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Exploring the Influence of E-Commerce on Supply Chain Management in Guyana's Retail Industry: Insights for Small and Medium Enterprises Development

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Abstract

This study investigates the influence of e-commerce adoption on supply chain management (SCM) within Guyana's retail sector, offering critical insights for small and medium enterprises (SMEs). E-commerce has emerged as a catalyst for enhancing supply chain efficiency, customer satisfaction, and competitive positioning in local and international markets. SMEs in developing countries like Guyana often struggle with challenges such as limited digital infrastructure, financial limitations, and insufficient technical expertise. Employing a mixed-methods approach, the research combines quantitative data from 248 SME survey responses with qualitative feedback from 11 key stakeholders, including business owners, IT specialists, and supply chain managers. The results indicate a strong positive relationship between e-commerce adoption and SCM improvements, particularly in areas like inventory accuracy, lead time reduction, and supplier collaboration. On average, SMEs that embraced e-commerce experienced an 18% increase in annual revenue and a 20% drop in operational inefficiencies. However, barriers such as limited internet access and affordability of digital tools persist, especially in rural areas. To mitigate these issues, the study recommends strategic actions, including government-backed expansion of internet infrastructure, financial incentives for digital adoption, and training programs to boost digital literacy. Collaboration with tech providers to deliver scalable e-commerce solutions is also emphasized. These strategies can enable SMEs to integrate into global supply chains, fostering national economic development.

Keywords: *Business, Developing, Digital, E-commerce, Guyana, Supply Chain.*

Introduction

E-commerce has emerged as an evolutionary force in modern supply chain management (SCM), reshaping how businesses operate, connect with suppliers, and serve customers [1]. In Guyana's retail sector, small and medium enterprises (SMEs) face significant challenges that hinder their ability to leverage the benefits of e-commerce. These challenges include inefficient supply chains, limited access to digital tools, and infrastructural gaps, particularly in rural or peri-urban areas [2]. Addressing these issues is vital for SMEs to enhance their competitiveness, improve operational efficiencies, and contribute to the country's progressive economic development [3].

Despite these challenges, developing nations worldwide leveraged digital technologies to enhance their Supply chain and operational efficiencies. Cloud-based inventory systems, real-time data tracking, and e-commerce platforms for supplier collaboration are means for enhancing SCM performance [4]. In Guyana, however, the adoption of these solutions remains limited due to financial constraints, lack of technical skills, and unreliable digital infrastructure [5]. While some SMEs have implemented essential digital tools, these barriers have constrained their impact.

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Adopting existing digital e-commerce platforms with result-driven track records that enable complete supply chain process automation is one proven approach to mitigating these challenges [6]. These platforms streamline operations transparently, improve supplier collaboration, and enhance customer satisfaction [7]. However, implementing these platforms in Guyana is hindered by high costs, dependency on stable internet connectivity, and the need for employees with the required skill set.

Nevertheless, those who adopted e-commerce in Guyana's SME sector have achieved noticeable growth. Businesses implementing digital technologies have reported an 18% increase in annual revenue, a 20% reduction in operational delays, and improved customer satisfaction. These achievements underline the transformative potential of e-commerce on the supply chain and operational efficiency [8].

This study aims to assess and explore the impact of e-commerce on SCM practices within Guyanese SMEs, identify barriers to adoption, and propose strategies to address these challenges. The study was conducted from a local perspective, combining quantitative and qualitative research methodologies to provide actionable insights for policymakers and all applicable and relevant stakeholders [9].

A unique aspect of this research is its focus on Guyana, an emerging oil and gas economy with socio-economic and infrastructural constraints. Unlike existing studies that often generalize findings from developed economies, this work provides a distinct approach to understanding and addressing the specific needs of Guyanese SMEs. The findings contribute to the level of digital transformation in developing regions and position Guyana as a case study for leveraging e-commerce to bridge the gaps and foster growth.

Materials and Methods

Walliman in [10], defines epistemology as the study of knowledge creation and validation. The research philosophy adopts an epistemological approach that combines the quantitative and the thoroughness of qualitative depth to foster a broader understanding of the exploration [9]. Such a multidimensional mixed-method approach provides a holistic understanding of e-commerce on supply chain impacts, allowing for analysis of numerical data and a secondary perspective.

The interpretive qualitative analysis explores how SMEs strategized about adopting e-commerce in the supply chain and integrating it with business operational processes to foster efficiency and transparency. The quantitative analysis of data from structured questionnaires seeks to identify patterns and validity in data to provide more meaningful insights into e-commerce and supply chain adoption and practices [11]. Both methods are vital to exploring the impact of e-commerce on the supply chain in SMEs.

Description of the Site

The research was conducted across various regions in Guyana, covering both urban and peri-urban areas to capture the multiple experiences of SMEs. Urban areas like Georgetown provided insights into businesses with better infrastructure and access to digital tools. In contrast, peri-urban areas highlighted the challenges SMEs face in limited areas. The sectors surveyed included retail, manufacturing, and services, representing most of Guyana's SMEs. This site selection was instrumental in understanding regional gaps in e-commerce adoption and identifying barriers to integration among local businesses.

Description of the Experiments Done

The study utilized a mixed-methods approach to capture both quantitative and qualitative measurements of the problem. A structured survey was conducted on 248 SME

owners and managers to measure e-commerce adoption rates, operational efficiencies, and customer satisfaction. In addition, semi-structured interviews were conducted with 11 key stakeholders, including supply chain managers, IT specialists, and policymakers, to provide better insights into the challenges and adoption of e-commerce integration. The secondary data are from academic journals, books, and online repositories such as Google Scholar, Government websites, and local news articles.

More emphasis was placed on SMEs in Guyana's retail sector to explore and measure the adoption level of e-commerce and supply chains, focusing on key influencing factors such as financial readiness, digital literacy, infrastructural access, and strategies.

The results of the responses are analyzed using graphs, charts, and tables to provide insights into patterns and foster further discussions [12].

Description of the Laboratory Methods

While the study did not involve traditional laboratory-based experiments, it relied on digital tools and platforms to analyze e-commerce norms related to SMEs in Guyana. Tools such as cloud-based inventory systems and digital supply chain management platforms were explored to assess their practical application within Guyanese SMEs [13]. Case studies of SMEs employing these tools showed their impact on operational performance. Additionally, the interviews captured the first-hand data of stakeholders interacting with these tools in real-world scenarios.

Description of Statistical Methods Used

The quantitative data collected through surveys were analyzed using statistical techniques to identify patterns and correlations. Descriptive statistics were used to summarize demographic characteristics, e-commerce adoption rates, and key performance indicators such as revenue growth and operational delays. Regression analysis examined the relationship between e-commerce adoption and SCM performance metrics.

The model is expressed as:

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \varepsilon$$

Results

This study disclosed necessary insights into the impact of e-commerce adoption on supply chain management among SMEs in Guyana. The findings are categorized into four critical areas: demographics, adoption trends, barriers, and measurable impacts on SCM performance [4]. These results form the foundation for the discussions and recommendations presented later.

Demographic Characteristics of SMEs

The research recorded responses from 248 SME owners and managers across the economic sectors, including retail, services, and manufacturing. The study showed that SMEs have an average operational history of five years, with a significant proportion just starting. 57% of interviewees were located in urban areas, while the remainder were in peri-urban regions, highlighting regional gaps in infrastructure access. The average age of interviewees ranges from 21 to 60 years, with a majority between 21 and 30 years, directly relating to a semi-skilled or inexperienced labor force for businesses with digital technologies.

Trends in E-Commerce Adoption

Approximately 46% of SMEs reported incorporating some level of e-commerce adoption. The adoption is higher among SMEs in urban areas, where reliable internet access and enhanced infrastructure facilitate straightforward integration.

Business-to-Business (B2B): 30% of SMEs used e-commerce for supplier collaboration and procurement.

Consumer-to-Business (C2B): 16% employed e-commerce tools to enhance customer engagement and feedback. These findings indicate that the interest in e-

commerce adoption is prevalent but lacking the necessary digital resources to leverage its effectiveness.

Barriers to E-Commerce Adoption

The study identified several barriers limiting the margin of e-commerce adoption.

Infrastructure Gaps: 22% of SMEs indicated that proper internet connectivity is a significant challenge, especially in peri-urban areas.

Financial Constraints: Results indicated that 20% lack the investment capital to implement digital technologies.

Skill Deficits: Results indicated that 18% lacked the technical skills on the use of e-commerce platforms effectively

These barriers highlight the need for human resources education in e-commerce. Focus and better collaboration are also required to enable SMEs to overcome structural and operational challenges.

Impact on SCM Performance

SMEs that adopted e-commerce reported significant improvements in SCM performance, directly indicating its potential. A few considerable outcomes are:

Operational Efficiency: Results show a 20% reduction in processing times, enhancing efficiency in meeting market demands.

Revenue Growth: SMEs that adopted e-commerce saw an 18% increase in annual revenue, which indicates a return on investing in digital technologies.

Customer Satisfaction: Businesses using e-commerce tools reported a 15% increase in customer satisfaction, which indicated improved engagement and service delivery.

Environmental Impact: SMEs using digital platforms for logistics reported reduced inventory overhead and less wastage [14].

Regional Disparities in Performance

Based on the geography of Guyana's landscape, the financial district is centered in the urban areas; hence, SMEs are better poised in urban areas than in peri-urban areas. SMEs in urban areas are exposed to better digital infrastructure, skilled or qualified human resources, adequately enforced policies, and other related resources.

Statistical Validation

Regression analysis confirmed the positive correlation between e-commerce adoption and SCM performance. The model showed that:

Training investments ($\beta 2=0.35$, $p<0.05\backslash beta\_2 = 0.35, p < 0.05\beta 2=0.35$, $p<0.05$) had the most decisive influence on SCM improvements.

Infrastructure improvements ($\beta 3=0.29$, $p<0.05\backslash beta\_3 = 0.29, p < 0.05\beta 3=0.29$, $p<0.05$) significantly enhanced operational efficiency.

E-commerce adoption rates ($\beta 1=0.22$, $p<0.05\backslash beta\_1 = 0.22, p < 0.05\beta 1=0.22$, $p<0.05$) demonstrated moderate but meaningful impacts on performance.

The results reveal that while e-commerce offers significant benefits to SMEs, its adoption in Guyana is met with infrastructural, skilled labor, and financial barriers, among other obstacles. However, there is a positive relationship ($p < 0.05$) between e-commerce adoption and performance metrics. Training and infrastructure improvements exhibited the most substantial influence, indicating that investments in these areas are critical for enhancing supply chain efficiency and driving revenue growth.

Discussion

The findings of this study explored valuable insights into the impact of e-commerce adoption on supply chain management (SCM) practices among Guyana's SMEs. This section interprets the results in the context of the research objectives, evaluates their consistency with other researchers, and outlines areas for further research.

The overall goal and objectives of the research are to explore e-commerce adoption

and its influence on SCM and business operations and identify the barriers faced by SMEs while leveraging digital technologies. The results align with the objectives outlined, for the research depicts that e-commerce adoption improved logistics by improving delivery times and customer relations, which shows cash flows and profitability [4]. The outcome confirms the assumption that e-commerce adoption within business processes is a strategy ploy and a step toward SMEs gaining a competitive advantage [15].

On the other hand, the research sought to identify infrastructural and geo-location challenges. The results underscore gaps in adoption rates and operational performance between urban and peri-urban SMEs. These findings highlighted the need to bridge the digital and infrastructure gap and foster more support for peri-urban SMEs.

The overall findings are consistent with e-commerce and SCM studies in developing economies. For example, Gunasekaran and Ngai, in [4], found that e-commerce adoption enhances supply chain visibility, reduces costs, and improves customer engagement - outcomes mirrored in this study. Also, McKinsey & Company in [2], emphasized the importance of digital tools in driving operational efficiencies and revenue growth, particularly in SMEs. As mentioned earlier, a positive correlation between human resources training and investments, infrastructure improvements, and SCM-enhancing operational performances aligns with best practices globally, which is a testament to the universal applicability of these strategies.

Table 1. Sourced from Questionnaire Data Analysis – Strategy Implementation

Strategies	**Count**	**%**
Strengthening supplier relationships	109	22%
Adoption of technology solutions	104	21%
Workforce training and development	99	20%
Enhancing logistics and distribution	92	18%
Other	102	20%

The study highlights the practical roles of government policies and private sector engagement in enforcing e-commerce adoption [16]. “Table 1”, as mentioned earlier, investing in digital technologies and infrastructure and ensuring access in peri-urban areas are fundamentals for fostering e-commerce and SCM adoption. Human capital investment is also critical in training and building literacy levels on digital platforms, which are critical for SMEs to fully leverage e-commerce and SCM's benefits. Also, a collaboration between government-private partnerships, technology providers, and training institutes, like TAU, is vital to implementing these strategies.

As the findings suggest, financial subsidies and tax breaks are welcome initiatives to assist with adopting digital technologies. Development of the legal framework policies, infrastructure, and human resource education in digital technologies are major leaps toward leveraging the full benefits of e-commerce and SCM for Guyana’s SMEs.

While this study provides valuable insights into e-commerce and SCM in Guyana’s SMEs, further exploration can be conducted in the following areas:

Explore each Sector: Examine each sector and explore the impacts of e-commerce and SCM on their operational processes and business outlook, for example, manufacturing vs. wholesale vs. retail, to garner a more microscopic look at the behavior.

Peri-urban Inclusion: Findings on SMEs in peri-urban areas are inconclusive, and more focus should be placed on understanding the

specific challenges to ensure symmetry in digital technologies across all regions.

Digital Emergent Technologies: Technologies are evolving and becoming more advanced daily; as such, more emphasis is required to better understand how integrating these technologies can contribute to the current challenges of e-commerce and SCM in Guyana's SMEs. Technologies like Artificial intelligence and Bitcoin payments are becoming more prevalent on e-commerce platforms [17].

Besides further insights on the requirements to better understand questions of specific results, this study shows the potential of e-commerce and SCM among Guyana SMEs. It highlights the challenges and strategies in a local context. The findings confirm that adopting digital technologies improved operational efficiency and spun revenue growth [18]. Barriers were identified for policymakers and stakeholders alike to have a direction to foster a more adaptable and sustainable digital economy in Guyana for all its business sectors.

Equations

A regression analysis was conducted to quantify these impacts and assess the relationship between e-commerce adoption and supply chain performance metrics such as cost savings, efficiency, and revenue growth. The regression formula used was

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \varepsilon$$

Where:

Y represents supply chain performance (dependent variable).

X1 represents the e-commerce adoption rate.

X2 represents training and skill development investment.

X3 represents infrastructure improvement initiatives.

β0 is the intercept.

β1, β2, and β3 are coefficients indicating the influence of each independent variable.

ε is the error term.

Table 2 analysis showed a statistically significant positive relationship ($p < 0.05$) between e-commerce adoption and performance metrics. Training and infrastructure improvements exhibited the most substantial influence, indicating that investments in these areas are critical for enhancing supply chain efficiency and driving revenue growth.

Table 2. Sourced from Questionnaire data analysis – Statistical Data for Regression Formula

Variable	Description	Mean	Std Dev	Min	Max
Y (Performance)	Supply Chain Performance Score	75.6	12.4	50	95
X1 (E-commerce Rate)	Percentage of SMEs adopting e-commerce	46%	10.2	30%	65%
X2 (Training Investment)	Percentage of revenue allocated to training	15%	5.8	5%	25%
X3 (Infrastructure)	Percentage of revenue allocated to infrastructure	18%	6.3	7%	28%

Conclusion

This research did a general review and analysis of how e-commerce and SCM adoption impacted SMEs in Guyana. The findings depict the significance of integrating e-commerce into SCM to improve operational efficiencies, such as reducing lead times, increasing customer satisfaction, and improving revenue growth [19]. However, the research also highlights the infrastructure barriers, financial strains, and lack of skilled

human resources that hinder the adoption of e-commerce in SCM [20].

Guyana is posed as an emerging oil and gas economy, but it is still recognized as a developing nation. Hence, this study is justified by addressing unique challenges faced by SMEs. This study focuses on a general approach to the local context and offers actionable insights into the perspective of Guyanese. The context of the specific focus used a mixed quantitative and qualitative approach to ensure a holistic overview and understanding of the challenges, resulting in valuable insights for policymakers and all relevant stakeholders.

As mentioned earlier, this study is unique in the Guyanese context. Hence, it can be used as a roadmap for intervention and support in policies, infrastructure, digital technologies, incentives or grants, and training. This research is a step toward exploring the positive impacts of implementing e-commerce and SCM to enhance operational efficiency and gain a competitive advantage locally and internationally [21].

Additionally, this research can be further expounded by exploring each sector and comparing them to get more granular perspectives. Also, including peri-urban areas in the study will give an in-depth understanding of the challenges, which will assist with the roadmap for solutions that create symmetry in digital technologies across all Geographic areas. Technologies are constantly evolving, and as such, further research into the impact and applicability of artificial intelligence and Analytics [22] and Bitcoin payments could provide innovative solutions [15] to existing challenges and allow for more adoption of e-commerce and SCM for SMEs in Guyana.

The research gives a unique perspective on e-commerce and SMC adoption in Guyana. It also provides insights into the use of digital technologies to transform developing economies by outlining the areas of infrastructure and policy barriers. Stakeholders can address these barriers and allow SMEs to adopt and harness the full potential of e-commerce and SCM, as well as their efficiency and market share, and be competitive [4].

Conflict of Interest

There is no conflict of interest.

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References

[1]. Chopra, S., & Meindl, P., 2019, Supply chain management: Strategy, planning, and operation *(7th ed.). Pearson.*

[2]. McKinsey & Company, 2020, The impact of e-commerce on supply chain efficiency. *McKinsey Insights.* https://www.mckinsey.com

[3]. Guyana Bureau of Statistics, 2022, Economic performance and SME development in Guyana. *Government of Guyana.*

[4]. Gunasekaran, A., & Ngai, E. W. T., 2004, Information systems in supply chain integration and management. *European Journal of Operational Research,* 159(2), 269-295. https://doi.org/10.1016/j.ejor.2003.08.016

[5]. Saunders, M., Lewis, P., & Thornhill, A., 2019, Research methods for business students (8th ed.). *Pearson Education.*

[6]. Alford, P., & Page, S. J., 2019, Return on investment in digital marketing: A perspective on SMEs in tourism. *Tourism Management,* 70, 281–289.

[7]. Hajli, N., 2014, A study of the impact of social media on consumers. *International Journal of Market Research*, 56(3), 387–404. https://doi.org/10.2501/IJMR-2014-025

[8]. Liu, X., Li, J., & Wei, X., 2021, Consumer-driven data analytics in supply chain management. *Data & Decision Analytics Journal*, 15(4), 145-160.

[9]. Creswell, J. W., & Creswell, J. D., 2018, Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.*). SAGE Publications.*

[10]. Walliman, N., 2011, Research methods: The basics. *Routledge.*

[11]. Turban, E., Outland, J., King, D., Lee, J. K., Liang, T.-P., & Turban, D. C., 2018, Electronic commerce 2018: A managerial and social networks perspective (9th ed.). *Springer.*

[12]. Bryman, A., 2016, Social research methods (5th ed.). *Oxford University Press.*

[13]. Dawson, C., 2009, Introduction to research methods: A practical guide for anyone undertaking a research project. *Constable & Robinson.*

[14]. Gong, Y., Janssen, M., & von Eije, H., 2018, Improving SMEs' logistics management through collaboration. *Journal of Supply Chain Management,* 54(3), 55-70.

[15]. Kim, J., & Park, H., 2022, Innovations in consumer-driven supply chains. *Journal of Business Strategy*, 43(1), 112-130.

[16]. CARICOM Secretariat, 2023, Regional trade agreements: Opportunities for SMEs. Retrieved from https://caricom.org

[17]. Turban, E., Pollard, C., & Wood, G., 2018, Information technology for management: On-demand strategies for performance, growth, and sustainability (11th ed.). *Wiley*.

[18]. Deloitte., 2019, Digital supply networks: Transform your supply chain into a competitive weapon. *Deloitte Insights*. https://www2.deloitte.com

[19]. Amit, R., & Zott, C., 2001, Value creation in e-business. *Strategic Management Journal*, 22(6-7), 493-520. https://doi.org/10.1002/smj.187

[20]. Kshetri, N., 2018, The adoption of e-commerce and supply chain management technologies in developing economies. *Journal of Global Information Technology Management*, 21(3), 150–166. https://doi.org/10.1080/1097198X.2018.148708

[21]. Minatogawa, K., Saito, T., & Yamamoto, S., 2021, E-commerce and logistics: Opportunities for SMEs. *Journal of Logistics and E-commerce*, 9(2), 221–233.

[22]. Ivanov, D., Tsipoulanidis, A., & Schönberger, J., 2020, Global supply chain and operations management: A decision-oriented introduction to the creation of value *(2nd ed.). Springer*