



# Impact of Green IS, Service Innovation and Customer Experience in Influencing Customer Satisfaction and Environmental Performance

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## ABSTRACT

The current study is focused to empirically identify the relationship between digitalization, customer experience, satisfaction, and performance in the hotel industry of Indonesia. In doing so, the authors seek to examine the technological antecedents of customer experience (CUE) by examining the role of green information systems (GIS) and service innovation (SEI). Moreover, the study also aims to investigate the association of SEI and GIS with customer satisfaction (CUS) and hotels environmental performance (ENP). The novelty of the present study lies in identifying and testing the joint effects of the studied variables in improving the understanding of CUS and ENP in an existing complex environment. The results of PLS-SEM confirm that customer experience and ENP have a positive and significantly influenced by the GIS. Moreover, the results further suggested that customer experience and CUS have significantly and positively impacted by SEI. Finally, the results of PLS-SEM confirm that ENP and CUS have significantly and positively impacted by customer experience in multinational firms in Indonesia.

**Keywords:** Green Information System, Service Innovation, Customer Satisfaction, Indonesia

**JEL Classification:** L8, O3

## 1. INTRODUCTION

In the existing level of high competence and greater self-motivation in the hotel industry, service providers are keen to adopt numerous strategies that can guarantee higher customer satisfaction (CUS) (Wu and Liang, 2009). However, given the rising environmental consciousness, the notion of CUS is highly linked with sustainable goods and services (Sharma and Henriques, 2005). There exist numerous driving factors that can influence the satisfaction levels of customers. Several authors have been devoted to study the notion over the last thirty years (Erjavec et al., 2016). In doing so, many have introduced and modified a series of measurement instruments and frameworks that can recognize the connection between CUS, firm performance, and their antecedents (Erjavec et al., 2016).

In this regard, the use of digitalization to derive satisfaction has been identified as the significant driver of CUS (Joshi and Parihar, 2017; Wang et al., 2017; Iberahim et al., 2016) and organization performance (Bouwman et al., 2019; Joensuu-Salo et al., 2018; Wadho and Chaudhry, 2018; Soto-Acosta et al., 2016). Given the growing ecological realization, the association between technological advancements and eco-friendly firm practices has been the center of attention in the literature, especially from last decade (Tang et al., 2018; Gholami et al., 2013). This has resulted in increased utilization of technological innovations due to enhanced business awareness and understanding of the potential association.

The application of information technology can influence businesses in two ways. First, it can bring negative effects on the

environment through industry level technological production, usage, and disposal (Elliot, 2011). To mitigate the adverse impact of technologies on environments, the notion of going green is adopted in modern businesses suggesting that technologies can cause a positive impact on the environment through the utilization of green information systems (GIS) to ensure environmental sustainability through eco-friendly technical utilization in business operations and services (Chen et al., 2008). Thus, the importance of green technological innovations is prime to assist businesses in developing strategic environmental operations that coincide with the environmental goals as well as organizational goals in terms of reduced cost and enhanced efficiencies.

The motivation for supreme CUS is focused on improving the customer experience. In this context, Berry et al., (2002) stated that in order to improve firm competence, the customers are required to be satisfied by creating optimistic service experience. Among the drivers of customer experience, innovation in services is considered eminent in instigating good service experience (Su, 2011, Mihardjo et al., 2018). Service innovation (SEI) is utilized to recognize novel services that have not been effectively familiarized in the industry (Schumpeter and Redvers, 1934) and observed to boost good customer experience (Su, 2011). It is also believed that SEI plays a major role in attaining competitive advantages and considered eminent to derive satisfaction (Simon and Honore, 2012). Hence, it is rational to believe that hotels that encourage SEI are likely to benefit in terms of improved customer experience, along with greater CUS.

In a similar context, the adoption of GIS is also considered crucial for improving customer experience and a firm's environmental performance (ENP) (Gholami et al., 2013). At present, there exist strong demand in customers and society for green products and services (Lee et al., 2018). This is justified in terms of ethical concerns that enhance the perceptions of a cleaner environment and future sustainability. In addition, the notion of GIS is observed as an efficient resolution of several ecological concerns (Dedrick, 2010). With the help of such systems, businesses can be able to process recycling as well as derive power efficiency that can decrease the environmental burden and embolden resource competency (Grant et al., 2010). Hence, with efficacy in production and services, the business would be able to reduce costs and generate greater revenues along with superior ENP.

Therefore, in line with the above discussion, the current study is focused to empirically identify the relationship between digitalization, customer experience, satisfaction, and performance in the hotel industry of Indonesia. In doing so, the authors seek to examine the technological antecedents of customer experience (CUE) by examining the role of GIS and SEI. Moreover, the study also aims to investigate the association of SEI and GIS with CUS and hotels ENP (ENP). The novelty of the present study lies in identifying and testing the joint effects of the studied variables in improving the understanding of CUS and ENP in an existing complex environment that can offer higher insights to managers, policy makers and researchers of the field.

## 2. LITERATURE REVIEW

Given the significance of sustainable performance and satisfied customers to strengthen firm's competitiveness, there have been the growing increase in the recent literature for examining the critical antecedents of CUS (Hult et al., 2019; Marinkovic and Kalinic, 2017; Tontini et al., 2017; Xu and Li, 2016) and ENP (Liu et al., 2019; Corsini et al., 2019; Ardito and Dangelico, 2018; Inman and Green, 2018). In this regard, the role of customer experience is considered crucial in fulfilling a firm's vision of satisfied customers and improved performance. Hence, examining the link of customer experience with CUS in service marketing, many studies argued that advanced environment improves customer experience and bring positive influence on satisfaction (Wakefield and Blodgett, 1996; Han and Ryu, 2009; Wong, 2013).

In this regard, Smith and Wheeler (2002) discussed that the efficient administration of customer experience could transform customers into organizational advocates that underlies the potential to benefit the firm's competitiveness and long-term performance. In addition, Lin and Liang, (2011) debated that in the field of environmental psychology, service environment is persistently linked with improved CUS. Similarly, Wakefield and Blodgett (1996) also stated that positive views regarding numerous physical business features resulted in higher CUS.

Testing the empirical significance of customer experience with CUS, Ali et al., (2016) analyzed the hospitality industry in China and applying the method of structural equation modeling on the responses of 170 customers, the findings of the analysis established the significant impact of service experience on customer emotions and satisfaction. The results further established that higher satisfaction led to enhance the ability of customer's price acceptance and thus benefitted resorts of China. In another study, Ren et al., (2016) examined the connection between customer experience and satisfaction of the customers stayed at budget hotels. In doing so, the authors explained customer experience in four dimensions. They included physical and sensorial experience, place, artistic view, and staffs experience. The findings of the study applying regression method established the significant influence of customer experience dimensions on CUS. Specifically, the outcome suggested that all dimensions explained positive variance in CUS with R-square of 60%.

Identifying the importance of expertise and technologies, many studies argued that improved satisfaction and performance are significantly derived by efficient utilization of information technology and SEI. Among them, Costantini et al., (2017) examined the relationship of green innovation and ENP. The authors discussed the importance of eco-driven technologies in improving environmental quality along with a firm's competitiveness. The empirical outcomes of the study reported the significance of ecological innovations in enhancing ENP. In particular, the results confirmed the positive influence of eco-innovation in declining ecological pressures suggesting that the magnitude of this influence varies across the sectors conditional to the efficacy of adopted technology.

Similarly, Gholami et al. (2013) investigated the role of GIS in influencing ENP. Utilizing the sample of 405 enterprises, the

outcomes of the study confirmed the significant contribution of GIS adoption on a firm's ENP. Specifically, the findings suggested that GIS for product stewardship and GIS for sustainable development carried a positive impact on ENP. More recently, Liu et al. (2019) also examined the contribution of green IS in enhancing a firm's ENP. Utilizing the responses of 231 companies, the findings of the study, similar to Gholami et al., (2013) reported the significant contribution of GIS in affecting a firm's ENP in China. In particular, the outcomes concluded that vision sharing, inter-functional cooperation, and workforce participation, drive the usefulness of GIS, which subsequently improved ENP.

Associating SEI with CUS, Yu-Sheng and Ibrahim, (2019) examined the relationship of SEI and service delivery (SED) in enhancing CUS and loyalty (CUL) of Ghana banking sector. Using the data of 450 responses, the findings of the study reported the empirical significance of studied variables. In specific, the results established that SEI and SED exerted a positive influence on CUS and CUL in Ghana's banking sector. In another study, Chen et al., (2014) examined the association of SEI derived from several customer experiences on CUS and value of air travelers. In doing so, the study utilized the data of 300 passengers and utilized the method of structural equation modelling. The empirical results suggested that customer experience in airport accessibility and security check significantly derive CUS. In addition, the study examined the moderating effects of SEI in influencing the relationship between CUS and customer value. The findings concluded that SEI significantly moderated the impact of satisfaction in driving customer value in the air industry.

Therefore, based on the above literature, we hypothesized that;

- Hypothesis-1: GIS has a significant impact on ENP.
- Hypothesis-2: GIS has a significant impact on CUE.
- Hypothesis-3: SEI has a significant impact on CUE.
- Hypothesis-4: SEI has a significant impact on CUS.
- Hypothesis-5: CUE has a significant impact on ENP.
- Hypothesis-6: CUE has a significant impact on CUS.

The following Figure 1 demonstrated the conceptual model of the current study.

### 3. DATA AND METHODOLOGY

#### 3.1. Measures

The study investigates the impact of the GIS, SEI, and customer experience on ENP and CUS in various multinational organizations

in Indonesia. So as to achieve this goal, the current study centers around the research framework dependent on past examinations, and the structure is presented in Figure 1. The fundamental properties of the variables are explained by utilizing the Likert scale system from 1 (Strongly Disagree) to 5 (Strongly Agree). In general, the current study uses five different variables. The components used in this examination are the GIS, SEI, Customer Experience (CUE), ENP, and CUS. On the other hand, the four things of (GIS) are received from the past investigation of Esty and Winston, (2006). Besides, the four constructs of (SEI) are received from the earlier investigation of Hsieh and Hsieh, (2015). Additionally, the four things of (CUE) are embraced from the previous study of Grove et al. (1998). Also, the four last items of (ENP) are taken from the past research of Chowdhury et al. (2014). At last, the four things of (CUS) utilized in this investigation are adopted from the past examination of Ali et al. (2016).

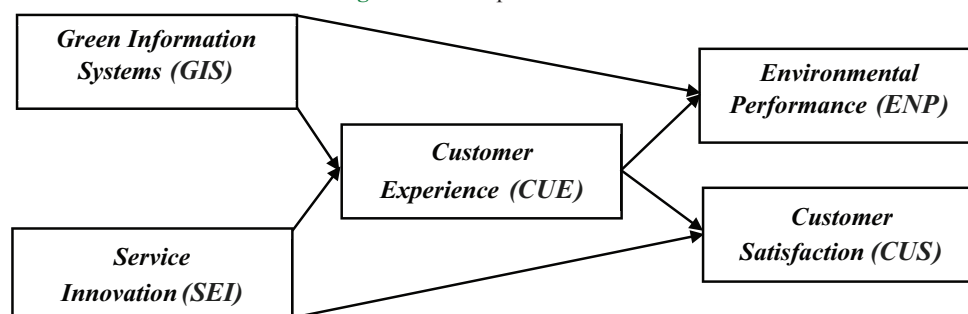
#### 3.2. Sample Collection Procedure

In this present investigation, the technique for information gathering is done by gathering the data from the various multinational firms of Indonesia. In addition, we select 22 different multinational firms in Indonesia for the data collection process. So as to get quick and beneficial data accumulation process, we make an interpretation of our research questionnaire into the English language and allude to the chose different multinational firms of Indonesia. Besides, we distribute an aggregate of total 352 research questionnaire to utilizing both printed and soft copy of the research questionnaire. The technique for information accumulation took a time of the complete three months and ten days and gathered 309 research questionnaires with the response rate of 87.53%.

### 4. DATA ANALYSIS AND INTERPRETATION

In the present study, the data examination is finished by utilizing two novel statistical software, which is the Statistical Package for Social Sciences (Version-23) and SmartPLS V-3.2.9 (Ringle et al. 2015). The final information utilized for the present examination is 301 resulting in taking out univariate and multivariate anomalies. The strategy for the detecting of univariate and multivariate anomalies are Z-test score and Mahalanobis Distance (D2) by utilizing SPSS (V-23), and further information analysis is done by applying SmartPLS. Demonstrated Table 1 is the structure and composition of the information used in this examination. Moreover, Table 2 explain the mean and Pearson's Correlation of the information used in the present examination. In like way, to manage the issue of multicollinearity, we search for the

Figure 1: Conceptual framework



investigation of Hair et al. (2011) start that by an immense range in Pearson's Correlation examination ought to underneath 0.90. In this way, to affirm the nonappearance of multicollinearity among the variables (Frooghi et al. 2015; Hair et al., 2013).

**Table 1: Descriptive statistics**

Valid	Frequency	Percent
Gender		
Female	131	44
Male	170	56
Total	301	100
Age		
20-30 years	88	29
31-40 years	148	49
41-50 years	36	12
51 and above	29	10
Total	301	100
Working experience		
1-5 years	65	22
6-10 years	193	64
11-15 years	15	5
More than 15 years	28	9
Total	301	100
Education		
Undergraduate	47	16
Graduate	168	56
Post-Graduate	49	16
Others	37	12
Total	301	100

Source: Authors estimation

**Table 2: Means and pearson correlations**

Variables	MEAN	GIS	SEI	CUE	ENP	CUS
GIS	4.065	-				
SEI	4.129	0.473**	-			
CUE	3.985	0.392**	0.338**	-		
ENP	3.892	0.293**	0.311**	0.302**	-	
CUS	4.002	0.312**	0.322**	0.361**	0.374**	-

n=301

\*\*Correlation is significant at the 0.01 level (2-tailed)

**Table 3: Measurement model results**

Variables	Items	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Green information system	GIS1	0.862	0.883	0.843	0.584
	GIS2	0.783			
	GIS3	0.826			
	GIS4	0.844			
Service innovation	SEI1	0.792	0.858	0.832	0.593
	SEI2	0.760			
	SEI3	0.770			
	SEI4	0.764			
Customer experience	CUE1	0.766	0.892	0.842	0.602
	CUE2	0.746			
	CUE3	0.796			
	CUE4	0.720			
Environmental performance	ENP1	0.776	0.904	0.801	0.632
	ENP2	0.738			
	ENP3	0.764			
	ENP4	0.738			
Customer satisfaction	CUS1	0.755	0.864	0.783	0.583
	CUS2	0.747			
	CUS3	0.721			
	CUS4	0.703			

Source: Authors estimation

The results of descriptive insights are reported in Table 1 with complete structure and composition of the gathered information. The descriptive measurements are additionally isolated into four diverse sub-classes, which are gender, age, work experience, and education. Table 1 clarifies the descriptive of all the sub-classes.

Moreover, content legitimacy is made whether the correlation of the items utilizing in the data examination load with high qualities in their particular factor in association with the items showed up in the model, while internal consistency is seen whether the estimation of Cronbach's alpha and composite reliability found more recognizable than 0.7 (Hair et al. 2013; Waseem et al. 2013). Factor loadings and composite reliability values appear in Table 3, which exhibit that a smooth estimation of the assembles factor loadings more clear than 0.7. Also, these loadings show up in their individual parts, which guaranteeing the inner legitimacy of the selected items.

Besides, convergent validity uncovers to what degree an item with respect to a particular factor loaded to different components where they expected to be loaded (Mehmood and Najmi, 2017; Khan et al. 2019). In this examination, convergent validity is showed up by utilizing an average variance extracted (AVE) for each factor (Fornell and Larcker, 1981; Mehmood and Najmi, 2017). They gave the benchmark of more overwhelming than and revealed contrastingly in relationship with 0.5 for insisting the concurrent authenticity. The consequences of AVE in Table 3 is avowing the major parameters.

In the next step, discriminant legitimacy is uncovered as how much an item of a factor is discriminant and novel from different factors utilized in a model (Frooghi et al., 2015). As showed up by Fornell and Larcker (1981), the discriminant legitimacy is said to be created if the AVE square root parameter is more than the pair-wise relationship of the unidentified factor (idle variable). The outcomes showed up in Table 4, bold, and italic parameter are the square root of AVE, which is more than the cutoff value,

**Table 4: Discriminant validity Fornell and Larcker criterion**

	GIS	SEI	CUE	ENP	CUS
GIS	0.764				
SEI	0.384	0.770			
CUE	0.302	0.402	0.776		
ENP	0.277	0.388	0.285	0.795	
CUS	0.352	0.372	0.412	0.402	0.764

Source: Authors estimation

**Table 5: Results of loadings and cross loadings**

Variable	ENC	ENU	GRI	EMA	FPR
Green information	0.862	0.251	0.349	0.170	0.355
System	0.783	0.409	0.266	0.248	0.300
	0.826	0.104	0.195	0.225	0.336
	0.844	0.347	0.336	0.269	0.366
Service innovation	0.108	0.792	0.454	0.208	0.275
	0.103	0.760	0.276	0.425	0.234
	0.104	0.770	0.202	0.373	0.261
	0.104	0.764	0.229	0.278	0.338
Customer experience	0.134	0.104	0.766	0.214	0.296
	0.131	0.101	0.746	0.234	0.380
	0.140	0.108	0.796	0.216	0.334
	0.126	0.098	0.720	0.149	0.291
Environmental performance	0.280	0.136	0.274	0.776	0.303
	0.565	0.130	0.482	0.738	0.428
	0.527	0.122	0.284	0.764	0.302
	0.437	0.130	0.482	0.738	0.261
Customer satisfaction	0.295	0.404	0.133	0.294	0.755
	0.429	0.340	0.131	0.331	0.747
	0.382	0.394	0.127	0.403	0.721
	0.305	0.531	0.123	0.372	0.703

Source: Authors estimation

which is the pair-wise relationship of each factor. Furthermore, Table 5 shows the factor loadings of other and individual factor, in like way, articulating the cut-off benchmark. Along these lines, the discriminant legitimacy is similarly attested if the Hetro Trait and Mono Trait parameter are lower than 0.85, as proposed by Henseler et al. (2015). The results in Table 6 revealed that all parts have Discriminant legitimacy.

In the last step, we connect a partial least square system to look at the model structure and theory testing, which showing beta coefficients, t-details, and P-value. As showed up by Chin (1998) suggestion, a bootstrapping system utilizing 1000 sub-test was related to insisting the quantifiable key assessments of the broad number of values. Table 7 uncovers beta coefficients, t-details, and their noteworthy persuading power with the remarks about the hypothesis testing.

The outcomes of the partial least square structural equation modelling are shown in Table 7. The table presented the beta coefficient, t-stats value, P-value, and the status of hypothesis testing against each hypothesis. Generally, the outcome confirms that all selected variables have a positive and significant impact on ENP except environmental uncertainty. Moreover, the outcomes of the PLS-SEM confirm that customer experience ( $\beta = 0.294$ ,  $P < 0.000$ ) and ENP ( $\beta = 0.326$ ,  $P < 0.000$ ) have a positive and significantly influenced by a GIS, hence confirming H1 and H2. Moreover, the results further suggested that customer experience

**Table 6: Results of HTMT ratio of correlations**

	GIS	SEI	CUE	ENP	CUS
GIS					
SEI	0.604				
CUE	0.382	0.593			
ENP	0.302	0.372	0.634		
CUS	0.338	0.294	0.402	0.536	

Source: Authors estimation

**Table 7: Results of path coefficients**

Hypothesized path	Path coefficient	C.R	P-value	Remarks
CUE←GIS	0.294	4.543	0.000	Supported
ENP←GIS	0.326	5.023	0.000	Supported
CUE←SEI	0.204	3.995	0.000	Supported
CUS←SEI	0.332	4.213	0.000	Supported
ENP←CUE	0.274	11.436	0.000	Supported
CUS←CUE	0.345	3.886	0.000	Supported
Level of significance (5% i.e., 0.050)				

Source: Authors' estimation

( $\beta = 0.204$ ,  $P < 0.000$ ) and CUS ( $\beta = 0.332$ ,  $P < 0.000$ ) have significantly and positively impacted by SEI, therefore affirming H3 and H4. Finally, the results of PLS-SEM confirm that ENP ( $\beta = 0.274$ ,  $P < 0.000$ ) and CUS ( $\beta = 0.345$ ,  $P < 0.000$ ) have significantly and positively impacted by customer experience in multinational firms in Indonesia, hence confirming H5 and H6. Technical speaking, the results confirm that the GIS and SEI are the key contributors to enhance the customer experience and CUS of Indonesian multinational firms.

## 5. CONCLUSION AND DISCUSSION

In the recent world, the rising environmental consciousness, the notion of CUS is highly linked with sustainable goods and services. There exist numerous driving factors that can influence the satisfaction levels of customers. Several authors have been devoted to study the notion over the last thirty years. In doing so, many have introduced and modified a series of measurement instruments and frameworks that can recognize the connection between CUS, firm performance, and their antecedents. In this regard, the use of digitalization to derive satisfaction has been identified as the significant driver of CUS and organizational performance. Given the growing ecological realization, the association between technological advancements and eco-friendly firm practices has been the center of attention in the literature, especially from the last decade. This has resulted in increased utilization of technological innovations due to enhanced business awareness and understanding of the potential association.

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