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EVALUATING THE MODEL OF REALIZATION OF THE BENEFITS OF THE SUCCESS OF THE STRATEGIC PLANNING INFORMATION SYSTEM AT HIGHER EDUCATION IN INDONESIA

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Abstract. *Information System Strategic Planning (ISSP) at Higher Education in Indonesia is still very much needed because it can provide the realization of benefits for success. Success can be felt in terms of benefits realization. Currently, there are many studies related to the ISSP; however, there are still not many studies that discuss the evaluation of a successful ISSP model in terms of its benefit realization. The purpose of this study is to evaluate a model for the realization of the benefits of the success of strategic planning in information systems using Partial Least Squares Structural Equation Modeling (PLS-SEM). This evaluation used a purposive sampling method involving 166 respondents from the results of both online and offline survey activities at Higher Education in Indonesia. The application used for data processing from this evaluation activity is SmartPLS 3.1. The results of this study are statistical results that all variables in the model being evaluated provide validity, reliability, and the power of estimation between variables to the model as a whole. These results are expected to contribute both theoretically and practically in planning the success of the ISSP in Higher Education.*
Keywords: Evaluating model, PLS-SEM analysis, Benefits realization, Information System Strategic Planning

1. **Introduction.** PLS-SEM analysis activities in evaluating a model [1,2] are activities that have been carried out by many researchers. This activity is important in ensuring that the model can provide validity, reliability, and the power of estimation between variables so that it can generalize to the applicable population. Evaluating the model can be done serially, namely evaluating the outer model first and then evaluating the inner model. Evaluating the outer model emphasizes activities to obtain unobserved variables by representing latent variables to assess the validity and reliability of a model [2]. Evaluating the inner model places more emphasis on activities to show the power of estimating latent variables by predicting the relationship between variables from a model. The activity of evaluating this model is certainly not considered attractive anymore for expert researchers, but for novice researchers, and this is a very useful input for improving skills in evaluating a model [3]. Besides, this study emphasizes the theme of realizing the

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benefits of ISSP which may have rarely been encountered in previous studies despite having the same study population.

In this study, the object of evaluation is the Information Systems Strategic Planning Benefit Realization Model (ISSPBRM) as shown in Figure 1 [5]. The evaluation that has been done is the evaluation of the outer model and inner model of the ISSPBRM. The population taken as a sample is Higher Education in Indonesia. In reaching the completion of this study, two questions were directed, namely RQ1 and RQ2.

RQ1: What are the statistical results and evaluation results of the ISSPBRM outer model?
RQ2: What are the statistical results and the results of the inner model evaluation of the ISSPBRM?

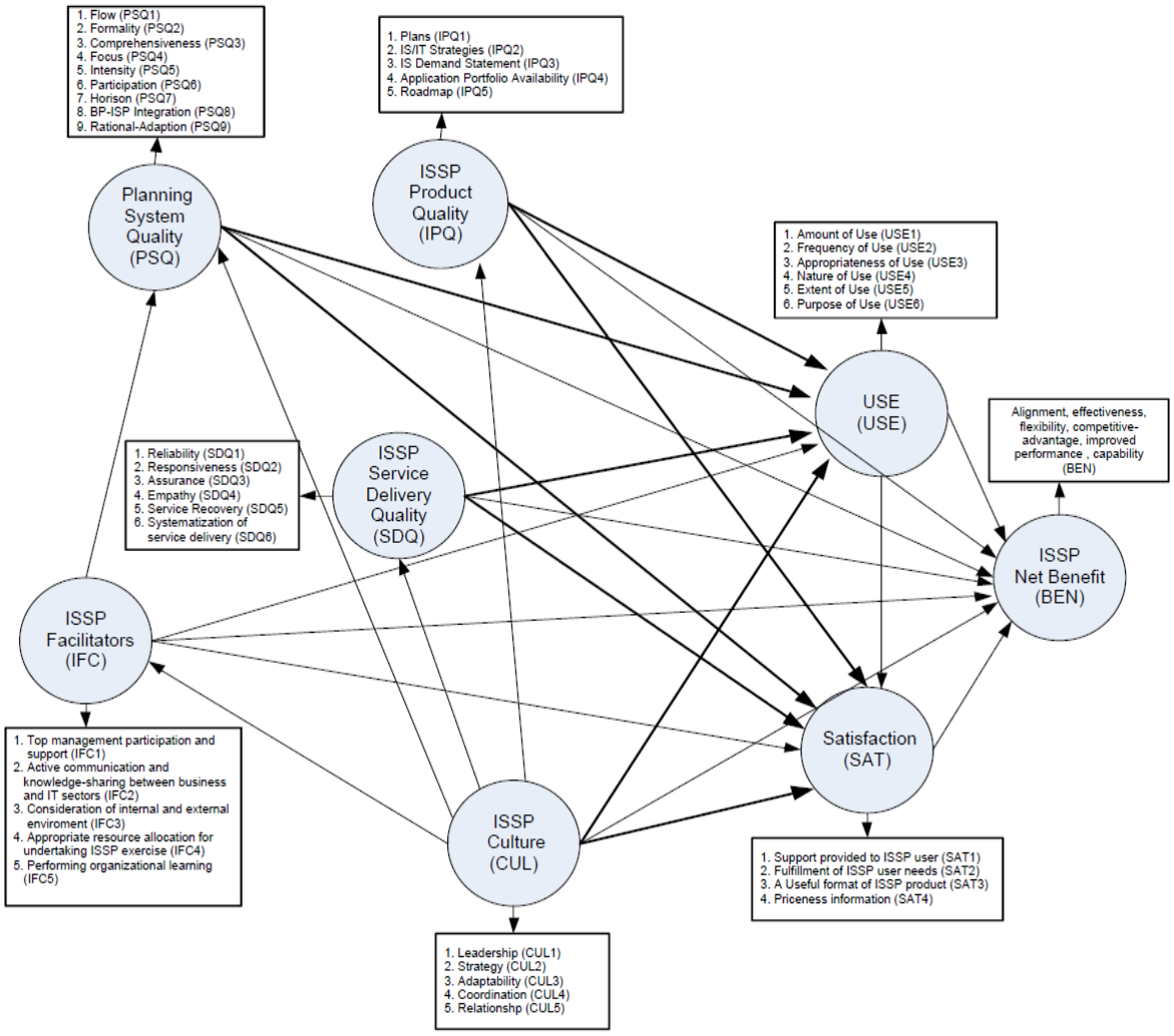

FIGURE 1. ISSPBRM

2. **Literature Review.** Currently, there are many studies related to ISSP at Higher Education in Indonesia because ISSP is so important in supporting success in Higher Education. A successful ISSP can provide the benefits needed for Higher Education. The success of the ISSP can be expressed in terms of the realization of its benefits [4,5]. The realization of the benefits of the ISSP can be expressed in terms of effectiveness, efficiency, competitive advantage, alignment, increased capabilities, increased performance, and flexibility [5]. Several factors influence the success of the ISSP, namely culture, service delivery quality, product quality, planning system quality, facilitator, use, and satisfaction. A review related to the factors that led to the success of the ISSP in Higher Education

in Indonesia in 2009-2019 shows that there are only one or two factors that determine the success of the ISSP [5] and are considered incomplete. Studies on the incompleteness of the factors that determine the success of the ISSP have also been investigated [6,7]. ISSPBRM, which is a model with a more complete number of factors, needs to be further evaluated.

This study was conducted to evaluate the ISSPBRM by PLS-SEM analysis [1,8]. This analysis begins with an evaluation of the measurement model (outer model) and is then followed by a structural model (inner model). The outer model activity begins by first testing the questionnaire data indicated from the indicators of each variable in the ISSPBRM and will produce statistical data that can provide an assessment of the validity and reliability of the ISSPBRM. Inner model activity will produce predictions of the relationship between the variables in the ISSPBRM.

3. **Research Method.** The research stages in this study are shown in Figure 2. The research was carried out in 7 stages, namely literature review, modeling, research design, tools constructions, surveys, PLS-SEM analysis, and evaluation. The research stages (1), namely literature review [9,10] are activities that review the ISSP-related literature to produce research program data. The research stage activity (2) is modeling by proposing a new model, namely ISSPBRM [4]. The third stage of the research is research design, which is building a research plan. The fourth stage of the research is to build a tool for planning the questionnaire which will be used in stage 5, namely the survey [11]. Survey data is used for stage 6, namely PLS-SEM analysis with SmartPLS 3.1 software and produces statistical data results [8]. The 7th stage of the research is the evaluation of the outer model and inner model so that it will produce the necessary evaluation results.

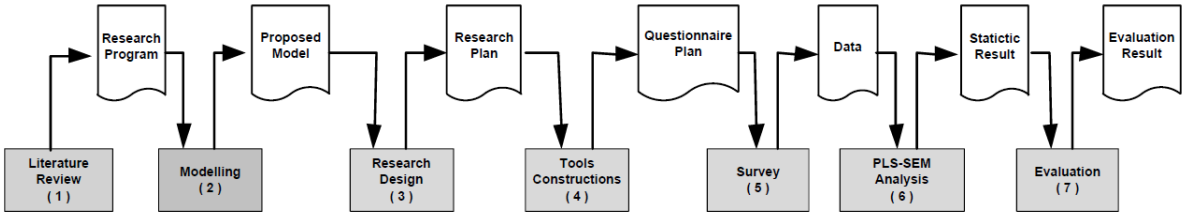

FIGURE 2. Research stage

4. **Result and Analysis.**

4.1. **Demographic respondent.** Table 1 shows the demographics of the 166 respondents who filled out the questionnaire. The questionnaire was filled in utilizing email, WhatsApp, direct distribution, and Facebook.

4.2. **Results of PLS-SEM analysis and evaluation.** PLS-SEM analysis was carried out after the survey activity which was represented by 166 respondents who filled out the questionnaire. PLS-SEM analysis produces statistical results as shown in Table 2, Table 3, Table 4, and Table 5. These statistical results make it possible to evaluate the outer and inner models [12]. Figure 3 shows the results of data processing from the questionnaire with the SmartPLS application which shows the outer model of the ISSPBRM. Evaluation of the outer model of the ISSPBRM focuses on evaluating the validity and reliability of the ISSPBRM which has reflective indicators.

Evaluation of the outer model is further clarified in Table 2 and Table 3. Evaluations related to validity and reliability are used to test whether the questionnaire used for the survey is good or not. This is also related to the validity and reliability of the indicators for each model in the ISSPBRM. Seen in Table 2 shows the statistical results related

Table 1. Respondent's demographics

Characteristics	Group	Number of respondents	Percentage (%)
Education	Ph.D.	34	20.5
	Master	130	78.30
	Bachelor	1	0.6
	Diploma	1	0.6
Job level	Top management	33	19.87
	Middle to low management	37	22.30
	Lecturer	88	53.01
	IT staff	8	4.82
ISSP planner	Yes	35	21.10
	No	131	78.90
The length of ownership of ISSP	$<$ 2 years	44	26.50
	2-5 years	57	34.34
	5-10 years	45	27.11
	$>$ 10 years	20	12.05
Territory	Aceh	1	0.6
	North Sumatera	5	3.01
	West Sumatera	1	0.6
	South Sumatera	5	3.01
	Bengkulu	1	0.6
	Riau	4	2.41
	Bangka Belitung	1	0.6
	Lampung	4	2.41
	Jakarta	56	33.73
	Banten	11	6.63
	West Java	28	16.87
	Central Java	12	7.22
	Yogyakarta	2	1.21
	East Java	7	4.22
	Bali	1	0.6
	West Nusa Tenggara	3	1.81
	East Nusa Tenggara	1	0.6
	West Kalimantan	2	1.21
	East Kalimantan	1	0.6
	South Kalimantan	2	1.21
	South Sulawesi	6	3.61
	North Sulawesi	4	2.41
	Southeast Sulawesi	2	1.21
	Central Sulawesi	1	0.6
	Gorontalo	3	1.81
	West Papua	2	1.21

to outer loadings and cross-loadings. The statistical results in Table 2 indicate that the rule of thumb of convergent validity and discriminant validity has been fulfilled. The rule of thumb regarding Table 2 is that the outer loadings and cross-loadings values of more than 0.7 [2,9] are shaded in Table 2 cells. Other statistical results related to the fulfillment of convergent validity and discriminant validity are shown in Table 3, namely the existence of a rule of thumb of Average Variance Extracted (AVE) where the value is more than 0.5 [2]. Evaluation of the outer model regarding the reliability of the ISSPBRM

Table 2. Outer loadings and cross loadings statistic results

	BEN	CUL	IFC	IPQ	PSQ	SAT	SDQ	USE
BEN	1.000	0.616	0.622	0.354	0.405	0.613	0.631	0.549
CUL1	0.519	0.822	0.717	0.251	0.328	0.577	0.667	0.629
CUL2	0.562	0.843	0.700	0.327	0.386	0.568	0.658	0.620
CUL3	0.524	0.880	0.706	0.309	0.376	0.563	0.680	0.617
CUL4	0.528	0.872	0.676	0.319	0.371	0.549	0.661	0.568
CUL5	0.509	0.871	0.671	0.306	0.356	0.586	0.688	0.599
IFC1	0.574	0.641	0.781	0.309	0.348	0.568	0.675	0.583
IFC2	0.481	0.659	0.874	0.290	0.378	0.556	0.656	0.564
IFC3	0.494	0.655	0.849	0.264	0.349	0.503	0.643	0.583
IFC4	0.523	0.688	0.873	0.287	0.364	0.572	0.687	0.573
IFC5	0.542	0.756	0.839	0.307	0.450	0.713	0.742	0.666
IPQ1	0.377	0.301	0.317	0.882	0.597	0.329	0.299	0.265
IPQ2	0.297	0.312	0.293	0.862	0.606	0.281	0.241	0.271
IPQ3	0.347	0.344	0.355	0.882	0.732	0.317	0.299	0.332
IPQ4	0.263	0.264	0.287	0.861	0.688	0.237	0.249	0.263
IPQ5	0.221	0.294	0.232	0.834	0.671	0.275	0.210	0.246
PSQ1	0.378	0.274	0.321	0.689	0.777	0.364	0.212	0.336
PSQ2	0.385	0.382	0.367	0.710	0.839	0.368	0.335	0.383
PSQ3	0.378	0.391	0.373	0.627	0.869	0.378	0.384	0.403
PSQ4	0.269	0.371	0.378	0.654	0.878	0.426	0.358	0.450
PSQ5	0.361	0.347	0.383	0.642	0.892	0.420	0.344	0.438
PSQ6	0.339	0.400	0.473	0.654	0.854	0.399	0.394	0.428
PSQ7	0.304	0.387	0.429	0.712	0.867	0.463	0.328	0.428
PSQ8	0.374	0.332	0.368	0.642	0.880	0.416	0.272	0.394
PSQ9	0.359	0.387	0.389	0.576	0.884	0.450	0.369	0.440
SAT1	0.494	0.605	0.625	0.311	0.430	0.898	0.624	0.738
SAT2	0.515	0.604	0.602	0.276	0.421	0.925	0.600	0.740
SAT3	0.573	0.542	0.577	0.300	0.447	0.890	0.612	0.706
SAT4	0.581	0.592	0.657	0.300	0.385	0.820	0.654	0.669
SDQ1	0.487	0.671	0.614	0.374	0.381	0.522	0.798	0.504
SDQ2	0.512	0.588	0.612	0.346	0.360	0.515	0.792	0.496
SDQ3	0.616	0.684	0.728	0.268	0.363	0.628	0.857	0.589
SDQ4	0.543	0.585	0.637	0.140	0.296	0.570	0.812	0.624
SDQ5	0.453	0.637	0.657	0.145	0.250	0.590	0.817	0.590
SDQ6	0.486	0.676	0.724	0.235	0.269	0.629	0.837	0.598
USE1	0.410	0.586	0.605	0.255	0.406	0.678	0.549	0.885
USE2	0.439	0.587	0.601	0.298	0.425	0.729	0.525	0.836
USE3	0.400	0.596	0.616	0.266	0.384	0.642	0.541	0.822
USE4	0.406	0.502	0.535	0.139	0.314	0.609	0.587	0.774
USE5	0.506	0.594	0.566	0.247	0.373	0.671	0.635	0.854
USE6	0.573	0.671	0.621	0.381	0.485	0.713	0.637	0.844

has been fulfilled, which can be seen in Table 3, namely the value of Cronbach's alpha and composite reliability has been following the predetermined rule of thumb. The rule of thumb of Cronbach's alpha and composite reliability should be more than 0.7 [3]. The inner model evaluation is clarified by the data shown in Table 4, and Table 5. The inner model evaluation begins with the evaluation of R Square as shown in Table 4. R Square shows that there is a substantive effect of exogenous latent variables on endogenous

Table 3. Construct reliability and validity

	Cronbach's alpha	Composite reliability	Average Variance Extracted (AVE)
BEN	1.000	1.000	1.000
CUL	0.910	0.933	0.736
IFC	0.898	0.925	0.712
IPQ	0.916	0.937	0.748
PSQ	0.956	0.962	0.740
SAT	0.906	0.935	0.781
SDQ	0.902	0.924	0.671
USE	0.914	0.933	0.700

Table 4. R Square

	R Square	Meaning of R Square
BEN	0.492	Weak
IFC	0.655	Moderate
IPQ	0.124	Weak
PSQ	0.213	Weak
SAT	0.703	Moderate
SDQ	0.612	Moderate
USE	0.601	Moderate

Table 5. Path coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T Statistic	P Values	Evaluation result
CUL → BEN	0.177	0.183	0.133	1.329	0.184	Not significant
CUL → IFC	0.809	0.811	0.034	23.648	0.000	Significant
CUL → IPQ	0.353	0.358	0.106	3.339	0.001	Significant
CUL → PSQ	0.170	0.169	0.116	1.474	0.141	Not significant
CUL → SAT	−0.023	−0.015	0.117	0.200	0.842	Not significant
CUL → SDQ	0.782	0.785	0.045	17.555	0.000	Significant
CUL → USE	0.287	0.290	0.119	2.403	0.017	Significant
IFC → BEN	0.123	0.132	0.135	0.915	0.361	Not significant
IFC → PSQ	0.313	0.321	0.093	3.371	0.001	Significant
IFC → SAT	0.107	0.115	0.129	0.831	0.406	Not significant
IFC → USE	0.207	0.203	0.102	2.042	0.042	Significant
IPQ → BEN	0.099	0.100	0.097	1.022	0.307	Not significant
IPQ → SAT	−0.009	0.001	0.073	0.125	0.901	Not significant
IPQ → USE	−0.131	−0.116	0.096	1.356	0.176	Not significant
PSQ → BEN	0.021	0.024	0.109	0.193	0.847	Not significant
PSQ → SAT	0.095	0.081	0.093	1.017	0.310	Not significant
PSQ → USE	0.272	0.259	0.142	1.910	0.057	Not significant
SAT → BEN	0.281	0.291	0.127	2.208	0.028	Significant
SDQ → BEN	0.212	0.180	0.150	1.408	0.160	Not significant
SDQ → SAT	0.217	0.231	0.118	1.841	0.066	Not significant
SDQ → USE	0.235	0.242	0.114	2.067	0.039	Significant
USE → BEN	−0.079	−0.079	0.125	0.634	0.527	Not significant
USE → SAT	0.555	0.528	0.123	4.525	0.000	Significant

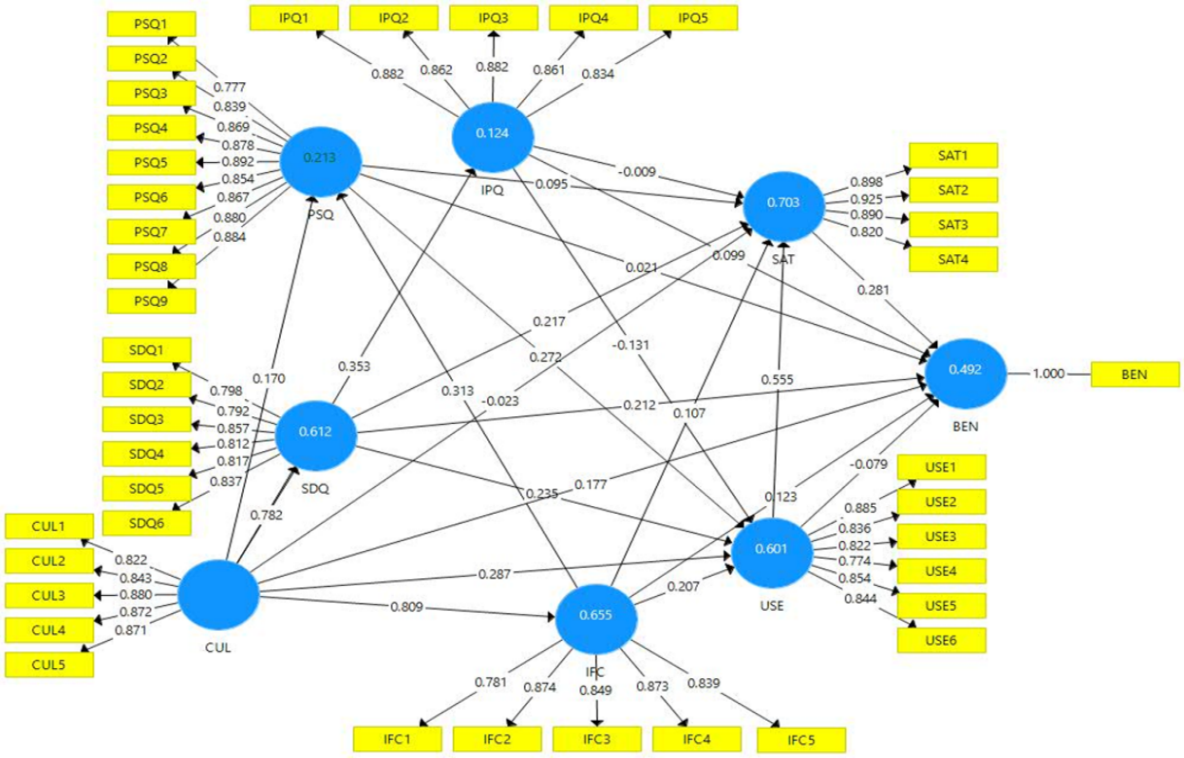

FIGURE 3. Outer model evaluation

latent variables [9,13]. The rule of thumb of R Square is the values of 0.75, 0.5, and 0.25 indicating that there are strong, moderate, and weak variable effects [4,9]. As seen in Table 4, the moderate variables are IFC, SAT, SDQ, USE and the weak variables are BEN, IPQ, PSQ. The BEN variable is close to moderate value. The SAT variable is close to the strong variable value. The CUL variable does not have an R Square value because it is an independent variable.

Table 5 shows that the original sample (O) [1,14] shows that CUL → SAT, IPQ → SAT, IPQ → USE, USE → BEN have independent and dependent relationships that are inversely or negative, while the relationship between other variables has a positive independent and dependent relationship.

Table 5 also shows the statistical results of the T Statistic value which will affect the value of the evaluation result column which contains whether the hypothesis is fulfilled or not. The evaluation result column has not significant and significant value [13]. The consideration to decide the value of not significant and significant in the evaluation result column is determined by the T Statistic value greater than 1.96 for a confidence level of 95% [3,9]. The meaning of not significant means that the hypothesis of the relationship between variables is not fulfilled. Significant meaning means that the hypothesis of the relationship between variables has been fulfilled. For the hypothesis of the relationship between variables that have been fulfilled (Significant), they are CUL → IFC, CUL → IPQ, CUL → SDQ, CUL → USE, IFC → PSQ, IFC → USE, SAT → BEN, SDQ → USE and USE → SAT.

5. **Conclusions.** The ISSPBRM evaluation produces statistical results related to the evaluation of the outer model and inner model of the processing of the questionnaire results for 166 respondents using PLS-SEM analysis. The statistical results related to the evaluation of the ISSPBRM outer model show that validity and reliability have been fulfilled. The statistical results related to the inner model evaluation show that the R Square, Sample (O), and T Statistics are tested. The R Square test shows moderate variables: IFC, SAT, SDQ, USE, and weak variables: BEN, IPQ, PSQ. Sample test (O)

shows that there is a negative and positive independent and dependent relationship in ISSPBRM. Statistic T-test shows 0.39% hypothesis of the relationship between variables is met (Significant), namely 9 hypotheses of the relationship between variables are fulfilled (Significant) of a total of 23 relationships between variables. The results of the ISSPBRM evaluation statistics are expected to provide both theoretical and practical input related to research that focuses on the realization of the benefits of ISSP. Further studies need to be expanded with an explanation of the relationship between variables in order to obtain a broader description of the ISSPBRM.

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