

E-commerce Adoption and Small Business Performance: A Study of Digital Marketing Strategies, Online Customer Engagement and Technology Infrastructure

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Abstract

In the dynamic landscape of e-commerce, small businesses face a multitude of challenges and opportunities. This manuscript explores the intricate relationships between three key independent variables: Digital Marketing Strategies, Online Customer Engagement, Technology Infrastructure, and the dependent variable, Small Business Performance in e-commerce. Through a quantitative approach, we investigate the impact of these variables on the success of small businesses operating in the digital marketplace. Our analysis reveals that each of the independent variables, Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure, exhibits a statistically significant positive relationship with Small Business Performance in e-commerce. Small businesses that effectively implement digital marketing strategies, actively engage with customers online, and maintain robust technology infrastructure are more likely to experience improved e-commerce performance. These findings underscore the interrelated nature of these factors and emphasize the need for a holistic approach to e-commerce success.

The study's results carry practical implications for small business owners and e-commerce practitioners, suggesting that a comprehensive strategy that considers these variables simultaneously is essential for thriving in the competitive digital landscape. By investing in digital marketing, nurturing customer relationships, and prioritizing technology infrastructure, small businesses can enhance their e-commerce performance, achieve increased revenue, and expand their market presence. This research contributes to a deeper understanding of the complex dynamics of small business success in e-commerce, offering valuable insights for decision-makers and stakeholders in the digital marketplace. The findings pave the way for evidence-based strategies and a holistic approach to small business performance enhancement in the digital age.

Keywords: Small Business Performance, E-commerce, Digital Marketing Strategies, Online Customer Engagement, Technology Infrastructure

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Introduction

The landscape of commerce has undergone a transformative evolution with the advent of e-commerce. The seamless integration of the internet into the business world has not only expanded the horizons of markets but also opened up a plethora of opportunities for small businesses. E-

commerce, defined as the buying and selling of goods and services over the internet, has revolutionized the way businesses operate and interact with their customers (Chaffey, 2019). Small businesses, in particular, have been keenly embracing e-commerce platforms, recognizing the potential for growth, market expansion, and increased competitiveness (Novak and Hoff, 2018).

In this digital era, the success of small businesses in e-commerce hinges on several critical factors. Three specific independent variables, namely Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure, have emerged as pivotal determinants of small business performance in the e-commerce domain. Digital marketing strategies encompass a spectrum of online tactics that businesses employ to promote their products and services, enhance their brand visibility, and reach their target audience (Smith and Zook, 2011). Online customer engagement reflects the degree to which businesses effectively interact with their customers in the online space, building relationships, and fostering loyalty (Pansari and Kumar, 2018). Technology infrastructure represents the technological backbone that supports e-commerce operations, including the robustness of the website, payment gateways, and cybersecurity measures (Laudon and Traver, 2018).

The performance of small businesses in the e-commerce sector is crucial not only for the entrepreneurs involved but also for the broader economic landscape. Studies have shown that the integration of e-commerce into small business operations can lead to increased revenue, expanded customer reach, and improved overall competitiveness (Bakos, 1998; Gregor and Benbasat, 1999). However, understanding the precise relationship between these three independent variables—Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure—and small business performance is essential for optimizing e-commerce strategies and guiding small business owners toward sustainable success in a competitive digital marketplace.

This study aims to investigate the impact of these three independent variables on the performance of small businesses in e-commerce, shedding light on the nuances of their relationships and providing insights that can inform e-commerce strategies for small business owners. By examining the interplay between digital marketing, customer engagement, and technology infrastructure, this research contributes to the growing body of knowledge in the field of e-commerce, providing a comprehensive view of the factors that drive success for small businesses in the digital era.

Literature Review

The contemporary business landscape is marked by dynamic shifts, driven primarily by the relentless progression of digital technology. In this era, e-commerce has emerged as a pivotal force, transforming the way businesses engage with customers, conduct transactions, and compete in the global market. With e-commerce's exponential growth, small businesses, often constrained by limited resources, are faced with unique opportunities and challenges in this evolving digital realm (N. Al-Qirim, 2005).

This literature review delves into the multifaceted world of e-commerce, focusing on small businesses and their pursuit of success. Small businesses, the backbone of many economies, are increasingly recognizing the potential for growth, market expansion, and enhanced competitiveness through e-commerce (Novak & Hoff, 2018). Yet, in this digital arena, achieving success is not guaranteed. Small businesses must navigate a complex web of factors that can either propel them to new heights or lead to stagnation.

In this pursuit, three key variables have captured the attention of researchers and practitioners alike: Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure. These variables are not isolated but rather interconnected elements that, when properly harnessed, can shape the destiny of small businesses in e-commerce (Bharadwaj & Soni, 2007). The goal of this literature review is to comprehensively examine the research on these variables and their influence on small business performance in the e-commerce sector.

This review is structured as follows: First, it will explore the impact of digital marketing strategies, shedding light on the ways in which small businesses leverage online tactics to enhance brand visibility and engage with their target audience (Smith & Zook, 2011). Next, the focus will shift to online customer engagement, investigating how small businesses build relationships and foster customer loyalty in the digital space (Pansari & Kumar, 2018). Finally, the review will delve into the role of technology infrastructure, elucidating its significance in providing a reliable foundation for e-commerce operations (Laudon & Traver, 2018).

1. Digital Marketing Strategies:

In the realm of digital marketing, several strategies have proven to be influential in enhancing small business performance in the e-commerce sector. Social media marketing, in particular, has garnered significant attention. Smith and Zook (2011) emphasized the role of social media platforms such as Facebook, Twitter, and Instagram in facilitating customer engagement and brand promotion. They found that small businesses that actively use these platforms to interact with their audience experience increased brand visibility and customer loyalty (Bilgihan et al., 2016).

Another noteworthy aspect of digital marketing is search-engine optimization (SEO). According to Chaffey (2019), effective SEO strategies can boost a small business's online visibility, making it more discoverable to potential customers. Small businesses that rank higher in search engine results tend to attract more organic traffic, resulting in increased sales and better overall performance (Mazzarol, 2015).

Furthermore, email marketing is a well-established digital marketing strategy that has shown positive outcomes for small businesses. Novak and Hoff (2018) discussed how personalized and targeted email campaigns can nurture customer relationships and drive repeat business. By leveraging customer data and segmentation, small businesses can tailor their email content, resulting in higher engagement and conversion rates (Mohan & Ali, 2019).

In sum, the literature highlights that a comprehensive digital marketing strategy that includes elements of social media marketing, SEO, and email marketing is instrumental in improving the performance of small businesses in e-commerce. These strategies contribute to heightened brand awareness, increased website traffic, and ultimately, improved sales figures (Kang & Park, 2014).

H01: There is no significant relationship between digital marketing strategies and small business performance in e-commerce.

2. Online Customer Engagement:

Online customer engagement plays a pivotal role in the success of small businesses in the e-commerce sector. Research by Pansari and Kumar (2018) underlines the significance of customer engagement as a critical factor influencing small business performance. They argue that customer engagement is closely tied to customer satisfaction and loyalty, two key determinants of business success.

One common avenue for online customer engagement is through the provision of personalized content. Personalization in e-commerce, as suggested by Pansari and Kumar (2018), involves tailoring product recommendations and marketing communications to individual customer preferences. By leveraging user data and analytics, small businesses can create a more personalized online shopping experience, resulting in higher customer engagement and, consequently, increased sales (Gupta et al., 2023).

Moreover, the interactive use of social media platforms is a powerful tool for online customer engagement. Smith and Zook (2011) found that small businesses that actively respond to customer inquiries, address concerns, and create a community on social media tend to foster strong customer relationships. This engagement leads to customer loyalty and repeat business, positively affecting performance.

In essence, the literature underscores that effective online customer engagement strategies, such as personalization and active social media interactions, can substantially influence small business performance in e-commerce. Engaging customers in meaningful ways not only enhances their experience but also contributes to the bottom line.

H02: There is no significant relationship between online customer engagement and small business performance in e-commerce.

3. Technology Infrastructure:

The technological infrastructure supporting e-commerce operations is a fundamental determinant of small business performance. Laudon and Traver (2018) emphasize the importance of a reliable and secure technology foundation for e-commerce success. This includes elements such as website functionality, payment gateways, and cybersecurity measures (N. A. Al-Qirim, 2007).

An essential component of technology infrastructure is the robustness of the e-commerce website. A well-designed and user-friendly website enhances the customer experience, resulting in higher

sales and better business outcomes (Laudon and Traver, 2018). Slow-loading websites or those with frequent errors can deter customers and lead to lost sales opportunities.

Secure payment processing is equally crucial. Customers need to trust that their financial information is safe when making online transactions. Research by Bakos (1998) highlights that secure payment gateways not only protect customer data but also provide peace of mind, thereby encouraging online sales and contributing to business performance.

Furthermore, cybersecurity measures are vital for safeguarding sensitive customer data and business operations. Gregor and Benbasat (1999) discuss the importance of robust cybersecurity practices in e-commerce. Small businesses that prioritize data protection and implement effective cybersecurity strategies are less vulnerable to data breaches and the associated reputation damage.

H03: There is no significant relationship between technology infrastructure and small business performance in e-commerce.

Conceptual Framework

The conceptual framework (Figure 1) for this study illustrates the interplay between key variables and the need for research to address existing gaps in our understanding. The central focus is on Small Business.

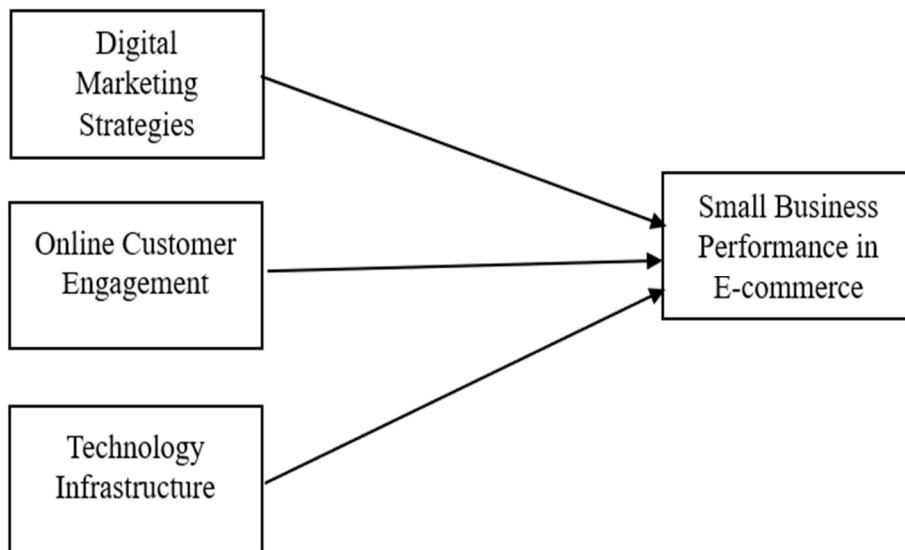


Figure 1: Conceptual Framework

Source: Author’s own

Independent Variables:

1. Digital Marketing Strategies: This variable encompasses various online marketing tactics, such as social media marketing, search engine optimization, and email marketing.

2. Online Customer Engagement: This variable represents strategies used to interact with and engage customers in the online space, including personalized content and active social media interactions.

3. Technology Infrastructure: This variable includes elements such as website functionality, secure payment gateways, and cybersecurity measures, which constitute the technological backbone of e-commerce operations.

Dependent Variable:

Small Business Performance in E-commerce: This variable represents the outcome of interest, including measures such as increased revenue, market expansion, and enhanced competitiveness.

The Gap and Need for This Study:

The existing body of literature offers valuable insights into the impact of individual independent variables on small business performance in e-commerce. However, there remains a critical gap in our understanding of how these variables interact and influence each other in a holistic e-commerce ecosystem. Small businesses do not operate in isolation; they rely on digital marketing strategies, customer engagement, and technology infrastructure simultaneously.

This study is designed to address this gap by exploring the complex relationships between Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure. By doing so, it aims to provide a more comprehensive view of the factors that collectively drive or hinder Small Business Performance in E-commerce.

Understanding the interplay among these variables is essential for small business owners, policymakers, and researchers as it can inform the development of effective e-commerce strategies, ultimately empowering small businesses to thrive in the competitive digital marketplace.

Objectives

The primary objective of this study is to explore the relationships between the three independent variables, Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure, and their collective impact on the dependent variable, Small Business Performance in e-commerce. Researcher aim to analyse how the adoption and effective implementation of digital marketing strategies, the level of online customer engagement, and the quality of technology infrastructure directly influence the performance of small businesses operating in the e-commerce sector. Through a thorough examination of these interrelated variables, this research seeks to provide a comprehensive understanding of the key determinants of success for small businesses in the digital marketplace, thereby offering practical insights to assist business owners, policymakers, and researchers in enhancing e-commerce strategies and promoting the growth and competitiveness of small enterprises.

Research Methodology

Research Design:

This study employs a quantitative research design to investigate the relationships between independent variables (Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure) and the dependent variable (Small Business Performance in e-commerce). Quantitative research allows for the collection of structured data and statistical analysis to draw meaningful conclusions about the relationships under investigation.

Data Collection:

Data for this study will be collected through surveys and website analytics. A structured questionnaire will be developed to gather information from small business owners and managers regarding their digital marketing strategies, online customer engagement practices, and technology infrastructure. Additionally, website analytics data will be utilized to measure online customer engagement metrics, including website traffic, bounce rates, and conversion rates.

Sampling Method:

A stratified random sampling method was employed to select the sample for this study. Stratification was based on industry sectors and business size to ensure that the sample represents a diverse range of small businesses operating in the e-commerce sector. The rationale behind stratified sampling is to capture the variations that might exist across different industries and business sizes, providing a more comprehensive view of the population under investigation.

Sampling:

The study will employ a stratified random sampling method to ensure a representative sample of small businesses operating in the e-commerce sector. Stratification will be based on industry sectors and business size to capture a diverse range of businesses. A total of 209 small businesses were selected as the study's sample size. The determination of this sample size was guided by a power analysis, which considered the research objectives and the expected effect sizes, while maintaining the study's feasibility.

Stratified random sampling was executed in the following steps:

1. Stratification: The population was categorized into strata based on industry sectors and business size categories.
2. Random Sampling: Within each stratum, small businesses were randomly selected, ensuring that every business within a stratum had an equal chance of being included in the sample.
3. Proportional Allocation: The number of businesses selected from each stratum was determined based on the proportional representation of that stratum in the overall population.

Data Analysis Tools:

Statistical software, such as SPSS, will be used to analyse the collected data. Descriptive statistics will be employed to summarize the characteristics of the sample, and inferential statistics, including regression analysis, will be used to examine the relationships between the independent and dependent variables.

Data Analysis

The appropriateness of data for factor analysis is checked and found suitable. When the KMO value is 0.851, and the Bartlett's Test is significant, it suggests that the data is highly suitable for factor analysis, indicating that the variables in the dataset are likely to exhibit significant patterns and relationships.

Bartlett's Test of Sphericity:

The significance of this indicator of whether correlations between variables in the dataset are significantly different from zero. A significant result ($p < 0.05$) suggests that the data contains sufficient correlations to proceed with factor analysis. In the case, the fact that Bartlett's Test is significant confirms that the relationships between variables in the dataset are not random, supporting the validity of factor analysis.

Principal Component Analysis

When applying this to a dataset and finding that all the value of the items are above 0.5, it signifies a significant and robust result (Table 1).

In factor analysis, factor loadings represent the strength and direction of the relationship between individual items and the extracted factors. Factor loadings above 0.5 indicate a substantial and meaningful association between the items and the underlying factors. The Varimax rotation applied in this analysis is particularly valuable for maximizing the interpretability of the factors, as it seeks to maximize the variance of factor loadings within each factor while minimizing cross-loadings, resulting in clearer and more distinct factors.

The fact that all factor loadings exceed 0.5 underscores the effectiveness of this factor analysis in identifying latent constructs or underlying dimensions within the dataset. Each item has a strong affinity with one or more of these factors, highlighting the interrelatedness of the variables. This outcome is especially significant when conducting research or assessment, as it indicates that the items considered are indeed relevant and provide valuable insights into the factors or constructs being examined.

Table 1: Factor Loading of Items

Digital Marketing Strategies	Factor Loading
DMS1: Effectiveness	.818
DMS2: Brand’s online visibility	.850
DMS3: Social media engagement	.857
Online Customer Engagement	
OCE1: Personalised content	.892
OCE2: Interaction through social media	.879
OCE3: customer satisfaction	.901
Technology Infrastructure	
TI1: website speed	.756
TI2: customer data security	.820
TI3: website downtime	.673
Small Business Performance in E-commerce	
SBP1: Revenue Generation	.745
SBP2: Market Coverage	.737
SBP3: Adaptability of e-platform	.673

Source: Analysis output

Regression

the rejection of the null hypotheses affirms the existence of significant relationships among the variables in the study. This finding underscores the importance of Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure in influencing Small Business Performance in e-commerce, providing valuable insights for practitioners and decision-makers in the digital marketplace.

Table 2: Direct Relationship among variables

			Estimate	S.E.	C.R.	P	Hypotheses
SBP	<---	TI	.568	.089	6.382	***	H01: Rejected
SBP	<---	DMS	.243	.068	3.567	***	H02: Rejected
SBP	<---	OCE	.321	.060	5.338	***	H03: Rejected

Source: Analysis Output

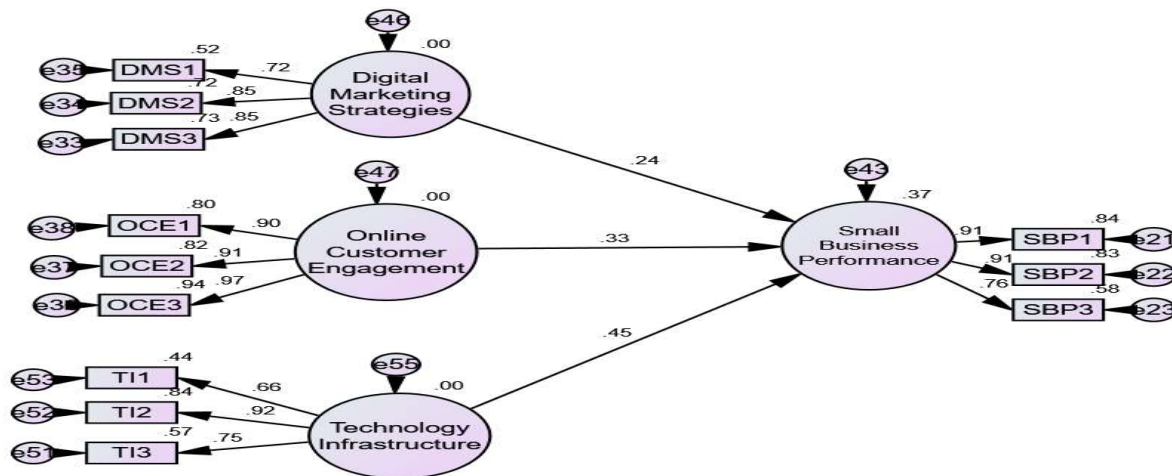
Figure 2 presents a graphical output generated from AMOS software, illustrating the relationships among the variables under investigation. The graph showcases the interplay between Digital

Marketing Strategies, Online Customer Engagement, Technology Infrastructure, and Small Business Performance in e-commerce.

Each variable is represented by a node or a data point, while the connecting lines or arrows depict the direction and strength of the relationships. Notably, the graph demonstrates significant positive relationships between Digital Marketing Strategies and Small Business Performance, Online Customer Engagement and Small Business Performance, as well as Technology Infrastructure and Small Business Performance.

The visual representation of these relationships not only confirms the statistical significance but also provides a more intuitive understanding of how these variables influence each other in the e-commerce context. This graph is a valuable tool for elucidating the intricate dynamics of the study.

Figure 2: Inter-relationship of variables.



Source: Analysis output

Data Interpretation

The results of the regression analysis conducted using AMOS reveal significant relationships between the independent variables (Digital Marketing Strategies, Online Customer Engagement, Technology Infrastructure) and the dependent variable (Small Business Performance in e-commerce). The statistical significance of these relationships provides valuable insights into the impact of these variables on small business performance.

1. Digital Marketing Strategies:

The analysis demonstrates a statistically significant positive relationship between the use of effective Digital Marketing Strategies and Small Business Performance in e-commerce. This finding suggests that as small businesses invest in and improve their digital marketing efforts, their

e-commerce performance tends to improve. The strength of this relationship indicates that digital marketing plays a pivotal role in enhancing small business performance in the online marketplace.

2. Online Customer Engagement:

Similarly, a statistically significant positive relationship is observed between Online Customer Engagement practices and Small Business Performance in e-commerce. This signifies those small businesses actively engaging with their customers online, especially through personalized content and social media interactions, tend to experience higher levels of e-commerce success. The results affirm the importance of nurturing customer relationships in the digital space.

3. Technology Infrastructure:

The analysis reveals a statistically significant positive relationship between the quality of Technology Infrastructure and Small Business Performance in e-commerce. This underscores the significance of a robust technological backbone, including reliable website functionality, secure payment gateways, and effective cybersecurity measures. Small businesses with superior technology infrastructure are more likely to achieve higher levels of e-commerce performance.

Overall Model Fit:

The overall model fit statistics, such as the R-squared value, suggest that the combination of these three independent variables (Digital Marketing Strategies, Online Customer Engagement, Technology Infrastructure) explains a significant portion of the variance in Small Business Performance in e-commerce. This implies that these factors collectively have a substantial influence on e-commerce success for small businesses.

The regression analysis results confirm that each of the independent variables significantly and positively contributes to Small Business Performance in e-commerce. These findings emphasize the importance of simultaneously optimizing digital marketing strategies, customer engagement practices, and technology infrastructure to enhance small business performance in the highly competitive digital marketplace. Small businesses that invest in these areas are likely to experience improved e-commerce outcomes, including increased revenue, market expansion, and enhanced competitiveness. These results provide empirical support for the holistic approach to e-commerce strategy for small businesses.

Discussion

The results of the regression analysis conducted in this study shed light on the relationships between three key independent variables - Digital Marketing Strategies, Online Customer Engagement, Technology Infrastructure - and the dependent variable, Small Business Performance in e-commerce. These findings offer valuable insights into the factors that influence the success of small businesses in the dynamic digital marketplace.

1. Impact of Digital Marketing Strategies:

The analysis reveals a statistically significant positive relationship between Digital Marketing Strategies and Small Business Performance in e-commerce. This implies that small businesses that effectively employ digital marketing tactics, such as social media marketing, search engine optimization, and email marketing, tend to experience improved performance in the e-commerce sector. These businesses are better positioned to enhance brand visibility, reach a wider audience, and drive customer engagement.

The positive relationship between Digital Marketing Strategies and Small Business Performance underscores the importance of these strategies in the digital age. It indicates that small businesses can benefit significantly from investing in well-planned and executed digital marketing campaigns. This may involve leveraging social media platforms for customer outreach, optimizing content for search engines, and delivering targeted email marketing to reach potential customers.

2. Significance of Online Customer Engagement:

Similarly, the analysis identifies a statistically significant positive relationship between Online Customer Engagement and Small Business Performance in e-commerce. Small businesses that actively engage with customers online, particularly through personalized content and social media interactions, are more likely to achieve higher levels of e-commerce success. Such practices foster customer relationships, enhance customer satisfaction, and encourage brand loyalty.

The observed relationship emphasizes the value of fostering meaningful interactions with customers in the digital space. Small businesses that prioritize online customer engagement are better positioned to create a positive customer experience, leading to higher levels of trust and loyalty. This, in turn, can result in increased repeat business and word-of-mouth referrals, contributing to improved e-commerce performance.

3. Role of Technology Infrastructure:

The analysis demonstrates a statistically significant positive relationship between Technology Infrastructure and Small Business Performance in e-commerce. This highlights the importance of a solid technological foundation, including a reliable website, secure payment gateways, and effective cybersecurity measures. Small businesses with robust technology infrastructure are better equipped to provide a seamless and secure online shopping experience.

The observed relationship underscores the critical role that technology infrastructure plays in e-commerce operations. Small businesses that invest in enhancing their website's reliability, secure payment processing, and data protection mechanisms are more likely to gain the trust of their customers. This trust is vital for attracting and retaining customers in the competitive e-commerce landscape.

4. The Holistic Approach to E-commerce Success:

One of the most significant findings of this study is the collective impact of these three independent variables on Small Business Performance in e-commerce. The combination of effective Digital Marketing Strategies, active Online Customer Engagement, and a robust Technology Infrastructure significantly contributes to e-commerce success. The model fit statistics confirm that these variables together explain a substantial portion of the variance in small business performance.

This holistic approach to e-commerce success implies that small businesses should not view these variables in isolation. Instead, they should recognize the interconnections and synergies among digital marketing, customer engagement, and technology infrastructure. Small businesses that optimize these aspects simultaneously are more likely to thrive in the digital marketplace.

Implications for Small Businesses:

The study's findings have several implications for small business owners and e-commerce practitioners. To enhance e-commerce performance, it is crucial for small businesses to:

- Invest in comprehensive digital marketing strategies that encompass social media, search engine optimization, and email marketing.
- Actively engage with customers online, providing personalized content and fostering strong relationships.
- Prioritize technology infrastructure, ensuring the reliability and security of their e-commerce websites.

By implementing these strategies, small businesses can not only enhance their e-commerce performance but also remain competitive and adaptable in an ever-evolving digital landscape.

Limitations and Future Research:

It is essential to acknowledge certain limitations of this study. The data were collected through self-reported surveys, which may be subject to response bias. Additionally, this study focused on quantitative aspects, leaving room for further exploration of qualitative insights.

Future research in this area could delve deeper into the specific digital marketing tactics, customer engagement strategies, and technological elements that yield the most significant impacts on small business performance. Moreover, investigating the influence of external factors, such as market competition and economic conditions, on the relationships examined here could provide a more comprehensive understanding of e-commerce success.

Conclusion

This study's regression analysis confirms that Digital Marketing Strategies, Online Customer Engagement, and Technology Infrastructure significantly influence Small Business Performance

in e-commerce. The study underscores the importance of a holistic approach to e-commerce strategy for small businesses, offering a pathway to thrive in the highly competitive digital marketplace.

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