Understanding POS ABC Adoption in Indonesia: A Quantitative Analysis Using Modified UTAUT

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***Abstract*—Micro, Small, and Medium Enterprises (MSMEs) are vital to Indonesia's economy. However, they face challenges in technology adoption, particularly Point of Sale (POS) systems, which remains relatively low despite their potential benefits. The research addresses the significant gap between the projected and actual adoption of POS ABC, a leading cloud-based POS system in Indonesia, by identifying key determinants that may act as barriers or enablers in the adoption process. By analyzing these factors, the researchers offer theoretical explanations for the suboptimal adoption rate and suggests strategic directions for increasing technology uptake among MSMEs. Utilizing a modified Unified Theory of Acceptance and Use of Technology (UTAUT) framework, the research uniquely integrates system quality as an additional construct to address recurring technical complaints highlighted in user reviews, offering a novel perspective on technology adoption in this context. A quantitative approach is employed, collecting data from 400 MSMEs across Indonesia via online surveys. Structural Equation Modeling (SEM) with SmartPLS 4.1.0.9 is used for analysis, yielding an R^2 of 49.4% for behavioral intention and 52.5% for use behavior. The findings reveal that performance expectancy, social influence, and habit significantly impact behavioral intention, while facilitating conditions, habit, system quality, and behavioral intention significantly influence use behavior. Effort expectancy, facilitating conditions, and price value show no significant effect on behavioral intention. The findings offer essential insights for developers of POS systems and policymakers, guiding strategies to enhance the adoption of digital solutions and address technical challenges faced by Indonesian MSMEs.**

***Index Terms*—Point of Sale (POS), UTAUT, MSMEs, Technology Adoption.**

I. Introduction

MICRO, Small, and Medium Enterprises (MSMEs) play a crucial role in Indonesia's economy, contributing 60.51% of GDP and employing 96.92% of the workforce [1]. Despite their significance, MSMEs face persistent challenges such as limited capital, inadequate technology adoption, low financial literacy, and ineffective marketing strategies [2, 3]. To mitigate these challenges, financial technology (fintech) has emerged as a promising solution, offering services such as payment systems, lending, accounting, and Point of Sale (POS) solutions [4]. Among various fintech services, POS systems are particularly crucial for MSME operations due to their comprehensive integration of sales tracking, inventory management, and automated financial reporting, making them more practical than transaction-focused fintech alternatives. The implementation of POS systems has demonstrated significant positive impacts on business performance, including increased sales volume, reduced payment queues, and improved business income, as evidenced by studies in diverse contexts. A study in Nigeria has found that POS terminals have increased sales volume, reduced payment queues, and improved business income [5]. Similarly, a study on cloud-based POS systems during the COVID-19 pandemic has showed a positive impact on non-financial performance, such as operational efficiency and customer satisfaction, although financial performance is negatively affected due to reduced sales during the pandemic [6].

Despite the potential benefits of POS systems, their adoption among Indonesian MSMEs remains relatively low [7]. This limited adoption constitutes a significant barrier to the digital transformation of Indonesian MSMEs, potentially hindering their competitiveness, efficiency gains, and broader economic contribution. A prominent example of this challenge is observed in the adoption of POS ABC, a leading cloud-based

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POS provider tailored for MSMEs. This platform delivers a comprehensive digital solution that includes transaction recording, inventory management, financial reporting, and business analytics to streamline business operations. However, from its website, despite its ambitious goal of reaching 30 million users, POS ABC currently has only 45,000 active users. This significant gap between projected and actual adoption figures underscores a critical research problem: a lack of comprehensive understanding regarding the underlying factors that impede or facilitate the widespread adoption of POS technology by Indonesian MSMEs. Addressing this knowledge gap is urgent to unlock the full potential of MSMEs in the digital economy.

The research seeks to address significant limitations found in prior studies on technology adoption in Indonesia, specifically regarding POS systems. For example, Majoo in Indonesia and StoreHub in Malaysia are compared, identifying social influence and performance expectancy as factors influencing POS ABC adoption. However, the previous research is limited to a small sample of 100 respondents from South Tangerang, Indonesia and 100 from Selangor, Malaysia. Hence, it compromises the generalizability of the findings. Crucially, it also does not investigate technical barriers such as system bugs or malfunctions, which are critical in technology adoption [8]. Hence, the research seeks to address that gap by incorporating system quality as an additional construct, thus capturing the influence of technical issues on POS adoption.

In a similar research, the adoption of Moka POS in Jakarta through the UTAUT model is analyzed, highlighting performance expectancy, effort expectancy, and social influence as key adoption factors. Nevertheless, it is confined to Jakarta and focuses exclusively on Moka POS [9]. Although Moka and POS ABC are both POS systems, they cater to different business segments and offer varying features, service models, and technical capabilities. Consequently, the results from Moka may not be entirely relevant to users of POS ABC. The methodological and contextual limitations in the existing literature highlight a notable gap, especially concerning a thorough understanding of the adoption of POS ABC in Indonesia and the impact of technical issues on user behavior.

To address the identified gaps in existing literature and to develop a contextually relevant research model, the researchers conduct a preliminary qualitative analysis. It involved a comprehensive review of 375 user reviews from the Google Play Store and App Store, collected from September 2023 to September 2024, in conjunction with detailed interviews with specific MSME users. This preliminary phase is crucial for identifying key user perceptions, satisfaction points, and, critically, recurring pain points directly related to the POS ABC system. The user reviews are systematically categorized into positive and negative feedback, as summarized in Tables I and II, respectively. Positive feedback predominantly highlights operational benefits (Android: 48.5%; iOS: 36.4%), ease of use (Android: 29.6%), and comprehensive features (Android: 14.8%; iOS: 9.1%), aligning with established constructs like performance expectancy and effort expectancy. Conversely, negative reviews significantly indicate issues, such as malfunctioning features (Android: 60.6%; iOS: 65.7%) and problems following application updates (Android: 16.3%; iOS: 14.3%). These frequent technical complaints strongly demonstrate the importance of system reliability and functionality.

TABLE I
CATEGORIES OF POSITIVE REVIEWS IN SEP 2023–SEP 2024

Category	Platform (%)	
	Android	iOS
Supporting business operation	48.5	36.4
Being easy to use	29.6	0.0
Having comprehensive features	14.8	9.1
Providing high quality service to customer services or sales	6.5	9.1
Offering affordable price	0.6	45.5
Total	100	100

TABLE II
CATEGORIES OF NEGATIVE REVIEWS IN SEP 2023–SEP 2024

Category	Platform (%)	
	Android	iOS
Features do not work properly	60.6	65.7
There are difficulties after updating the application version	16.3	14.3
There are issues related to receiving verification codes	10.6	2.9
There are problems related to customer service or sales	6.3	0.0
Others	5.6	17.1
It has high price	0.6	0.0
Total	100	100

Moreover, interviews with user have provided additional validation and depth to these findings. For instance, Ms. S, a user of POS ABC from Bandung, initially chose the application for its comprehensive features but encountered technical issues with the attendance system, in addition to being influenced by business colleagues' recommendations. Similarly, Mr. A, a business owner from Tasikmalaya, experienced transaction processing delays despite benefiting from the efficiency of POS ABC. He was also influenced by observing other businesses using the system. These qualitative narratives collectively highlight that while perceived benefits and social influence play roles, technical performance issues pose significant barriers

to consistent usage and user satisfaction.

Consequently, the findings from this preliminary qualitative analysis directly informs the adaptation of the Unified Theory of Acceptance and Use of Technology (UTAUT) model, specifically justifying the inclusion of system quality as a new, essential construct. Furthermore, these insights guide the refinement of indicators for other UTAUT variables, ensuring their contextual relevance to the adoption of POS ABC among Indonesian MSMEs. Therefore, building upon the refined theoretical framework, the research aims to examine the key determinants empirically influencing POS ABC adoption among MSMEs in Indonesia. Specifically, it investigates the roles of performance expectancy, effort expectancy, social influence, facilitating conditions, price value, habit, and the newly integrated system quality on behavioral intention and actual use behavior. The findings are expected to provide robust empirical insights into MSME technology adoption dynamics, offering actionable recommendations for POS system developers and policymakers to accelerate digital transformation initiatives within Indonesia.

A. Point Of Sale (POS)

A POS system is defined as the point where sales transactions take place, facilitating the transfer of ownership of goods from seller to buyer, and determining applicable tax obligations, including Value Added Tax (VAT) [10]. Additionally, POS systems serve broader functions beyond transaction recording, supporting various business operations such as accounting, inventory management, payroll processing, debt management, and other administrative tasks [11]. By integrating software and hardware, these systems play a crucial role in enhancing business efficiency and operational management.

B. Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The UTAUT [12] is a comprehensive framework for analyzing technology adoption behavior. It synthesizes constructs from eight established models (Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Motivational Model (MM), Model of PC Utilization (MPCU), Combined TAM and TPB (C-TAM-TPB), Social Cognitive Theory (SCT), and Innovation Diffusion Theory (IDT)) to identify four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. Additionally, gender, age, experience, and voluntariness of use function are as moderating variables that influence user behavior. The UTAUT model has been widely applied across various sectors to evaluate technology adoption and continued system usage.

C. Unified Theory of Acceptance and Use of Technology (UTAUT) 2 Model

The UTAUT 2 extends the original UTAUT model by shifting its focus from organizational settings to consumer technology adoption. This expanded framework introduces three additional constructs: hedonic motivation, price value, and habit, which significantly enhance its explanatory power [13]. Previous research by [13] demonstrates that these additions improve the model's predictive capability, increasing the explained variance in behavioral intention from 56% in UTAUT to 74% in UTAUT 2. It also raises the variance in technology use from 40% to 52%.

D. Performance Expectancy

Performance expectancy refers to the degree to which individuals perceive that using a system enhances job performance and leads to better outcomes [12].Previous studies have indicated that performance expectancy significantly influences behavioral intention [12, 14]. In this research, it defines performance expectancy as the degree to which users believe the system improve business operations. Three key indicators are used to measure this construct [12, 14]. First, operational support reflects the system's ability to facilitate business processes efficiently, as supported by user reviews and interviews. Second, comprehensive features refer to users' perceptions of how well the system meets their needs. Third, time efficiency highlights the extent to which the system optimizes time usage in operational tasks. Therefore, the hypothesis proposed is as follows:

H1: Performance expectancy has a positive influence on behavioral intention to use POS ABC systems.

E. Effort Expectancy

Effort expectancy, as defined [12], refers to the degree of ease associated with using a system. Previous research has indicated that effort expectancy significantly influences behavioral intention [12, 14, 15]. In this research, effort expectancy is the perceived ease of system utilization by users. Three indicators are used for measurement [12, 14]. First, ease of understanding reflects the system's user-friendliness and comprehensibility through direct interaction or by referring to the user guide. Second, ease of use

refers to the system's intuitive menus and features, as supported by user reviews and interviews. Third, speed and ease of access highlight the system's ability to provide quick and effortless access when needed, which aligns with previous findings [15]. Therefore, the next hypothesis proposed is as follows:

H2: Effort expectancy has a positive influence on behavioral intention to use POS ABC systems.

F. Facilitating Condition

Facilitating conditions refer to the extent to which individuals perceive the availability of adequate organizational and technical infrastructure to support system use [12]. Previous reserach has demonstrated that facilitating conditions significantly influence behavioral intention and use behavior [16]. In this research, facilitating conditions are defined as users' perceptions of the adequacy of resources and support for system utilization. Three indicators are used for measurement. First, the availability of helpful after-sales service ensures customer support to assist users in resolving operational issues, as reinforced by user reviews [12, 14]. Second, the availability of hardware and software emphasizes the importance of supporting devices such as computers, tablets, or smartphones for effective POS system operatio [16, 17]. Third, system alignment with existing business processes ensures seamless integration into operational management, as supported by previous findings [12, 16]. Therefore, the hypothesis proposed is as follows:

H3: Facilitating condition has a positive influence on behavioral intention to use POS ABC systems,
H4: Facilitating condition has a positive influence on use behavior in users to use POS ABC systems.

G. Social Influence

Social influence refers to the extent to which individuals perceive that important people in their environment believe they should use the system [12]. Previous studies have shown that social influence has a significant impact on behavioral intention [12, 14]. This research defines social influence as the degree to which users perceive the adoption of the system to be important due to external factors. Three indicators are used for measurement. First, recommendations from the community or business partners highlight the role of colleagues or industry networks in encouraging system adoption, as supported by previous findings [13, 18] and user interviews. Second, wide acceptance refers to the extent to which the system has gained broad industry recognition, aligning with previous findings [13, 18]. Third, brand perception emphasizes the idea that system usage contributes to enhancing consumer image or reputation, consistent with previous studies [13, 14]. Therefore, the hypothesis proposed is as follows:

H5: Social influence has a positive influence on behavioral intention to use POS ABC systems.

H. Hedonic Motivation

Hedonic motivation refers to the enjoyment or satisfaction derived from using a technology [13]. However, the research excludes hedonic motivation, aligning with previous findings [19]. This decision is based on the nature of Software as a Service (SaaS) applications, which prioritize usability and functional value over user enjoyment or pleasure.

I. Price Value

Price value refers to the customer's cognitive evaluation of the perceived benefits of a system relative to its costs [13]. Price value is considered positive when the benefits of using a technology outweigh the costs incurred. Previous studies have indicated that price value significantly influences behavioral intention [13, 18]. This research defines price value as the degree to which users believe the benefits they receive justify the costs they incur. Two indicators are used for measurement. First, price perception reflects users' evaluation of the alignment between incurred costs and received benefits, as supported by previous findings [13, 18] and user interviews. Second, the effect of price on intention to use emphasizes users' perception that the system's cost influences their decision to continue using it [13, 18]. Therefore, the hypothesis proposed is as follows:

H6: Price value has a positive influence on behavioral intention to use POS ABC systems.

J. Habit

Habit refers to the extent to which individuals perform certain behaviors automatically as a result of previous learning and experience [20]. Furthermore, habit is equated with automaticity [21]. Previous studies have indicated that habit significantly influences both behavioral intention and use behavior [13, 18]. Meanwhile, the research conceptualizes habit as the extent to which users perceive the integration of the system into their operational activities. Three indicators are used for

measurement [13, 18]. First, integration into routine is where users perceive that the system has become a habitual component of their daily operations. Second, the dependence on the system reflects users' reliance on the system for efficient task execution. Third, ease of use due to familiarity emphasizes that users find the system intuitive and convenient as a result of their familiarity with its features. Therefore, the hypothesis proposed is as follows:

H7: Habit has a positive influence on behavioral intention to use POS ABC systems,
H8: Habit has a positive influence on use behavior for users to use POS ABC systems.

K. System Quality

System quality encompasses several key characteristics, including availability, usability, reliability, adaptability, and waiting time [22]. Previous study has demonstrated a positive and significant relationship between system quality and use behavior [23]. In this research, the system quality is measured using two indicators. First, system stability after updates refers to the system's ability to remain stable and error-free following application updates, consistent with previous findings [22, 24] and user reviews. Second, proper functioning of all features, emphasizing that all system features operate as intended without issues, aligning with previous research [22, 24] and further validated by user feedback. Based on these considerations, the following hypothesis is proposed:

H9: System quality has a positive influence on use behavior for users to use POS ABC systems.

L. Behavioral Intention

Behavioral intention refers to an individual's willingness to use a particular technology in the future [13]. Previous studies have demonstrated that behavioral intention significantly influences use behavior [13, 24]. The research conceptualizes behavioral intention as the degree to which users are inclined to continue using the system. This construct is measured through two key indicators [13, 24]. First, the intention to continue using the system indicates users' commitment to sustained usage. Second, the intention to explore system features represents users' willingness to explore and utilize available functionalities. Therefore, the hypothesis proposed is as follows:

H10: Behavioral intention positively influences use behavior in POS ABC system adoption.

M. Use Behavior

Use behavior refers to an individual's actual engagement with a technology [13]. In the research, use behavior is conceptualized as the frequency of user interactions with the system. This construct is measured through two key indicators [13]. First, system usage frequency reflects how often users integrate the system into their daily operations. Second, user satisfaction represents the extent to which users feel satisfied after using the system, further reinforcing its continued usage.

II. Research Method

The research employs a quantitative research approach to investigate the factors influencing the adoption and use of the POS ABC application among MSMEs in Indonesia. The research adopts a modified UTAUT framework, which is extended by incorporating insights derived from both a comprehensive literature review and a preliminary qualitative analysis of user reviews to enhance its contextual relevance. Figure 1 depicts the proposed research model, which integrates core UTAUT variables including performance expectancy, effort expectancy, social influence, and facilitating conditions [12]. To enhance its applicability for consumer technology adoption, the model further incorporates price value and habit [13]. Additionally, to address the technical performance and system reliability issues identified in the preliminary analysis, system quality is incorporated as an additional construct. Table III summarizes the variables, corresponding indicators, and supporting references, based on both prior literature and processed research data.

A. Sample and Data Collection

The research uses structured questionnaires for data collection, which are then analyzed using numerical methods, Structural Equation Modeling (SEM). The population consists of all POS ABC application users in Indonesia. However, due to the unavailability of precise user data, the official website estimates that over 45,000 merchants use the application, which serves as the assumed population size. Using the Slovin formula with a 5% margin of error, the required sample size is 397 respondents. For practicality, the sample size is rounded up to 400 respondents.

Primary data are collected through a questionnaire that is randomly distributed to POS ABC users via a Google Form link shared on social media and messaging platforms. The questionnaire is designed based on research indicators for each variable under investigation and employed a Likert scale (1–5) to measure respondent opinions: 5 = Strongly Agree, 4

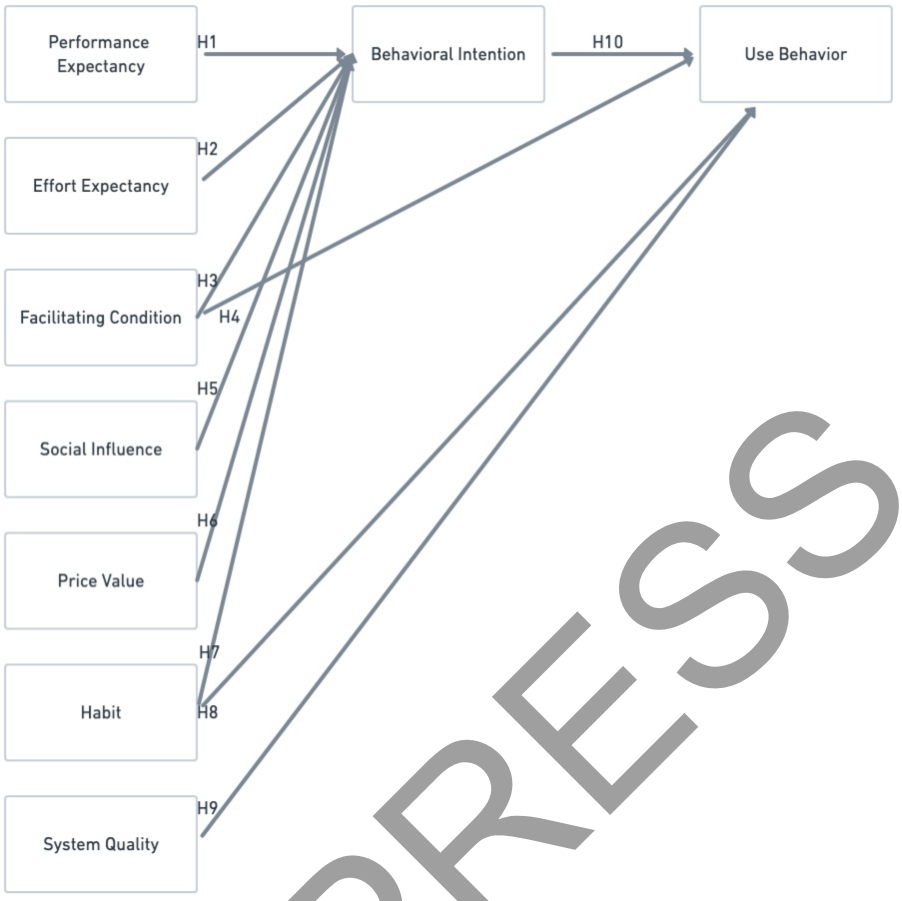

Fig. 1. Research model.

= Agree, 3 = Moderately Agree, 2 = Disagree, and 1 = Strongly Disagree. Then, a random sampling technique is applied to ensure equal selection probability, enhancing the representativeness and reliability of the sample for statistical analysis.

B. Data Analysis

The research employs SEM with the Partial Least Squares (PLS) approach using SmartPLS 4.1.0.9 software. Data analysis is conducted in two stages following the collection of questionnaire. The outer model is tested to evaluate the validity and reliability of the indicators, while the inner model assesses the relationships between latent variables. Once validity and reliability criteria are met, hypothesis testing is performed using SEM analysis to derive research conclusions. The findings from this analysis provide a deeper understanding of the interrelationships between variables within the study's context.

The measurement or outer model evaluates the reliability and validity of the constructs and their indicators. There are three key criteria for this assessment. First, indicator reliability is examined through outer loadings, with values of 0.7 or higher considered optimal, although values above 0.5 are acceptable [25]. Second, convergent validity is assessed using Average Variance Extracted (AVE) values of 0.5 or higher and Composite Reliability (CR) values of 0.7 or higher [26].

Cronbach's Alpha is also employed to assess the internal consistency of the measurement items. A Cronbach's Alpha value of 0.7 or higher is generally considered acceptable, indicating that the items reliably measure the same construct [26]. Although this measure tends to provide a conservative estimate compared to CR, it remains a widely recognized indicator of reliability in SEM-PLS. By reporting both Cronbach's Alpha and CR, the research ensures a more comprehensive evaluation of construct reliability.

Third, discriminant validity is evaluated to ensure

TABLE III
VARIABLE AND INDICATOR IN THE RESEARCH.

No	Variable	Code	Indicator	Source
1	Performance Expectancy	PE1	Operational support	[12, 14], Processed Research Data
		PE2	Comprehensive feature	[12], Processed Research Data
		PE3	Time efficiency	[12, 14]
2	Effort Expectancy	EE1	Ease of understanding the system	[12, 14]
		EE2	Ease of use the system	[12, 14], Processed Research Data
		EE3	Speed and ease of access	[15]
3	Facilitating Conditions	FC1	Availability of helpful after-sales service	[12, 14], Processed Research Data
		FC2	Availability of hardware and software	[16, 17]
		FC3	System aligns with existing business processes	[12, 16]
4	Social Influence	SI1	Recommendations from community or business partners	[13, 18], Processed Research Data
		SI2	Wide acceptance	[13, 18], Processed Research Data
		SI3	Brand perception	[13, 14]
5	Price Value	PV1	Price perception	[13, 18], Processed Research Data
		PV2	Effect of price on intention to use	[13, 18]
6	Habit	HA1	Integration of the system into routine	[13, 18]
		HA2	Dependence on the system	[13, 18]
		HA3	Ease of use due to familiarity	[13, 18]
7	System Quality	SQ1	Stable system post-update	[22, 24], Processed Research Data
		SQ2	All features functioning properly	[22, 24], Processed Research Data
8	Behavioral Intention	BI1	Intention to use the system	[12, 24]
		BI2	Intention to explore the system	[13, 24]
9	Use Behavior	UB1	Frequency of system usage	[13]
		UB2	User satisfaction	[13]

the distinctness among constructs. It is assessed using the Fornell-Larcker criterion. The square root of AVE for each construct should be greater than its correlations with other constructs [26].

The structural or inner model is evaluated to test the hypothesized relationships between latent variables and assess the model's predictive power. The main criteria for this assessment are as follows. First, hypothesis testing is conducted by examining path coefficients (β), t-statistics, and p-value. A p-value less than 0.05 indicates a statistically significant relationship [26]. Second, coefficient of determination (R-square) quantifies the variance in dependent variables explained by predictors. Third, predictive relevance (Q^2) uses the Stone-Geisser Q^2 criterion, with values greater than zero indicating predictive relevance [27]. Last, effect size (f^2) analyzes to determine the practical significance of each exogenous construct on its endogenous construct, following Cohen's guidelines (0.02 for small, 0.15 for medium, and 0.35 for large effects) [28].

III. RESULTS AND DISCUSSION

A. Respondents' Profile

Respondent profiles can be seen in Table IV. The majority of respondents are male (58.5%), while female respondents account for 41.5%. In terms of age, most fall within the 25–34 (34.3%) and 35–44 (32.3%) age groups. The results are followed by 18–24 years (23.3%), with smaller proportions in other categories. Geographically, respondents are primarily from Jawa (62.3%). The other results are Kalimantan (14.3%), Sulawesi (13.8%), and Sumatra (9.8%), indicating a strong concentration of POS ABC users in Jawa.

TABLE IV
RESPONDENTS' PROFILE

Respondents' Profile	Total	Percentage (%)
Gender		
Male	234	58.5
Female	166	41.5
Age		
<18	21	5.3
18–24	93	23.3
25–34	137	34.3
35–44	129	32.3
44–54	14	3.5
>55	6	1.5
Location		
Jawa	249	62.3
Sumatera	39	9.8
Kalimantan	57	14.3
Sulawesi	55	13.8

B. Measurement Model (Outer Model)

The outer model evaluation assesses whether the indicators used meet the required validity and reliability criteria before advancing to the inner model analysis. If the evaluation results indicate that certain

TABLE V
OUTER LOADINGS RESULTS.

Variable	Indicator	Outer Loadings	Status
Behavioral Intention	BI1	0.865	Valid
	BI2	0.893	Valid
Effort Expectancy	EE1	0.753	Valid
	EE2	0.772	Valid
	EE3	0.850	Valid
Facilitating Condition	FC1	0.861	Valid
	FC2	0.814	Valid
	FC3	0.821	Valid
Habit	H1	0.897	Valid
	H3	0.911	Valid
Performance Expectancy	PE1	0.801	Valid
	PE2	0.812	Valid
	PE3	0.792	Valid
Price Value	PV1	0.902	Valid
	PV2	0.864	Valid
Social Influence	SI1	0.828	Valid
	SI2	0.803	Valid
	SI3	0.823	Valid
System Quality	SQ1	0.895	Valid
	SQ2	0.893	Valid
Use Behavior	UB1	0.885	Valid
	UB2	0.894	Valid

TABLE VI
AVERAGE VARIANCE EXTRACTED (AVE) VALUE RESULTS.

Indicator	AVE Value	Status
Behavioral Intention	0.773	Valid
Effort Expectancy	0.628	Valid
Facilitating Condition	0.693	Valid
Habit	0.817	Valid
Performance Expectancy	0.643	Valid
Price Value	0.780	Valid
Social Influence	0.670	Valid
System Quality	0.800	Valid
Use Behavior	0.791	Valid

TABLE VII
RELIABILITY TEST RESULTS USING CRONBACH'S ALPHA AND COMPOSITE RELIABILITY (CR).

Variable	Cronbach's Alpha	CR (rho_a)	CR (rho_c)	Status
Behavioral Intention	0.706	0.712	0.872	Reliable
Effort Expectancy	0.712	0.752	0.835	Reliable
Facilitating Condition	0.778	0.779	0.871	Reliable
Habit	0.776	0.779	0.899	Reliable
Performance Expectancy	0.723	0.723	0.844	Reliable
Price Value	0.719	0.730	0.876	Reliable
Social Influence	0.753	0.755	0.859	Reliable
System Quality	0.749	0.749	0.889	Reliable
Use Behavior	0.737	0.737	0.884	Reliable

indicators do not meet the specified criteria, these indicators are eliminated or modified to ensure that the analysis produces more accurate and reliable findings. Table V presents the outer loading values. It include only indicators with loading factors above 0.7. The H2 indicator is excluded from this table due to its outer loading value below 0.5. The indicators fail to meet the validity criteria. In general, a factor loading value greater than 0.7 is considered optimal, although values above 0.5 may still be acceptable under certain conditions [25].

Furthermore, AVE testing is conducted to assess convergent validity, as presented in Table VI. The results indicate that all constructs have an AVE value above the threshold of 0.5. They validate that each variable satisfies the necessary criteria for validity. Therefore, it can be concluded that both convergent and discriminant validity have been successfully established for the research.

Table VII presents the reliability test results, measured using Cronbach's Alpha and CR. The analysis results indicate that all variables have values exceeding 0.7. They demonstrate good internal consistency and meeting reliability standards. Therefore, the variables used can be confirmed as reliable.

Next, discriminant validity is further assessed using the Fornell-Larcker criterion to ensure that each construct is distinct from other constructs within the model. As shown in Table VIII, the square root of the AVE for each construct is greater than its correlations with all other constructs in the model (value in bold). The results satisfy the Fornell-Larcker criterion. This finding confirms that each construct represents a unique dimension of the research model, reducing the risk of multicollinearity and overlap. Establishing discriminant validity is critical in SEM because it ensures that indicators measure their intended construct rather than others, thereby reinforcing the credibility and robustness of the modified UTAUT framework employed.

These results collectively affirm that both convergent and discriminant validity have been successfully established for all constructs in the research. The results indicate that the measurement model demonstrates sufficient reliability and validity, ensuring that the constructs are accurately represented by their respective indicators. Establishing convergent validity confirms that the indicators within each construct share a high proportion of variance, while discriminant validity assures that the constructs are empirically distinct from one another. Together, these tests minimize the risk of redundancy and misinterpretation, which are common issues in SEM. The robustness of these measurement properties provides a strong foundation for proceeding to the structural model analysis, as the relationships among constructs can now be interpreted with greater confidence. Consequently, the results strengthen the overall credibility of the modified UTAUT framework applied and support its suitability for examining tech-

TABLE VIII
FORNELL-LARCKER RESULTS.

	BI	EE	FC	H	PE	PV	SI	SQ	UB
BI	**0.879**								
EE	0.412	**0.793**							
FC	0.568	0.506	**0.832**						
H	0.594	0.450	0.622	**0.904**					
PE	0.609	0.461	0.668	0.678	**0.802**				
PV	0.544	0.431	0.635	0.613	0.632	**0.883**			
SI	0.620	0.404	0.660	0.629	0.649	0.633	**0.818**		
SQ	0.500	0.399	0.593	0.554	0.586	0.559	0.579	**0.894**	
UB	0.581	0.434	0.621	0.640	0.585	0.618	0.624	0.527	**0.890**

Behavioural Intention (BI), Effort Expectancy (EE), Facilitating Condition (FC), Habit (H), Performance Expectancy (PE), Price Value (PV), Social Influence (SI), System Quality (SQ), and Use Behavior (UB).

nology adoption in the context of Indonesian MSMEs.

C. Structural Model (Inner Model)

The structural model is evaluated to test the hypothesized relationships between the latent variables and to assess the model's overall predictive power. This assessment involved examining the path coefficients, R-square, predictive relevance (Q^2), and effect size (f^2). The explanatory power of the model is assessed through the R-square for the endogenous latent variables. Table IX shows that the R-square value for behavioral intention is 0.494. It indicates that 49.4% of its variance is explained by the exogenous variables in the model. Similarly, the R-square value for use behavior is 0.525. It means that 52.5% of its variance is accounted for by its predictors. The adjusted R-square values are 0.487 for behavioral intention and 0.520 for use behavior. The results provide a more reliable measure of explanatory power by accounting for model complexity. These R-square values suggest a substantial explanatory power for both dependent variables within the context of technology adoption research.

Furthermore, the model's predictive relevance (Q^2) is assessed. The Q^2 values for behavioral intention (0.486) and use behavior (0.518) are both above zero. The results confirms the model's predictive relevance for these constructs. These findings indicate that the model can generate accurate predictions beyond the sample data, thereby reinforcing its explanatory strength. Since Q^2 complements R-square in evaluating model quality, the results can be conveniently presented together with R-square values in Table IX to avoid redundancy. Integrating both metrics in a single table provides a clearer and more concise overview of the model's explanatory and predictive power.

D. Hypothesis Test

The hypothesized relationships are tested through the analysis of path coefficients (β), t-statistics, and p-values. A hypothesis is supported if its corresponding p-value is less than the significance level of 0.05. Hence, it indicates a statistically significant relationship. Table X summarizes the results of the hypothesis test. Out of the ten hypotheses proposed, seven are supported while three are rejected. Specifically, performance expectancy (H1), social influence (H5), habit (H7 and H8), facilitating conditions on use behavior (H4), system quality (H9), and behavioral intention (H10) show significant effects. Conversely, effort expectancy (H2), facilitating conditions on behavioral intention (H3), and price value (H6) are found to be insignificant. These results highlight that behavioral intention is primarily driven by perceived usefulness, social influence, and habitual usage, whereas actual use behavior is more strongly explained by facilitating conditions, habit, system quality, and intention to use.

Performance expectancy positively influences behav-

TABLE IX
R-SQUARE AND PREDICTIVE RELEVANCE (Q^2) RESULTS.

Variable	R-Square	Adjusted R-Square	Q^2
Behavioral Intention	0.494	0.487	0.486
Use Behavior	0.525	0.520	0.518

TABLE X
HYPOTHESES TEST RESULTS.

Hypotheses	Path	T-Statistics	P-Value	Status
H1	PE → BI	3.694	0.000	Accepted
H2	EE → BI	1.605	0.109	Rejected
H3	FC → BI	1.387	0.166	Rejected
H4	FC → UB	5.103	0.000	Accepted
H5	SI → BI	5.030	0.000	Accepted
H6	PV → BI	1.389	0.165	Rejected
H7	H → BI	3.321	0.001	Accepted
H8	H → UB	6.619	0.000	Accepted
H9	SQ → UB	2.345	0.019	Accepted
H10	BI → UB	4.052	0.000	Accepted

Behavioural Intention (BI), Effort Expectancy (EE), Facilitating Condition (FC), Habit (H), Performance Expectancy (PE), Price Value (PV), Social Influence (SI), System Quality (SQ), and Use Behavior (UB).

ioral intention, with a p-value of 0.000 ($p < 0.05$). This finding aligns with prior research [29, 30], reinforcing that users who perceive the system as beneficial in supporting business operations are more likely to continue using it. In the context of POS ABC adoption by Indonesian MSMEs, it highlights POS ABC's perceived ability to enhance operational efficiency (a crucial factor given their often-limited resources). Features like integrated sales tracking, inventory management, and financial reporting are highly valued for streamlining business processes. The preliminary qualitative analysis indicates consistent positive feedback regarding "operational support" and "comprehensive features" further validates that these tangible improvements are primary drivers for MSMEs' intention to adopt and continuously use POS ABC. Thus, POS ABC's perceived performance benefits are directly linked to users' sustained adoption intentions.

Effort expectancy does not significantly influence behavioural intention, with a p-value of 0.109, exceeding the 0.05 threshold. This result suggests that users' perception of ease of use does not play a crucial role in their intention to continue using the POS ABC system. This finding aligns with previous research [29], which also concludes that effort expectancy does not significantly impact behavioral intention. A possible explanation is that the majority of respondents are within the productive age range (25–44 years), indicating familiarity with technology and reducing the importance of ease of use as a deciding factor. This statement is consistent with previous study [31], which argues that when users are already accustomed to technology, ease of use becomes less relevant. Furthermore, another previous research suggests that external pressure and urgent needs play a more dominant role in influencing users to adopt a system than their perception of ease of use (effort expectancy) [32]. In certain situations, users tend to adopt technology despite its complexity, primarily due to external factors, such as urgency and the lack of viable alternatives.

Facilitating conditions are found to have no significant effect on behavioral intention. The p-value is 0.166, which exceeds the 0.05 threshold, indicating that the hypothesis is not supported. This result suggests that the availability of resources and support provided by POS ABC does not significantly influence users' intention to use the system. This finding aligns with the previous studies [16, 33] that facilitating conditions do not significantly influence behavioral intention. However, it contradicts the finding from another study [8]. The lack of significance in the research may be attributed to the high level of digital literacy and existing technological familiarity among respondents, which reduces their reliance on external facilitating conditions. Additionally, since POS ABC is a widely used platform with a user-friendly interface, users may not perceive resource availability or support as critical factors influencing their behavioral intention.

Facilitating conditions have positive effect on use behavior. The p-value is 0.000, which is below the 0.05 threshold. This result indicates that the availability of resources and support significantly influences users' actual system usage. This finding is consistent with previous studies [8, 18] that facilitating conditions positively affect use behavior. This contrasting finding with H3 offers a critical insight. While facilitating conditions may not be a primary driver for forming the initial intention to use POS ABC, they become crucial once users begin to actually interact with the system. For MSMEs, the availability of helpful after-sales service, a strong hardware/software infrastructure, and seamless integration with existing business processes are essential for sustained and effective utilization, particularly in their lack of dedicated information technology support or extensive technical knowledge. This interpretation is supported by the qualitative analysis of open-ended survey responses and user reviews, where several participants cite the importance of customer service and technical support. For instance, negative reviews frequently mention difficulties in resolving issues, such as "slow response for customer service" or "hard to contact support". These factors reflect how the availability (or lack thereof) of support services can directly affect continued usage. While the research does not directly examine POS ABC's organizational commitment to support services, the significant effect of facilitating conditions on use behavior suggests that the availability of technical and operational support may play an important role in sustaining system usage. Future research can explore this aspect in greater depth to confirm its impact on long-term adoption.

Social influence positively impacts behavioral intention. The p-value of 0.000 is below the 0.05 threshold. This result indicates that social influence, such as peer recommendations, significantly enhances users' intention to adopt the POS ABC system. This finding corroborates previous studies [8, 29], which also demonstrate a positive relationship between social influence and behavioral intention. In the Indonesian MSME context, community ties and informal networks significantly influence business decisions, making social influence a critical factor. MSME owners often depend on referrals and the experiences of trusted colleagues or other businesses in their community when evaluating new technologies. The preliminary qualitative analysis strongly supports this statement, as

anecdotal evidence from user interviews reveals that recommendations from business colleagues (e.g., Ms. S) and observing other businesses' usage (e.g., Mr. A) are key drivers for choosing POS ABC. The result suggests that the perceived success or endorsement of POS ABC by respected peers within their business ecosystem reduces uncertainty and builds confidence, directly translating into a stronger intention to adopt the system. Consequently, fostering positive social norms and leveraging community recommendations should be a central strategy for accelerating POS ABC's adoption among Indonesian MSMEs.

Price value demonstrates no significant effect on behavioral intention. The p-value recorded is 0.165, exceeding the 0.05 threshold. This result indicates that users' perception of the POS ABC subscription price does not significantly affect their intention to persist with the system. This finding aligns with the research conducted [30] that price value does not significantly influence behavioral intention. This non-significant influence may initially seem counter-intuitive for MSMEs, which are often highly price-sensitive due to limited capital. However, users may view the POS ABC subscription price as a justified investment rather than a primary barrier to their intention to use once they recognize the significant operational benefits (performance expectancy) and are influenced by their social networks (social influence). The perceived benefits of efficiency gains and streamlined operations may outweigh the cost concerns. While the preliminary qualitative analysis identifies "high price" as a minor negative concern (0.6% in Android reviews), it is significantly overshadowed by functional issues. It suggests that for the majority, the value proposition of POS ABC (benefits vs. cost) is generally accepted or at least not a deterrent to initial intention. Users prioritize the tangible utility and social endorsement of the system over its absolute price, provided the price is perceived as reasonable for the value delivered.

Habit significantly influences behavioral intention. The p-value of 0.001 is below the 0.05 threshold. This result implies that habitual usage of the POS ABC system notably enhances users' intention to persist in its use. This finding aligns with the previous research [30] that habit exerts a positive effect on behavioral intention. This finding indicates that as the integration of POS ABC into the daily operations of MSMEs deepens, their intention to continue using it strengthens. Habit, frequently associated with automaticity, refers to users interacting with the system without conscious thought, resulting from prior learning and repeated experience. For MSMEs, integrating POS ABC into their routine (e.g., for daily sales transactions or inventory updates) streamlines their workflow and reduces cognitive effort, making the system an indispensable part of their business processes. The preliminary qualitative analysis, through insights on perceived "ease of use due to familiarity" in positive user reviews and interviews (e.g., Mr. A finding POS ABC beneficial for business efficiency), further supports this notion. When using POS ABC becomes a routine, it fosters a sense of dependence and comfort, reinforcing users' future intentions for continued utilization. Disengaging from a deeply integrated system will disrupt established operational flows.

Habit also significantly affects use behavior, as evidenced by a p-value of 0.000, which is below the 0.05 threshold. This result indicates that habitual use of the POS ABC system notably influences user behavior. This finding aligns with the previous study [18], finding a strong relationship between habits and use behavior. The significant impact indicates that once POS ABC is thoroughly integrated in the operational routines of MSMEs, its utilization becomes predominantly automatic and frequent. The repetitive nature of daily business tasks (e.g., recording sales or checking inventory) fosters a strong dependence on the system for efficient execution. As users become increasingly familiar and comfortable with POS ABC's features, the effort required for interaction diminishes, promoting consistent and active engagement. This "ease of use due to familiarity" transforms the system from a mere tool into an integral, almost subconscious, component of their operational activities. Thus, for POS ABC, it is essential to cultivate and strengthen user habits by ensuring consistent system performance and seamless integration into daily business workflows. This approach is vital for enhancing both the intention and the actual frequency and depth of system utilization among Indonesian MSMEs.

System quality significantly influences use behavior. The p-value of 0.019 is below the 0.05 threshold. This result suggests that the POS ABC system's quality impacts user engagement. This result corroborates the previous finding [18], which indicates a positive relationship between system quality and use behavior. While statistically significant, the very small practical effect of system quality on use behavior warrants a nuanced interpretation. It suggests that although a well-functioning and stable system is important for actual engagement, its individual contribution to the overall variance in use behavior is relatively minor compared to other factors. The preliminary qualitative analysis, which identifies "malfunctioning features" and "difficulties after updating" as prominent negative

concerns in user reviews, confirms that technical issues are indeed pain points. However, the low f^2 value in Table XI implies that merely having good system quality, while a basic expectation, may not be the primary driver for users' frequency or depth of use once they are committed to the system. Users may tolerate minor system glitches if other benefits (like performance expectancy or habit) are strong, or if the overall utility of the application outweighs occasional technical inconveniences. It can also suggest that while system quality prevents abandonment, it does not necessarily propel higher usage frequency, which may be driven more by routine or core business needs.

Behavioral intention is found to have a significant effect on use behavior. The p-value is 0.000 which is below the 0.05 threshold. This finding indicates that users' intention to use the POS ABC system significantly influences their actual use behavior. This result aligns with the previous study [8] that behavioral intention positively affects use behavior. In the context of POS ABC adoption by Indonesian MSMEs, this robust relationship highlights the direct translation of users' conscious plans and willingness to engage with the system into actual usage. Once MSME owners have developed a strong intention to use POS ABC, influenced by its perceived performance benefits, social recommendations, and habitual integration, they are highly likely to manifest this intention into active and consistent interaction with the application. Efforts to bolster behavioral intention through various factors (such as performance expectancy, social influence, and habit, which are found to be significant predictors of behavioral intention in the research) will effectively translate into higher rates of actual POS ABC usage. For POS ABC, it underscores the importance of continuously nurturing user intention through ongoing feature development, community engagement, and fostering habit formation to ensure high levels of actual system utilization and sustained engagement.

Next, to further assess the practical significance of the relationships, the researchers calculate the f^2 for each significant path, following Cohen's guidelines [28]. The results are presented in Table XI. The f^2 values indicate the substantive impact of each predictor on the R-square of its endogenous construct. As shown in Table XI, most significant paths demonstrate a small effect size, indicating that while these relationships are statistically significant, their individual practical contributions to the explained variance of the dependent variables are modest. Notably, the path from habit to use behavior shows f^2 of 0.096. The result approaches a medium effect, suggesting a more substantial practical influence. Conversely, the effect size of system quality on use behavior (f^2 = 0.014) is very small, even falling below the conventional threshold for a small effect (f^2 = 0.02). This result implies that despite its statistical significance, system quality's individual contribution to explaining the variance in use behavior is practically negligible. Overall, the f^2 analysis reveals that while multiple factors significantly influence POS ABC adoption, their practical magnitudes are predominantly small, with habit being a comparatively stronger predictor for actual usage.

TABLE XI
EFFECT SIZE (F^2) RESULTS.

Path	F^2 Value	Effect Size
PE → BI	0.029	Small
SI → BI	0.057	Small
H → BI	0.027	Small
FC → UB	0.067	Small
H → UB	0.096	Small to Medium
SQ → UB	0.014	Very Small
BI → UB	0.050	Small

Behavioural Intention (BI), Facilitating Condition (FC), Habit (H), Performance Expectancy (PE), Social Influence (SI), System Quality (SQ), and Use Behavior (UB).

E. Managerial Implication

Based on the research findings, several managerial implications can be proposed to optimize POS ABC's user adoption and engagement. Implementing these strategies will enable POS ABC to optimize user retention, strengthen its competitive positioning, and enhance its value proposition in the dynamic business management software market. First, performance expectancy has a significant influence on behavioral intention, indicating that users are more likely to continue using the system when they perceive it as beneficial to their business operations. POS ABC should focus on enhancing and promoting features that increase operational efficiency, including automated transaction processing, advanced inventory management, and streamlined financial reporting. Marketing strategies should emphasize these advantages to attract and retain users by demonstrating clear and measurable benefits.

Second, although facilitating conditions do not significantly influence behavioral intention, they play a crucial role in actual system usage. Hene, users depend on the availability of resources and technical support when interacting with POS ABC. To boost engagement, the company should invest in high-quality customer service to ensure system reliability and provide accessible technical support channels. A well-supported system fosters user trust and encourages sustained usage.

Third, social influence emerges as a strong predictor of behavioral intention, underlining the importance of recommendations and peer influence in driving adoption. To capitalize on this indicator, POS ABC should expand referral programs, collaborate with industry influencers, and engage with business communities. Case studies and testimonials from satisfied users can be utilized as persuasive marketing tools to build credibility and attract new users.

Fourth, habit formation significantly impacts both behavioral intention and use behavior, suggesting that frequent interaction with the system increases the likelihood of long-term adoption. To reinforce this indicator, POS ABC should introduce engagement strategies such as gamification, personalized notifications, and loyalty programs that encourage continuous system use. A seamless onboarding experience, complemented by interactive tutorials, facilitates the integration of POS ABC into daily business processes for new users.

Fifth, another critical factor is system quality, which strongly determines user behavior. Minimizing system downtime, proactively resolving issues, and maintaining a responsive support team will enhance user satisfaction and encourage long-term engagement. Regular performance updates and feature enhancements should be communicated effectively to users to maintain trust and reliability. In addition, ensuring high system quality reduces the likelihood of abandonment, as users tend to discontinue platforms that frequently experience errors or instability. A consistently reliable system not only supports operational continuity but also builds users' confidence, which is crucial for fostering habitual use and sustained adoption. Ultimately, maintaining high system quality serves not only as a technical requirement but also as a strategic advantage in enhancing user loyalty. For POS ABC, it means that long-term adoption is contingent upon consistent reliability, which positions system quality as a key driver of sustainable competitive advantage in the MSME digital ecosystem.

Last, as behavioral intention significantly impacts actual system usage, continuous improvements in user experience remain paramount. POS ABC should focus on maintaining an intuitive interface, implementing seamless system updates, and effectively addressing user pain points to sustain strong engagement and long-term adoption. Strengthening behavioral intention ensures that users' positive attitudes are consistently translated into actual usage. By prioritizing user-centric design and responsive support, POS ABC can reinforce users' commitment and reduce the risk of disengagement. This approach not only enhances immediate adoption but also secures long-term system loyalty among MSMEs.

IV. Conclusion

The research aims to investigate the key factors influencing the adoption of the POS ABC system among Indonesian MSMEs using a modified UTAUT framework. Based on data from 400 MSMEs analyzed through SEM, the research finds that performance expectancy, social influence, and habit significantly influence behavioral intention. Moreover, facilitating conditions, habit, system quality, and behavioral intention significantly affect actual use behavior. Conversely, effort expectancy, facilitating conditions, and price value do not significantly affect behavioral intention. These findings suggest that perceived usefulness, peer influence, habitual use, and system support are more critical to POS adoption than ease of use or pricing considerations. In conclusion, the adoption of POS ABC among MSMEs is primarily driven by its perceived effectiveness and integration into business processes, supported by user habits and social influence. These insights contribute to a deeper understanding of digital technology adoption in Indonesian MSMEs and can inform strategic improvements in system design and implementation.

The research is limited by its focus on a single POS provider (POS ABC) and the lack of sectoral analysis. It means the findings may not be fully generalizable to other POS platforms or across different MSME industries with varying levels of digital readiness. Future research is recommended to explore industry-specific adoption patterns, such as in retail, food and beverage, or service sectors, to capture more nuanced challenges and opportunities. Comparative studies across multiple POS providers will also provide broader insights into competitive dynamics, feature preferences, and user loyalty. Expanding the scope in this way will enrich the theoretical contribution of UTAUT-based studies and offer more actionable recommendations for policymakers and technology developers.

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Author Contribution

Conceived and designed the analysis, D. V. E.; Collected the data, D. V. E.; Contributed data or analysis tools, D. V. E.; Performed the analysis, D. V. E.; Wrote the paper, D. V. E.; and Supervised the project and reviewed the manuscript, S.

Data Availability

Dataset is available from the Zenodo Repository at http://doi.org/10.5281/zenodo.16737869.

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