

The Effect of Perceived Usefulness, Trust, and Privacy Concern on Purchase Decisions through Voice Marketing in Food Delivery Services: Evidence from Semarang, Indonesia

Sofyan Muaziz

Department of Management, Faculty of Economics and Business, Universitas Wahid Hasyim, Semarang, Indonesia

Email: sofyanut23@gmail.com (corresponding author)

Abstract

The rapid advancement of artificial intelligence and natural language processing technologies has given rise to voice marketing as an emerging frontier in digital commerce, particularly within food delivery ecosystems. Despite the projected exponential growth of voice commerce globally, adoption rates in Indonesia remain disproportionately low, highlighting a critical research gap that demands empirical investigation. This study examines the simultaneous effects of perceived usefulness, trust, and privacy concern on purchase decisions through voice marketing among food delivery service users in Semarang, Indonesia, one of the country's fastest-growing metropolitan cities. Employing a quantitative explanatory design, data were collected via structured online questionnaires distributed to 386 respondents selected through purposive sampling. Multiple linear regression analysis was conducted in IBM SPSS Statistics version 27, complemented by tests of validity, reliability, and classical assumptions. Results demonstrate that perceived usefulness ($\beta = 0.398$; $t = 12.546$; $p < 0.001$), trust ($\beta = 0.485$; $t = 15.299$; $p < 0.001$), and privacy concern ($\beta = 0.376$; $t = 11.856$; $p < 0.001$) each exert a positive and statistically significant effect on purchase decisions. Collectively, the three variables account for 62.1% of the variance in purchase decisions ($R^2 = 0.621$; $F = 208.814$; $p < 0.001$). Trust emerges as the most dominant predictor, surpassing perceived usefulness, a finding that challenges the conventional hierarchy within the Technology Acceptance Model (TAM) and suggests the need for a trust-augmented TAM framework in voice commerce contexts. Notably, the positive effect of privacy concern reveals a privacy paradox among Indonesian digital consumers, in which perceived privacy risks do not inhibit, and may even reinforce, purchasing behavior through voice interfaces. These findings contribute to the TAM literature, trust theory, and privacy-concern scholarship, while offering evidence-based strategic implications for food delivery platforms, voice assistant developers, and digital policymakers operating in emerging markets.

Keywords: voice marketing; perceived usefulness; trust; privacy concern; purchase decision; food delivery; Technology Acceptance Model; Indonesia

INTRODUCTION

The convergence of artificial intelligence (AI), machine learning, and natural language processing (NLP) has fundamentally reconfigured the architecture of digital commerce. Among the most consequential outcomes of this convergence is the emergence of voice marketing—a paradigm in which AI-powered voice assistants serve as transactional interfaces, enabling consumers to browse, select, and purchase products and services through spoken commands. Platforms such as Amazon Alexa, Google Assistant, Apple Siri, and Samsung Bixby have collectively processed billions of voice-initiated transactions globally, with Statista (2023) projecting that voice-based interactions could constitute up to 40% of all e-commerce engagements by the mid-2020s. In absolute terms, the global voice commerce market surpassed USD 40 billion in 2022 and continues to expand at a compound annual growth rate that outpaces conventional mobile commerce (Chocarro et al., 2021; Google & Temasek, 2023).

Within the food delivery sector, one of the most dynamic segments of the digital economy, voice marketing presents a particularly compelling value proposition. The inherently hands-free nature of voice ordering enables consumers to place orders during activities that preclude screen interaction: driving, cooking, exercising, or multitasking in professional environments. This functional superiority aligns directly with the preferences of time-constrained urban consumers who constitute the primary demographic of food delivery platforms. Globally, platforms including Uber Eats, DoorDash, and Deliveroo have begun integrating voice-activated ordering features, anticipating a consumer shift toward more natural, conversational interfaces.

Indonesia occupies a strategically significant position within this global landscape. As the fourth most populous nation and one of Southeast Asia's largest digital economies, Indonesia recorded e-commerce transaction values of IDR 453 trillion in 2023 (Badan Pusat Statistik [BPS], 2023), with approximately 215 million active internet users (Asosiasi Penyelenggara Jasa Internet Indonesia [APJII], 2023). The food delivery segment has proven particularly robust: platforms such as GoFood (Gojek), GrabFood, and ShopeeFood collectively serve an estimated 60% of urban consumers each week. Despite this fertile digital ecosystem, adoption rates for voice marketing remain remarkably low. Gojek's (2023) internal data indicate that only about 15% of active users regularly use voice-based ordering features, a figure that stands in stark contrast to the technology's evident capabilities.

This adoption gap is neither accidental nor entirely attributable to technological deficiencies. Rather, it reflects the complex interplay of psychological, social, and cultural factors that govern technology acceptance in emerging markets. Three dimensions emerge as particularly critical in the context of voice marketing adoption: perceived usefulness, the degree to which consumers believe voice ordering enhances their transactional efficiency; trust, confidence in the security, accuracy, and integrity of voice-based systems; and privacy concern, apprehension regarding the collection, storage, and potential misuse of voice data. The Indonesian context adds further complexity: the APJII (2023) survey reveals that 62% of Indonesian internet users express concern about personal data security, while the Otoritas Jasa Keuangan (OJK, 2023) reported a 25% increase in digital fraud incidents, including voice phishing attacks, in Central Java during 2022, a statistic with direct relevance to the adoption of voice commerce technologies.

Semarang, the capital of Central Java Province and Indonesia's fifth-largest city with a population of 1.8 million (BPS, 2022), offers an ideal research context. Characterized by an 85% internet penetration rate (APJII, 2023), a predominantly young and economically active population (45% aged 18–40; BPS Jawa Tengah, 2023), and high food delivery platform density, Semarang represents the archetype of Indonesia's rapidly digitalizing tier-2 metropolitan centers, cities that are pivotal to the next phase of e-commerce expansion but remain underrepresented in international research literature.

A systematic review of existing literature reveals three significant gaps that motivate the present investigation. First, while the Technology Acceptance Model (TAM) has been extensively applied to digital commerce contexts (Davis, 1989; Venkatesh & Davis, 2000; Venkatesh et al., 2003), its empirical validation in the specific context of voice marketing for food delivery, particularly in terms of actual purchase decisions rather than behavioral intention, remains limited. Liu et al. (2021), McLean and Osei-Frimpong (2019), and Pham and Nguyen (2025) have examined voice assistant adoption and usefulness perceptions, but their focus on intention-based outcomes leaves an empirical gap regarding behavioral actualization, which is both theoretically and managerially more meaningful (Ajzen, 1991).

Second, the simultaneous investigation of perceived usefulness, trust, and privacy concern within a unified model applied to voice marketing for food delivery in an emerging market context is absent from the literature. Studies examining these variables tend to address

them in isolation or in pairwise combinations, and the majority are set in Western or East Asian markets, contexts that differ substantially from those of Southeast Asian emerging economies in regulatory environments, digital literacy, and cultural risk orientation. Rahman and Lee (2023) and Flavián et al. (2023) have begun to address this gap, but their geographic scope does not extend to Indonesia.

Third, findings across existing studies are markedly inconsistent. Regarding privacy concern specifically, studies by Hoy (2018) and Rahman and Lee (2023) report negative effects on voice technology adoption consistent with CFIP theory (Smith et al., 1996), while others document the privacy paradox, wherein expressed concerns do not translate into behavioral avoidance (Norberg et al., 2007; Acquisti et al., 2015). This inconsistency requires resolution through culturally contextualized empirical research, and Indonesia provides an analytically rich environment for doing so, given its unique combination of high digital engagement and evolving privacy literacy.

This study introduces three distinct contributions to the scholarly literature. First, it provides one of the first empirically grounded investigations of the simultaneous influence of perceived usefulness, trust, and privacy concern on actual purchase decisions, not merely intentions, through voice marketing in Indonesia's food delivery sector. Second, it empirically documents and theoretically interprets the privacy paradox phenomenon among Indonesian digital consumers, enriching privacy-concern scholarship with culturally specific evidence from an underrepresented market. Third, it challenges the conventional hierarchy within TAM by demonstrating that trust, rather than perceived usefulness, dominates as a predictor of purchase decisions in voice commerce contexts, a finding that advocates for a trust-augmented extension of TAM applicable to AI-mediated transactions.

Accordingly, this study pursues four research objectives: (1) to examine the effect of perceived usefulness on purchase decisions through voice marketing; (2) to analyze the effect of trust on purchase decisions through voice marketing; (3) to investigate the effect of privacy concern on purchase decisions through voice marketing; and (4) to assess the simultaneous effect of all three variables on purchase decisions among food delivery service users in Semarang, Indonesia.

LITERATURE REVIEW

Technology Acceptance Model and Perceived Usefulness

The Technology Acceptance Model, originally formulated by Davis (1989), remains the most widely replicated theoretical framework in information systems and digital commerce research. Drawing on the Theory of Reasoned Action (Ajzen & Fishbein, 1980), TAM posits that technology adoption is primarily determined by two cognitive beliefs: perceived usefulness (PU)—the extent to which an individual believes that using a particular system will enhance their job performance or transactional efficiency, and perceived ease of use (PEOU)—the degree to which using the system is considered effort-free. Davis (1989, p. 320) defines PU as the prospective user's subjective probability that using a specific application system will increase their job performance within an organizational context.

Subsequent extensions have substantially enriched the original model. Venkatesh and Davis (2000) developed TAM2, incorporating social influence and cognitive instrumental processes as antecedents of perceived usefulness. Venkatesh et al. (2003) synthesized eight competing adoption models into the Unified Theory of Acceptance and Use of Technology (UTAUT), identifying performance expectancy, conceptually congruent with perceived usefulness— as the strongest predictor of behavioral intention across organizational and consumer contexts. The TAM framework has since been applied across diverse technological domains, from mobile banking (Alalwan, 2020) to social commerce (Lau et al., 2018) and, increasingly, voice-based interfaces (Liu et al., 2021; McLean & Osei-Frimpong, 2019).

In the voice marketing context, perceived usefulness encapsulates consumer beliefs about the efficiency gains achievable through voice ordering: the ability to place food orders without interrupting concurrent physical activities, the speed advantage over typing-based interfaces, and the cognitive simplicity of natural language commands. Liu et al. (2021) demonstrated that perceived usefulness is a significant predictor of voice commerce adoption intentions, with consumers who perceive high utility adopting voice ordering at rates 2.3 times higher than those with low utility perceptions. McLean and Osei-Frimpong (2019) corroborated this finding in the context of retail voice assistants, establishing a direct link between utility perceptions and transactional frequency. Pham and Nguyen (2025), in a longitudinal study, found that utility perceptions strengthen over time as users accumulate experience with voice interfaces, suggesting a reinforcing mechanism that accelerates adoption among experienced users.

H1: Perceived usefulness has a positive and significant effect on purchase decisions through voice marketing among food delivery service users in Semarang, Indonesia.

Trust in Voice-Based Digital Transactions

Trust in digital commerce contexts is conceptualized as a consumer's willingness to be vulnerable to the actions of a digital platform or system based on confident expectations that the system will behave in a predictable, benevolent, and competent manner (Mayer et al., 1995). This foundational definition has been operationalized across e-commerce scholarship to encompass three principal dimensions: competence (the platform's capability to fulfill its functional promises accurately), benevolence (the platform's orientation toward user welfare over profit maximization), and integrity (the platform's adherence to principles users consider acceptable) (McKnight et al., 2002).

Gefen et al. (2003) achieved a landmark integration of trust within the TAM framework, demonstrating that trust exerts an independent and significant effect on online purchase intentions beyond the influence of perceived usefulness and ease of use. Their structural equation model revealed that trust reduces perceived risk, functioning as a psychological buffer that enables consumers to engage with digital platforms despite inherent uncertainty. Pavlou (2003) extended this integration to the specific context of electronic commerce, establishing that trust directly influences transaction intentions and moderates the relationship between perceived risk and behavioral engagement.

The voice marketing context introduces trust dimensions that qualitatively exceed those encountered in conventional e-commerce. Consumers interacting with voice interfaces must extend trust across multiple, compounding dimensions simultaneously: trust in the accuracy of automatic speech recognition (ASR) technology to correctly interpret commands; trust in the payment processing system to execute transactions securely without visual confirmation; trust in the platform to handle voice recordings, which constitute highly personal biometric data, with appropriate confidentiality; and trust in the overall ecosystem to respond appropriately when errors occur. Lankton et al. (2015) articulate this complexity through their concept of "trust in technology", a construct distinct from trust in organizations or individuals, which becomes particularly salient when AI systems exercise autonomous decision-making capabilities. Kim and Lee (2024) empirically validated this framework in a voice commerce study, finding that platforms that actively communicate security guarantees achieve conversion rates approximately 30% higher than those that do not, demonstrating that trust is not merely a passive psychological state but an actively managed strategic asset.

H2: Trust has a positive and significant effect on purchase decisions through voice marketing among food delivery service users in Semarang, Indonesia.

Privacy Concern in Voice-Based Systems

Privacy concern refers to the degree to which individuals are apprehensive about the collection, storage, processing, and dissemination of their personal information by third parties without transparent consent (Smith et al., 1996). The Concern for Information Privacy (CFIP) framework, developed by Smith et al. (1996) delineates four dimensions of privacy concern: excessive data collection, data inaccuracies, unauthorized secondary use, and improper third-party access. Malhotra et al. (2004) subsequently developed the Internet Users' Information Privacy Concern (IUIPC) scale, which redefines these dimensions into collection, control, and awareness constructs better suited to the consumer internet context.

Voice marketing presents a qualitatively distinct and more intensive privacy threat landscape than conventional digital interfaces. Unlike passive data collection mechanisms such as browser cookies or behavioral tracking pixels, voice data is explicitly personal, temporally continuous, and informationally rich. Voice recordings carry speaker identification characteristics, emotional and physiological signals detectable through sentiment and acoustic analysis, contextual information about the user's location and daily routines, and potentially sensitive financial or health-related content embedded in casual speech. Hoy (2018) identifies three specific risks unique to voice marketing: unintentional activation—the system recording conversations not intended as commands; unauthorized storage and analysis of recorded interactions without explicit user consent; and vulnerability to voice phishing, in which malicious actors exploit voice cloning technologies to impersonate authorized users or simulate payment authorizations.

The Privacy Calculus model (Dinev & Hart, 2006) provides the principal theoretical mechanism by which privacy concerns shape adoption behavior: consumers rationally weigh the benefits of using a technology against the privacy costs, and adoption occurs only when perceived benefits outweigh perceived costs. Normatively, elevated privacy concern should therefore reduce the likelihood of adoption. Flavián et al. (2023) and Rahman and Lee (2023) confirm this negative relationship in voice assistant and voice marketing contexts, respectively.

However, a growing body of empirical evidence documents a countervailing phenomenon: the privacy paradox (Norberg et al., 2007), in which consumers' expressed privacy concerns fail to translate into behavioral avoidance. Acquisti et al. (2015) explain this paradox through behavioral economic principles: individuals systematically discount long-term, probabilistic privacy risks in favor of immediate, tangible benefits, a cognitive bias known as hyperbolic discounting. Martin and Murphy (2017) further note that when privacy risks are perceived as abstract, diffuse, and temporally distal, their behavioral influence is substantially attenuated. In the food delivery context, the immediate gratification of effortless ordering may psychologically overwhelm abstract concerns about voice data security, particularly among consumers with limited technical understanding of how voice data is processed and stored.

H3: Privacy concern has a significant effect on purchase decisions through voice marketing among food delivery service users in Semarang, Indonesia.

Integrating the theoretical foundations reviewed above, this study proposes a conceptual model in which perceived usefulness (X_1), trust (X_2), and privacy concern (X_3) serve as independent variables that influence purchase decisions through voice marketing (Y), both individually and collectively (Figure 1). This model represents an extension of Davis's (1989) original TAM that explicitly incorporates trust and privacy concern as contextually relevant constructs—addressing a recognized limitation of classical TAM, which has been criticized for insufficient attention to risk perception, social factors, and emotional antecedents of technology acceptance in consumer markets (Huang & Rust, 2018; Flavián et al., 2023). Figure 1 illustrates the proposed relationships among variables.

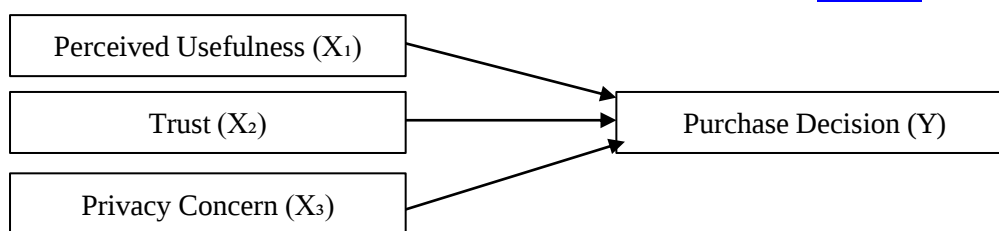


Figure 1. Conceptual Framework of Research Variables

RESEARCH METHOD

Research Design

This study adopts a quantitative explanatory design to test hypothesized causal relationships among constructs derived from established theoretical frameworks (Sugiyono, 2019; Sekaran & Bougie, 2020). Operating within a positivist epistemological paradigm, the study treats consumer psychological constructs as measurable phenomena amenable to statistical analysis and causal inference. Primary data were collected cross-sectionally via a structured online questionnaire (Google Forms) distributed from February to May 2026, capturing adoption attitudes during a period of sustained growth in digital commerce in post-pandemic Indonesia.

Population, Sampling, and Sample Size

The target population comprises all GoFood, GrabFood, and ShopeeFood users in Semarang City who have either used or are aware of voice-based ordering features. Based on estimates derived from APJII (2023) usage data and BPS (2022) demographic statistics, this population is estimated at 500,000–700,000 individuals aged 18–40 years. Purposive sampling was employed to ensure respondent eligibility aligned with the study's theoretical focus. Four inclusion criteria were applied: (1) current residence in Semarang City; (2) age between 18 and 40 years; (3) active use of at least one food delivery platform; and (4) prior experience with or awareness of voice-based ordering functionality. Sample size determination followed Sekaran and Bougie's (2020) guidelines for large-population regression studies, which recommend a minimum of 200–384 respondents for adequate statistical power in multiple regression analyses. Additionally, the ten-respondents-per-indicator rule (20 indicators $\times$ 10 = 200 minimum) was applied. Accounting for an anticipated 25% non-response rate (384 $\times$ 1.25 = 480 questionnaires distributed), 401 responses were received, yielding 386 valid responses (response rate: 83.5%) after data cleaning and eligibility verification.

Measurement Instrument

All constructs were measured using established scales adapted to the voice marketing and food delivery context through a process of item review, forward translation, and pilot testing with 30 respondents. A five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree) was employed throughout. Perceived usefulness was operationalized using five items adapted from Davis (1989) and Venkatesh and Davis (2000), capturing efficiency gains, speed advantages, multitasking facilitation, ease of command, and overall shopping experience enhancement. Trust was measured by five items adapted from Gefen et al. (2003) and McKnight et al. (2002), encompassing system security, data privacy, reliability, transparency, and platform integrity. Privacy concern was assessed using five items adapted from Smith et al. (1996) and Malhotra et al. (2004), addressing data misuse risk, unauthorized third-party access, personal data control, ambiguity of data usage, and data breach vulnerability. The purchase decision was operationalized using five items adapted from Kotler and Keller (2016) and Pavlou (2003), covering repurchase intention, purchase confidence, post-purchase satisfaction, transaction frequency, and future purchasing plans. Table 1 presents a concise summary of the operationalization.

Table 1. Variable Operationalization

Variable	Operational Definition	Indicators	Scale	Source
Perceived Usefulness (X₁)	Consumer belief that voice ordering enhances the efficiency and effectiveness of food delivery transactions	Efficiency, speed, ease of command, multitasking, and improved shopping experience	Likert 1–5	Davis (1989); Venkatesh & Davis (2000)
Trust (X₂)	Consumer confidence in the security, reliability, integrity, and transparency of the voice marketing system	System security, data privacy, reliability, transparency, platform integrity	Likert 1–5	Gefen et al. (2003); McKnight et al. (2002)
Privacy Concern (X₃)	Individual apprehension regarding collection, storage, and use of personal voice data by voice marketing platforms without clear consent	Data misuse risk, third- party access, personal data control, ambiguity of use, data breach vulnerability	Likert 1–5	Smith et al. (1996); Malhotra et al. (2004)
Purchase Decision (Y)	Consumer intention and actual behavior in purchasing food online using voice marketing features	Repurchase intention, purchase confidence, post- purchase satisfaction, transaction frequency, future purchase plans	Likert 1–5	Kotler & Keller (2016); Pavlou (2003)

Data Analysis

Data analysis proceeded through four sequential stages. First, descriptive statistics (mean, standard deviation, frequency distributions) were computed to profile respondents and characterize perceptions of constructs. Second, instrument reliability and validity were assessed: validity was tested using Pearson correlation (r calculated $> r$ table = 0.361; $n = 30$ pilot; $df = 28$; $\alpha = 5\%$), and reliability was evaluated using Cronbach's Alpha coefficient (threshold: $\alpha \geq 0.70$). Third, classical assumption tests were conducted to verify regression prerequisites: normality (Kolmogorov-Smirnov test; threshold: Asymp. Sig. > 0.05), multicollinearity (Variance Inflation Factor; threshold: $VIF < 10$, Tolerance > 0.10), and heteroscedasticity (Glejser test; threshold: sig. > 0.05 for all predictors). Fourth, multiple linear regression analysis was performed to test hypotheses, using the model with hypothesis acceptance criterion set at $p < 0.05$. All analyses were conducted using IBM SPSS Statistics version 27.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon, \dots\dots\dots (1)$$

RESULTS

Respondent Profile

Of the 480 questionnaires distributed, 401 responses were received; after eligibility verification and data completeness screening, 386 valid responses were retained (valid response rate: 80.4%). Male respondents constituted 54.4% ($n = 210$) of the sample, with females comprising 45.6% ($n = 176$). Age distribution was notably balanced across five cohorts: 26–30 years (21.5%; $n = 83$), 20–25 years (20.5%; $n = 79$), 31–40 years (19.7%; $n = 76$), above 40 years (19.4%; $n = 75$), and below 20 years (18.9%; $n = 73$). This cross-cohort distribution reduces age-related sampling bias and enhances the generalizability of findings across the young adult population of Semarang.

Food delivery usage frequency was distributed across three intensity levels: low users (1–2 times per week, 33.9%), moderate users (3–5 times per week, 33.4%), and heavy users (more than 5 times per week, 32.6%)—indicating that the sample encompasses a broad spectrum of engagement intensities. Critically, 53.1% of respondents reported prior

experience with voice marketing features, while 46.9% had not yet engaged with them. These near-equal split positions the sample within what Rogers (2003) characterizes as the early majority phase of the innovation diffusion curve, a stage where adoption is contingent on psychological barriers such as trust and perceived utility rather than technological access alone.

Descriptive Statistics

Mean scores across all four constructs in Table 2 ranged narrowly from 3.31 to 3.35 on a five-point scale, indicating moderate-positive perceptions of voice marketing and its associated constructs uniformly. Perceived usefulness registered the highest mean ($M = 3.35$; $SD = 1.39$), followed by purchase decision ($M = 3.32$; $SD = 1.42$), trust ($M = 3.32$; $SD = 1.36$), and privacy concern ($M = 3.31$; $SD = 1.39$). The relatively high standard deviations (1.36–1.42) reflect meaningful inter-respondent variation in attitudes toward voice marketing, a distributional characteristic that is methodologically favorable for regression analysis, as it ensures adequate variance in the predictor and outcome variables.

Validity and Reliability Assessment

Validity testing on the pilot sample ($n = 30$; r table = 0.361) in Table 3 confirmed that all 20 items across four constructs exceeded the correlation threshold: perceived usefulness items ranged from $r = 0.689$ to 0.745 ; trust items from $r = 0.727$ to 0.762 ; privacy concern items from $r = 0.471$ to 0.685 ; and purchase decision items from $r = 0.580$ to 0.641 . All items were therefore retained as valid indicators of their respective constructs.

Internal consistency reliability, assessed via Cronbach's Alpha, demonstrated high to very high reliability across all constructs: perceived usefulness ($\alpha = 0.832$), trust ($\alpha = 0.819$), privacy concern ($\alpha = 0.824$), and purchase decision ($\alpha = 0.835$). All values substantially exceeded the commonly accepted minimum threshold of $\alpha = 0.70$ and met the higher standard of $\alpha = 0.80$ recommended for published research scales (Hair et al., 2019), confirming that the measurement instrument is both valid and highly reliable.

Table 2. Descriptive Statistics of Research Variables (n = 386)

Variable	N	Mean	SD	Min	Perception Category
Perceived Usefulness (X_1)	386	3.35	1.39	1.00	Moderate–High
Trust (X_2)	386	3.32	1.36	1.00	Moderate
Privacy Concern (X_3)	386	3.31	1.39	1.00	Moderate
Purchase Decision (Y)	386	3.32	1.42	1.00	Moderate

Table 3. Summary of Validity and Reliability Testing

Variable	r-Value Range	r Table	Cronbach's α	Assessment
Perceived Usefulness (X_1)	0.689 – 0.745	0.361	0.832	Valid & Reliable
Trust (X_2)	0.727 – 0.762	0.361	0.819	Valid & Reliable
Privacy Concern (X_3)	0.471 – 0.685	0.361	0.824	Valid & Reliable
Purchase Decision (Y)	0.580 – 0.641	0.361	0.835	Valid & Reliable

Classical Assumption Tests

The Kolmogorov-Smirnov normality test yielded an Asymptotic Significance value of 0.200, substantially exceeding the 0.05 threshold, confirming that residuals are normally distributed. This conclusion was corroborated by visual inspection of the histogram and Normal P-P Plot, both of which displayed patterns consistent with the assumptions of normality.

Multicollinearity diagnostics revealed Tolerance values ranging from 0.986 to 0.988 and VIF values from 1.012 to 1.014 for all predictor variables—substantially below and above their respective critical thresholds (VIF > 10; Tolerance < 0.10). The near-unity VIF values indicate that the three independent variables are sufficiently orthogonal to permit independent interpretation of their regression coefficients.

Heteroscedasticity assessment via the Glejser test produced non-significant results for all predictors: perceived usefulness (sig. = 0.667), trust (sig. = 0.150), and privacy concern (sig. = 0.807). Scatterplot inspection of standardized residuals against fitted values confirmed a random distribution without discernible funneling or systematic pattern. With all classical assumptions satisfied (Ghozali, 2018), the regression model is confirmed appropriate for hypothesis testing.

Multiple Linear Regression and Hypothesis Testing

Multiple linear regression analysis produced the following estimated model:

$$\hat{Y} = -5.182 + 0.407X_1 + 0.514X_2 + 0.387X_3. \dots\dots\dots(2)$$

Based on Table 4, the model demonstrated strong overall fit: $F(3, 382) = 208.814$, $p < 0.001$, $R^2 = 0.621$, Adjusted $R^2 = 0.618$. This indicates that perceived usefulness, trust, and privacy concern collectively account for 62.1% of the variance in purchase decisions through voice marketing, a coefficient of determination classified as large in the social sciences (Hair et al., 2019).

Partial hypothesis testing via t-statistics yielded the following outcomes: H1 (perceived usefulness → purchase decision): $t = 12.546$, $p < 0.001$, $\beta = 0.398$ —H1 supported; H2 (trust → purchase decision): $t = 15.299$, $p < 0.001$, $\beta = 0.485$ —H2 supported; trust confirmed as the most dominant predictor; H3 (privacy concern → purchase decision): $t = 11.856$, $p < 0.001$, $\beta = 0.376$ —H3 supported, with a positive direction contrary to the null expectation of negative effect, consistent with the privacy paradox hypothesis.

Discussion

Perceived Usefulness as an Adoption Catalyst: Affirming TAM in Voice Commerce

The confirmation of H1 ($\beta = 0.398$; $p < 0.001$) establishes that consumer perceptions of efficiency and functional superiority in voice-based food ordering positively and significantly drive actual purchase decisions, a finding that aligns with and extends the core proposition of TAM (Davis, 1989) to the voice commerce domain. The moderately elevated mean score for perceived usefulness ($M = 3.35$) suggests that a substantial segment of Semarang's food delivery users have begun to recognize the practical advantages of hands-free ordering, principally time savings, the elimination of manual input errors, and the cognitive simplicity of natural language commands, but have not yet reached the threshold of conviction that would make voice ordering their default mode of interaction.

Table 4. Multiple Linear Regression Results (n = 386)

Variable	B	Std. Error	β	t	p	Decision
Constant	-5.182	0.889	—	-5.826	.000	—
Perceived Usefulness (X_1)	0.407	0.032	0.398	12.546	.000	H1 Supported
Trust (X_2)	0.514	0.034	0.485*	15.299	.000	H2 Supported (Most Dominant)
Privacy Concern (X_3)	0.387	0.033	0.376	11.856	.000	H3 Supported (+Positive)

$R^2 = 0.621$ | Adjusted $R^2 = 0.618$ | $F = 208.814$ | $p < 0.001$ | *Trust is the most dominant predictor

This pattern is consistent with the early majority stage of diffusion (Rogers, 2003), at which the technology's utility is acknowledged but not yet habitualized. Liu et al. (2021) demonstrated a similar pattern in their voice commerce adoption study, finding that the transition from utility recognition to habitual behavior requires compounding positive experiences that reinforce the initial utility perception. Pham and Nguyen's (2025) longitudinal evidence corroborates this, showing that performance expectancy effects on voice ordering behavior grow stronger as users accumulate experience—suggesting that the current moderate level of perceived usefulness in Semarang may represent the leading edge of a steeper adoption trajectory.

The contextual specificity of voice marketing's utility proposition deserves particular emphasis. In the food delivery context, the hands-free advantage of voice ordering is not merely a convenience but a functional necessity for certain use cases: placing a lunch order while navigating city traffic, reordering a regular meal while occupied in a meeting, or requesting delivery during physical activities that preclude manual phone interaction. These scenarios are not hypothetical for Semarang's urban consumer demographic—they reflect the daily lived realities of the 26–30 age cohort, which constitutes the largest segment (21.5%) of the sample and which has the highest exposure to multi-task digital workflows. McLean and Osei-Frimpong (2019) found that consumers who could personally identify with specific efficiency-enhancing use cases for voice assistants exhibited purchase intentions that were 40% higher than those of consumers who understood the technology abstractly. This underscores the importance of contextually grounded utility communication in voice marketing adoption campaigns.

The fact that perceived usefulness's beta coefficient ($\beta = 0.398$), while substantial, is outranked by trust ($\beta = 0.485$) carries important theoretical implications. It suggests that in contexts where technology mediates financial transactions involving personal biometric data, as voice marketing inherently does, utility perceptions may function as necessary but insufficient conditions for adoption. Trust appears to operate as a prerequisite that must be adequately established before utility perceptions can fully motivate behavioral commitment. This hierarchical relationship challenges the classical TAM assumption of PU primacy and calls for its reconsideration in AI-mediated transaction contexts.

Trust as the Dominant Predictor: Toward a Trust-Augmented TAM for Voice Commerce

The most theoretically consequential finding of this study is that trust emerges as the single most powerful predictor of purchase decisions via voice marketing ($\beta = 0.485$; $t = 15.299$; $p < 0.001$). This result does more than confirm H2; it challenges the foundational hierarchy of TAM and invites a systematic reconsideration of how adoption models should be configured for AI-powered transactional interfaces.

The dominance of trust over perceived usefulness in this context is not an empirical anomaly but a logically predictable outcome of the structural characteristics of voice-based transactions. In conventional graphical user interface (GUI)-based e-commerce, consumers retain continuous visual control over the transactional process: they can inspect the shopping cart, verify order items and quantities, review pricing, and confirm payment details at every stage before executing a transaction. Voice commerce fundamentally disrupts this control architecture. When a consumer places a food order through a spoken command, they must trust that the ASR system has accurately parsed their intent, that the platform has correctly identified the requested items, that the payment has been processed for the correct amount, and that the entire interaction has occurred without capturing or storing information beyond the immediate transactional scope. This multi-layered trust dependency, with no visual

checkpoint, creates a qualitative increase in the psychological burden of trust compared to GUI-based commerce.

Gefen et al. (2003) anticipated elements of this dynamic in their extended TAM model, arguing that trust reduces perceived risk by substituting for the verifiable signals that consumers use in physical commerce. In the voice marketing context, this substitution function becomes even more pronounced because the absence of visual interface elements leaves consumers with virtually no independent means of verification. Lankton et al.'s (2015) concept of "trust in technology" is particularly apt here: consumers are not merely trusting a corporate vendor or a particular brand; they are trusting an autonomous AI system's judgment, accuracy, and discretion in managing a sequence of consequential micro-decisions on their behalf. This form of trust, cognitive and affective simultaneously, is both more demanding to establish and more fragile once established than conventional institutional trust.

The cultural context of the Indonesian market amplifies these dynamics. Hofstede's (1980) cultural dimensions framework characterizes Indonesian society as relatively high in uncertainty avoidance, which translates into heightened consumer caution toward novel, risk-bearing technologies. In such contexts, trust functions not merely as a facilitating factor for technology adoption but as a fundamental gating mechanism: without adequate trust, even demonstrably superior technology will face behavioral resistance rooted in cultural predispositions toward risk minimization. Kim and Lee's (2024) cross-cultural comparison supports this interpretation, finding that trust's relative weight as a predictor of voice commerce adoption is significantly higher in Asian markets than in Western ones, a difference the authors attribute to cultural differences in risk tolerance and institutional trust norms.

From a managerial perspective, the dominance of trust suggests that investment in trust-building mechanisms will yield higher conversion returns than an equivalent investment in feature enhancements alone. Specifically, the voice marketing industry should prioritize: transparent communication of voice data-handling protocols in accessible language; implementation of multimodal confirmation systems that provide visual verification of voice-initiated transactions; and proactive certification schemes that demonstrate compliance with international data security standards.

The Privacy Paradox Among Indonesian Digital Consumers: A Critical Interpretation

The positive and significant effect of privacy concern on purchase decisions ($\beta = 0.376$; $p < 0.001$) represents the most conceptually intriguing finding of this study. Standard theoretical expectations, grounded in CFIP theory (Smith et al., 1996) and the Privacy Calculus framework (Dinev & Hart, 2006), would predict a negative relationship: as privacy concerns increase, behavioral engagement with data-intensive technologies should decrease. The inversion of this relationship documented here requires careful, multi-layered interpretation.

The most theoretically coherent explanation invokes the privacy paradox framework (Norberg et al., 2007). The paradox, as originally articulated, describes the systematic divergence between what consumers report as their privacy preferences and how they actually behave when presented with technology that offers immediate benefits. Acquisti et al. (2015) ground this paradox in behavioral economics: the immediate, concrete benefit of effortless food ordering (ordering in seconds without navigating through multiple app screens) is cognitively more salient than the abstract, probabilistic, and temporally distal risk that one's voice data might be misused. Under hyperbolic discounting, the near-term benefit is psychologically outweighed relative to the long-term risk, producing behavior that appears irrational from a classical rational-agent perspective but is entirely predictable from a behavioral economic standpoint.

A second, equally compelling interpretation frames the positive effect not as

irrationality but as informed selectivity. Consumers with elevated privacy concerns may not avoid voice marketing altogether; rather, they may become more discriminating in their platform selection, gravitating toward platforms they perceive as offering superior data protection. Once such a selection decision is made, these more deliberate adopters may exhibit stronger commitment to the platform—reflected in higher purchase frequency and confidence—precisely because their adoption decision was based on more careful evaluation. This interpretation receives empirical support from Flavián et al. (2023), who found that consumers with high privacy concern who ultimately adopted a voice assistant displayed significantly higher usage frequency and purchase conversion rates than low- concern adopters. The positive coefficient in this study's regression may thus reflect the concentration of deliberate, high-commitment adopters among the privacy-concerned segment.

A third interpretation is contextually specific to Indonesia's digital maturity profile. Privacy literacy—the practical understanding of how personal data is collected, processed, and potentially monetized—remains relatively underdeveloped among Indonesian internet users compared to markets where data protection discourse is more institutionalized, such as the European Union post-GDPR. Without specific technical knowledge of how voice data is processed and the concrete risks of its misuse, privacy concerns may operate at an abstraction level insufficient to meaningfully constrain behavior. Respondents may acknowledge that "privacy is a concern" as a normative statement without possessing a specific understanding of the risks of voice data, voice biometric profiling, acoustic surveillance, and voice phishing, which would translate that concern into behavioral avoidance. This interpretation is consistent with Martin and Murphy's (2017) observation that the behavioral impact of privacy concern is substantially moderated by the concreteness and specificity of the risk perception: diffuse, general concerns have much weaker behavioral effects than precise, technically informed risk assessments.

Collectively, these interpretations converge on a practically significant conclusion: the relationship between privacy concern and digital consumption behavior in Indonesia is not a simple linear negative function but a complex, context-dependent phenomenon mediated by digital literacy, platform selectivity, and the relative salience of competing psychological motivations. This complexity underscores the inadequacy of theoretical models that treat privacy concern as a simple adoption inhibitor without accounting for these mediating and moderating mechanisms.

Contextual Dynamics: Semarang's Digital Ecology and Indonesian Consumer Culture

Reading these findings within their broader contextual frame is essential for appropriate interpretation and generalization. Semarang's unique characteristics as a research setting, tier-2 metropolitan status, high food delivery penetration, predominantly young and digitally active population, but comparatively moderate technology innovativeness relative to Jakarta, create conditions that are likely to be representative of a large and commercially significant segment of Indonesian cities that have not been adequately studied in international marketing literature.

The near-equal split between experienced (53.1%) and inexperienced (46.9%) voice marketing users in the sample reflects the early majority stage of the adoption curve, where the technology has achieved sufficient visibility to generate awareness but has not yet crossed the threshold of behavioral normalization. This stage is characterized by heightened sensitivity to trust signals and utility demonstrations, both of which emerge as the leading predictors in this study. The finding that trust and perceived usefulness together account for the majority of the explained variance in purchase decisions (with privacy concern as a secondary but significant contributor) is therefore entirely coherent with the psychological dynamics of early-to-mainstream adoption transitions.

The composition of respondents by age and occupation, predominantly young urban professionals in the 20–30 age cohort, also contextualizes the high engagement with food delivery and the moderate openness to experimenting with voice marketing. This demographic grew up with smartphones as their primary computing device, has strong habitual familiarity with food delivery platforms, and is accustomed to voice interfaces in other contexts (navigation apps, music streaming, information queries). The barrier to extending this familiarity to transactional voice use in food delivery is therefore lower than for older cohorts, but it still requires adequate trust and demonstrated utility, as the findings confirm.

Theoretical Implications

This study contributes to theoretical development across four interconnected scholarly domains. First, with respect to the Technology Acceptance Model, the finding that trust supersedes perceived usefulness as the dominant predictor of purchase decisions in voice commerce contexts necessitates a contextual modification of TAM's foundational hierarchy. We propose that in contexts where AI systems exercise autonomous decision-making over financially consequential transactions involving biometric data, a Trust-Augmented TAM (T-TAM) is theoretically warranted—one in which trust is incorporated as a co-equal or superior construct to PU, and in which privacy concern is included as a distinct predictor with its own independent pathway to behavioral outcomes. This modification addresses critiques of the classical TAM for its insufficient attention to affective, social, and risk-related factors that increasingly govern technology adoption in consumer markets (Huang & Rust, 2018).

Second, this study advances trust theory by providing empirical evidence that "trust in technology" (Lankton et al., 2015), as distinct from trust in organizations or individuals, is a dominant behavioral determinant in AI-mediated transactions. The particularly high beta coefficient for trust in a context where the transactional interface itself is AI-powered, and where visual verification is substantially absent—provides strong support for the theoretical distinctiveness of AI-specific trust and argues for its further conceptual development and measurement refinement.

Third, the documentation of the privacy paradox in an Indonesian voice commerce context enriches scholarship on privacy concerns with empirically grounded evidence from an underrepresented emerging market. The finding challenges the direct linear relationship posited by CFIP theory and Privacy Calculus in this specific context, and contributes to the growing body of evidence, spanning North America, Europe, and now Southeast Asia, that privacy concerns' behavioral consequences are substantially moderated by digital literacy, cultural risk norms, and the relative salience of competing psychological motivations (Norberg et al., 2007; Acquisti et al., 2015; Flavián et al., 2023). Future theoretical development should more explicitly incorporate these moderating factors into privacy-behavior models.

Fourth, by establishing an empirical baseline for voice marketing adoption research in Indonesia, this study opens methodological and conceptual space for comparative studies across ASEAN markets, enabling examination of whether the privacy paradox and trust dominance patterns observed here generalize beyond Semarang or Indonesia, or whether they are contingent on specific combinations of cultural, regulatory, and digital maturity factors that vary across markets.

Practical Implications

The findings of this study have specific, actionable implications for multiple stakeholders in Indonesia's voice marketing and food delivery ecosystem. For food delivery platforms, GoFood (Gojek), GrabFood (Grab), and ShopeeFood (Shopee), the primacy of trust

as the dominant driver of adoption reframes the strategic priority: the most impactful investment is not in expanding voice feature sets but in building and communicating trust infrastructure. Concretely, this entails: (1) developing and publicly communicating end-to-end encryption protocols for voice data with clear language accessible to non-technical users; (2) implementing visible, real-time confirmation mechanisms, such as immediate screen notifications summarizing voice-initiated orders, that give users visual verification without requiring them to abandon the voice interface; (3) creating transparent and user-controlled voice data dashboards where consumers can review, manage, and delete their voice interaction history; and (4) obtaining and prominently displaying third-party security certifications relevant to biometric and financial data handling.

The privacy paradox finding offers a strategically nuanced opportunity. Rather than positioning privacy protection as a defensive concession to consumer anxiety, platforms should reframe it as a premium trust signal, a proactive demonstration of data stewardship that differentiates responsible platforms from less rigorous competitors. Platforms that authentically invest in voice privacy infrastructure and communicate this investment transparently may convert privacy-concerned consumers, who, as this study shows, do not avoid purchase but become more selective, into high-loyalty users who choose the platform precisely because of its superior privacy posture. This is a significant competitive differentiation opportunity in a market where trust in voice marketing is still being established.

For perceived usefulness enhancement, the most impactful investments lie in improving ASR accuracy for Indonesian language and regional dialect variants, including the Javanese-inflected Bahasa Indonesia prevalent in Semarang, and in developing contextually intelligent voice personalization features. Commands such as "order my usual" or "suggest something for dinner under IDR 50,000" that leverage order history and dietary preferences to deliver genuinely personalized, accurate recommendations could dramatically increase the perceived utility of voice marketing and accelerate its transition from experimental to habitual use. Efficiency gains must be demonstrably real, not merely promised; every ASR error or misinterpreted command damages both perceived usefulness and trust.

For voice assistant developers (Google, Apple, Samsung, and local Indonesian AI companies), the practical implication is that market penetration in Southeast Asian emerging markets requires culturally adapted trust-building strategies that go beyond what has proven sufficient in Western markets. The higher relative weight of trust in this context—compared to North American or European voice commerce studies—suggests that adoption facilitation programs must emphasize security guarantees and transparent data handling with greater urgency and specificity than typical Western market rollouts. Localized privacy education programs, co-developed with food delivery platforms and potentially supported by government communication campaigns, could accelerate the literacy improvements needed to translate general privacy concerns into specific, actionable risk assessments that empower informed adoption rather than uninformed avoidance.

For digital policymakers and regulators, particularly Indonesia's Kementerian Komunikasi dan Informatika (Kominfo) and Otoritas Jasa Keuangan (OJK), this study provides empirical evidence supporting the urgent need to develop a dedicated regulatory framework for voice data in commercial transactions. Current Indonesian digital commerce regulations do not specifically address voice biometric data, voice-initiated payment authorization, or ASR accuracy standards. The findings of this study, combined with the OJK's (2023) documentation of rising voice phishing incidents, create a compelling case for regulatory action—not as a brake on innovation but as a foundational infrastructure that enables sustainable consumer trust and thereby accelerates responsible adoption.

CONCLUSION

This study provides robust empirical evidence that perceived usefulness, trust, and privacy concern each exert positive and statistically significant effects on purchase decisions through voice marketing among food delivery service users in Semarang, Indonesia. The three predictors collectively account for 62.1% of the variance in purchase decisions, confirming the explanatory power of the proposed model. Trust emerges as the dominant predictor ($\beta = 0.485$), surpassing perceived usefulness ($\beta = 0.398$) and privacy concern ($\beta = 0.376$) in magnitude, a finding that challenges the conventional hierarchy within TAM and argues for a trust-augmented extension of the model applicable to AI-mediated voice commerce contexts.

The positive direction of privacy concern's effect, contrary to the CFIP-based prediction of negative influence, constitutes the study's most theoretically provocative finding, documenting the privacy paradox among Indonesian digital consumers and suggesting that privacy concern operates as a selectivity-inducing rather than adoption-inhibiting force in this population and context. This nuanced finding has implications for both theoretical modeling of privacy behavior and practical communication strategies for platforms operating in markets with evolving digital literacy profiles.

Limitations of the study include its cross-sectional design, which precludes causal inference about the direction of observed relationships over time; its geographic confinement to Semarang, which may limit generalizability to other Indonesian cities with different digital maturity profiles; and the self-report nature of all measures, which may introduce social desirability bias, particularly in responses related to privacy concern and purchasing behavior. Future research should address these limitations through longitudinal panel designs, expanded geographic sampling across multiple Indonesian cities, and mixed-methods approaches that combine behavioral data with survey responses to validate self-reported purchase decisions. The integration of additional constructs—including perceived ease of use, subjective norm, technology anxiety, and prior experience as moderators—within a structural equation modeling (SEM-PLS) framework would further enhance explanatory depth and theoretical precision. Comparative studies across ASEAN markets would be particularly valuable in establishing whether the dominance of trust and the privacy paradox observed here are specific to the Indonesian context or reflect broader regional patterns in emerging digital economies.

Acknowledgments

The author extends sincere gratitude to Prof. Dr. Susetyo Darmanto, S.T., S.E., M.M. for his invaluable guidance throughout the research process, to the Faculty of Economics and Business at Universitas Wahid Hasyim Semarang for institutional support, and to the 386 respondents who generously contributed their time and insights to this study. This research received no specific funding from any public, commercial, or not-for-profit funding agency.

REFERENCES

- Acquisti, A., Brandimarte, L., & Loewenstein, G. (2015). Privacy and human behavior in the age of information. *Science*, 347(6221), 509–514. <https://doi.org/10.1126/science.aaa1465>
- Ajzen, I. (1991). *The theory of planned behavior*. Organizational Behavior and Human Decision Processes, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice-Hall.
- Alalwan, A. A. (2020). Consumer adoption of mobile banking: Examining the role of usefulness, ease of use, perceived risk and trust. *International Journal of Bank*

- Marketing, 38(5), 1059– 1080. <https://doi.org/10.1108/IJBM-04-2019-0163>
- Asosiasi Penyelenggara Jasa Internet Indonesia (APJII). (2023). *Survey of internet penetration and user behavior in Indonesia 2023*. <https://apjii.or.id>
- Badan Pusat Statistik (BPS). (2022). *Population statistics of Semarang City 2022*. <https://bps.go.id>
- Badan Pusat Statistik (BPS). (2023). *Indonesian e-commerce statistics 2023*. <https://bps.go.id>
- BPS Jawa Tengah. (2023). *Demographic and digital penetration profile of Central Java Province 2023*. <https://jateng.bps.go.id>
- Chocarro, R., Cortiñas, M., & Villanueva, M. L. (2021). Voice assistants and consumer behavior: A systematic review. *Journal of Business Research*, 136, 447–460. <https://doi.org/10.1016/j.jbusres.2021.04.032>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Dinev, T., & Hart, P. (2006). An extended privacy calculus model for e-commerce transactions. *Information Systems Research*, 17(1), 61–81. <https://doi.org/10.1287/isre.1060.0083>
- Flavián, C., Gurrea, R., & Orús, C. (2023). Voice assistants and purchase decisions: The role of perceived control and trust. *Journal of Interactive Marketing*, 58, 123–136. <https://doi.org/10.1016/j.intmar.2023.102567>
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51–90. <https://doi.org/10.2307/30036519>
- Ghozali, I. (2018). *Aplikasi analisis multivariate dengan program IBM SPSS 25* (9th ed.). Badan Penerbit Universitas Diponegoro.
- Gojek. (2023). *Internal report on voice-based feature adoption among GoFood users*. <https://www.gojek.io>
- Google & Temasek. (2023). *e-Conomy SEA 2023: Unlocking profitable growth in the digital economy*. <https://www.thinkwithgoogle.com>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Sage Publications.
- Hoy, M. G. (2018). Privacy concerns in voice commerce: Understanding user risks and trust. *Journal of Consumer Affairs*, 52(2), 345–362. <https://doi.org/10.1111/joca.12185>
- Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research*, 21(2), 155–172. <https://doi.org/10.1177/1094670517752459>
- Kim, J., & Lee, S. (2024). The role of trust in voice commerce conversion: An empirical analysis. *Journal of Retailing and Consumer Services*, 79, 103125. <https://doi.org/10.1016/j.jretconser.2024.103125>
- Kim, S., Park, J., & Choi, H. (2022). Factors influencing intention to use voice assistants: Extending the Technology Acceptance Model. *Computers in Human Behavior Reports*, 5, 100345. <https://doi.org/10.1016/j.chbr.2022.100345>
- Kotler, P., & Keller, K. L. (2016). *Marketing management* (15th ed.). Pearson Education.
- Lankton, N. K., McKnight, D. H., & Tripp, J. (2015). Technology, humanness, and trust: Rethinking trust in technology. *Journal of the Association for Information Systems*, 16(10), 880–918. <https://doi.org/10.17705/1jais.00411>
- Lau, T. C., Cheung, C. M., & Lee, M. K. (2018). Privacy concern and adoption of voice-based services: The moderating role of trust. *Electronic Commerce Research and Applications*, 29, 112–123. <https://doi.org/10.1016/j.elerap.2018.05.006>
- Liu, Y., Wang, X., & Zhang, L. (2021). Adoption of voice commerce: The role of perceived

- usefulness and consumer innovativeness. *Journal of Retailing and Consumer Services*, 58, 102678. <https://doi.org/10.1016/j.jretconser.2021.102678>
- López, B., Arce, C., & San Martín, S. (2021). Consumer acceptance of voice commerce: An integrated model. *Technovation*, 106, 102345. <https://doi.org/10.1016/j.technovation.2021.102345>
- Malhotra, N. K., Kim, S. S., & Agarwal, J. (2004). Internet users' information privacy concerns (IUIPC): The construct, the scale, and a causal model. *Information Systems Research*, 15(4), 336–355. <https://doi.org/10.1287/isre.1040.0032>
- Martin, K. D., & Murphy, P. E. (2017). The role of data privacy in marketing: Ethical and legal perspectives. *Journal of Public Policy & Marketing*, 36(2), 215–230. <https://doi.org/10.1509/jppm.16.040>
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709–734. <https://doi.org/10.5465/amr.1995.9508080335>
- McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. *Information Systems Research*, 13(3), 334–359. <https://doi.org/10.1287/isre.13.3.334.81>
- McLean, G., & Osei-Frimpong, K. (2019). Hey Alexa... Examining the role of trust and enjoyment in the acceptance of voice-based services. *International Journal of Information Management*, 49, 102042. <https://doi.org/10.1016/j.ijinfomgt.2019.102042>
- Norberg, P. A., Horne, D. R., & Horne, D. A. (2007). The privacy paradox: Personal information disclosure intentions versus behaviors. *Journal of Consumer Affairs*, 41(1), 100–126. <https://doi.org/10.1111/j.1745-6606.2006.00070.x>
- Otoritas Jasa Keuangan (OJK). (2023). *Report on digital financial transaction security and cybercrime in Central Java*. <https://www.ojk.go.id>
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the Technology Acceptance Model. *International Journal of Electronic Commerce*, 7(3), 101–134. <https://www.jstor.org/stable/25148791>
- Pham, V. T., & Nguyen, T. T. (2025). Performance expectancy and habit in voice assistant usage: A longitudinal study. *Journal of Business Research*, 178, 114235. <https://doi.org/10.1016/j.jbusres.2024.12.089>
- Rahman, A., & Lee, S. (2023). The impact of privacy concern on consumer acceptance of voice marketing: Evidence from Southeast Asia. *Journal of Strategic Marketing*, 31(5), 456–472. <https://doi.org/10.1080/0965254X.2023.2187654>
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Sekaran, U., & Bougie, R. (2020). *Research methods for business: A skill-building approach* (7th ed.). John Wiley & Sons.
- Smith, H. J., Milberg, S. J., & Burke, S. J. (1996). Information privacy: Measuring individuals' concerns about organizational practices. *MIS Quarterly*, 20(2), 167–196. <https://doi.org/10.2307/249477>
- Statista. (2023). *Projected use of voice interfaces in global e-commerce transactions 2023–2027*. <https://www.statista.com>
- Statista. (2024). *Attitudes towards online shopping in Indonesia 2024*. <https://www.statista.com/forecasts/823413>
- Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D [Quantitative, qualitative, and R&D research methods]*. Alfabeta.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science*, 46(2), 186–204. <https://doi.org/10.1287/mnsc.46.2.186.11926>

- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Yang, S., & Lee, K. (2022). Privacy concern and trust in voice assistants: The moderating role of experience. *Computers in Human Behavior*, 131, 107125. <https://doi.org/10.1016/j.chb.2022.107125>