The impact of ChatGPT integration and customer relationship management on MSME sales performance with operational efficiency as a mediating variable

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A B S T R A C T

In an increasingly advanced digital era, micro, small, and medium enterprises (MSMEs) face new challenges and opportunities in enhancing their sales performance. The use of innovative technologies, such as ChatGPT and Customer Relationship Management (CRM), is key to improving operational efficiency and strengthening MSME competitiveness. This study aims to analyze the impact of integrating ChatGPT and CRM on MSME sales performance with operational efficiency as a mediating variable. The research employs a quantitative approach using SEM-PLS methodology to explore the relationships between relevant variables. The study was conducted on 100 MSMEs in Subang Regency, Indonesia, using an online questionnaire as the data collection tool. The findings indicate that the integration of ChatGPT and CRM significantly affects MSME sales performance in Subang Regency, with operational efficiency as a mediating variable. First, ChatGPT has been shown to have a significant positive impact on MSME sales performance. This technology facilitates the adoption of new technologies, enhances customer interaction, and enables better service personalization, which directly impacts increased sales volume, sales growth, and revenue. Second, effective CRM implementation also demonstrates a significant positive influence on MSME sales performance. Good customer data management, customer satisfaction, and customer loyalty contribute to increased sales volume, sales growth, and revenue. Third, operational efficiency proves to play a significant mediating role in the relationship between ChatGPT and CRM integration and MSME sales performance. Improvements in operational efficiency through reduced processing times, optimized resource use, and cost reduction support increased sales volume, sales growth, and revenue.

1. Introduction

In the rapidly advancing digital era, micro, small, and medium enterprises (MSMEs) face new challenges and opportunities to enhance their sales performance. The widespread availability of digital tools, previously accessible only to large corporations, has empowered MSMEs to adopt innovative technologies and optimize their business operations. One such technology is ChatGPT, a form of Artificial Intelligence (AI) that is increasingly being used across various business sectors, including in Customer Relationship Management (CRM) strategies. The integration of ChatGPT into MSME operations offers significant potential for improving operational efficiency and enhancing competitiveness. ChatGPT has become an essential tool for MSMEs aiming to strengthen customer relationships and meet the evolving needs of their clientele by providing fast, responsive, and personalized customer service. CRM, on the other hand, facilitates better customer data management, allowing MSMEs to develop more targeted marketing strategies and improve customer satisfaction (Mulyana & Azka, 2022). Through the effective integration of ChatGPT and CRM, MSMEs can optimize their operations, which can ultimately contribute to improved sales performance, revenue growth, and sustainable business development.

At the global level, the integration of AI into business operations has demonstrated significant positive impacts on sales growth and operational efficiency. In developed countries such as the United States, Europe, and East Asia, AI technologies have been widely adopted in various business sectors, including marketing and CRM. For instance, a study by (McKinsey & Company, 2024) found that companies that incorporated AI into their CRM strategies experienced up to a 40% increase in productivity, alongside significant improvements in customer satisfaction. In the United States, major retailers such as Amazon and Walmart use AI to analyze customer data in real-time, providing personalized product recommendations and optimizing their supply chains. In Europe, companies like IKEA and Zara have leveraged AI to enhance customer experiences and optimize inventory management, while in East Asia, e-commerce giants like Alibaba and Tencent have long utilized AI to improve customer interactions through their platforms. The integration of AI not only increases operational efficiency but also reduces costs, ultimately driving profitability.

In the Indonesian context, MSMEs are the backbone of the national economy, contributing over 60% of the gross domestic product (GDP) and absorbing around 97% of the workforce. Despite their crucial role, MSMEs face significant challenges in adopting advanced technologies that could enhance their operational efficiency and sales performance. While the government has introduced initiatives such as the UMKM Go Digital program and technological assistance through the Ministry of Cooperatives and MSMEs, the adoption of AI and CRM remains low. According to the Indonesian Internet Service Providers Association (APJII, 2024), only about 16% of MSMEs have adopted digital technologies in their operations, with even fewer implementing advanced tools like AI. Several barriers hinder technology adoption, including limited knowledge, inadequate access to digital infrastructure, and concerns about high implementation costs. As a result, many MSMEs are unaware of the potential benefits offered by integrating technologies like ChatGPT and CRM, which could significantly enhance their competitiveness in an increasingly digital market. The gap between the potential of these technologies and their actual adoption highlights the need for further exploration into how AI and CRM can support MSME development in Indonesia.

Focusing on Subang Regency, a region with a significant MSME presence, the adoption of AI and CRM technology remains minimal. Data from the Subang Regency Cooperative, MSMEs, Industry, and Trade Office indicates that although over 1,000 MSMEs operate in the region, only a small percentage have integrated digital tools into their business processes. Many MSMEs in Subang continue to rely on traditional methods for managing customer relationships, such as manually recording transactions and relying on word-of-mouth marketing (Ausat et al., 2022). These outdated practices result in inefficiencies and hinder sales performance, as businesses struggle to manage customer data and develop data-driven marketing strategies. Moreover, a lack of training and mentorship on digital technology adoption further impedes MSMEs' ability to implement AI and CRM systems. Local government and business associations have made efforts to support digitalization, but challenges such as limited internet access, high hardware and software costs, and a shortage of skilled professionals remain significant obstacles. Given Subang's large growth potential—particularly with access to local and regional markets—these barriers must be addressed to enable MSMEs to realize their full potential.

Based on preliminary surveys conducted in Subang Regency, it is evident that while some MSMEs have begun to adopt ChatGPT and CRM, the scale of adoption remains limited. MSMEs that have successfully implemented these technologies report improvements in operational efficiency, such as faster response times and better customer data management. However, these benefits are not yet widespread due to the low level of adoption among most MSMEs in the region. This research seeks to explore the untapped potential of integrating ChatGPT and CRM into MSME operations in Subang, aiming to provide insights into how these technologies can be more effectively adopted to enhance business performance.

Previous research has explored the impact of AI and CRM on business operations, but there remains a lack of studies specifically focused on the integration of ChatGPT and CRM in MSME settings, particularly with operational efficiency as a mediating variable. One of the key advantages of ChatGPT is its ability to automate customer interactions, handling common inquiries, processing orders, and providing customer service, thereby reducing time and costs for MSMEs (Raj et al., 2023). MSMEs can allocate human resources to more strategic functions, improving overall operational efficiency by automating these tasks. However, while ChatGPT can improve customer interactions, its impact on sales performance may be limited if operational efficiency is not adequately enhanced. Simply integrating ChatGPT without addressing underlying operational processes may not lead to substantial improvements in sales performance. To fully realize the potential of AI technologies, MSMEs must ensure that operational processes are optimized in tandem with technological adoption.

Operational efficiency plays a critical role in driving sales performance. When businesses operate efficiently, they can serve more customers in less time, reduce errors, and improve customer satisfaction (Subagja et al., 2023). Higher operational efficiency can also result in more competitive pricing, ultimately leading to higher sales. In a competitive market, efficiency often translates into improved overall business performance, including increased sales and profitability. However, it is important to note that operational efficiency alone may not be sufficient to drive sales in times of economic instability or declining consumer demand. External market conditions, such as economic downturns or fluctuations in purchasing power, can hinder sales growth despite improvements in operational efficiency (Wang et al., 2023).

In addition to improving operational efficiency, effective CRM strategies are essential for boosting MSME sales performance. CRM enables businesses to build stronger customer relationships, increase loyalty, and enhance customer lifetime value. MSMEs can improve customer retention and drive repeat purchases, which directly impacts sales by effectively managing customer relationships (Eriksson & Vaghult, 2000). Moreover, CRM allows businesses to better understand customer needs

and provide personalized services, leading to higher customer satisfaction and more sustainable sales. However, CRM's impact on operational efficiency is not as direct, as it primarily focuses on marketing and customer management rather than optimizing operational processes (Nasır, 2017). While CRM is crucial for enhancing customer value, it may not directly contribute to cost reduction or faster operations.

This study aims to fill the research gap by examining the impact of integrating ChatGPT and CRM on MSME sales performance, with operational efficiency serving as a mediating variable. This research seeks to provide valuable insights into how these technologies can be more effectively adopted to improve business performance in the region by focusing on MSMEs in Subang Regency.

2. Literature review and hypothesis development

2.1 Disruptive Innovation Theory and ChatGPT

Disruptive Innovation Theory, introduced by Clayton Christensen in 1995, explains how simpler, more affordable technologies can replace established, complex systems by creating new markets or transforming existing ones (Bower & Christensen, 1995). In the context of this study, ChatGPT is viewed as a disruptive innovation, fundamentally altering how MSMEs (Micro, Small, and Medium Enterprises) engage with customers and manage their business processes. Traditional customer interactions often rely on manual communication and time-consuming responses, while ChatGPT offers an AI-driven, efficient solution. This shift from human-dependent processes to AI-based tools represents the essence of disruptive innovation—replacing established methods with simpler, scalable, and cost-efficient alternatives. ChatGPT, an AI-based language model developed by OpenAI, utilizes transformer architecture to produce human-like text. It is trained on vast datasets to generate accurate, contextually relevant responses across various applications, including customer service, content creation, and educational assistance. For MSMEs, ChatGPT can streamline customer support, improve service personalization, and enhance overall business efficiency. The theory becomes more applicable when considering how ChatGPT creates new value for businesses by opening avenues for rapid customer engagement and operational efficiency, allowing even resource-constrained MSMEs to compete more effectively in the digital landscape (Harahap, Ausat, et al., 2023). The relevant indicators used for this variable include:

- Technology Adoption Ease: Measured by how seamlessly MSMEs can integrate ChatGPT into their operations, focusing on the ease of implementation, training, and associated costs.
- Customer Interaction Improvement: Examines how ChatGPT improves the frequency, speed, and quality of customer interactions, indicated by customer satisfaction and feedback.
- Service Customization: Assesses how well ChatGPT tailor responses to customer needs, measured by the relevance, personalization, and adaptability of its output.

2.2 Customer Relationship Management (CRM) Theory

Customer Relationship Management (CRM) emerged in the late 1990s as a technology-driven approach to improving customer interactions and building long-term relationships. CRM theory traces its origins to marketing practices that emphasize relationships and personalized communication, as first discussed by Richard Bagozzi in 1974. The theory underscores the importance of understanding customer needs and preferences through data-driven approaches, enabling businesses to develop targeted marketing strategies and improve customer satisfaction and loyalty (Wübben, 2009). For MSMEs, CRM is critical in managing customer data effectively to personalize services, foster loyalty, and enhance customer retention—key factors in driving business growth (Ramaj & Ismaili, 2015). CRM tools allow MSMEs to collect, store, and analyze customer data efficiently, which can be used to improve marketing efforts, tailor services, and enhance overall customer experiences. The theory's applicability to MSMEs lies in its ability to help businesses with limited resources optimize their customer interactions, build stronger relationships, and drive sales growth by leveraging technology. Effective CRM implementation is crucial for MSMEs to compete in highly competitive markets, offering personalized and data-driven customer experiences. The indicators used for this variable include:

- Customer Data Management: The effectiveness of MSMEs in collecting, storing, and analyzing customer data, enabling targeted marketing and service personalization.
- Customer Satisfaction: Measured through surveys, feedback, and service outcomes, this indicator evaluates how well CRM strategies improve customer satisfaction levels.
- Customer Loyalty: Assessed by tracking customer retention rates, repeat purchases, and customers' willingness to recommend the business to others.

2.3 Socio-Technical Systems Theory and Operational Efficiency

Socio-Technical Systems Theory, introduced by Eric Trist and Fred Emery in the late 1940s, explores the interaction between an organization's social and technical systems (Emery, 2000). In this study, operational efficiency is seen as the outcome of integrating advanced technologies such as ChatGPT and CRM into the social work processes of MSMEs. The theory posits that organizations are socio-technical systems where the effectiveness of technical tools (e.g., ChatGPT and CRM) depends on how well they align with social systems, including organizational culture, processes, and employee capabilities. For MSMEs, achieving operational efficiency requires not only adopting new technologies but also ensuring that these tools are

effectively integrated into daily operations. Operational efficiency refers to an organization's ability to maximize output with minimal resource usage, focusing on labor, time, materials, and costs (Handoyo et al., 2023). The implementation of ChatGPT and CRM technologies can significantly improve the speed and accuracy of tasks, reduce waste, and increase productivity, enabling MSMEs to deliver greater value to customers and enhance their competitive advantage. In this research, operational efficiency is particularly relevant to how well MSMEs manage to optimize their processes and reduce costs while maintaining high service levels. The theory helps explain how the interaction between new technologies and social systems can lead to improved business outcomes. The indicators for this variable include:

- Processing Time: The time taken to complete operational tasks, measured through service delivery speed, response times, and production cycles.
- Resource Utilization: Efficiency in the use of resources such as time, labor, and raw materials, measured through productivity gains and waste reduction.
- Operational Cost Reduction: The degree to which MSMEs reduce costs through improved efficiency, measured by analyzing operational expenses, overheads, and other cost savings.

2.4 Organizational Sales Performance

Organizational performance is a concept developed from research in management and organization during the 1950s and 1960s, with significant contributions from researchers like Herbert Simon and Chester Barnard (Emerald, 2016). This concept focuses on how various factors within an organization, such as structure, strategy, and environment, influence overall organizational performance. In this context, sales performance is a crucial aspect of organizational performance measured through various sales metrics. MSME (Micro, Small, and Medium Enterprises) sales performance refers to how effectively MSMEs generate revenue through the sale of their products or services over a specific period (Ausat & Peirisal, 2021). Sales performance is an important indicator of MSME health, reflecting their ability to attract and retain customers, compete in the market, and meet revenue targets. Factors affecting MSME sales performance include product or service quality, marketing strategy effectiveness, customer service, pricing, and market conditions. MSMEs can secure sustainable growth, increase profitability, and expand their market share by improving sales performance. Good sales performance also helps MSMEs overcome financial challenges, expand operations, and enhance competitiveness, despite often operating with limited resources. Indicators used for this variable include:

- Sales Volume: The quantity of products or services sold over a specific period, measured quantitatively through sales reports.
- Sales Growth: The rate of increase in sales over time, measured through monthly, quarterly, or annual growth percentages.
- Revenue: The total revenue generated from sales, measured through gross revenue analysis, profit margins, and net income.

2.5 The Relationship Between Variables

ChatGPT, launched by OpenAI in 2020, has demonstrated significant impact in the field of customer relationship management and communication for MSMEs. ChatGPT enables MSMEs to manage customer interactions more efficiently and personally with its ability to interact naturally and understand human language. Research shows that responsive and relevant customer service is a crucial factor in maintaining customer satisfaction, which can ultimately enhance loyalty and sales (Rane et al., 2023). ChatGPT, with its capability to process large amounts of data, also provides in-depth analysis that helps MSMEs identify customer trends and preferences. For example, MSMEs in the e-commerce sector integrating ChatGPT into their customer service report reduced response times, improved relevance of product recommendations, and faster handling of customer inquiries. All these factors contribute to a more satisfying shopping experience and increased sales. Previous studies have shown that integrating technologies like ChatGPT can improve operational efficiency and customer service quality (Harahap, Junianto, et al., 2023). MSMEs can tailor their marketing strategies to enhance campaign effectiveness and sales conversion by better understanding customer needs (Ausat & Suherlan, 2021). The findings support the hypothesis that ChatGPT can positively and significantly impact MSME sales performance by enhancing customer experience and optimizing customer interactions.

Customer Relationship Management (CRM) is a strategy aimed at enhancing interactions and relationships with customers in a more effective and organized manner. Research shows that CRM allows MSMEs to collect, analyze, and utilize customer data to build more targeted marketing strategies (Gil-Gomez et al., 2020). MSMEs can design more relevant offers, develop precise marketing strategies, and improve overall customer experience by leveraging this information. For instance, MSMEs using CRM systems can create marketing campaigns based on previous purchase and interaction data, potentially increasing sales conversion rates. Effective CRM implementation enables MSMEs to better understand customer needs and preferences, which in turn can enhance customer satisfaction and loyalty. Research indicates that loyal customers are more likely to make repeat purchases and recommend products or services to others, contributing to increased sales (Hermawan & Vikaliana, 2023). CRM implementation also helps MSMEs design more specific and relevant offers based on data collected from customer interactions. Overall, data from various studies support the hypothesis that CRM positively and significantly

enhances MSME sales performance by helping understand and meet customer needs and creating more effective marketing strategies.

Operational Efficiency is a crucial concept for MSMEs as it focuses on optimizing business processes, managing resources effectively, and reducing waste. Research shows that when MSMEs can improve their operational efficiency, they can lower production and operational costs, allowing them to offer more competitive prices to customers (Andi et al., 2023). Additionally, high operational efficiency contributes to faster and higher-quality service, which in turn enhances customer satisfaction and the potential for repeat purchases. Empirical studies confirm that MSMEs implementing operational efficiency practices, such as better resource management and waste reduction, tend to experience increases in productivity and production capacity (Sutrisno et al., 2024). This allows MSMEs to better meet market demand, supporting sales growth. Operational efficiency also enables MSMEs to allocate saved resources to other activities that directly support sales, such as marketing and product development. Improved operational efficiency often translates into cost reductions and increased competitiveness, which can help MSMEs enhance their sales performance. Research also indicates that MSMEs able to manage their processes efficiently can focus on innovation and more aggressive marketing strategies, contributing to increased sales (Sari et al., 2023). Thus, existing data supports the hypothesis that operational efficiency positively and significantly enhances MSME sales performance through cost reduction, improved service quality and speed, and the ability to focus resources on activities supporting sales growth.

The integration of ChatGPT in MSME operations has shown significant potential in improving operational efficiency, which in turn positively affects sales performance. ChatGPT, as an artificial intelligence tool, can automate various operational functions such as customer service, sales support, and data management. Research shows that using ChatGPT for automating routine tasks—such as answering customer questions and providing product recommendations—can reduce manual workload, decrease response times, and optimize operational processes (Jusman et al., 2023). MSMEs can better allocate their resources to activities directly supporting sales, such as product development or marketing strategies with more efficient processes. Studies show that implementing automation technologies like ChatGPT can reduce operational costs and increase productivity (George et al., 2023). For example, an MSME in the e-commerce sector integrating ChatGPT to manage customer interactions can expedite order processing, reduce errors, and enhance customer satisfaction. All these factors contribute to increased sales as customers experience faster and more accurate service. The research supports the hypothesis that integrating ChatGPT positively and significantly enhances MSME sales performance through operational efficiency. ChatGPT helps MSMEs reduce costs, increase productivity, and directly improve sales performance by automating and optimizing processes.

The implementation of Customer Relationship Management (CRM) in MSMEs plays a crucial role in enhancing operational efficiency and, in turn, sales performance. CRM functions to strategically manage customer interactions and relationships, and to improve operational efficiency through automation and streamlining of various customer-related processes. MSMEs can manage customer data, analyze behavior, and organize customer service interactions more efficiently with an integrated CRM system. This reduces the time and effort required to handle customer interactions manually, improving speed and accuracy in responding to customer requests and issues. Studies show that MSMEs using CRM systems for automating scheduling, sales follow-ups, and marketing campaign management can reduce errors, accelerate processes, and lower operational costs (Yanti et al., 2023). For example, CRM implementation allows MSMEs to manage customer information more efficiently, reducing operational workload and improving service quality. Effective CRM systems help MSMEs respond better to customer needs, reduce wait times, and enhance service quality, all contributing to increased customer satisfaction and sales performance. Research indicates that operational efficiency achieved through CRM implementation enables MSMEs to allocate resources more effectively to sales and marketing activities (Pohludka & Štverková, 2019). MSMEs can focus on strategic efforts that directly impact sales, such as product development and more effective marketing campaigns with fewer resources and time wasted on manual and administrative processes. Therefore, the hypothesis that Customer Relationship Management positively and significantly enhances MSME sales performance through operational efficiency is supported by evidence that CRM improves operational efficiency by automating and streamlining customer-related processes. This, in turn, improves service quality and customer experience, and supports increased sales performance.
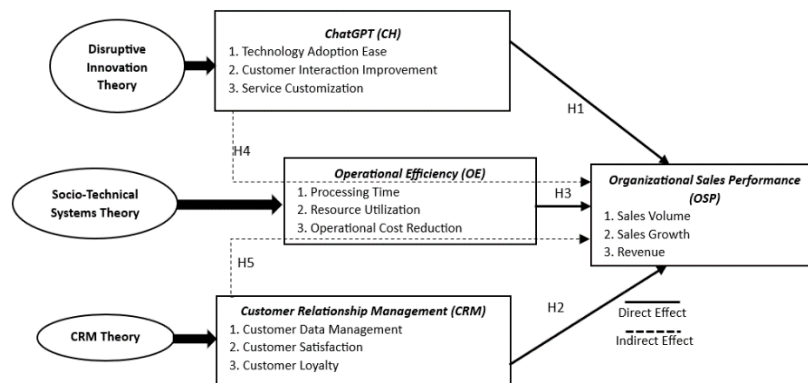

Fig.1. Conceptual Framework

Based on the formulation of the problem, literature review and research conceptual framework that has been described in the previous discussion, the research hypothesis is formulated as follows:

H_1: *The integration of ChatGPT positively and significantly improves MSME sales performance.*
H_2: *Customer Relationship Management (CRM) positively and significantly enhances MSME sales performance.*
H_3: *Operational efficiency positively and significantly enhances MSME sales performance.*
H_4: *The integration of ChatGPT positively and significantly enhances MSME sales performance through operational efficiency.*
H_5: *Customer Relationship Management (CRM) positively and significantly enhances MSME sales performance through operational efficiency.*

3. Research Method

3.1 Study Design

This research adopts a quantitative approach to investigate the impact of integrating ChatGPT and Customer Relationship Management (CRM) on the sales performance of MSMEs in Subang Regency, with operational efficiency serving as a mediating variable. The quantitative method is selected because it allows for the collection of objectives, measurable data and enables the application of rigorous statistical analyses to evaluate the relationships between these key variables. This approach is particularly suited to the study's goal of generating scientifically valid findings that can be generalized to similar MSME contexts. The research aims to uncover patterns and causal relationships that can inform business strategies within the digital economy by using a quantitative method. The study is designed as a survey to collect data efficiently from a broad population within a relatively short timeframe. A survey approach is optimal for capturing the perspectives of MSME owners and managers, especially in understanding how ChatGPT and CRM integration impacts sales performance. An online questionnaire is deployed using Google Forms, allowing for ease of access and completion by respondents, regardless of their location within Subang Regency. The online format also reduces costs, facilitates wide geographical coverage, and improves response rates, making it ideal for gathering data from technology-savvy MSMEs. The survey uses a Likert scale to measure respondents' perceptions of ChatGPT, CRM, operational efficiency, and sales performance, with responses ranging from "strongly disagree" to "strongly agree." This scale is chosen for its ability to capture nuanced differences in attitudes and perceptions, allowing for precise statistical analysis of these constructs. This survey design ensures standardized data collection and facilitates the identification of patterns and trends, contributing to a comprehensive understanding of how these technologies influence MSME performance.

3.2 Research Sample

The research sample consists of MSME owners and managers in Subang Regency who actively utilize information and communication technology (ICT) in their business processes. A purposive sampling technique is employed to ensure that the participants selected are relevant to the research objectives. This method allows the researcher to focus on individuals who are familiar with the technologies under investigation—namely, ChatGPT and CRM. The inclusion criteria require participants to be MSME owners or managers who regularly use ICT tools and who recognize the significance of ChatGPT and CRM in their business operations. Exclusion criteria are set to filter out individuals who do not use ICT or do not consider these technologies relevant to their business. This ensures that the sample is composed of participants who can provide valuable insights into how ChatGPT and CRM integration affects their operational efficiency and sales performance. Out of an initial pool of 112 respondents, 100 participants meet the inclusion criteria and are included in the final sample. This sample size is appropriate for the study's use of Structural Equation Modeling-Partial Least Squares (SEM-PLS), as it meets the recommended thresholds for this type of analysis. The purposive sampling method ensures that the findings are relevant to the MSME context in Subang Regency, while still allowing for broader generalization to similar settings.

3.3 Data Analysis

Data analysis is conducted using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with the aid of SmartPLS 3.0 software. SEM-PLS is chosen for its ability to analyze complex relationships between latent variables and effectively handle small to medium sample sizes. The SEM-PLS methodology allows for simultaneous examination of the measurement model and structural model, providing a comprehensive understanding of the relationships between ChatGPT integration, CRM, operational efficiency, and sales performance. The analysis process begins with an assessment of the outer model, evaluating convergent validity, discriminant validity, and reliability of the measurement model. Convergent validity is confirmed by verifying that indicators within each construct exhibit strong correlations, with factor loadings exceeding the recommended threshold of 0.70. The inner model is then examined through R-square and Q-square analysis, assessing the explanatory power and predictive relevance of the model. This analysis is crucial for validating the theoretical framework and ensuring that proposed relationships are supported by data. Hypothesis testing is conducted to confirm the existence and strength of relationships between variables, providing empirical support for the research theory propositions. The use of SEM-PLS, along with SmartPLS 3.0 software, enhances the rigor of the analysis and offers a deep understanding of the dynamics at play within MSMEs in Subang Regency. This methodological approach strengthens the validity of the findings and provides a solid foundation for further research in this field.

4. Results

4.1 Respondents' Profiles

Respondent profiles in research refer to demographic characteristics and other attributes that describe research participants. This information is important to provide context about who is participating in the research and to ensure that the sample is representative of the intended population.

Table 1
Demographic Respondents

Demographic		Frequency	Percentage
Firm Age	1-5 years	20	20%
	6-10 years	44	44%
	11-15 years	31	31%
	>15 years	5	5%
	Total	100	100%
Gender	Male	61	61%
	Female	39	39%
	Total	100	100%
Respondents Age	15-25 years	19	19%
	26-35 years	31	31%
	36-45 years	37	37%
	>45 years	13	13%
	Total	100	100%
MSMEs Sector	Agriculture and Plantation	20	20%
	Fisheries and Animal Husbandry	20	20%
	Crafts	9	9%
	Food and Beverages	37	37%
	Trade	14	14%
	Total	100	100%
Social-Media	WhatsApp Business	52	52%
	Facebook	12	12%
	TikTok	16	16%
	Instagram	20	20%
	Total	100	100%
E-commerce Platforms	Tokopedia	33	33%
	Shopee	55	55%
	Bukalapak	10	10%
	Lazada	2	2%
	Total	100	100%
Digital Payments	GoPay	28	28%
	OVO	33	33%
	Dana	39	39%
	Total	100	100%
ChatGPT Utilization	Yes	100	100%
	No	0	0%
	Toal	100	100%
Business Location	Subang	100	100%

The majority of MSMEs surveyed in this study have been operating for 6-10 years (44%), with the majority of respondents being male (61%). The dominant age group among respondents is 36-45 years old (37%), and the food and beverage sector represent the largest business sector (37%). In terms of social media usage, WhatsApp Business is the most popular platform (52%), while Shopee dominates among e-commerce platforms (55%). The most frequently used digital payment method is Dana (39%), and all respondents (100%) use ChatGPT in their business operations, with all businesses located in Subang.

4.2 Outer Model Evaluation

In the initial phase of the Structural Equation Modeling-Partial Least Squares (SEM-PLS) analysis, the focus is on evaluating the outer model to ensure the constructs meet essential validity and reliability criteria. This stage is crucial for confirming that the data used is both accurate and consistent for further analysis.

Convergent validity examines whether indicators within a construct have strong correlations with each other. To establish this, each manifest variable should ideally have a loading factor greater than 0.70 when assessed using SmartPLS 3.2 software. This criterion ensures that indicators are effectively measuring the same underlying construct. In our analysis, as detailed in Table 2, all indicators associated with the constructs demonstrate loading factor values above 0.70. This confirms that the constructs achieve the necessary level of convergent validity, indicating that the measures are consistently reflecting the intended constructs.

To assess discriminant validity, one must compare the square root of the Average Variance Extracted (AVE) for each construct with the correlations between constructs. Discriminant validity is supported if the square root of the AVE for a construct is higher than its correlations with other constructs. This comparison ensures that each construct is distinct and not overly correlated with others. According to the analysis shown in Table 3, the model meets the discriminant validity criteria, as evidenced by the higher squared AVE values relative to the correlation values. This finding indicates that each construct is sufficiently distinct from the others.

Reliability testing involves evaluating Cronbach's Alpha and Composite Reliability to ensure the consistency and dependability of the constructs. For constructs with reflexive indicators, acceptable reliability is indicated by values exceeding 0.60. This threshold ensures that the constructs reliably measure their respective variables. The results, presented in Table 2, show that all Cronbach's Alpha and Composite Reliability values are above 0.60. This confirms that the research constructs demonstrate satisfactory reliability, validating that the constructs are measured consistently across different indicators.

Table 2
Measurement Model Analysis

Variable	Item	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
ChatGPT (CH)	CH.1	0.812	0.776	0.792	0.678
	CH.2	0.892			
	CH.3	0.877			
Customer Relationship Management (CRM)	CRM.1	0.816	0.752	0.735	0.644
	CRM.2	0.813			
	CRM.3	0.822			
Operational Efficiency (OE)	OE.1	0.797	0.712	0.748	0.629
	OE.2	0.810			
	OE.3	0.747			
Organizational Sales Performance (OSP)	OSP.1	0.788	0.733	0.711	0.601
	OSP.2	0.766			
	OSP.3	0.865			

Table 3
Discriminant Validity

Var/Ind	CH	CRM	OE	OSP
CH.1	**0.812**	0.349	0.333	0.429
CH.2	**0.892**	0.388	0.350	0.476
CH.3	**0.877**	0.360	0.411	0.428
CRM.1	0.320	**0.816**	0.321	0.311
CRM.2	0.314	**0.813**	0.318	0.329
CRM.3	0.420	**0.822**	0.449	0.412
OE.1	0.433	0.411	**0.797**	0.324
OE.2	0.484	0.439	**0.810**	0.347
OE.3	0.455	0.457	**0.747**	0.337
OSP.1	0.583	0.355	0.420	**0.788**
OSP.2	0.522	0.397	0.385	**0.766**
OSP.3	0.477	0.322	0.335	**0.865**

4.3 Inner Model Evaluation

The next phase of SEM-PLS analysis involves testing the inner model, which uses R-square, Q-square, and hypothesis testing methods to evaluate the model's performance.

R-square assesses the extent to which exogenous constructs influence endogenous constructs. According to Table 4, an R-square value of 0.588 indicates that variables such as ChatGPT Integration and Customer Relationship Management account for 58.8% of the variance in Operational Efficiency. The remaining 41.2% of the variance is attributed to factors not covered by this study. Additionally, an R-square value of 0.575 shows that ChatGPT Integration, Customer Relationship Management, and Operational Efficiency collectively explain 57.5% of the variance in MSME Sales Performance, with 42.5% of the variance attributable to external factors. As noted by (Hair et al., 2011), R-square values exceeding 0.50 signify that SEM models have acceptable explanatory power, demonstrating moderate-to-strong explanatory capability.

Predictive relevance is evaluated by calculating the Q^2 value, where a value greater than 0 indicates adequate predictive capability (Hair et al., 2011). The formula for computing Q^2 is:

$Q^2 = 1 - (1 - R_1^2) \times (1 - R_2^2)$

Using the obtained R-square values:

$Q^2 = 1 - (1 - 0.588) \times (1 - 0.575)$
$Q^2 = 1 - 0.412 \times 0.425$

Q2 = 1 – 0.1751
Q2 = 0.8249

A Q2 value of 0.824 indicates the model's effectiveness in accurately predicting observed values [Hair et al 2011].

Hypothesis testing assesses whether path coefficients are statistically significant, with a common threshold of a P-value less than 0.05 indicating a significant correlation (Hair et al., 2011). The results of hypothesis testing are detailed in Table 5. This evaluation ensures that the proposed relationships between variables in the model are significant and relevant, providing a robust foundation for further analysis.

Table 4
R-square Test

No	Variable	R-Square
1	OE	0,588
2	OSP	0,575

Table 5
Hypothesis Testing Results

Hypothesis	Path Coefficient	T Value	P Values	Decision
CH → OSP	0,611	9,612	0,000	Accepted
CRM → OSP	0,547	7,501	0,000	Accepted
OE → OSP	0,486	5,776	0,000	Accepted
CH → OE → OSP	0,339	3,613	0,005	Accepted
CRM → OE → OSP	0,322	3,576	0,025	Accepted

5. Discussion

5.1 The Significant Relationship between ChatGPT Integration and MSME Sales Performance

The first hypothesis in Table 5 indicates that ChatGPT integration has a positive and significant impact on employee sales performance in MSMEs. This finding supports previous research that yielded similar results (Bapat et al., 2024). The ease of adopting technology, such as ChatGPT, facilitates MSMEs in adopting new technologies without requiring significant investments in training or complex operational adjustments. Technology Adoption Ease allows MSME operators to quickly implement ChatGPT for various business needs, such as automating customer responses and personalizing services. This directly impacts Sales Volume and Sales Growth, as the ability to respond to customers quickly and efficiently enhances customer satisfaction and the likelihood of sales conversions. Additionally, the improved operational efficiency resulting from this technology adoption also contributes to increased Revenue.

ChatGPT's ability to enhance customer interaction is a key factor positively affecting MSME sales performance (Ausat et al., 2023). Customer Interaction Improvement through ChatGPT enables MSME operators to provide responsive, personalized, and 24/7 customer service, which in turn increases customer loyalty and extends the purchase cycle. MSMEs can better understand customer needs and preferences, allowing them to tailor their offerings more effectively with improved customer interactions, which directly impacts increased Sales Growth and Revenue.

Service Customization enabled by ChatGPT integration allows MSMEs to offer a more personalized and relevant customer experience. ChatGPT can provide suitable product recommendations and special offers tailored to individual preferences by utilizing customer data collected (Abdelkader, 2023). This increases Sales Volume because customers feel the service they receive meets their personal needs, encouraging them to make more or more frequent purchases. Moreover, service personalization also contributes to increased Revenue as customers are willing to pay more for services perceived as more valuable and relevant.

Based on the above analysis, it can be concluded that ChatGPT integration has a positive and significant impact on MSME sales performance. Technology Adoption Ease facilitates quick and efficient technology implementation, Customer Interaction Improvement enhances engagement and customer satisfaction, and Service Customization allows better tailoring of services for each customer. These three factors collectively contribute to increased Sales Volume, Sales Growth, and Revenue in MSMEs adopting ChatGPT as part of their sales strategy.

5.2 The Significant Relationship between Customer Relationship Management and MSME Sales Performance

The second hypothesis in Table 5 indicates that customer relationship management (CRM) has a positive and significant impact on employee sales performance in MSMEs. This finding supports previous research that yielded similar results (Mozaheb et al., 2015). Effective customer data management is a key element in CRM that directly impacts MSME sales performance. Customer Data Management enables MSMEs to systematically collect, store, and analyze customer data, which can then be used to develop more targeted marketing strategies. MSMEs can tailor their product and service offerings, leading to increased Sales Volume with a deeper understanding of customer preferences, needs, and behaviors. Additionally,

appropriate use of data can help MSMEs identify opportunities for upselling or cross-selling, contributing to Sales Growth and overall Revenue increase.

Customer Satisfaction is a direct result of effective CRM implementation. Customer Satisfaction reflects the extent to which the products and services offered by MSMEs meet or exceed customer expectations (Rahman et al., 2023). High satisfaction levels encourage repeat purchases, which increases Sales Volume. Moreover, satisfied customers are more likely to recommend products or services to others, which can expand the customer base and drive Sales Growth. Overall, high customer satisfaction contributes to increased Revenue as satisfied customers tend to transact more frequently and in larger amounts.

Customer Loyalty is a key indicator of the long-term success of CRM strategies. Loyal customers continue to purchase products or services from the same MSME and are more resistant to competitor offers (Mujianto et al., 2023). High customer loyalty positively impacts Sales Volume as loyal customers are likely to make repeat purchases over the long term. Furthermore, strong customer loyalty supports Sales Growth as loyal customers can become strong brand advocates, attracting new customers through personal recommendations. Finally, high loyalty levels significantly contribute to Revenue since loyal customers tend to have a higher lifetime value.

Based on this analysis, it can be concluded that effective CRM implementation, focusing on Customer Data Management, Customer Satisfaction, and Customer Loyalty, has a positive and significant impact on MSME sales performance. Customer Data Management enables better strategies and decisions based on accurate information, Customer Satisfaction ensures customer base sustainability and growth, and Customer Loyalty secures long-term revenue. Collectively, these three factors contribute to increased Sales Volume, Sales Growth, and Revenue for MSMEs that adopt CRM as part of their sales strategy.

5.3 The Significant Relationship between Operational Efficiency and MSME Sales Performance

The third hypothesis in Table 5 indicates that operational efficiency has a positive and significant impact on employee sales performance in MSMEs. This finding supports previous research that yielded similar results (Andi et al., 2023). Efficient processing time management is one of the key aspects of Operational Efficiency that directly affects MSME sales performance. Fast Processing Time enables MSMEs to fulfill customer orders more quickly, increasing customer satisfaction and reducing waiting times. This reduction in processing time contributes to increased Sales Volume, as customers are more likely to make purchases when they know they will receive products or services promptly. Additionally, reduced processing time allows MSMEs to handle more orders within the same time period, ultimately contributing to Sales Growth. The long-term impact of this efficiency improvement is also reflected in increased Revenue, as more orders can be processed and delivered on time.

Optimal resource utilization is a key aspect of operational efficiency that directly impacts MSME sales performance (Eka et al., 2024). Effective Resource Utilization means that MSMEs can use available resources—such as labor, raw materials, or technology—more efficiently to maximize output. MSMEs can increase their production and service capacity, which in turn boosts Sales Volume by minimizing waste and optimizing resource allocation. Optimal resource utilization also contributes to Sales Growth, as MSMEs can enhance their sales capacity without incurring significant additional costs. Furthermore, better resource utilization can improve profitability, which contributes to increased overall Revenue.

Cost reduction is an important component of operational efficiency that can positively impact MSME sales performance (Titin et al., 2024). Operational Cost Reduction allows MSMEs to cut unnecessary expenses, such as production, distribution, and other overhead costs, without sacrificing product or service quality. This reduction in operational costs enables MSMEs to offer products or services at more competitive prices, attracting more customers and increasing Sales Volume. Additionally, lower operational costs provide MSMEs with the opportunity to improve their profit margins, supporting Sales Growth. Ultimately, cost reduction significantly boosts Revenue as MSMEs can optimize profitability through cost efficiency.

Based on the discussion above, it can be concluded that improvements in Operational Efficiency, measured through Processing Time, Resource Utilization, and Operational Cost Reduction, have a positive and significant impact on MSME sales performance. Fast Processing Time enhances customer satisfaction and sales capacity, Optimal Resource Utilization allows for increased output without significant additional costs, and Operational Cost Reduction improves profitability through cost savings. Collectively, these three aspects contribute to increased Sales Volume, Sales Growth, and Revenue for MSMEs that successfully enhance their operational efficiency.

5.4 The Significant Mediation Relationship between ChatGPT Integration with MSME Sales Performance through Operational Efficiency

The fourth hypothesis outlined in Table 5 states that the integration of ChatGPT into MSME operations in Subang Regency has a positive and significant impact on sales performance through enhanced operational efficiency. MSMEs can accelerate processing times by providing instant responses to customer inquiries and handling orders efficiently by adopting ChatGPT, which reduces processing times and improves customer satisfaction. This reduction in processing time enhances time efficiency in operations and contributes to increased sales volume and sales growth.

Additionally, ChatGPT enables the optimization of resource use by transferring routine tasks such as customer support from human labor to automated systems (Menon & Shilpa, 2023). This maximizes the use of existing resources, allowing human labor to focus on more complex and strategic tasks. The increased efficiency in resource utilization leads to better service capacity and reduces the need for additional labor, positively impacting sales volume and MSME revenue.

Cost reduction is another benefit of integrating ChatGPT, as the technology reduces the need for additional staff for administrative tasks and customer service (Javaid et al., 2023). MSMEs can save on operational costs, which can then be allocated to product development or more aggressive marketing strategies by automating various functions. This reduction in operational costs enhances MSME profitability, contributing to sales growth and increased overall revenue.

Overall, the integration of ChatGPT, which improves operational efficiency through reduced processing times, optimized resource use, and cost reduction, has a significant impact on MSME sales performance. This enhancement in operational efficiency allows MSMEs to respond more quickly to the market, serve more customers, and do so at lower costs, thereby increasing sales volume, sales growth, and revenue.

5.5 The Significant Mediation Relationship between Customer Relationship Management with MSME Sales Performance through Operational Efficiency

The fifth hypothesis detailed in Table 5 states that customer relationship management (CRM) has a positive and significant impact on MSME sales performance in Subang Regency through enhanced operational efficiency. Effective CRM implementation allows MSMEs to manage customer data in a more structured manner, improve customer satisfaction, and build customer loyalty, all of which contribute to better operational efficiency.

MSMEs can manage Customer Data Management more efficiently with CRM. CRM systems enable the systematic collection and analysis of customer data, providing deep insights into customer needs and preferences. Well-managed data helps MSMEs optimize their business processes, personalize their offerings, and respond to customer requests more quickly (Sudirjo et al., 2023). Increased efficiency in data management contributes to reduced processing times, allowing MSMEs to fulfill orders more swiftly and increase Sales Volume.

Additionally, improved Customer Satisfaction through CRM plays a crucial role in operational efficiency. MSMEs can provide more responsive and personalized service, reducing the time needed to handle customer complaints and requests with CRM systems. Enhanced customer satisfaction leads to better relationships and reduces churn rates, which in turn increases customer loyalty and supports Sales Growth. Satisfied customers are more likely to make repeat purchases and recommend MSMEs to others, contributing to increased sales volume and revenue (Gan et al., 2024).

Customer Loyalty built through CRM also contributes to operational efficiency. Loyal customers are more likely to make repeat purchases and become active brand advocates (Wilk et al., 2021). High customer loyalty allows MSMEs to reduce the costs of acquiring new customers and focus on retaining existing ones. This loyalty increases profitability and reduces marketing and sales-related operational costs, positively impacting Revenue.

Overall, effective CRM improves MSME operational efficiency by enhancing customer data management, increasing customer satisfaction, and building customer loyalty. This increased efficiency enables MSMEs to manage their business processes more effectively, respond to customer demands more quickly, and reduce operational costs, ultimately boosting Sales Volume, Sales Growth, and Revenue.

6. Conclusion

This study shows that the integration of ChatGPT and Customer Relationship Management (CRM) significantly influences the sales performance of MSMEs in Subang Regency, with operational efficiency acting as a mediating variable. First, ChatGPT has been proven to have a significant positive impact on MSME sales performance. This technology facilitates the adoption of new technologies, enhances customer interaction, and enables better service personalization, which directly contributes to increased sales volume, sales growth, and revenue. Second, effective CRM implementation also shows a significant positive influence on MSME sales performance. Effective customer data management, customer satisfaction, and customer loyalty are key factors in improving sales volume, sales growth, and revenue. Third, operational efficiency has proven to be a significant mediator in the relationship between the integration of ChatGPT and CRM with MSME sales performance. Enhancing operational efficiency through reduced processing time, optimized resource utilization, and lowered operational costs supports increased sales volume, sales growth, and revenue.

These findings have important implications for MSME management in Subang Regency. The adoption of technologies like ChatGPT and the implementation of effective CRM strategies can improve MSME sales performance by enhancing operational efficiency. Easily adoptable technology and good customer relationship management can strengthen customer interactions, ultimately leading to increased customer satisfaction and loyalty. Therefore, MSMEs that implement these technologies and strategies can optimize their resource utilization, reduce operational costs, and improve overall sales performance.

To maximize the benefits of ChatGPT and CRM, MSMEs are advised to focus on employee training to effectively utilize the technology and understand how to use customer data for more targeted marketing strategies. Additionally, MSMEs need to invest in reliable CRM systems and technologies that can enhance their operational efficiency. These policies will support long-term goals, strengthen customer relationships, and improve competitiveness in the market.

7. Limitation and Future Research Recommendation

This study has several limitations that should be carefully considered. Firstly, the research is geographically confined to MSMEs in Subang Regency, limiting its generalizability to other regions with potentially differing economic, cultural, or technological conditions. The findings may not fully apply to MSMEs in areas with distinct business environments or infrastructure. Secondly, the relatively small sample size of 100 participants, while sufficient for preliminary insights, may restrict the robustness of statistical analysis and the generalizability of results. Future studies with larger sample sizes could provide stronger empirical support and more reliable conclusions. Thirdly, the data collection method relied heavily on self-reported survey responses, which can introduce subjective biases, such as social desirability bias or inaccurate self-assessments by respondents. This could affect the validity of the data, leading to potential discrepancies between perceived and actual business performance.

Moreover, external factors, such as fluctuating economic conditions, technological advancements, or policy changes, were not integrated into this study's framework, even though they might play a significant role in influencing MSME sales performance. These external factors should be considered in future research to provide a more comprehensive understanding of how broader environmental variables interact with the integration of ChatGPT and CRM in enhancing MSME performance.

For future research, it is recommended to broaden the geographic scope of the study, involving MSMEs from various regions and industries to increase the external validity of the findings. Expanding the sample size will also allow for a more diverse dataset, improving the reliability of results and the ability to generalize findings to broader MSME populations. Conducting longitudinal studies will be beneficial to explore the long-term effects of ChatGPT and CRM on MSME sales performance, providing deeper insights into how these technologies contribute to sustained business growth over time. Additionally, future research should explore external factors, such as market conditions and regulatory changes, that may affect the outcomes, using mixed-method approaches that combine quantitative surveys with qualitative interviews or case studies. This would reduce bias and offer a more nuanced understanding of how these technologies integrate into broader business management strategies. Finally, further studies could investigate the dynamic interactions between new technologies like AI, operational processes, and other facets of business management, such as leadership and financial planning, to offer a more holistic approach to improving MSME performance.

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