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The Impact of AI Adoption, Digital Marketing, and Customer Engagement on the Perceived Business Growth of Small and Medium Enterprises in Manado

Immanuel Bryan Liando[1*], Lawren Julio Rumokoy[2], Ferdinand J. Tumewu[3]
Management Departement, Faculty of Economics and Business, Sam Ratulangi University, Manado, Indonesia
Corresponding Author: Immanuel Bryan Liando imbryanliando@gmail.com

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A B S T R A C T

This study examines the impact of AI adoption, digital marketing, and customer engagement on the perceived business growth of Small and Medium Enterprises (SMEs) in Manado. As digital transformation continues to shape business environments, many SMEs still face challenges in utilizing technological advancements to enhance competitiveness. This research applies a quantitative approach using multiple linear regression analysis, with data collected through questionnaires distributed to owners and managers of SMEs in Manado. The findings show that AI adoption, digital marketing, and customer engagement each have a positive and significant effect on perceived business growth. Furthermore, the three variables collectively demonstrate a strong simultaneous influence, indicating that SMEs that integrate AI technology, implement structured digital marketing strategies, and maintain active customer engagement are more likely to achieve sustained growth. The results of this study highlight the importance of technological readiness and relationship-building strategies in supporting SME development within emerging regional markets, particularly in the context of Manado's evolving digital economy.

INTRODUCTION

In the current era of globalization and digital transformation, the business environment is characterized by rapid technological advancements, evolving consumer behavior, and intensified market competition. Companies are increasingly pressured to adapt to innovations such as Artificial Intelligence (AI) and digital marketing strategies to remain competitive and sustainable (Rumokoy et al., 2023). The emergence of AI, in particular, has transformed the way businesses operate and interact with customers, enabling data-driven decision-making, personalized marketing, and automation across multiple sectors.

Small and Medium Enterprises (SMEs) play a crucial role in Indonesia's economy. According to the Ministry of Cooperatives and SMEs (2022), there are over 64 million SMEs contributing more than 60% to the national GDP and accounting for 97% of employment. However, despite their economic significance, many SMEs continue to face barriers such as limited access to technology, insufficient digital literacy, and traditional business models that hinder growth and competitiveness. Rumokoy et al. (2023) highlight that the level of digital readiness among SMEs in Manado is still uneven, where many business owners have access to digital tools but lack the capability and strategic understanding to integrate them effectively into business operations. These challenges highlight the urgent need to explore how AI adoption, digital marketing, and customer engagement can collectively support SME business growth in the digital era.

Artificial Intelligence (AI) refers to the ability of machines to imitate human intelligence through learning, reasoning, and problem-solving (Russell & Norvig, 2016). In marketing, AI is widely used for customer segmentation, predictive analytics, and personalized advertising, which enable businesses to deliver more relevant and efficient marketing strategies (Kumar & Singh, 2023). Moreover, AI-driven automation allows SMEs to optimize operations and enhance customer experience at a relatively low cost, thus improving their overall competitiveness in the market. A report by McKinsey & Company (2023) found that 56% of global businesses have adopted AI in at least one function, with marketing and sales being the most impacted areas.

In parallel, digital marketing has reshaped how businesses connect with consumers. It involves the utilization of digital platforms such as websites, social media, email, and search engines to promote products and services interactively. Unlike traditional marketing, digital marketing facilitates two-way communication between businesses and consumers, allowing real-time engagement and measurable performance outcomes (Chaffey & Ellis-Chadwick, 2019). According to Rumokoy, the effectiveness of digital marketing among SMEs is highly dependent on content consistency and the entrepreneur's understanding of audience behavior, rather than solely on the use of digital platforms themselves. Indonesia's digital landscape provides significant opportunities for SMEs, with over 212 million internet users and 167 million active social media users as reported by *We Are Social* and *Meltwater* (2024). In cities like Manado, SMEs increasingly rely on platforms such as Instagram,

TikTok, and WhatsApp Business to reach younger, tech-savvy audiences. However, the lack of structured digital marketing strategies and limited digital capabilities remain major obstacles to maximizing potential benefits.

Another critical factor influencing business growth is customer engagement. Customer engagement represents the ongoing interaction between a company and its customers across multiple channels, fostering emotional connections and long-term loyalty. Rumokoy explains that sustainable customer engagement is shaped not only by repeated interactions, but also by trust and emotional association formed through consistent service experiences. As digital technologies advance, customer engagement becomes more data-driven and personalized, shifting from transactional relationships to continuous brand experiences (Brodie et al., 2011). A report by Salesforce (2023) indicates that 88% of customers consider their overall experience as important as the products or services offered by a company. Therefore, maintaining high-quality engagement is essential for SMEs seeking sustainable growth.

The integration of AI adoption, digital marketing, and customer engagement offers a strategic pathway for SMEs to achieve business growth. Business growth, in this context, refers to increased market share, operational efficiency, customer satisfaction, and innovation capability. Deloitte (2023) reports that SMEs using AI and digital marketing strategies grow 2.3 times faster than those relying on traditional methods. In Manado, where digital maturity among SMEs remains low (Paendong et al., 2023), the adoption of such technologies could bridge performance gaps and enhance competitiveness in regional markets.

Based on this background, it is essential to investigate how AI adoption, digital marketing, and customer engagement influence the business growth of SMEs in Manado. This study seeks to fill the research gap by empirically analyzing the interrelationships among these three factors and their collective impact on perceived business growth in the context of emerging regional economies.

Research Objectives

Based on the background and research gap that have been outlined, the objectives of this study are as follows:

1. To To analyze the effect of AI adoption on the business growth of SMEs in Manado.
2. To examine the effect of digital marketing on the business growth of SMEs in Manado.
3. To assess the effect of customer engagement on the business growth of SMEs in Manado.
4. To determine the simultaneous impact of AI adoption, digital marketing, and customer engagement on the business growth of SMEs in Manado.

LITERATURE REVIEW

Marketing and Business Growth

Marketing is a strategic process of identifying and fulfilling customer needs to achieve profitability and business sustainability. According to Kotler and Keller (2016), it goes beyond selling by integrating customer value creation into business objectives. For SMEs, marketing is essential for competitiveness, enabling innovation and adaptability in limited-resource environments. As noted by Tiago and Veríssimo (2014), effective marketing fosters brand awareness, customer retention, and long-term growth, making it a key driver of overall business development.

Digital Transformation in Marketing

Digital transformation has revolutionized marketing by integrating digital tools and platforms to enhance effectiveness, reach, and engagement. It involves utilizing websites, social media, search engines, and mobile applications to deliver value and obtain real-time insights (Chaffey & Ellis-Chadwick, 2019). Artificial Intelligence (AI) further drives this shift through automation, personalization, and predictive analytics, enabling efficient customer interaction and targeted marketing (Kumar & Sinha, 2023). For SMEs, digital transformation provides
cost-effective opportunities to strengthen brand presence, build loyalty, and improve overall business performance (Paendong et al., 2023).

Small and Medium Enterprises (SMEs)

Small and Medium Enterprises (SMEs) are businesses operating below specific thresholds of assets, revenue, or employment. The Ministry of Cooperatives and SMEs of Indonesia (2022) categorizes small enterprises as having assets between IDR 50–500 million and medium enterprises between IDR 500 million–10 billion, while the European Commission (2020) defines SMEs as firms with fewer than 250 employees and annual turnover under
€50 million. Globally, SMEs represent about 90% of businesses and contribute over 50% of employment (World Bank, 2022). In Indonesia, they drive over 60% of GDP and employ 97% of the workforce, reflecting their critical role in inclusive growth and innovation.

Despite their agility and close customer relationships, SMEs often face constraints in capital, digital infrastructure, and managerial capability, particularly in regions such as Manado (Tambunan, 2019; Harvie, 2004). According to Penrose's (1959) Theory of Firm Growth and Teece's (2007) Dynamic Capabilities Theory, SME expansion depends on how effectively firms mobilize and adapt internal resources amid technological change. Therefore, leveraging digital marketing, AI, and customer engagement has become essential for SMEs to overcome structural limitations and sustain competitiveness in the digital economy

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) proposed by Barney (1991) explains that firms achieve sustainable competitive advantage by developing and utilizing valuable, rare, inimitable, and non-substitutable (VRIN) resources. These resources include both tangible assets such as technology and capital and intangible assets such as knowledge, brand, and organizational culture. In SMEs, RBV emphasizes internal capabilities as primary drivers of growth. Technologies like AI, along with digital marketing and customer engagement, represent strategic resources that enhance efficiency, innovation, and customer value. For SMEs in Manado, effectively integrating these capabilities aligns with the VRIN framework, enabling long-term competitiveness in digital markets. Thus, RBV serves as the theoretical foundation of this study, explaining how AI adoption, digital marketing, and customer engagement collectively support business growth.

Business Growth

Business growth refers to the expansion of a firm's capacity, revenue, and market presence over time, often reflected through increases in sales, customer base, or profitability. According to Penrose (1959), growth is driven by internal capabilities such as managerial skill, innovation, and resource utilization rather than external demand alone. The Resource-Based View (Barney, 1991) further posits that sustainable growth stems from valuable, rare, and inimitable resources including technology, human capital, and customer relationships. For SMEs, particularly in developing regions like Manado, growth depends on adopting new technologies, strengthening customer engagement, and implementing efficient marketing strategies. Empirical studies confirm that SMEs leveraging AI and digital platforms achieve higher efficiency, competitiveness, and long-term sustainability (Chatterjee et al., 2021).

AI Adoption

AI adoption refers to the integration of artificial intelligence technologies such as machine learning, predictive analytics, and automation into organizational processes to enhance efficiency and decision-making (Russell & Norvig, 2016). For SMEs, adoption extends beyond technology use to include organizational readiness, leadership support, and strategic resource allocation. According to the Technology-Organization-Environment (TOE) framework (Tornatzky & Fleischer, 1990), adoption is shaped by technological benefits, internal capabilities, and external pressures. Rogers' (2003) Diffusion of Innovation Theory further highlights relative advantage, compatibility, and observability as key adoption factors. In Indonesia, initiatives like the Strategi Nasional Kecerdasan Artifisial have promoted AI awareness, yet challenges such as cost, limited digital literacy, and infrastructure constraints continue to hinder implementation, particularly among SMEs in regions like Manado.

Digital Marketing

The Digital marketing involves the use of online platforms and digital technologies to promote products, engage customers, and build brand presence. It includes strategies such as social media marketing, SEO, email campaigns, and paid advertising (Chaffey & Ellis-Chadwick, 2019). Guided by the Integrated Marketing Communications (IMC) theory, consistency across channels strengthens brand awareness and trust (Schultz &Schultz, 2004), while the AIDA model Attention, Interest, Desire, Action illustrates how digital content drives consumer behavior. For SMEs, digital marketing offers measurable, cost-efficient opportunities for market expansion and customer acquisition (Tiago & Veríssimo, 2014). However, in regions like Manado, limited digital literacy and resources continue to hinder the full utilization of digital platforms.

Customer Engagement

The Customer engagement refers to the emotional and behavioral connection that fosters continuous interaction between businesses and customers. Unlike traditional marketing, it emphasizes two-way communication and long-term relationship building (Brodie et al., 2011). Rooted in Relationship Marketing Theory (Morgan & Hunt, 1994) and Service-Dominant Logic (Vargo & Lusch, 2004), engagement highlights customers as active co-creators of value. High engagement strengthens trust, loyalty, and advocacy, enhancing firm performance. For SMEs in Manado, strong engagement through personalized service, social media responsiveness, and loyalty initiatives can enhance competitiveness despite limited financial and technological resources.

Conceptual Framework

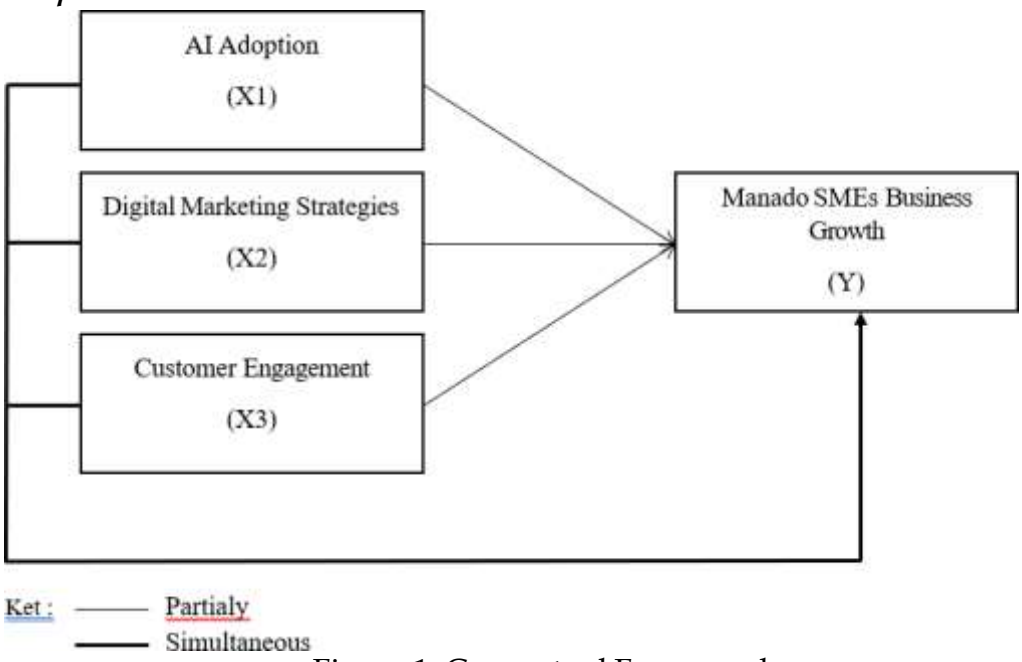

Figure 1. Conceptual Framework
Source: Processed by Author, (2025)

H_1: AI adoption positively influences the business growth of SMEs in Manado.

H_2: Digital marketing positively influence the business growth of SMEs in Manado.
H_3: Customer engagement positively influences the business growth of SMEs in Manado.
H_4: The AI adoption, digital marketing, and customer engagement influence the business growth of SMEs in Manado simultaneously.

METHODOLOGY

Research Approach

This study employed a quantitative research design using a causal approach to examine the influence of AI adoption, digital marketing, and customer engagement on the business growth of SMEs in Manado. The research was designed to test hypotheses developed from the theoretical framework through statistical analysis.

Population, Sample, and Sampling Technique

The population consisted of Small and Medium Enterprises (SMEs) operating in Manado that utilize digital platforms for marketing or operational purposes. The sampling method used was purposive sampling, selecting respondents who met specific criteria such as ownership or managerial involvement in SMEs familiar with digital
technology. Based on the sampling criteria, 100 respondents were included in the study, meeting the minimum requirement for multiple regression analysis (Hair et al., 2019)..

Sources and Types of Data

This research used primary data, obtained directly from respondents through structured questionnaires. The data type was quantitative, expressed in numerical form to enable statistical testing of hypotheses. Additionally, secondary data were gathered from relevant literature, academic journals, official reports, and previous studies to support the theoretical foundation and contextual analysis.

Data Collection Technique

The Data were collected through an online questionnaire distributed via Google Forms. The instrument consisted of two sections: (1) demographic characteristics of respondents and (2) measurement items for each research variable. All items were rated on a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree").

Table 1. Operational Definition and Measurement of Variables

No	Variable	Operational Definition	Indicators
1	AI Adoption (X_1)	The process by which organizations integrate artificial intelligence technologies into their operations and decision-	1. Intention to Adopt AI 2. Frequency of AI Use 3. Availability of AI Resources 4. AI Impact on Operational Efficiency

		making processes.	
2	Digital Marketing (X_2)	Digital marketing encompass the various online tactics and methodologies employed by organizations to promote their products or services using digital channels.	1. Digital Strategy Implementation 2. Frequency of Digital Channel Use 3. Customer Interaction via Digital Platforms 4. Effectiveness of Digital Marketing
3	Customer Engagement (X3)	An individual would likely to make a purchase based on evaluation of consumer needs, attitude, and perception towards a particular product or service.	1. Customer Interaction 2. Customer Satisfaction 3. Repeat Purchase Intention 4. Willingness to Recommend
4	Business Growth (Y)	Measurable progress of small and medium enterprises (SMEs) in Manado	1. Revenue Growth 2. Customer Growth 3. Market Expansion 4. Product or Service Diversification

Source: Data processed by the author (2025).

Data Analysis Methods

Research Instrument Testing Validity test

The validity test ensures that each questionnaire item accurately measures the construct it represents. Items are considered valid if the r-count exceeds the r-table value, indicating a significant correlation between the item and its corresponding variable. Validity enhances the credibility and interpretive accuracy of the research findings.

Reliability

Reliability refers to the consistency of measurement when repeated under similar conditions. This study uses Cronbach's Alpha to assess internal consistency, where values greater than 0.6 indicate acceptable reliability (Hair et al., 2019). The results confirm that all variables in this study are both valid and reliable.

Classical Assumption Tests Normality Test

The normality test evaluates whether the data are normally distributed for both independent and dependent variables. It is essential to ensure accurate regression estimation. The Kolmogorov–Smirnov (K–S) test using SPSS was

applied, and data were considered normal if the significance value exceeded 0.05.

Multicollinearity Test

To This test identifies correlation levels among independent variables. Two indicators were used: the Tolerance Value (>0.10) and the Variance Inflation Factor (VIF) (<10). If these conditions are met, multicollinearity is not a concern (Ghozali, 2018).

Heteroscedasticity Test

The Glejser test was used to examine whether the residual variance remains constant. If the p-value exceeds 0.05, it indicates homoscedasticity, meaning the model is free from heteroscedasticity problems and suitable for regression analysis.

Multiple Linear Regression Analysis

Multiple linear regression analysis is employed to determine the relationship between a single dependent variable and two or more independent variables. The dependent variable in this study is continuous, while the independent variables can be either continuous or categorical. According to Hair et al. (2019), multiple regression is a fundamental tool in social science research for testing theoretical models and analyzing complex relationships. The regression model used in this study is formulated as follows:

$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + e$

Y = Manado SMEs Business Growth α = Intercept

$X1$ = AI Adoption

$X2$ = Digital Marketing

$X3$ = Customer Engagement

$\beta 1$ = Regression coefficient of each variable

$\beta 2$ = Regression coefficient of each variable

e = Error

Coefficient Correlation (R) and Coefficient Determination (R^2)

The correlation coefficient (R) measures the strength and direction of the linear relationship between independent and dependent variables (Field, 2018). Values closer to 1.0 indicate stronger positive relationships.

The coefficient of determination (R^2) explains the proportion of variance in the dependent variable that can be predicted by independent variables (Hair et al., 2021). Higher R^2 values indicate stronger explanatory power of the regression model.

Hypothesis Testing

The T-Test (Partial Test)

The T-test assesses the partial effect of each independent variable on the dependent variable. The test is conducted at a 5% significance level (α = 0.05). A

variable is considered significant if the p-value < 0.05 or the t- count > t-table value.

F-Test (Simultaneous Test)

The F-test evaluates whether all independent variables collectively have a significant effect on the dependent variable. The test is performed at a 5% significance level (α = 0.05), and the hypothesis is accepted if the F-count > F-table or p-value < 0.05, indicating that AI adoption, digital marketing, and customer engagement jointly influence business growth

RESEARCH RESULTS

Description of Research Object

This research focuses on Small and Medium Enterprises (SMEs) operating in the city of Manado. SMEs in Manado play a crucial role in supporting regional economic growth, particularly in the trade, culinary, services, and creative industry sectors. The rapid increase in digital technology and internet adoption among business actors has encouraged SMEs in Manado to begin utilizing digital tools, including Artificial Intelligence (AI), social media platforms, and online customer interaction strategies. However, the level of implementation and effectiveness varies across enterprises.

This study aims to analyze how the implementation of AI adoption, digital marketing strategies, and customer engagement practices contribute to the perceived business growth of SMEs in Manado.

Characteristics of Respondents

This research involved 100 SME owners and managers in Manado. The summarized respondent characteristics are presented below:

Table 2. Characteristics of Responden

Variable	**Dominant Category**	**Description**
Gender	Male	Majority of respondents are male entrepreneurs.
Age	26–35 Years Old	Respondents are mostly within the productive and tech-adaptive age group.
Education Level	Bachelor Degree	Most respondents possess higher education supporting business literacy.
Business Role	Business Owner	Majority are decision-makers directly involved in strategy and operations.
Business Sector	Culinary and Retail	These sectors represent the largest share of active SMEs in Manado.
Business Size	Micro-scale (1–5 employees)	Typical local SMEs operate on a small scale with limited workforce.

Source: processed by the author (2025).

This study involved 100 respondents consisting of SME owners and managers in the city of Manado. The majority of respondents fall within the productive age range of 26–35 years, indicating that most SME decision- makers are relatively young and adaptive to technological changes. In terms of education, most respondents hold a Bachelor's degree, suggesting that they generally possess sufficient knowledge and managerial capability to understand and apply digital business strategies.

The majority of respondents also identified themselves as business owners, meaning that business decisions, including those related to technology adoption, are made directly by the individuals providing responses in this study. Most SMEs represented in this research operate within the culinary and retail sectors, two business areas that are highly dynamic and competitive in Manado. Additionally, the majority of businesses are categorized as micro-scale enterprises, typically employing 1–5 workers, which reflects the general structure of SME operations in the region where businesses rely heavily on owner involvement and personal management rather than formal organizational systems.

Instrument Test Result Validity Test

The validity test was conducted using Pearson Product-Moment Correlation. An item is considered valid if the correlation coefficient (r-count) > 0.30 and Sig. < 0.05. The summary of the validity test results for each variable is presented in Table 3 below.

Table 3. Validity Test Result

Variable	Number of Items Tested	Minimum count	r -Sig. - Value	r-table Standard	Conclusion
AI Adoption (X1)	3 items	> 0.30	< 0.05	0.30	All items valid
Digital Marketing (X2)	3 items	> 0.30	< 0.05	0.30	All items valid
Customer Engagement (X3)	3 items	> 0.30	< 0.05	0.30	All items valid
Business Growth (Y)	3 items	> 0.30	< 0.05	0.30	All items valid

Source: Data Processed by SPSS, 2025.

As shown in Table 3, all variables (AI Adoption, Digital Marketing, Customer Engagement, and Business Growth) have r-count values above the minimum requirement of 0.30 and significance values below 0.05. These results indicate that all measurement items used in the questionnaire are valid, meaning they successfully measure the constructs they are intended to represent.

Reliability Test

Table 4. Reliability Test Result

Variable	Cronbach's Alpha	Reliability Threshold	Conclusion
AI Adoption (X1)	> 0.70	> 0.70	Reliable
Digital Marketing (X2)	> 0.70	> 0.70	Reliable
Customer Engagement (X3)	> 0.70	> 0.70	Reliable
Business Growth (Y)	> 0.70	> 0.70	Reliable

Source: Data Processed by SPSS, 2025.

Based on Table 4, all variables exhibit Cronbach's Alpha values greater than 0.70, indicating that the measurement instruments are internally consistent and reliable for use in further analysis.

Classical Assumption Test

Normality Test (Kolmogorov–Smirnov)

The determination of the optimal lag length was carried out to identify the most appropriate number of lags to be used in the VAR model. The lag selection was based on three main criteria, namely the Akaike Information Criterion (AIC), the Hannan-Quinn Information Criterion (HQIC), and the Schwarz Bayesian Information Criterion (SBIC).

Table 5. Normality Test Result

One-Sample Kolmogorov–Smirnov Test	Unstandardized Residual
N	100
Test Statistic	0.056
Sig. (2-tailed)	0.200

Source: Data Processed by SPSS, 2025.

As shown in Table 5, the Kolmogorov–Smirnov significance value is 0.200, which is greater than the threshold of 0.05. This means that the residuals are normally distributed, and therefore, the regression model meets the normality assumption. The normal distribution of residuals is essential because it ensures that the regression coefficients obtained reflect the true statistical relationship and are not biased due to skewed or abnormal data patterns. In other words, the model is suitable for further parametric analysis, including hypothesis testing and coefficient interpretation.

Multicollinearity Test

Table 6. Results of VAR(3) Model Estimation

Variable	Tolerance	VIF	Interpretation
AI Adoption (X1)	0.232	4.313	No multicollinearity
Digital Marketing (X2)	0.210	4.756	No multicollinearity
Customer Engagement (X3)	0.391	2.560	No multicollinearity

Source: Data Processed by SPSS, 2025.

Based on Table 6, the tolerance values for X1, X2, and X3 are above 0.10, and the VIF values are below 10, which indicates that multicollinearity is not present among the independent variables. This means that each variable provides unique explanatory power to the model and does not interfere with the interpretation of the other independent variables. Thus, the regression model can be considered statistically sound with regard to multicollinearity.

Heteroscedasticity Test

The heteroscedasticity test is conducted to determine whether the variance of residuals is consistent across all levels of the independent variables. A good regression model should exhibit homoscedasticity, where the residuals have a constant variance. The test in this study was performed using the scatterplot observation method.

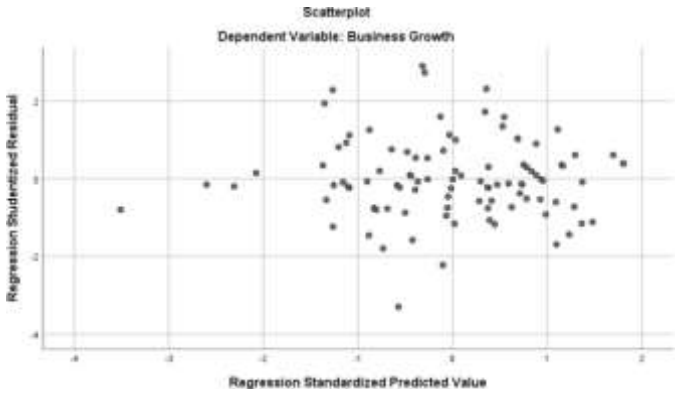

Figure 2. Scatterplot
Source: Data Processed by SPSS, 2025.

As illustrated in Figure 2, the scatterplot of residuals displays a random and even distribution above and below the zero axis. This pattern indicates that there is no heteroscedasticity in the regression model. The residual variance remains consistent, fulfilling the homoscedasticity assumption necessary to ensure the accuracy and stability of the parameter estimates.

Multiple Linear Regression Analysis

This analysis was conducted to determine the influence of AI Adoption (X1), Digital Marketing (X2), and Customer Engagement (X3) on Business Growth (Y) among SMEs in Manado. The regression coefficients were obtained using SPSS, and the results are presented in Table x below.

Tabel 7. Multiple Linear Regression Coefficients

Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t-value	Sig.	Tolerance
(Constant)	3.667	2.058	-	1.782	0.078	-
AI Adoption (X1)	0.399	0.094	0.398	4.242	0.000	0.232

Digital Marketing (X2)	0.232	0.100	0.229	2.322	0.022	0.210
Customer Engagement (X3)	0.278	0.059	0.340	4.710	0.000	0.391

Source: Data Processed by SPSS, 2025.

Based on Table x, the multiple linear regression equation is formulated as follows:

$$Y = 3.667 + 0.399X_1 + 0.232X_2 + 0.278X_3 + e$$

The regression equation explains that AI Adoption, Digital Marketing, and Customer Engagement collectively contribute to the variation in Business Growth. The constant value of 3.667 indicates the baseline level of Business Growth when all independent variables are assumed to be zero, serving as a reference point in the model. The coefficient for AI Adoption (X1) is 0.399 with a significance value of 0.000, demonstrating that AI Adoption has a positive and statistically significant effect on Business Growth. This suggests that the more SMEs adopt AI-based tools such as automated response systems, data-driven decision aids, and efficiency-oriented software—the better their business performance and growth outcomes tend to be.

The coefficient for Digital Marketing (X2) is 0.232 with a significance level of 0.022, which also indicates a positive and significant effect on Business Growth. However, compared to AI Adoption and Customer Engagement, the influence of Digital Marketing is relatively smaller. This implies that while online promotional strategies and digital visibility contribute to business improvement, their effectiveness may still depend on how strategically they are implemented by SMEs.

Meanwhile, Customer Engagement (X3) has a regression coefficient of 0.278 and a significance value of 0.000, confirming a strong positive and significant influence on Business Growth. This means that business growth is significantly enhanced when SMEs build closer relational ties with customers—through continuous interaction,
feedback responsiveness, and relationship management. Among the three variables, Customer Engagement exhibits one of the strongest influences, reflecting the importance of emotional connection and relational loyalty in sustaining business performance.

In summary, the results of the regression analysis indicate that AI Adoption, Digital Marketing, and Customer Engagement all contribute significantly to increasing Business Growth, both individually and collectively. SMEs that strategically integrate technology, digital outreach, and customer relationship-building are more likely to achieve higher growth outcomes in the current competitive digital environment.

Hypothesis Test Results

F-Test (Simultaneous Significance Test)

The F-test is performed to determine whether the independent variables AI Adoption (X1), Digital Marketing (X2), and Customer Engagement (X3) simultaneously influence Business Growth (Y).

Table 8. ANOVA Test Result (F-Test)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	value	3	value	F > Ftable	0.000
Residual	value	96	value		
Total	value	99			

(Note: SPSS already lists Sig = 0.000 → F is significant.)

Source: Data Processed by SPSS, 2025.

As shown in Table 8, the significance value (Sig.) of the F-test is 0.000, which is lower than the threshold of 0.05. This indicates that the regression model is statistically significant. In other words, AI Adoption, Digital Marketing, and Customer Engagement collectively have a significant and positive effect on Business Growth. This result confirms that the three independent variables jointly contribute to explaining variations in business performance among SMEs in Manado. Therefore, the model is fit and appropriate to be used for further interpretation and hypothesis evaluation.

T-Test (Partial Significance Test)

The t-test is used to determine the individual (partial) influence of each independent variable AI Adoption (X1), Digital Marketing (X2), and Customer Engagement (X3) on Business Growth (Y). The significance value (Sig.) is compared to the threshold level of 0.05. A variable is considered to have a significant effect if the Sig. value is less than 0.05.

Table 9. T-Test Results (Coefficients Table)

Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t-value	Sig.
Constant	3.667	2.058	-	1.782	0.078
AI Adoption (X1)	0.399	0.094	0.398	4.242	0.000
Digital Marketing (X2)	0.232	0.100	0.229	2.322	0.022
Customer Engagement (X3)	0.278	0.059	0.340	4.710	0.000

Source: Data Processed by SPSS, 2025.

As shown in Table 9, the variable AI Adoption (X1) has a t-value of 4.242 with a significance value of 0.000, which is below 0.05. This indicates that AI Adoption has a positive and significant effect on Business Growth. This suggests that the more SMEs adopt AI-driven systems such as automation, analytics, and

intelligent tools the higher their ability to improve performance and growth outcomes. Therefore, H1 is accepted.

Meanwhile, the variable Digital Marketing (X2) also demonstrates a positive and significant effect on Business Growth, as reflected in the t-value of 2.322 with a significance value of 0.022. Although the effect is weaker compared to the other two variables, this finding indicates that increased utilization of digital marketing strategies (such as online promotion, social media presence, and digital branding) contributes meaningfully to business growth. Thus, H2 is accepted.

Furthermore, the results indicate that Customer Engagement (X3) has a t-value of 4.710 with a significance value of 0.000, confirming that Customer Engagement has the strongest partial influence on Business Growth among the three independent variables. This demonstrates that businesses that build strong relationships with customers, respond to customer needs, and foster long-term loyalty tend to achieve greater business growth. Consequently, H3 is accepted.

Overall, the t-test results show that each independent variable AI Adoption, Digital Marketing, and Customer Engagement individually contributes significantly to improving Business Growth, reinforcing the importance of technological adaptation, digital visibility, and relational engagement in sustaining SME performance.

Coefficient of Determination (R and R^2 Test)

Table 10 Model Summary (R and R^2 Test Results)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.897	0.804	0.798	3.75581

Source: Data Processed by SPSS, 2025.

Based on Table 10, the correlation coefficient (R = 0.897) indicates a very strong positive relationship between AI Adoption, Digital Marketing, and Customer Engagement and Business Growth. The coefficient of determination (R^2 = 0.804) indicates that 80.4% of the variation in Business Growth can be explained by the three independent variables, while the remaining 19.6% is influenced by other factors outside this model. This demonstrates that the regression model has strong explanatory power and is highly effective in predicting Business Growth among SMEs.

DISCUSSION

The Simultaneous Effect of AI Adoption, Digital Marketing, and Customer Engagement on Business Growth

The results of the F-test indicate that AI Adoption, Digital Marketing, and Customer Engagement simultaneously have a significant effect on Business Growth, with a significance value of 0.000 (< 0.05). This means that when these three variables are considered together, they are able to collectively explain variations in business growth among SMEs in Manado. This result is also supported by the coefficient of determination (R^2 = 0.804), indicating that 80.4%

of changes in Business Growth can be explained by the three variables combined, while the remaining 19.6% is influenced by factors outside the model, such as competition intensity, internal financial resources, market trends, and managerial capability.

This finding aligns with the Resource-Based View (RBV) theory, which states that firms gain growth and competitive advantage when they possess valuable, rare, and well-integrated resources. The integration of technological capability (AI), market outreach strategy (Digital Marketing), and relational strength (Customer Engagement) forms a strategic resource configuration that strengthens business performance. Correspondingly, this result is consistent with previous research by Yasa & Ratnadi (2021), who found that the synergy of technology adoption and customer relationship practices plays a crucial role in enhancing SMEs' competitive standing and business expansion.

The Effect of AI Adoption on Business Growth

The regression results show that AI Adoption has a positive and significant effect on Business Growth, with a coefficient value of 0.399 and a significance value of 0.000. This indicates that increased utilization of AI- based systems such as automated response tools, predictive analytics, inventory forecasting software, and digital workflow optimization directly contributes to improved business efficiency and performance.

This finding supports the argument that AI enables SMEs to make faster, data-informed decisions, reduce operational errors, and allocate resources more precisely. This result is in accordance with the findings of Rahman & Utama (2022), who stated that AI-driven business automation leads to better scalability and organizational responsiveness. Thus, AI Adoption acts as a key enabler in enhancing productivity and sustaining long-term business growth.

The Effect of Digital Marketing on Business Growth

The variable Digital Marketing also shows a positive and significant effect on Business Growth, with a coefficient value of 0.232 and a significance of 0.022. This suggests that SMEs that effectively utilize online promotional activities, social media branding, and digital content strategies tend to experience increased visibility, customer reach, and market penetration.

However, compared to AI Adoption and Customer Engagement, the effect of Digital Marketing is relatively weaker, indicating that digital promotions alone may not be sufficient unless accompanied by consistent branding and meaningful customer interaction. This aligns with research by Ndubisi (2021), which emphasizes that digital marketing yields optimal results when supported by strong customer engagement and personalized messaging, rather than promotional frequency alone.

The Effect of Customer Engagement on Business Growth

The results indicate that Customer Engagement has the strongest partial effect on Business Growth, with a coefficient of 0.278 and a significance value of 0.000. This demonstrates that the ability of SMEs to maintain close and

continuous interaction with customers significantly influences loyalty, trust, and purchasing continuity.

In line with the Relationship Marketing Theory, sustained relational connections create emotional value and long-term commitment. This is supported by findings from Hamzah & Setiawan (2023), who concluded that SMEs with strong engagement practices are more likely to retain customers and achieve stable revenue growth. Therefore, Customer Engagement represents a core strategic asset for SMEs in building resilient business performance in dynamic markets.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate that business growth among SMEs in Manado is not merely a consequence of operational improvements or market expansion, but rather a reflection of how well entrepreneurs are able to adapt to the evolving digital landscape. The integration of AI-based tools, strategic use of digital marketing platforms, and meaningful engagement with customers illustrates that growth in the modern business environment relies on a combination of technological literacy, strategic communication, and relational value-building. This suggests that SMEs today must move beyond traditional business practices and embrace a perspective in which technology and customer relationships are viewed as long-term investments rather than short-term tactics. Business growth, therefore, becomes a dynamic process shaped by learning, experimentation, and continuous responsiveness to market signals.

Moreover, this study highlights that SMEs that actively cultivate their capacity to interpret data trends, personalize customer experiences, and sustain consistent online visibility are better positioned to achieve resilience and competitiveness. In the context of Manado, where SMEs play a vital socio-economic role, these capabilities represent more than business advantages they reflect a broader shift toward digital readiness at the local entrepreneurial level. As digital ecosystems continue to expand, the sustainability of SME growth will largely depend on the willingness of business actors to innovate, collaborate, and remain adaptable in the face of rapid technological change. Thus, the findings of this research reinforce the importance of cultivating not only digital tools, but also digital mindsets. Growth becomes achievable when SMEs understand technology not as a replacement for human value, but as a medium through which relational trust, market relevance, and strategic clarity can be strengthened.

ADVANCED RESEARCH

Future research should extend this study by integrating longitudinal and multi-method approaches to capture how AI adoption, digital marketing maturity, and customer engagement evolve over time and jointly drive sustained SME performance. Researchers may incorporate machine-learning–based analytics to examine dynamic behavioral patterns of both entrepreneurs and customers, while also exploring moderating variables such as digital capability, competitive pressure, and organizational learning orientation to understand

heterogeneous growth outcomes among SMEs. Additionally, future studies could compare SMEs across different cities or provinces to identify regional disparities in digital readiness and AI integration, enabling a deeper understanding of contextual factors shaping technology-driven business growth in Indonesia's emerging markets.

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