



Challenges And Barriers In E-Commerce For Rural Smes Of Al Dakhiliyah Governorate, Sultanate Of Oman

¹Dr. Venkata Naga Sundar Rao Abbaraju, ²Dr. Lenin Kumar Nooney

¹Senior Lecturer, ²Senior Lecturer

¹College of Economics and Business Administration, University of Technology and Applied Sciences-
Muscat, Oman

²College of Economics and Business Administration, University of Technology and Applied Sciences-
Nizwa, Oman

Abstract: This study examined the challenges and barriers that rural Small and Medium Enterprises (SMEs) in Al Dakhiliyah Governorate, Sultanate of Oman, encountered in using e-commerce platform. A structured questionnaire was used to collect data from 133 owners or managers of rural SMEs as part of a survey-based study strategy. The study used quantitative research methodologies, which included statistical analysis techniques like descriptive statistics, correlation analysis, and regression analysis using SPSS. Purposive sampling was used to identify participants. The main findings show significant positive associations between barriers and performance expectancy, effort expectancy, and observational learning, as well as between challenges and these same variables. Regression models show that barriers and challenges account for a portion of the variation in performance expectancy, effort expectancy, and observational learning. The study emphasizes the need of overcoming challenges and barriers for rural SMEs to effectively use e-commerce, as well as the implications for policy and practice in promoting digital adoption among rural enterprises.

Index Terms - Barriers, Challenges, E-commerce, SMEs, Observational Learning, Performance and Effort expectancy.

I. INTRODUCTION

The worldwide e-commerce boom has completely changed the way businesses function and created new opportunities for growth and market expansion. While urban areas have welcomed this change, small and medium-sized businesses (SMEs) in rural areas face unique challenges that impede their ability to integrate into the digital economy. For policymakers, researchers, and practitioners to create specialized programs and tactics that enable rural SMEs to take advantage of e-commerce's potential advantages, they must have a thorough awareness of these difficulties.

Information and communication technologies (ICTs) have transformed business models by allowing enterprises to engage in e-commerce and overcome geographical limits, as noted by Mudambi & Schuff (2010). Nevertheless, there are barriers to e-commerce adoption for SMEs, such as restricted access to digital infrastructure, insufficient technological capacity, and a lack of knowledge about its benefits (UNCTAD, 2019). Additionally, logistical issues including inadequate transportation networks and erratic internet connectivity make it harder for rural SMEs to engage in e-commerce (Hartungi et al., 2020). Financial and regulatory obstacles also provide a significant obstacle, discouraging rural SMEs from funding digital marketing campaigns and e-commerce platforms (Götz et al., 2019). Nevertheless, e-commerce has a lot of potential advantages for SMEs. E-commerce platforms facilitate supply chain management, lower transaction costs, and provide access to a larger client base (UNCTAD, 2020). Moreover, e-commerce enables rural

business owners to increase market awareness, expand their product offers, and become more competitive in the online market (Kshetri, 2014).

In light of these conditions, the study examined the difficulties and barriers that prevent rural SMEs in the Sultanate of Oman's Al Dakhiliyah Region from adopting e-commerce practices. The research intends to close a significant knowledge gap about the distinct dynamics of e-commerce adoption among SMEs in rural Oman by concentrating on this particular geographic region. The study aims to offer important insights into the obstacles faced by rural SMEs. The research endeavors to provide policymakers and stakeholders with actionable recommendations to foster a supportive environment for digital entrepreneurship by shedding light on the unique challenges faced by SMEs in the Al Dakhiliyah Region.

Study Objectives:

1. To examine the barriers and challenges in E-commerce faced by rural SMEs.
2. To assess how rural SMEs perceive the performance and effort expectations.
3. To examine the observational learning of SMEs by using e-commerce.

Based on the above objectives, the following hypotheses are framed for the study.

1. There is no significant relationship between barriers and performance, effort expectations and observational learning of SMEs by using e-commerce.
2. There is no significant relationship between challenges and performance, effort expectations and observational learning of SMEs by using e-commerce.

II. REVIEW OF LITERATURE

Al-Tit (2020) seeks to discover factors that influence e-commerce adoption in SMEs, identify impediments to adoption, and investigate their impact on e-customer loyalty. The study uses 163 SME management and 213 consumer responses to identify eleven adoption drivers, including customer preferences and trust. It also identifies seven impediments, including connectivity costs and legal limits. Furthermore, determinants of e-customer loyalty are identified, such as e-commerce ethics and customer trust. Organizations are encouraged to consider these facts while using e-commerce to increase client loyalty.

Amornkitvikai et al., (2022) identified that Thai MSMEs, particularly in Bangkok, face digital disparities hindering their e-commerce sustainability. The TOE framework proves relevant for Thai MSMEs, with internal tools like smartphones and websites, and external platforms like social media and e-marketplaces enhancing sustainability. However, firm and CEO age negatively impact sustainability. Exporting, B2B e-commerce, and experience can bolster sustainability, but consumer literacy and security concerns pose challenges. Improved e-commerce literacy among Thai entrepreneurs could enhance sustainability, fostering customer satisfaction and trust, ultimately driving long-term online sales.

Ariansyah et al., (2021) investigated the factors influencing Indonesian individuals' decisions to engage in online purchases. Primary data from a nationwide 2019 survey across all 34 provinces and secondary data on village infrastructure potential are utilized. Findings indicate that male, young, married, highly educated, and entrepreneurial individuals with internet access, easy logistic and financial services, digital skills, and limited exposure to harmful content are more likely to use e-commerce. Recommendations aim to enhance inclusive e-commerce adoption and its economic impact.

Azam & Ansari (2024) observed into how e-commerce was changing and how much it affected modern business methods. It seeks to investigate the primary forces behind, challenges faced by, and patterns associated with the growing importance of e-commerce in the corporate world. Due to its ability to facilitate both domestic and international market expansion, e-commerce has completely changed global corporate operations. From its beginnings in the 1960s to the present, it has grown as a result of significant occasions like the dot-com boom and technical developments like mobile commerce, augmented reality, artificial intelligence, and machine learning. E-commerce also promotes global trade and improves market analysis while addressing issues like cybersecurity and logistics. Mobile technology have a big impact on consumer behavior and marketing tactics. Businesses must adjust as e-commerce grows due to the influence of ethical and sustainable consumerism.

Dubel et al., (2023) investigate the evolution and current state of global e-commerce, emphasizing its growing importance in both personal and business spheres as a result of rapid advances in information technology. Various e-commerce models are investigated, with a focus on their integration into the global retail sector. The essence, actors, and forms of e-commerce, as well as its benefits and drawbacks in Ukraine, are examined. Despite possible concerns, the benefits of e-commerce exceed the drawbacks, with proposed measures including improved electronic security and regulatory frameworks.

Fosu et al., (2024) assess the readiness of SMMEs in the new Bono Region for e-commerce participation. Using quantitative methods and a questionnaire, data was collected from 85 participants. While participants possess basic ICT tools, low ICT literacy (47.2%) impedes effective usage of social media platforms for e-commerce. Despite high mobile phone ownership (96.8%), there are challenges in leveraging ICT for entrepreneurial growth amid the digital economic evolution.

Ghonyan (2020) analyzes hurdles to e-commerce adoption in underdeveloped countries, questioning existing research on the subject, particularly among SMEs. The study's goal is to create a realistic framework for these countries by investigating present hurdles and identifying both opportunities and problems in e-commerce.

Gupta et al. (2023) investigate the expansion and challenges of the e-commerce industry. They use the Delphi approach to engage experts in identifying the industry's top 10 benefits, challenges, and pathways. Key findings include cost-effective advertising, product variety, and worldwide reach as key benefits, while technology developments, returns/refunds, and counterfeit products pose substantial problems. Pathways such as government compliance checks and enhanced delivery partnerships are identified as critical to industry progress. The study provides vital data for businesses, politicians, and researchers as they navigate the e-commerce world.

Hossain (2022) noted that Bangladesh, a developing nation in the e-commerce space, has many unknowns and difficulties as it continues on its current development trajectory. The goal of government programs like Vision 2021 and Vision 2041 is to digitize the country, which is necessary to promote the expansion of e-commerce. E-commerce plays a crucial part in the growth of a nation, and academics stress that Bangladesh must create a sustainable digital ecosystem in order to lead the country into the fourth industrial revolution.

Hossain et al., (2023) analyze the influence of technological elements in boosting e-commerce among Bangladesh's small and medium-sized firms (SMEs). Information and communication adoption, internet connectivity, and company data management are all important technological elements, whereas e-commerce acceptance is impacted by strategic innovation, research and development, and increased productivity. Internet access and company data management are critical to e-commerce adoption, particularly during the COVID-19 epidemic. The data from 115 SMEs in Bangladesh were examined using SPSS software.

Jauhar et al., (2024) examined customer purchasing and return patterns in the expanding e-commerce industry, particularly in India. Employing digital transformation techniques, authors segmented customers based on recency, frequency, and monetary models to tailor personalized strategies. Findings reveal distinct customer segments, with over 61.15% categorized as likely purchasers, while seller clustering identifies factors like prompt delivery contributing to high sales. This research offers a unique seller segmentation strategy using digital transformation methods, aiding in effective seller grouping.

Karine (2021) investigates possible BRICS collaboration in growing e-commerce in rural and distant places to reduce poverty. The report evaluates the current state of e-commerce in various regions within each BRICS country, focusing on public and private initiatives. It outlines potential and problems, pointing out discrepancies in e-commerce development and insufficient BRICS cooperation. The report makes recommendations for improving collaboration using comparative analysis, with a focus on infrastructure, education, consumer protection, online dispute resolution, and coordinated international policy representation.

Kilay et al., (2022) identified challenges despite the introduction of e-payment and e-commerce services. The study examined how the adoption of these services influences MSME supply chain performance and proposed open innovations to expedite digitalization. Data from 164 Indonesian MSMEs revealed a significant positive impact of e-payment and e-commerce on supply chain performance. Identified obstacles prompted recommendations for fostering digitalization among MSMEs, aiding stakeholders in navigating this transition.

Kumari & Kumar (2024) explored consumer perceptions and concerns regarding online and digital payment methods amid today's interconnected technology landscape. Findings reveal growing acceptance and usage of digital payments in India, alongside benefits and challenges encountered by consumers. The research underscores the importance for businesses to offer digital payment options to remain competitive in the evolving market.

Miloradovic's (2024) study sought to identify the conditions for e-commerce dairy product sales as well as the problems faced by small-scale dairy processors. Using a mixed-methods approach, in-depth interviews with seven online platform representatives (OPRs) and a survey of 58 SSDPs were carried out. The findings were divided into four groups, demonstrating different habits among SSDPs. OPRs stressed the need for tools and resources to improve food safety and quality, particularly in cold chain transit. Tailored training programs can close knowledge gaps detected across many SSDP clusters.

Mustafa et al., (2023) investigate the combined impact of finance, business training, and e-commerce on microbusiness revenue using multiple linear regression. The population consists of microbusiness participants who have received business training. Purposive sampling was used, with 100 respondents filling out the questionnaire via Google Forms. The findings show that combining e-commerce, banking, and training greatly increases microbusiness revenue. Specifically, e-commerce usage, banking, and business training account for 52% of microbusiness income, showing their relevance in revenue generating.

Nazir & Roomi (2020), examines the challenges that SMEs in emerging economies encounter when attempting to embrace e-commerce. It extends the Technology-Organization-Environment (TOE) framework by incorporating the distinct characteristics of owner-managers through a thorough literature review, revealing a number of challenges in the areas of technology, organization, environment, and entrepreneurship. This innovative conceptual framework guides future research and assists stakeholders in navigating the e-commerce ecosystem by emphasizing present and emerging challenges.

Nhung et al., (2024) assessed human resource development is crucial for business competitiveness, especially in the context of e-commerce. In Vietnam, where there's a shortage of e-commerce professionals, businesses are recruiting and training candidates from other sectors. This study in Hanoi examined factors influencing e-commerce human resource development. It found six key factors: job analysis, recruitment, education and training, performance evaluation, compensation, and innovation encouragement. Among these, policies promoting innovation had the most significant impact on developing e-commerce human resources in commercial enterprises.

Novikova et al., (2023) assessed the evolution of E-commerce in Ukraine and globally, identifying key institutional features and challenges for national online stores. Factors like personalization, changing consumer demand, increased competition, the Covid-19 pandemic, and the conflict with Russia are highlighted. The study underscores E-commerce's transformative impact on retail markets, facilitating global accessibility, borderless transactions, and job creation. E-commerce drives economic growth, enhances export capabilities, boosts workforce skills, and increases tax revenues, fostering national development. Potential future directions for E-commerce in Ukraine are also proposed, providing insights for further research and global development trends.

Ramkylas et al., (2022) explore the delayed adoption of e-commerce by Small, Medium, and Micro Retailers (SMMRs) in South Africa, despite global expansion. They identify barriers through qualitative interviews, such as marketing, management support, technology, cost concerns, and social media use. The report makes recommendations and provides a methodology to help SMMRs optimize their e-commerce efforts.

Rouibah & Al-Hasan (2022) introduced a model examining the impact of user interface design (Design Aesthetics and Picture Aspects) and soft security protection (Third-Party Seal) on system quality and its effect on intention to reuse e-commerce websites. Findings from 328 online shoppers suggest that Design Aesthetics and Picture Aspects influence intention to reuse through system quality mediation, while Third-Party Seal insignificantly contributes. These insights aid researchers and practitioners in optimizing e-commerce B2C success for potential customers.

Saarah et al., (2024) looked into what influences the adoption of e-commerce in developing nations. Benefits included enhanced organizational performance, while challenges included concerns with trust and technological constraints. The results underscored the interdependence of these variables and the significance of managerial comprehension in propelling implementation. The study provides a new framework for tackling adoption barriers in e-commerce collaboratively, assisting developing nations in building plans.

Sahu et al., (2024) identified the increasing uptake of e-commerce among MSMEs globally lacks comprehensive analysis of its sustainability implications. While it offers economic benefits like market access and cost reduction, its effects on social and environmental sustainability are unclear. Existing literature often overlooks these broader implications, focusing on technological and economic aspects. Understanding the impact of e-commerce on sustainability is vital for guiding policies, business decisions, and sustainability efforts due to the significant role MSMEs play in economic growth and job creation.

Shaan and Mohdhar (2021) found that organizations place more emphasis on future relevance and less emphasis on previous success as their systems get more complex and efficient. With omnichannel transactions at the forefront amid the societal impact of the fourth industrial revolution, software today forms the foundation of commerce. This chapter explores the present technical growth of commerce, covering architecture, innovations such as cyber-physical systems, and system difficulties. Additionally, it looks at the function of omnichannel systems in 5G network communication, blockchain transaction processing, and Social Internet of Things composition. The fourth industrial revolution's omnichannel system drivers, opportunities, and constraints will become clearer to stakeholders.

Sutherland et al., (2024), e-commerce has become an important source of income for Australians living in regional, rural, and remote (RRR) areas, particularly women experiencing climate-related issues. Our research, based on interviews with successful female e-commerce entrepreneurs in rural Queensland, identifies common challenges and their usage of social media for consumer involvement. Product supply, delivery, and internet connectivity are among the most significant concerns. Social media platforms such as Facebook and Instagram play important roles in increasing website traffic and sales while also contributing to community development.

Vyas et al., (2023) identified Consumer preferences are increasingly favoring online and hybrid distribution channels over traditional methods, with E-commerce revolutionizing commercial dynamics. Initially limited to services like travel bookings, E-commerce has expanded into retail sectors, especially appealing to younger demographics. It enables convenient home delivery and facilitates market expansion by uniting suppliers and customers. E-commerce transcends traditional business operations, signifying a paradigm shift and driving global economic transformation, notably in countries like India, where startups leverage its potential for differentiation and growth.

Waseem (2024) identified, despite Pakistan ranking as the tenth-largest internet user population globally and boasting the fourth-largest IT export industry, its consumers exhibit considerable reluctance towards internet payment methods. This hesitancy arises from distrust in financial transaction systems, fears of delayed transactions, non-delivery risks, lack of confidence in using such systems, fraudulent activities, and privacy concerns. Addressing these issues effectively is crucial for fostering the growth of e-commerce and e-transaction systems in Pakistan.

Yadav et al., (2022) use unique analytical methodologies to evaluate barriers to the adoption of e-commerce platforms in developing nations. To fully comprehend these barriers, their work applies empirical analysis, drawing on an extensive literature review and expert perspectives. They use a fuzzy DEMATEL technique to examine causal links between identified barriers, revealing detailed insights into their structural interdependence. The study's main finding is that benchmarking has a substantial impact on e-commerce platform adoption, along with problems such as a lack of top management commitment and issues with turnover and planning.

III. RESEARCH METHODOLOGY

3.1 Research Design:

Survey research design is used to examine the Challenges and Barriers that rural SMEs in the Al Dakhiliyah Governorate, Sultanate of Oman's face when using e-commerce. For understanding the issues, the study used a structured questionnaire, which is in line with the goal of determining the Challenges and Barriers experienced by rural SMEs when using e-commerce.

3.2 Type of Research: Quantitative research method is used in the study, as it allows for in-depth data analysis of the Challenges and Barriers faced by rural SMEs in using e-commerce.

3.3 Research Respondents-Sampling Technique (Method): The research respondents are the owners or managers of rural SMEs in Al Dakhiliyah Governorate who have experience in using e-commerce. The sampling technique used in the study is purposive sampling, as it allows for the selection of participants who have relevant experiences and insights.

3.4 Population and Sample Size: The population would consist of rural SMEs in Al Dakhiliyah Governorate. The sampling size selected for the study is 150 owners or managers of rural SMEs.

3.5 Research Instrument: Structured questionnaire was used as the research instrument. This method allows for flexibility and in-depth collection of information related to challenges and barriers faced by rural SMEs in using e-commerce.

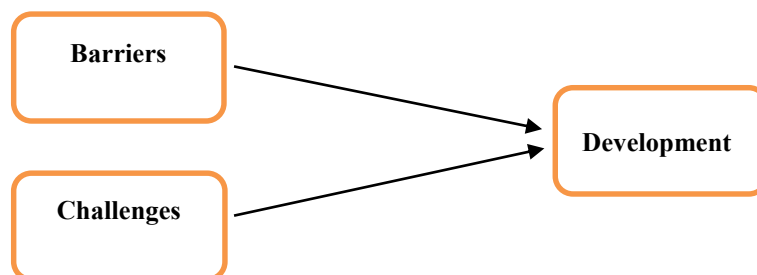
3.6 Research Procedure: The data was collected by distributing a questionnaire to owners or managers of rural SMEs in Al Dakhiliyah Governorate. Demographic information, Challenges and Barriers, Development with reference to performance and effort expectations, and observational learning are included in the questionnaire. Out of the 150 questionnaires distributed, 133 were accepted, with the remaining 17 being rejected owing to missing or partial data.

3.7 Treatment of Data (Data Analysis): The survey data was analyzed using SPSS. Statistical approaches such as descriptive statistics, correlation analysis, and regression analysis were used for analyzing data.

3.8 Research Limitations:

- **Limited generalizability:** Because of the unique circumstances of the Al Dakhiliyah Governorate, the results might not be relevant to all rural SMEs in Oman or other regions.
- **Bias:** The validity of the results may be impacted by respondent's bias or in the way the questions were understood by the respondents.
- **Resource limitations:** The breadth and depth of the study may be limited by restrictions on time, money, and participant access.

3.9 Conceptual Framework:



IV. RESULTS AND DISCUSSION

Table1: Demographic Details

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	88	66.2	66.2	66.2
	Female	45	33.8	33.8	100
Age	20-30 Years	53	39.8	39.8	39.8
	31-40 Years	38	28.6	28.6	68.4
	41-50 Years	27	20.3	20.3	88.7
	51 & Above	15	11.3	11.3	100
Education	Schooling	34	25.6	25.6	25.6
	Diploma	32	24.1	24.1	49.6
	Advanced Diploma	26	19.5	19.5	69.2
	Bachelors	31	23.3	23.3	92.5
	Post-Graduation	10	7.5	7.5	100
Number of Workers	1 - 10	113	85	85	85
	11 - 50	15	11.3	11.3	96.2
	51 -150	5	3.8	3.8	100

Source: Questionnaire

Table 1 shows that majority of the respondents (66.2%) are male, and 33.8% respondents are female. Data collected from the survey also indicates that that majority of the respondents are young who belong to the age group of 20 to 30 years, followed by the respondents from 31-40 years. 25.6 % of the respondent's education is only schooling, 24.1% of the respondent's education is diploma. Also, most of the respondents (85%) indicated that the number of workers in their SME is between 1-10, followed by 11.3% respondents indicated number of workers are between 11-50.

Table 2: Reliability Statistics

Variable	Cronbach's Alpha	N of Items
Barriers	.763	7
Challenges	.878	7
Performance Expectancy	.833	4
Effort Expectancy	.823	3
Observational Learning	.889	3

It is indicated from table 2 that the Cronbach alpha for all variables is above 0.60 so it is an indication of satisfactory reliability (Sekaran & Bougie, 2016).

Table 3: Descriptive Statistics of the Variables

Variables	Minimum	Maximum	Mean	Std. Deviation
Barriers	1.00	4.43	3.0311	.81029
Challenges	1.00	5.00	3.2427	.89266
Performance Expectancy	1.00	5.00	3.2763	.97956
Effort Expectancy	1.00	5.00	3.3935	1.03705
Observational Learning	1.00	5.00	3.4060	1.09201

1=Strongly Disagree-----5=Strongly Agree

The descriptive statistics for the variables involved is given above. Results shows that:

The "Barriers" variable most likely indicates perceived difficulties or hindrances that people confront when using e-commerce. With a mean value of 3.0311 and a standard deviation of 0.81029, we can conclude that, on average, respondents experience moderate to high obstacles, with some variation in perceived barriers between respondents.

The "Challenges" variable most likely relates to problems or sufferings that individuals face while using e-commerce. With a mean value of 3.2427 and a standard deviation of 0.89266, we may conclude that, on average, respondents experience moderate to high degrees of challenge, with some variation in perceived challenges among respondents.

Performance Expectancy variable is likely related to people's expectations about their own performance in using e-commerce. With a mean value of 3.2763 and a standard deviation of 0.97956, we can conclude that respondents have moderate to high expectations for their performance, with considerable variation amongst respondents.

The "Effort Expectancy" variable most likely represents people's opinions of the effort required to complete a task or attain a goal. With a mean of 3.3935 and a standard deviation of 1.03705, we may conclude that, on average, respondents perceive moderate to high levels of effort necessary, with considerable variation amongst respondents.

Observational Learning variable most likely measures people's participation in observational learning, which entails gaining knowledge or skills by using e-commerce. With a mean value of 3.4060 and a standard deviation of 1.09201, we may conclude that, on average, respondents participate in moderate to high levels of observational learning, with some variation across respondents.

Table 4: Correlation Analysis Between Barrier and Dependent Variables

		Barriers	Performance Expectancy	Performance Expectancy	Observational Learning
Barriers	Pearson Correlation	1	.487**	.399**	.550**
	Sig. (2-tailed)		.000	.000	.000
	N	133	133	133	133
Performance Expectancy	Pearson Correlation	.487**	1	.685**	.684**
	Sig. (2-tailed)	.000		.000	.000
	N	133	133	133	133
Effort Expectancy	Pearson Correlation	.399**	.685**	1	.802**
	Sig. (2-tailed)	.000	.000		.000
	N	133	133	133	133
Observational Learning	Pearson Correlation	.550**	.684**	.802**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	133	133	133	133
**. Correlation is significant at the 0.01 level (2-tailed).					

The correlation analysis from table 4 indicates the relationship between the variables. There is positive and significant correlation between barriers and performance expectancy ($r=.487$, $P<.01$). There is positive and significant correlation between barriers and effort expectancy ($r=.399$, $P<.01$). Finally, there is positive and significant correlation between barriers and observational learning ($r=.550$, $P<.01$).

Table 5: Correlation Analysis Between Challenges and Dependent Variables

		Challenges	Performance Expectancy	Performance Expectancy	Observational Learning
Challenges	Pearson Correlation	1	.648**	.500**	.565**
	Sig. (2-tailed)		.000	.000	.000
	N	133	133	133	133
Performance Expectancy	Pearson Correlation	.648**	1	.685**	.684**
	Sig. (2-tailed)	.000		.000	.000
	N	133	133	133	133
Effort Expectancy	Pearson Correlation	.500**	.685**	1	.802**
	Sig. (2-tailed)	.000	.000		.000
	N	133	133	133	133
Observational Learning	Pearson Correlation	.565**	.684**	.802**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	133	133	133	133

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis from table 5 indicates the relationship between the variables. There is positive and significant correlation between challenges and performance expectancy ($r=.648$, $P<.01$). There is positive and significant correlation between challenges and effort expectancy ($r=.500$, $P<.01$). Finally, there is positive and significant correlation between challenges and observational learning ($r=.565$, $P<.01$).

Table 6: Regression Analysis Between Barrier and Performance Expectancy

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.487 ^a	.237	.231	.85875	2.008

a. Predictors: (Constant), Barriers b. Dependent Variable: Performance Expectancy

From table 6, R Square is .237, suggesting that approximately 23.7% of the variance in the dependent variable (PE) can be explained by the independent variable. In this model, the Durbin-Watson statistic is 2.008, suggesting that there is no significant autocorrelation in the residuals.

Table 7: Regression Analysis Between Barrier and Effort Expectancy

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.399 ^a	.159	.153	.95467	1.570

a. Predictors: (Constant), Barriers b. Dependent Variable: Effort Expectancy

From table 7, R Square is .159, indicating that approximately 15.9% of the variance in the dependent variable can be explained by the independent variable. In this model, the Durbin-Watson statistic is 1.570, indicating some positive autocorrelation.

Table 8: Regression Analysis Between Barrier and Observational Learning

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.550 ^a	.303	.297	.91529	1.590

a. Predictors: (Constant), Barrier b. Dependent Variable: Observational Learning

From table 8, R Square is .303, indicating that approximately 30.3% of the variance in the dependent variable can be explained by the independent variable(s). In this model, the Durbin-Watson statistic is 1.590, indicating some positive autocorrelation.

Table 9: Regression Analysis Between Challenges and Performance Expectancy

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.648 ^a	.420	.416	.74865	1.835
a. Predictors: (Constant), Challenges			b. Dependent Variable: Performance Expectancy		

From table 9, R Square is .420, indicating that approximately 42.0% of the variance in the dependent variable can be explained by the independent variable. In this model, the Durbin-Watson statistic is 1.835, indicating some positive autocorrelation.

Table 10: Regression Analysis Between Challenges and Effort Expectancy

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.500 ^a	.250	.244	.90150	1.624
a. Predictors: (Constant), Challenges			b. Dependent Variable: Effort Expectancy		

From table 10, R Square is .250, indicating that approximately 25.0% of the variance in the dependent variable can be explained by the independent variable. In this model, the Durbin-Watson statistic is 1.624, indicating some positive autocorrelation.

Table 11: Regression Analysis Between Challenges and Observational Learning

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.565 ^a	.320	.314	.90416	1.603
a. Predictors: (Constant), Challenges			b. Dependent Variable: Observational Learning		

From table 11, R Square is .320, indicating that approximately 32.0% of the variance in the dependent variable can be explained by the independent variable. In this model, the Durbin-Watson statistic is 1.603, indicating some positive autocorrelation.

V. MAJOR FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Major Findings:

- There are significant positive correlations between barriers and performance expectancy, effort expectancy, and observational learning.
- Similarly, there are significant positive correlations between challenges and performance expectancy, effort expectancy, and observational learning.
- These correlations indicate that as barriers or challenges increase, so do the levels of performance expectancy, effort expectancy, and observational learning.
- The regression models indicate that a portion of the variance in the dependent variables (performance expectancy, effort expectancy, and observational learning) can be explained by the independent variables (barriers and challenges).
- The R-square values indicate the proportion of variance in the dependent variable that is accounted for by the independent variables. For example, approximately 23.7% of the variance in performance expectancy can be explained by barriers, and approximately 42.0% by challenges.
- The Durbin-Watson statistic is used to detect autocorrelation in the residuals. Positive autocorrelation suggests that consecutive errors are correlated, which could affect the reliability of the model.
- The Durbin-Watson statistics for some models indicate positive autocorrelation, which means there may be a systematic pattern in the residuals that the model has not captured. This suggests that the models may need further refinement or consideration of additional variables.

5.2 Conclusions: The findings indicate that barriers and challenges have significant relationships with performance, effort expectations and observational learning of SMEs by using e-commerce. SMEs aiming to improve performance or learning outcomes should consider strategies to address or mitigate barriers and challenges identified in the analysis. Further research could explore additional factors that may contribute to these relationships or refine the models to improve predictive accuracy.

5.3 Recommendations: Rural SMEs of Al Dakhiliyah Governorate, Sultanate of Oman, should proactively identify barriers and challenges that hinder performance expectancy, effort expectancy, and observational learning. Once identified, targeted strategies should be implemented to address or mitigate these barriers and challenges. This may involve providing additional resources, support, training, or restructuring processes to make tasks more manageable and learning opportunities more accessible. Additionally, SMEs should focus on Enhance Support Structures, Continuous Monitoring and Adjustment, Explore Additional Factors, Invest in Training and Development, Promote a Positive Organizational Culture. By implementing these recommendations, SMEs can effectively address barriers and challenges to enhance performance expectancy, effort expectancy, and observational learning outcomes, ultimately leading to improved overall performance and learning effectiveness.

REFERENCES

1. Al-Tit, A. A. (2020). E-commerce drivers and barriers and their impact on e-customer loyalty in small and medium-sized enterprises (SMES). *Verslas: teorija ir praktika*, 21(1), 146-157.
2. Amornkitvikai, Y., Tham, S. Y., Harvie, C., & Buachoom, W. W. (2022). Barriers and factors affecting the e-commerce sustainability of Thai micro-, small-and medium-sized enterprises (MSMEs). *Sustainability*, 14(14), 8476.
3. Ariansyah, K., Sirait, E. R. E., Nugroho, B. A., & Suryanegara, M. (2021). Drivers of and barriers to e-commerce adoption in Indonesia: Individuals' perspectives and the implications. *Telecommunications Policy*, 45(8), 102219.
4. Azam, A., & Ansari, A. M. (2024). The emerging role of e-commerce in today's business: A conceptual study.
5. Dubel, M., Hotsuliak, M., & Bila, I. (2023). BENEFITS OF E-COMMERCE IN DEVELOPING COUNTRIES. *Economy and Society*, (50). <https://doi.org/10.32782/2524-0072/2023-50-8>
6. Fosu, A., Giba-Fosu, N., & Odoi, E. (2024). Assessing E-commerce Readiness and E-Skills of Developing Nations' SMMEs in the Era of Global Digital Economic Evolution: A Case Study of the Bono Region, Ghana. *African Journal of Development Studies (formerly AFFRIKA Journal of Politics, Economics and Society)*, 14(1), 59-71.
7. Ghonyan, L. (2020). E-Commerce, Opportunities and Challenges: Prospectus for Developing Countries. *Opportunities and Challenges: Prospectus for Developing Countries* (March 15, 2020).
8. Götz, O., Lieberman, M. B., & Dalsace, F. (2019). Barriers to digitalization for SMEs. *Journal of Small Business Strategy*, 29(2), 24-36.
9. Hartungi, R., Kurniawati, A., & Sugiarto, Y. (2020). Barriers in the implementation of e-commerce in rural areas. *Journal of Entrepreneurship, Management and Innovation*, 16(1), 99-120.
10. Hossain, M. B., Dewan, N., Senin, A. A., & Illes, C. B. (2023). Evaluating the utilization of technological factors to promote e-commerce adoption in small and medium enterprises. *Electronic Commerce Research*, 1-20.
11. Hossain, M. S. (2022). E-Commerce in the next era of developing Bangladesh: Prospects and Challenges with the implementation of vision-2041. *International Journal of Humanities & Social Science Studies (IJHSSS)*, 8(6).
12. Jauhar, S. K., Chakma, B. R., Kamble, S. S., & Belhadi, A. (2024). Digital transformation technologies to analyze product returns in the e-commerce industry. *Journal of Enterprise Information Management*, 37(2), 456-487.
13. Karine, H. A. J. I. (2021). E-commerce development in rural and remote areas of BRICS countries. *Journal of Integrative Agriculture*, 20(4), 979-997.
14. Kilay, A. L., Simamora, B. H., & Putra, D. P. (2022). The influence of e-payment and e-commerce services on supply chain performance: Implications of open innovation and solutions for the digitalization of micro, small, and medium enterprises (MSMEs) in Indonesia. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 119.
15. Kshetri, N. (2014). The economics of social media and e-commerce in the Global South. *International Journal of E-Adoption*, 6(3), 18-36.

16. Kumari, R., & Kumar, D. (2024). From Kirana Stores to E-commerce: The Evolving Landscape of Consumer Perceptions on Digital Payments in India. *International Research Journal on Advanced Engineering Hub (IRJAEH)*, 2(02), 154-168.
17. Miloradovic, Z., Kovacevic, J., Miocionovic, J., Djekic, I., Kljajevic, N., & Smigic, N. (2024). E-commerce readiness and training needs of small-scale dairy processors in Serbia: Understanding barriers and knowledge gaps. *Heliyon*, 10(6).
18. Mohdhar, A., & Shaalan, K. (2021). The future of e-commerce systems: 2030 and beyond. *Recent Advances in Technology Acceptance Models and Theories*, 311-330
19. Mudambi, S. M., & Schuff, D. (2010). What makes a helpful online review? A study of customer reviews on Amazon.com. *MIS Quarterly*, 34(1), 185-200.
20. Mustafa, F., Melinda, T. F., Yusnanto, T., Rukmana, A. Y., & Majid, J. (2023). The Role of E-Commerce Use, Capital Availability and Business Training on Performance of Small Medium Enterprise (SMEs) in Indonesia. *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, 3(2), 247-252.
21. Nazir, M. A., & Roomi, M. A. (2020). Barriers to adopting electronic commerce for small and medium-sized enterprises in emerging economies. *EMAJ: Emerging Markets Journal*, 10(2), 43-55.
22. Nhung, H. T. T., Trang, N. T. T., & Ha, V. T. (2024). Factors Affecting Development Of E-Commerce Human Resources: Case Study Of Hanoi Trading Enterprises. *Educational Administration: Theory and Practice*, 30(4), 8077-8090.
23. Novikova, N., Fedun, I., Diachenko, O., Honcharenko, O., Stetsko, M., & Shnyrkov, O. (2023, May). Trends in the Development of E-Commerce in Ukraine. In *International Conference on Business and Technology* (pp. 91-100). Cham: Springer Nature Switzerland.
24. Ramkylas, V., Bick, G., & Carmichael, T. (2022). Challenges Faced by Small, Medium and Micro Retailers in South Africa in Developing an E-Commerce Route to Market. In *2022 INTERNATIONAL BUSINESS CONFERENCE* (p. 2096). TSHWANE UNIVERSITY OF TECHNOLOGY.
25. Rouibah, K., & Al-Hasan, A. (2022). Mechanisms to increase system quality and B2C e-commerce reuse: An empirical test. *Issues in Information Systems*, 23(3).
26. Saarah Hendricks, Samwel Dick Mwapwele, A systematic literature review on the factors influencing e-commerce adoption in developing countries, *Data and Information Management*, Volume 8, Issue 1, 2024, 100045, ISSN 2543-9251, <https://doi.org/10.1016/j.dim.2023.100045>.
27. Sahu, M., Iatha Soundarraj, P., Wagh, V. W., Themmadath, V. V., Noorjahan, S., & Singh, J. (2024). Factors Influencing E-Commerce Adoption on Sustainability of MSME; A Multiple Holistic Approach. *Journal of Informatics Education and Research*, 4(2).
28. Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & sons.
29. Srikant Gupta, Pooja S. Kushwaha, Usha Badhera, Prasenjit Chatterjee, Ernesto D.R. Santibanez Gonzalez, Identification of benefits, challenges, and pathways in E-commerce industries: An integrated two-phase decision-making model, *Sustainable Operations and Computers*, Volume 4, 2023, Pages 200-218.
30. Sutherland, K., Casey, S., & Crimmins, G. (2024). Social media behaviors and barriers impacting women e-commerce entrepreneurs in rural Australia: A pilot study. *Community Development*, 1–20.
31. United Nations Conference on Trade and Development (UNCTAD). (2019). *Digital economy report 2019: Value creation and capture: Implications for developing countries*. United Nations.
32. United Nations Conference on Trade and Development (UNCTAD). (2020). *Digital economy report 2020: Cross-border data flows and development*. United Nations.
33. Vyas, S. K., Vyas, L., Singh, S., & Joshi, M. (2023). Future of E-Commerce: A Robust Review. In *Intelligent Sustainable Systems: Selected Papers of WorldS4 2022*, Volume 2 (pp. 697-710). Singapore: Springer Nature Singapore.
34. Waseem, U. (2024). Unlocking E-Commerce Potential: Exploring Pakistani Consumers' Resistance to E-Payment Adoption in Online Purchasing. *International Multidisciplinary Journal Of Science, Technology & Business*, 3(1), 35-46.
35. Yadav, H., Soni, U., Gupta, S., & Kumar, G. (2022). Evaluation of barriers in the adoption of E-commerce technology in SMEs: A fuzzy DEMATEL approach. *Journal of Electronic Commerce in Organizations (JECO)*, 20(1), 1-18.