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Development of The Means of Engagement Concept on Enterprise Resource Planning User Satisfaction

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ABSTRACT

None of the several theories that underpin the assessment of IT adoption characterizes the process as dynamically as the Means of Engagement theory does. User satisfaction is a key factor in influencing the success of ERP implementation as well as the adoption of the ERP system by the user. Therefore, it is necessary to identify the factors affecting user satisfaction of the ERP system as well as the relationship between customer satisfaction and user involvement. This research aims to develop a concept or model of Means of Engagement (MOE) on relationship domain in particular for satisfaction factor with the research object of PT Glico Indonesia. The research uses SEM-PLS analysis method using the SmartPLS 4 application to construct and test a structural equation model that reflects the relationship between the variables investigated in the research. The evaluation results showed that the five SERVQUAL dimensions studied did not have a significant impact on user satisfaction while customer satisfaction had a significant positive impact on engagement. The results of this research, namely the development of the Means of Engagement model, are expected to be the basis for PT Glico Indonesia to design strategies that can improve and maintain the adoption of ERP system users based on the level of the means of engagement model.

1. INTRODUCTION

The swift advancement of technology stands as one of the foremost consequences of globalization. The rapid growth of information technology is compelling businesses to undergo a metamorphosis in their operational methodologies. Employing information technology that remains disconnected across different functional areas within a company is viewed as less effective and efficient in facilitating business process execution and supporting decision-making procedures. Enterprise Resource Planning (ERP) systems are one of the various technologies that simplify decision-making and improve the performance of a company [1]. Not a few companies fail to consider crucial factors in ERP implementation projects that lead to failures in implementation. Among the numerous theories employed to bolster the adoption of information technology or information systems, with the aim of preventing implementation failures, two widely recognized ones are the diffusion of innovation theory and the technology acceptance model (TAM). Diffusion of Innovation explains that the process of adopting a product begins at the stages of knowledge, persuasion, decision, implementation, and confirmation. In addition to the theory of diffusion of innovation, there is a TAM theory that is often used to measure the rate of adoption. The diffusion of innovation theory and the TAM model are not sufficient to explain adoption in the context of user involvement with the ERP system. This disparity arises from the fact that TAM and various other technology adoption theories do not delineate the gradual adoption process of ERP systems; instead, they depict adoption as a static process. In contrast, the Means of Engagement (MOE) model portrays the adoption phase as a dynamic process. While these theories can provide insights for understanding ERP adoption, their application has not yielded maximum results, as evidenced by the continued prevalence of substantial failures in ERP implementations.

User satisfaction is a key factor in influencing the success of ERP implementation. An ERP system that falls short in delivering user satisfaction is less likely to be embraced by its user base, and consequently, it may fail to make a valuable contribution to the business [2], [3]. In the context of the adoption of an information system, DeLone and McLean's Information System Success model shows that there is a two-way relationship between system usage (adoption) and user satisfaction, where users often rely on a system, in this case an ERP system, due to the high rate of acceptance [4][5].

To harness the full potential of costly implementations, it is imperative for management to pinpoint the factors that influence user satisfaction with ERP systems [6]. This research concentrates on how companies can develop a model that enhances user engagement with ERP systems by using the concept of means of engagement to improve user satisfaction with ERP systems. This study is currently in the exploratory phase, with the aim of identifying factors contributing to user satisfaction in order to develop the Means of Engagement (MOE) model within the domain of relationships, particularly with regard to user satisfaction, while considering the significance and magnitude of the relationship between constructs.

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2. LITERATURE REVIEW

A. Enterprise Resource Planning (ERP)

The ERP system (Enterprise Resource Planning), according to Monk and Wagner [7], is the core software program used by companies to integrate and coordinate information in every area of business. ERP also helps companies manage business processes. ERPs support business process operations efficiently by integrating tasks related to sales, marketing, manufacturing, logistics, accounting, and responsibility across the business area [7]. According to Shang and Seddon [8], the benefits offered by ERP implementation are divided into 5 dimensions: operational (cost reduction, increased productivity, and improved business process quality), managerial (enhancing decision-making capacity and better resource management), strategic (supporting business growth, generating product differentiation (including customization), and building external relationships (supplier and customer), IT infrastructure (reducing IT costs and building flexibility for business and organizational change), and facilitating business learning.

B. Enterprise Resource Planning (ERP)

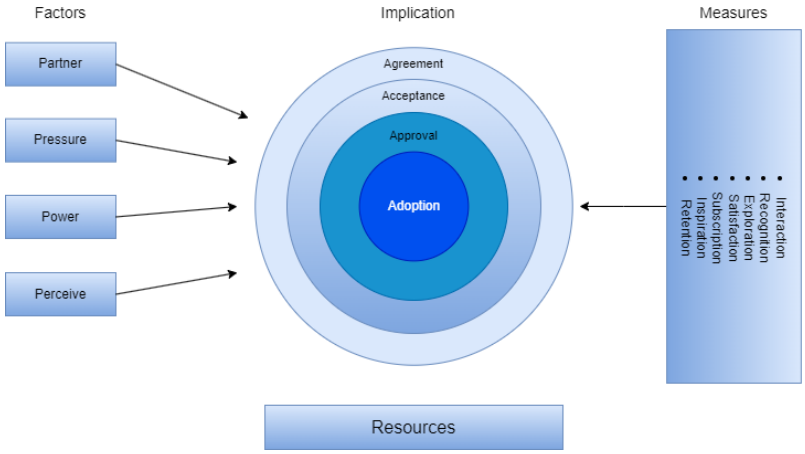

Figure 1. Means of engagement model

Means of Engagement refers to active participation within a system connection, which involves comprehending a variety of characteristics and behaviors that are substantiated by underlying factors and theories. The MoE model focuses on measuring the success of product and software adoption to be implemented by considering four levels: agreement, acceptance, approval, and adoption. Through this model, it is anticipated that an organization will be able to identify the relevant things in the company's business processes, ultimately enabling the development of a tailored model to enhance user engagement, rendering it more effective and efficient. This customization takes into consideration a multitude of factors that can be leveraged by the organization in the implementation of ERP software [9].

Here are the levels within the implication domain in the Means of Engagement model:

1. Agreement
   At the agreement level, there is a process of reaching consensus on the implementation of the ERP system while considering factors related to the implementation process. At this level, there is already a perception that there are benefits to implementing ERP software.
2. Acceptance
   At the acceptance level, there is a process of acknowledging the need for an ERP system as a tool that can help make business processes more effective and efficient, and there is a desire to use ERP software.
3. Approval
   At the approval level, the parties interested in implementing the ERP system approve its use and begin to consider the factors that must be considered in the use of the ERP system.
4. Adoption
   Adoption is considered a process that encompasses the formation, development, and implementation of new ideas, behaviors, or systems [10]. In the context of adoption in the MOE model, the parties interested in implementing the ERP system have confirmed their decision to use the system and have begun to adopt the new system.

C. User Satisfaction

User satisfaction is one of the important criteria for measuring the success of an information system. Information systems incur significant costs. Therefore, the decision to implement an information system requires the selection of mechanisms to ascertain its necessity and, once in operation, to verify its effectiveness [11]. User's satisfaction in the context of the use of information systems is the degree to which users believe that the information system used meets their needs. If the user is satisfied with an information system, then they will use it intensively [12]. Defining user satisfaction is a challenging endeavor, yet it is regarded as an evaluative construct [13]. There are several measurement tools or frameworks available for assessing user satisfaction with information technology and information systems, such as the end-user computing satisfaction, IT end-user satisfaction model, and user

information satisfaction (UIS) measurement [11], [14], [15]. In the realm of end-user computing satisfaction assessment instruments, there exist five fundamental components contributing to end-user satisfaction, namely content, accuracy, format, user-friendliness, and punctuality [14]. In contrast, UIS concentrates on assessing user satisfaction through three key factors: the information system product, user involvement, and system usage. The author further elaborates that User Information Satisfaction (UIS) stands as an evaluation tool that can serve to gauge whether the information system aligns with the requirements and expectations of its users [11].

D. SERVQUAL

SERVQUAL is a dual-scale instrument to measure consumer perceptions of service quality [16]. Initially, the quality of the service was said to be an intangible thing that was difficult to measure because the performance of a service was hard to evaluate before the sale occurred. This SERVQUAL assessment conceptualizes the quality of service as a gap between what customers expect from a service and their judgment of the actual performance of the service [17]. In its initial formulation concerning SERVQAL, Parasuraman et al. [17] stated that there are ten components of service quality, namely:

1. Reliability
2. Responsiveness
3. Competence
4. Access
5. Courtesy
6. Communication
7. Credibility
8. Security
9. Understanding the customer
10. Tangibles

Two years after the first formulation of SERVQUAL, there is a merger of these ten dimensions into just five dimensions, namely: tangible, reliability, responsiveness, assurance, and empathy [18].

1. Tangible
   Tangible is a physical appearance or assessment of the visible aspects of a service.
2. Reliability
   Reliability is the dimension that describes the ability of a service to ensure its service is accurate and reliable.
3. Responsiveness
   Responsiveness is the willingness of a service or service provider to provide assistance to a customer and provide a quick service.
4. Assurance
   Assurance is a dimension that deals with the ability of a service or service provider to inspire trust that can give users a sense of security.
5. Empathy
   This dimension includes the ability of an application system or a service to give attention and feelings to the user.

3. RESEARCH METHODS

In this study, as previously mentioned, the research adopts an exploratory nature with the primary objective of elucidating causal relationships between variables. This is achieved through the examination of hypotheses, often termed as explanatory research. The research employs a quantitative approach for sample collection, followed by data analysis and processing using statistical methodologies. Quantitative research is a method used to validate objective theories through the exploration of relationships among variables through the use of instruments so that the numerical data can be analyzed thoroughly using statistical procedures [19]. The dissemination of questionnaires to respondents is aimed at knowing the opinion and expectations of respondents about the quality of ERP system services that will affect the level of user satisfaction.

The research instruments utilized in this study consist of a questionnaire comprising 40 statements. The questionnaire encompasses 5 exogenous variables, namely reliability, responsiveness, assurance, empathy, and tangibility, as well as 1 endogenous variable (engagement) and 1 mediator variable (user satisfaction). The researchers employed Google Forms to distribute these questionnaires to employees utilizing ERP systems, resulting in the collection of 38 responses. The data analysis and hypothesis testing methodologies employed in this study encompass SEM-PLS analysis, comprising outer model testing, inner model testing, and effect size testing. Here are the hypotheses that will be tested on this study can be formulated as follows:

H_1: Reliability has a significant influence on user satisfaction.
H_2: Responsiveness has a significant influence on user satisfaction.
H_3: Assurance has a significant influence on user satisfaction.
H_4: Empathy has a significant influence on user satisfaction.
H_5: Tangible has a significant influence on user satisfaction.

The formulation of the five hypotheses is based on the role of service quality as an important determinant of user satisfaction [5], [20]. Therefore, Kettinger and Lee stated that there was an urgent need to complement user satisfaction measurement with service quality measurement [20]. Moreover, the model depicting the interplay between the five SERVQUAL dimensions and user

satisfaction is rooted in one of the models advocated by Kim Yong Jin et al., which considers the user's perception of service quality, evaluated exclusively based on service dimensions, as the exclusive determinant of customer satisfaction [20].

H_6: User satisfaction has a significant influence on engagement.

The formulation of this hypothesis is predicated upon the overarching research objective, which seeks to advance the concept of means of engagement within the domain of relationship dynamics, with a specific focus on the satisfaction factor, by proving whether there is a causal relationship between user satisfaction and engagement. Previous research has already demonstrated a positive impact of user satisfaction on user engagement within the context of ERP systems [21]. Nevertheless, it remains imperative to empirically test whether a causal link exists between user satisfaction and engagement, utilizing the engagement indicators previously identified in earlier studies as determinants. The objective is to investigate whether an increase in user satisfaction rates corresponds to a concurrent increase in these engagement-related factors, thereby influencing higher adoption rates at the MOE level.

Table 1. Engagement variable mapping

Variable	Indicator	Code	MOE Level	Theoretical Sources
Engagement	Improve work performance	KPG1	Adoption	Technology Acceptance Model;
	Easy to learn	KPG2		Diffusion of Innovation
	System compatibility with company business processes	KPG3		
	Appropriate training	KPG4		
	Effect of system productivity on performance	KMG1	Acceptance	TAM2;
	Accurate data result	KMG2		Information System Success Model
	Good planning control	KMG3		
	Structured work	PPC1	Agreement	UTAUT
	Enhanced inter-unit collaboration	PPC2		
	Good project communication	PPC3		
	Management support	PPC4		

Table 1 presents the chosen indicators utilized for assessing engagement variables. The selection of these indicators for measuring engagement is derived from the indicators associated with the components of user engagement at MOE levels, namely usage decisions, desire for use, and the attainment process [9], [22], [23]. Furthermore, in Table 2, the theoretical origins of these factors and the outcomes of their alignment with MOE levels, as explored in prior research [8], are also provided[9].

Table 2. Endogenous variable mapping

Variable	Indicator	Code	Theoretical Sources
Reliability	Frequency of disturbances in the system	RLB1	
	Frequency of bugs found in the system	RLB2	
	Can be relied on to help with work	RLB3	
	System availability	RLB4	
	The capacity of the number of users that can be handled	RLB5	TAM2;
Responsiveness	Speed of response to input	RSP1	
	Responsiveness of the ERP provider in responding to problems	RSP2	
	Speed of problem resolution	RSP3	
	ERP provider's ability to customize the system	RSP4	
	Problem resolution documentation	RSP5	
Assurance	Good security measures	ASR1	
	Clarity of system usage policies	ASR2	SERVQUAL
	Performance of protection functions against unauthorized access	ASR3	
	Risk management in system use	ASR4	
Empathy	Ease of use	EMP1	
	System capacity to meet needs	EMP2	
	Optimal service quality	EMP3	
	Personalization options	EMP4	
	Level of user satisfaction with UX	EMP5	
Tangible	Attractive System UI	TBL1	
	System performance	TBL2	
	Ease of searching data	TBL3	
	Facilities supporting system use	TBL4	
	Ease of navigation on the system	TBL5	

Table 3 shows the indicators selected to measure user satisfaction variables. The choice of the SERVQUAL dimension as an exogenous variable based on the relationship between service quality and user satisfaction, that is, the quality of service is an important determinant of customer satisfaction [20]. Although SERVQUAL was originally used in the marketing context, there are some researchers who argue that the measurement instrument of SERVQUAL can be used in information systems [5].

Table 3. Mediator variable mapping

Variable	Indicator	Code	Theoretical Sources
User Satisfaction	Fulfillment	USS1	
	Positive attitude	USS2	Unified Theory of Acceptance and Use of Technology (UTAUT)
	There is no difficulty in use	USS3	
	Completion of work	USS4	
	Increase productivity	USS5	

3 RESULTS AND DISCUSSIONS

A. Outer Model Testing

Table 4. Outer loadings

Variable	Indicator	Outer Loading
Reliability	RLB2	0.537
	RLB3	0.855
	RLB4	0.825
	RLB5	0.829
	RSP1	0.833
Responsiveness	RSP2	0.829
	RSP3	0.679
	RSP4	0.754
	RSP5	0.908
	ASR1	0.590
Assurance	ASR2	0.276
	ASR4	0.864
	ASR5	0.777
	EMP1	0.352
Empathy	EMP2	0.821
	EMP3	0.481
	EMP4	0.871
	EMP5	0.505
	TBL1	0.545
Tangible	TBL2	0.904
	TBL3	0.877
	TBL4	0.553
	TBL5	0.914
User Satisfaction	USS2	0.808
	USS3	0.795
	USS4	0.401
	USS5	0.756
	USS6	0.705
Engagement	KPG1	0.845
	KPG2	0.804
	KPG3	0.808
	KMG1	0.875
	KMG2	0.770

Variable	Indicator	Outer Loading
	KMG3	0.347
	PPC1	0.753
	PPC2	0.730
	PPC3	0.570
	PPC4	0.543

Several indicators have been removed from the instrument through a pilot analysis process involving validity tests and reliability tests. A pilot study's goal is to determine whether the method that will be utilized in a larger investigation is feasible [24]. The first is the validity test, which determines if the indicators (measurement tools) can capture latent variables. When taking repeated measurements, the reliability test is performed to assess the indicators' consistency [23]. The criteria used in the convergence validity test are that the outer loading value must be greater than 0.70 so it can be concluded to be valid [25]. In Table IV.1, it is indicated that not all outer loading values of existing indicators meet the value limit of 0.70. The next procedure is to trim or remove the indicator from the model on an invalid indicator. The first trim is to remove invalid indicators in accordance with the outer load values in Table 5. The second trim is done by removing invalid indicators from a model after an indicator has been removed on the first trim. Table 5 shows outer-loading results after two trim processes have been performed on indicators with an external load value below 0.70.

Table 5. Outer loadings after trimming

Variable	Indicator	Outer Loading
Reliability	RLB3	0.855
	RLB4	0.825
	RLB5	0.829
Responsiveness	RSP1	0.833
	RSP2	0.829
	RSP4	0.754
	RSP5	0.908
Assurance	ASR4	0.864
	ASR5	0.777
Empathy	EMP2	0.821
	EMP4	0.871
Tangible	TBL2	0.904
	TBL3	0.877
	TBL5	0.914
User Satisfaction	USS2	0.808
	USS3	0.795
	USS4	0.401
	USS5	0.756
	USS6	0.705
Engagement	KPG1	0.845
	KPG3	0.808
	KMG1	0.875
	KMG2	0.770
	KMG3	0.347
	PPC1	0.753
	PPC2	0.730

In the evaluation of the external model, it becomes imperative to conduct assessments for discriminant validity and reliability. Discriminant validity assessment entails the comparison of the cross-loading value of a construct with the correlation value of the

indicator with respect to another construct [26]. On the other hand, the reliability assessment gauges whether the research outcomes will exhibit consistency when the study is repeatedly conducted with the same variables employing the identical measurement instrument.

Table 6. Cross Loadings

Variable	RLB	RSP	ASR	EMP	TBL	USS	ENG
RLB3	**0.858**	0.577	0.345	0.488	0.447	0.546	0.514
RLB4	**0.841**	0.617	0.427	0.623	0.564	0.390	0.398
RLB5	**0.830**	0.722	0.422	0.429	0.508	0.392	0.453
RSP1	0.592	**0.830**	0.257	0.406	0.563	0.508	0.508
RSP2	0.685	**0.832**	0.408	0.567	0.571	0.394	0.366
RSP4	0.595	**0.767**	0.271	0.398	0.486	0.292	0.355
RSP5	0.656	**0.911**	0.161	0.509	0.634	0.626	0.569
ASR4	0.474	0.246	**0.892**	0.528	0.495	0.121	0.288
ASR5	0.366	0.302	**0.907**	0.658	0.432	0.130	0.207
EMP2	0.623	0.453	0.547	**0.837**	0.447	0.247	0.151
EMP4	0.495	0.537	0.625	**0.940**	0.687	0.397	0.377
TBL2	0.505	0.526	0.497	0.643	**0.960**	0.500	0.500
TBL5	0.631	0.784	0.486	0.621	**0.953**	0.466	0.509
USS2	0.536	0.615	0.219	0.479	0.724	**0.833**	0.754
USS3	0.425	0.370	0.165	0.291	0.156	**0.794**	0.778
USS5	0.343	0.401	-0.062	0.122	0.294	**0.828**	0.735
KPG1	0.495	0.582	0.106	0.227	0.600	0.106	**0.893**
KPG3	0.729	0.558	0.399	0.512	0.663	0.399	**0.771**
KMG1	0.332	0.492	0.212	0.286	0.515	0.212	**0.925**
KMG2	0.303	0.563	0.214	0.157	0.544	0.214	**0.826**
PPC1	0.425	0.371	0.165	0.291	0.177	0.786	**0.761**
PPC2	0.412	0.194	0.220	0.194	0.290	0.714	**0.783**

Table 7. Reliability test results

Variable	Cronbach's Alpha	Composite Reliability (rho_a)	Composite reliability (rho_c)
Assurance	0.765	0.775	0.895
Empathy	0.750	0.850	0.884
Engagement	0.916	0.919	0.933
Reliability	0.801	0.820	0.881
Responsiveness	0.860	0.921	0.902
Tangible	0.892	0.900	0.933
User Satisfaction	0.791	0.808	0.864

Table 6 presents the cross-loading outcomes for this model. The table reveals that the correlation value of the indicator with its corresponding construct is higher than its correlation with other constructs. These cross-loading results substantiate the sound discriminant validity of all the variables or constructs in this study, as they meet the established criteria.

The results for the reliability testing are available in Table 7. It can be concluded that all the variables exhibit good reliability, as they satisfy the criteria of Cronbach's alpha values greater than 0.7 and composite reliability exceeding 0.7. This is attributed to the measurement of SERVQUAL dimensions solely based on perceptual values, which generally yields a higher level of reliability in comparison to measurements involving the contrast between expectations and perceptions [27]. As a result, all the variables are deemed reliable for subsequent data processing and analysis.

B. Inner Model Testing

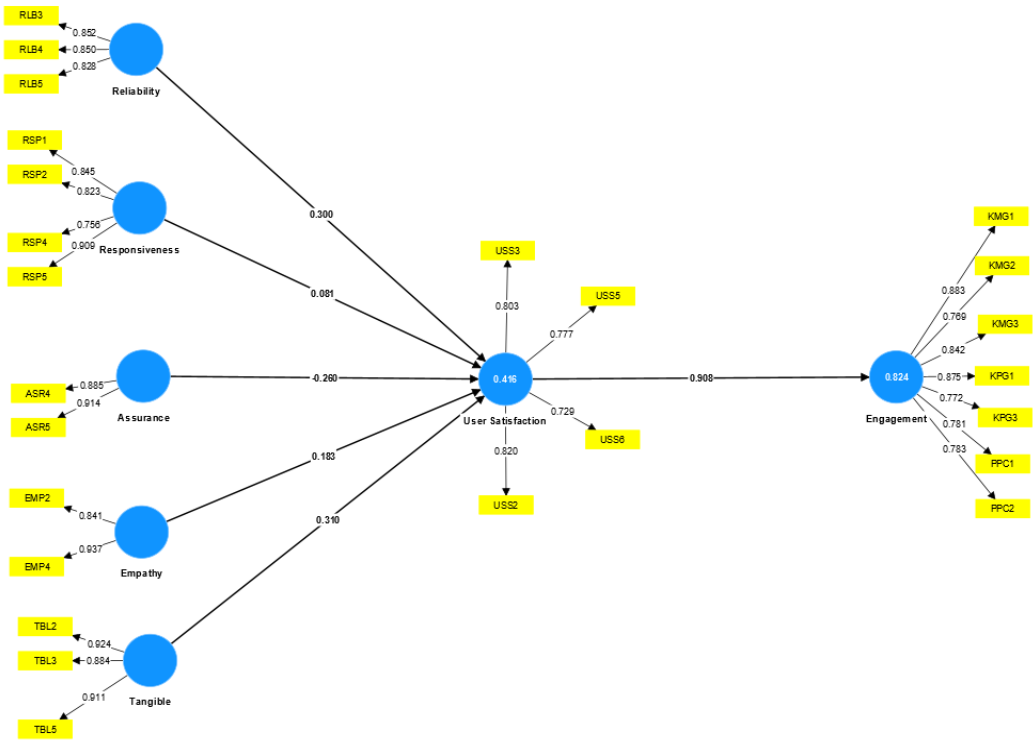

Figure 2. Inner Model

Table 8. Path Coefficients

Relationships	β
Reliability – User satisfaction	0,300
Responsiveness – User satisfaction	0,081
Assurance – User Satisfaction	-0,260
Empathy – User Satisfaction	0,183
Tangible – User Satisfaction	0,310
User Satisfaction – Engagement	0,908

Figure 2 and table 8 shows the path coefficient value result for interconnected variables. From the results of path coefficient testing, it can be interpreted that only the relationship between assurance and user satisfaction has a negative influence because the path coefficient value is negative.

Table 9. effect size test results

Relationships	f-squared
Reliability – User satisfaction	0,058
Responsiveness – User satisfaction	0,003
Assurance – User Satisfaction	0,061
Empathy – User Satisfaction	0,023
Tangible – User Satisfaction	0,070
User Satisfaction – Engagement	4,672

There are several topics that have been discussed in this context. Firstly, the analysis of effect sizes in Table 9 reveals the magnitude of the effects, regardless of sample size [28]. Effect size criteria classify effects as small ($f^2 > 0.02$), medium ($f^2 > 0.15$), or large ($f^2 > 0.3$) [29], [30]. In this context, two prominent relationships, namely, responsiveness and user satisfaction, indicate very small effects (<0.02), which can be disregarded. However, the relationship between user satisfaction and engagement shows a significant effect size (4.672), emphasizing the importance of user satisfaction in driving engagement [31]. This phenomenon can be observed

in the increasing popularity that raises concerns about violations. Furthermore, by conducting sentiment analysis [32], we can delve into and reveal communication methods that can further enhance the chances of success [33]. [34]. [35].

4 CONCLUSSION

Based on the results of variable mapping and the testing of validity and reliability in the model, this study has successfully identified the factors influencing user satisfaction within the concept of Means of Engagement (MOE), which are the SERVQUAL dimensions. These five SERVQUAL dimensions are reliability, responsiveness, assurance, empathy, and tangibility. These variables have been deemed valid, both in terms of convergent and discriminant validity, and are statistically reliable. These findings align with previous research which confirmed the validity and reliability of the SERVQUAL dimensions in their relationship with user satisfaction [20]. In the context of the development of the concept of means of engagement carried out, the results of the effect size analysis have given an important insight. The results of the analysis show that responsiveness has a very small influence on user satisfaction, so it can be ignored. Although other factors, namely reliability, assurance, empathy, and tangible, were also found to have a small contribution, the contribution is still considerable as it still belongs to the category of minor influence on Cohen's f-squared [30]. Only the relationship between user satisfaction and engagement on the MOE concept has a very strong and significant impact.
According to the results, further development of the concept of means of engagement is still needed to identify factors affecting user satisfaction in the context of the MOE concept. Mapping other variables that may affect customer satisfaction is still necessary. Nevertheless, the development of the concept of means of engagement has made an important contribution because it has successfully proved that user satisfaction can influence the dynamics of engagement levels on the MOE concept and the satisfaction of the user is an important factor in the domain relationship/measures on the means of commitment concept.

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