is a positive relationship between information quality and information application. When the quality of available data improves, so does its application. The correlation between information quality and user happiness is quite high, at 0.690. T-value=19.605 and p-value=0.000 (significance lower than 0.05). Since the coefficient has a positive value, we can infer that higher-quality information has a beneficial impact on users' overall satisfaction. When information is of higher quality, users are happier.

With a correlation of 0.257, information use is significantly related to end-user happiness. The t-value is 6.592, and the p-value is 0.000 (significance lower than 0.05). If the value of the coefficient is positive, then we can infer that there is a positive relationship between the information-use variable and the user-satisfaction variable. When information is used more effectively, it increases user happiness. The coefficient for the impact of information consumption on net individual benefit is 0.348. P-values are 0.000 and the T-statistic is 8.829. (Significance less than 0.05). Since the coefficient value is positive, we can infer that there is a positive relationship between information utilization and individual impact. Increased effectiveness results from more efficient information processing.

In addition, the contentment of the users has a 0.348 correlation with the net individual benefits. T-statistic=16.973, and the corresponding P-value=0.000 (significance lower than 0.05). There is a positive coefficient value. It indicates a positive correlation between user happiness and personal impact. If users are happier, they can have more of an effect. Contrarily, lower user satisfaction means also lower individual impact. There are different findings when compared with the reference journal or previous research. They act as a model with the attributes in the research variables complemented by the attributes studied in previous ones. The Figure 3 presents the results of the structural equation.

Table 3. Path coefficient and P-values

Variable	Original sample (O)	Sample mean (M)	Standard deviation (Stdev)	T statistics (|O/Stdev|)	P-values
X1 → Y1	0.531	0.531	0.045	11.700	0.000
X2 → Y1	0.409	0.409	0.046	8.860	0.000
Y1 → Y2	0.779	0.779	0.021	36.533	0.000
Y1 → Y3	0.690	0.691	0.035	19.605	0.000
Y2 → Y3	0.257	0.256	0.039	6.592	0.000
Y2 → Y4	0.348	0.351	0.039	8.829	0.000
Y3 → Y4	0.623	0.620	0.037	16.973	0.000

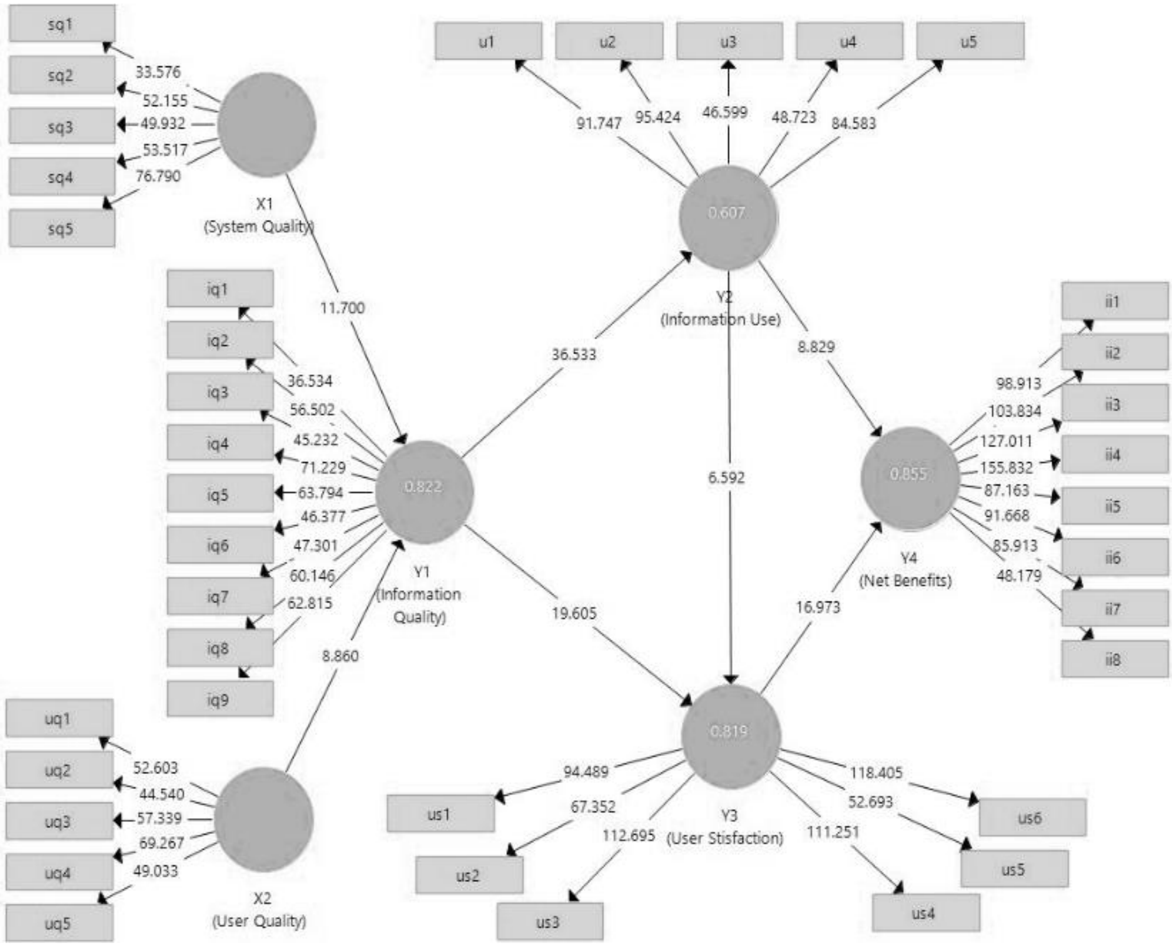

Figure 3. Path coefficient calculation results of research model

3.4. Discussion

3.4.1. Influence of quality-on-quality variable

System quality positively influences information quality: as shown in path coefficient and P-values in **Error! Reference source not found.**, the quality of the system has a profound impact on the accuracy of the d ata. With a value of 0.531, system quality is a major factor in how useful the data is. The corresponding T-statistic and P-value are 11.700 and 0.0001, respectively (significance lower than 0.05). There is a positive coefficient value. That the quality of the system has a beneficial effect on the information quality variable. When system quality is high, data is also high, and vice versa when system quality is low.

User quality positively influences information quality: information quality is heavily impacted by the caliber of the users who access it. The quality of the user has a substantial impact on the quality of the information provided (correlation coefficient of 0.409) as displayed in Table 7. We find a T-statistic of 8.860

and a P-value of 0.000. (Significance lower than 0.05). Having a good coefficient value, the quality of the user has a favorable effect on the quality of the information. Better user quality indicates better information quality, while lower user quality leads in worse information quality.

Information quality positively influences information use: as shown in Table 7, the quality of information has a major impact on how often it is used. The correlation coefficient between information quality and information utilization is 0.779. The corresponding T-statistic and P-value are 36.533 and 0.0001, respectively (significance lower than 0.05). Since the coefficient value is positive, we can infer that there is a positive relationship between information quality and information application. When information quality is high, its use is high, and vice versa when it is low.

Information quality positively influences user satisfaction: the quality of the information provided has a major bearing on how happy the end user is with the service. The correlation between information quality and user happiness is quite high, at 0.690. T-statistic=19.605, P-value=0.000 (significance lower than 0.05) as shown in Table 7. When the coefficient is positive, it indicates that there is a positive relationship between information quality and user pleasure. As information quality improves, user satisfaction rises, and vice versa.

Information use positively influences user satisfaction: use of information has a considerable impact on end-user happiness. With a correlation of 0.257, information use is significantly related to end-user happiness. A 6.592 T-statistic and a 0.0001 P-value indicate statistical significance (significance lower than 0.05) as shown in Table 7. The coefficient has a positive value, indicating a positive relationship between information utilization and user happiness. If users make greater use of the information provided, they will be more satisfied.

Information use positively influences individual impact: applying knowledge has a profound effect on one's influence. The correlation between information utilization and personal influence is quite high at 0.348. T-statistic=8.82, and the corresponding P-value=0.000 (significance lower than 0.05) as shown in Table 7. Since the coefficient was positive, we can infer that there was a positive relationship between information utilization and personal impact. Individual influence increases in proportion to the degree to which one makes use of available information, and vice versa.

User satisfaction positively influences net individual benefit: an individual's net gain is significantly influenced by how happy they are as a user. With a value of 0.348, user happiness is a major factor in determining net individual benefits. T-statistic=16.973, and the corresponding P-value=0.000 (significance lower than 0.05) as shown in Table 7. Individual impact is positively related to user pleasure, as indicated by the positive coefficient value. When users are happier, they reap more benefits.

3.5. Analysis of the quality of the dashboard and information on the performance of individual users

3.5.1. Impact analysis on individual user performance

Besides the quantitative survey aspect, four indicators can determine the impact of the IndiHome information system sales dashboard implementation on the users. There are 808 mandatory users. Operationally, there are registered 54,229 users that can measure the impact of the dashboard implementation since March 14, 2018 [13]. The implementation is calculated based on some points: i) aspects of productivity sales force from 0.3 to 0.6. per day/sales force as shown in Figure 4. There is a 100% increase in productivity. After the SIIS dashboard application, everyone and half days get a new install order; ii) increased sales force productivity will increase Indihome's accumulative sales. In 2018, IndiHome Sales growth increased by 468,555 SSL or 78.57% due to the existence of SIIS. However, after the dashboard, the occupancy of number of black ODP (occupancy 0) decreased drastically as shown in Figure 4. The unused amount (zero occupancy) decreased by 40.15 K or decreased by -30.38% from before the implementation of SIIS so that the optimization performance reached 143.64%; and iii) the productivity of home service/consumer service managers who are responsible for overseeing the achievement of increased sales targets. This can be seen through the increase in sales force productivity as described in point 1. The measurement can also be through sales productivity and open tables through IndiHome cars and planning product penetration. All of them are based on the condition of the front view of prospective customers' houses (seen from the Google Street view menu). Currently, IndiHome sales rate is stable in the range of 6,000-7,000 customers per day or 180,000 customers per month; iv) technician productivity, especially in terms of internet service installation time as shown in Figure 5, because technicians can see the location where the customer will install IndiHome services (from which ODP the fiber network will be distributed to customers' homes). The repair personnel can also check individual or mass disturbances at certain sites; and v) SIIS dashboard user productivity for users involved in the expansion and development of broadband access infrastructure viewed from the indicators of development accuracy where the occupancy level of each ODP is built. Before the SIIS dashboard, there was a lot of duplication of ODP development in one location and ODP development that was not on target (there was no potential demand).

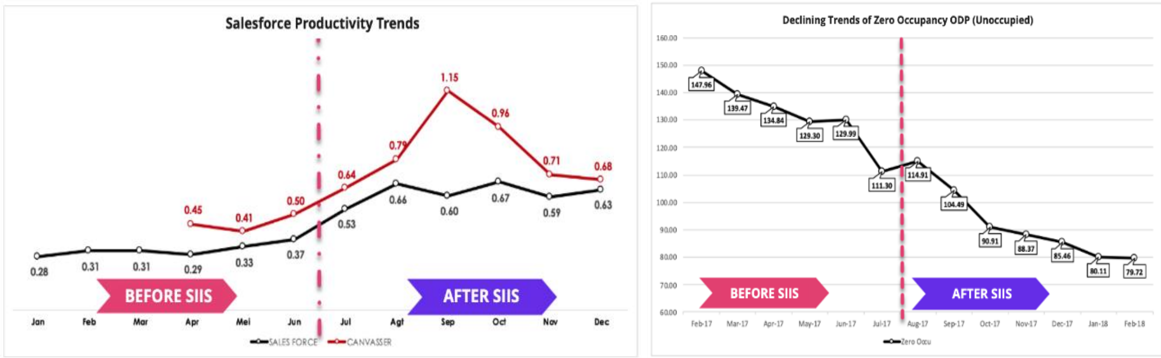

Figure 4. Sales force productivity trends and trend in the number of ODP zero occupancy

Figure 5. Time to install (TTI) internet service order

3.5.2. Delone and McLean dimensional analysis in measuring SIIS dashboard quality

The survey results show the average dashboard user assessment and the relationship of influence among dimensions. The analysis of the survey results explains the estimated causes and possibilities. The analysis shows that each attribute may be high or low. There is an approach with two discussions, namely an analysis related to user assessment of the measured variables and the relationship between each variable, and an analysis of the impact of user performance.

System quality variable: this variable measures the quality of the system through the attributes of ease of use, speed of access, data accuracy, features, and system reliability. The results of the analysis based on survey results and interpretations show that it has a good category by SIIS dashboard users. The lowest attribute (even though it is still in the good category) is data accuracy. The low value in data accuracy is because there are several outdated data layers as described in the BOT daily report related to SIIS validation data (sampling). Meanwhile, the results of the analysis of the effect of system quality on information quality prove that system quality affects information quality.

User quality variable: the survey results show that this variable has an average value of 3.86 (Table 2). It means the users rate it as good against the number of SIIS users. The analysis results of the attributes with the lowest user quality and only categorized as good enough are those related to user confidence in using and operating the SIIS dashboard. The root of the low user confidence is based on the respondents' profiles who have received training and certification in using the SIIS dashboard. There are 58% of respondents who does not have an SIIS certificate as. The rest (42%) already have an SIIS certificate. The SIIS dashboard is very different from a numerical-based dashboard. Therefore, it is mandatory to have training and certification, so that users can operate, read, and explore SIIS features and menus properly, especially in reading geospatial-based information. The results of the analysis of the influence of user quality on the quality of information prove that the users' quality affects the information quality. If the user does not understand and cannot operate the dashboard properly, the available information cannot be explored and used for helping with his daily work.

Information quality variable: this variable is the attribute measured in terms of the accuracy of information. The next aspects are information completeness, ease of understanding, data and information usefulness, relevance factor to the work, data presentation and display, proximity of the truth to the required information, the scope of the data, and information presentation time. The analysis of the survey results shows that the interpretation is good. The users feel the information has good quality. In detail, the data from the user's attributes also rate good. If something is getting lower than the other attributes, it is related to the accurate and precise attributes of the information obtained. The low data accuracy is because there are still outdated data layers on the SIIS dashboard. Weak precision of the evaluation results may be due to the street view layer. The street view data may be non-licensed and use free data from Google (the latest update of this data was in 2015). The results of the analysis of the effect of information quality on the use of information and user satisfaction show a significant relationship or influence. If the information quality is good, the intensity of use and user satisfaction in utilizing and operating the dashboard will also be at a good interpretation level.

Information use variable: the measurement of information use aims to determine the frequency and intensity of the use and operation of the SIIS dashboard in terms of the quality of information by users (Table 2). The measured attributes are daily use, frequency of use, the intensity of use if used repeatedly, need for information use and use of SIIS, and understanding of usage guidelines. From the operational side, 808 users are using SIIS dashboard. It is shown from the response when there is a disturbance in the SIIS dashboard. If SIIS is disrupted, there will be a lot of complaints from users in every operational group, even up to the Vice President level. This is supported by the analysis of the survey results. The average user assessment of the attributes in the use of information is 3.8 (good). The analysis results show the effect of the use of information on user satisfaction and the impact on individuals.

User satisfaction variable: these variable measures user satisfaction which includes effectiveness, efficiency, convenience, satisfaction with information, and overall satisfaction. Survey results show SIIS user satisfaction in total is good and on average the assessment of each attribute is also good.

Net individual benefit: it is of concern in this research because it determines if the SIIS dashboard (after being rated as good in each variable) can have a positive impact on the performance of its users. It also explains the real results in the field of how the users' productivity increases very significantly. The survey analysis results show that the SIIS dashboard has a very positive impact on users. The average value is in a good category.

4. CONCLUSION

Based on the results of a survey of SIIS dashboard users, the interpretation of the SIIS dashboard shows that the success rate is at a high level for the six variables (system quality, user quality, information quality, information use, user satisfaction, and net individual benefit). There is also a significant effect in increasing the work productivity of SIIS dashboard users as indicated by the correlation measure between SIIS dashboard success and net individual benefits: i) there is a significant effect of information use on individual impact. Information use has a significant effect on net individual benefit with a coefficient of 0.348 and ii) there is a significant effect of user satisfaction on individual impact. User satisfaction has a significant effect on net individual benefits with a coefficient of 0.623. Meanwhile, there is a significant effect in increasing the work productivity of SIIS dashboard users based on the achievement of KPI users.

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