

An Empirical Study on the Effect of E-Commerce Adoption on Income Generation among Rural Enterprises in India

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Abstract

Purpose: The purpose of this study is to examine the effect of e-commerce adoption on income generation among rural enterprises in India, with special reference to Bengaluru North and Bengaluru South districts of Karnataka. The study also seeks to identify the key factors influencing e-commerce adoption and assess its impact on business performance and sustainability.

Design/Methodology: The study adopts a descriptive and analytical research design. Primary data were collected from 150 rural entrepreneurs through a structured questionnaire using a convenience sampling technique. Secondary data were obtained from journals, books, government reports and online sources. Statistical tools such as percentage analysis, chi-square test, correlation analysis and multiple regression analysis were employed to analyze the data and test the research hypotheses.

Findings: The findings reveal that e-commerce adoption has a significant positive impact on income generation and business performance among rural enterprises. The average monthly income of respondents increased substantially after adopting e-commerce platforms. The study further found that digital literacy, internet accessibility, online payment systems and government support positively influence e-commerce adoption. Correlation and regression analyses indicate a strong positive relationship between e-commerce usage and business performance. However, certain challenges continue to affect adoption, including inadequate internet connectivity, limited technical knowledge, cyber security concerns and logistical constraints. Despite these challenges, the overall impact of e-commerce adoption on rural enterprises is positive, contributing to increased market reach, higher sales revenue, improved customer engagement and enhanced business sustainability.

Keywords: E-Commerce Adoption, Rural Enterprises, Income Generation, Business Performance, Digital Entrepreneurship, Rural Development.

Introduction

The digital revolution has significantly transformed the global business landscape, creating new opportunities for enterprises irrespective of their geographical location. The emergence of e-commerce has changed traditional methods of conducting business by facilitating online transactions, digital marketing, electronic payments and customer engagement. Rural enterprises, which traditionally depended on local markets and physical interactions, are increasingly adopting e-commerce platforms to expand their market reach and improve business performance.

According to **Laudon and Traver (2023)**, e-commerce refers to the use of internet-based technologies to conduct commercial transactions between businesses and consumers. The rapid growth of internet penetration, smartphone usage and digital payment systems has enabled even small rural enterprises to participate in the digital economy. In India, government initiatives such as Digital India, Startup India, BharatNet and PMGDISHA have accelerated digital inclusion and encouraged rural entrepreneurs to adopt online business models.

Rural enterprises play a vital role in employment generation, poverty reduction and local economic development. They contribute significantly to India's Gross Domestic Product (GDP) and support livelihoods in rural communities. However, rural businesses often face challenges such as limited market access, inadequate infrastructure, information asymmetry and financial constraints. E-commerce provides a viable solution to many of these challenges by enabling entrepreneurs to access national and international markets, reduce transaction costs and improve operational efficiency.

Previous studies have indicated that digital technologies positively influence enterprise performance. **Chaffey (2022)** observed that businesses utilizing e-commerce platforms experience improved customer engagement and increased sales opportunities. Similarly, **Sharma and Gupta (2024)** found that digital marketing and online marketplaces significantly enhance the visibility and profitability of small enterprises.

Despite the growing importance of e-commerce, its adoption among rural enterprises remains uneven due to factors such as digital literacy, internet accessibility, technological awareness and financial limitations. Therefore, understanding the relationship between e-commerce adoption and income generation becomes crucial for promoting inclusive economic growth and rural entrepreneurship.

The present study attempts to empirically examine the effect of e-commerce adoption on income generation among rural enterprises in Bengaluru North and Bengaluru South districts of Karnataka.

Review of Literature

Singh and Verma (2025) examined the adoption of e-commerce among small and medium enterprises in India and its impact on business growth. The study found that enterprises using digital platforms experienced higher sales growth, wider market reach and improved customer engagement compared to non-adopters. The authors emphasized that e-commerce helps businesses overcome geographical limitations and access larger customer bases. The study concluded that digital platforms have become a crucial factor in enhancing enterprise competitiveness and sustainability.

Kumar and Rao (2024) investigated digital transformation among rural businesses in India. The study revealed that internet accessibility and digital literacy are key determinants of technology adoption among rural entrepreneurs. The findings indicated that entrepreneurs with better digital skills were more likely to adopt e-commerce platforms and utilize digital marketing tools effectively. The study highlighted the importance of digital infrastructure and training programs in promoting rural entrepreneurship and business development.

Sharma and Gupta (2024) analyzed the role of online marketplaces in improving business performance among small enterprises. The study reported that enterprises participating in e-commerce platforms achieved significant growth in sales revenue, customer acquisition and profitability. The authors observed that online marketplaces provide cost-effective marketing opportunities and facilitate access to wider markets. The study concluded that e-commerce adoption positively contributes to overall business performance and long-term growth.

Patel and Shah (2023) examined the factors influencing e-commerce adoption among rural entrepreneurs. The findings identified perceived usefulness, ease of use, digital awareness and government support as significant determinants of adoption. The study found that entrepreneurs were more likely to adopt e-commerce when they perceived clear business benefits and received adequate institutional support. The authors emphasized the need for awareness programs and capacity-building initiatives to increase adoption rates in rural areas.

Choudhary and Meena (2022) explored the relationship between rural entrepreneurship and digital inclusion. The study revealed that digital platforms play a vital role in enhancing income generation, employment opportunities and economic empowerment in rural communities. The authors

found that access to digital technologies enabled entrepreneurs to expand their market reach and improve business efficiency. The study concluded that digital inclusion is essential for sustainable rural development.

Jain and Sinha (2021) evaluated the adoption of digital payment systems among small enterprises. The study found that secure and user-friendly online payment systems significantly encourage participation in e-commerce activities. The researchers observed that digital payments reduce transaction costs, improve customer convenience and increase trust in online business transactions. The study concluded that digital payment infrastructure is a critical component of successful e-commerce adoption.

Roy and Mukherjee (2021) investigated the impact of online marketplace participation among rural producers. The findings showed that online platforms helped entrepreneurs access new markets, increase product visibility and reduce dependence on intermediaries. The study highlighted that participation in digital marketplaces resulted in higher income levels and better bargaining power for rural producers. The authors concluded that e-commerce contributes significantly to rural economic development.

Mehta and Desai (2020) analyzed the barriers to e-commerce adoption among small enterprises. The study identified lack of technical knowledge, inadequate internet connectivity, cybersecurity concerns and financial constraints as major obstacles. The findings suggested that these challenges limit the ability of entrepreneurs to fully utilize digital business opportunities. The authors recommended strengthening digital infrastructure and providing training programs to enhance technology adoption among small businesses.

Research Gap

The reviewed studies primarily focus on e-commerce adoption, digital transformation and business performance among SMEs and rural enterprises. However, limited empirical research specifically examines the effect of e-commerce adoption on income generation among rural enterprises in Bengaluru North and Bengaluru South districts of Karnataka. Furthermore, there is a lack of studies that simultaneously analyze the influence of digital literacy, internet accessibility, online payment systems and government support on income generation. Therefore, the present study attempts to bridge this gap by examining the impact of e-commerce adoption on income generation among rural enterprises using primary data collected from rural entrepreneurs.

Statement of the Problem

Although e-commerce offers opportunities for market expansion and increased sales, many rural enterprises face challenges in adopting digital platforms. Limited awareness, poor digital infrastructure, inadequate technological skills and financial constraints often restrict participation in online business activities. Therefore, it becomes essential to examine whether e-commerce adoption significantly contributes to income generation and business performance among rural enterprises.

Objectives of the Study

- To examine the extent of e-commerce adoption among rural enterprises.
- To identify the factors influencing e-commerce adoption.
- To assess the impact of e-commerce adoption on income generation.
- To analyze the relationship between e-commerce usage and business performance.
- To suggest measures for enhancing e-commerce adoption among rural entrepreneurs.

Hypotheses

H₀₁: E-commerce adoption has no significant impact on income generation among rural enterprises.

H₀₂: There is no significant relationship between the level of e-commerce usage and business performance.

Research Methodology

- **Research Design:** The study adopts a descriptive and analytical research design.
- **Study Area:** Bengaluru North and Bengaluru South districts of Karnataka.

Sources of Data

- **Primary Data:** Data were collected from rural entrepreneurs through a structured questionnaire.
- **Secondary Data:** Data were collected from journals, books, conference proceedings, government reports and online databases.
- **Sampling Technique:** Convenience sampling technique.
- **Sample Size:** 150 rural entrepreneurs.
- **Statistical Tools:** Percentage Analysis, Chi-Square Test, Correlation Analysis and Multiple Regression Analysis.
- **Period of Study:** January 2025 to March 2026.

Limitations of the Study

- The study is limited to selected rural enterprises in Bengaluru North and South districts.
- The findings depend on respondents' perceptions.
- Time and resource constraints limited broader geographical coverage.

Data Analysis and Interpretation

Table 1: Age-wise Distribution of Respondents

Age Group (Years)	Frequency	Percentage
Below 25	18	12
25–35	52	34.7
36–45	44	29.3
46–55	25	16.7
Above 55	11	7.3
Total	150	100

Interpretation: The table reveals that 34.7 percent of the respondents belong to the age group of 25–35 years, followed by 29.3 percent in the age group of 36–45 years. This indicates that younger and middle-aged entrepreneurs are more actively engaged in e-commerce activities compared to older entrepreneurs.

Table 2: Gender-wise Distribution

Gender	Frequency	Percentage
Male	98	65.3
Female	52	34.7
Total	150	100

Interpretation: The majority (65.3%) of rural entrepreneurs are male, while 34.7 percent are female. However, female participation in digital entrepreneurship is steadily increasing due to improved access to technology and government support programs.

Table 3: Educational Qualification

Qualification	Frequency	Percentage
SSLC	28	18.7
PUC	36	24
Graduate	58	38.7
Postgraduate	20	13.3
Others	8	5.3
Total	150	100

Interpretation: A majority of respondents (38.7%) possess graduate-level education, indicating that educational attainment plays a significant role in technology adoption and online business participation.

Table 4: Type of Enterprise

Type of Enterprise	Frequency	Percentage
Handicrafts	32	21.3
Agriculture Products	40	26.7
Retail Business	38	25.3
Food Processing	25	16.7
Others	15	10
Total	150	100

Interpretation: Agriculture-related enterprises constitute the largest segment (26.7%), followed by retail businesses (25.3%), indicating significant potential for digital market expansion in rural sectors.

Table 5: Extent of E-Commerce Adoption

Adoption Level	Frequency	Percentage
High	62	41.3
Moderate	55	36.7
Low	33	22
Total	150	100

Interpretation: The results show that 41.3 percent of entrepreneurs exhibit high levels of e-commerce adoption, indicating growing acceptance of digital business models among rural enterprises.

Table 6: Preferred E-Commerce Platforms

Platform	Frequency	Percentage
Amazon	48	32
Flipkart	42	28
Meesho	35	23.3
WhatsApp Business	15	10
Others	10	6.7
Total	150	100

Interpretation: Amazon and Flipkart are the most preferred platforms among respondents due to wider customer reach, efficient logistics support and reliable payment systems.

Table 7: Monthly Income Before and After E-Commerce Adoption

Particulars	Mean Monthly Income (₹)
Before Adoption	24,500
After Adoption	38,700
Increase	14,200

Interpretation: The average monthly income increased from ₹24,500 to ₹38,700 after adopting e-commerce platforms, representing a growth of approximately 58 percent.

Hypothesis Testing: Chi-Square Test

H₀₁: There is no significant relationship between e-commerce adoption and income growth.

Table 8: Relationship between E-Commerce Adoption and Income Growth

Cell	Observed Frequency (O)	Expected Frequency (E)	(O-E) ² /E
High Adoption – High Income	40	26.04	7.48
High Adoption – Moderate Income	15	21.49	1.96
High Adoption – Low Income	7	14.47	3.86
Moderate Adoption – High Income	18	23.1	1.13
Moderate Adoption – Moderate Income	27	19.07	3.3
Moderate Adoption – Low Income	10	12.83	0.62
Low Adoption – High Income	5	13.86	5.67
Low Adoption – Moderate Income	10	11.44	0.18
Low Adoption – Low Income	18	7.7	13.26
Total χ^2 Value			37.46

Interpretation: The calculated Chi-Square value (37.46) is greater than the table value (9.49) at 4 degrees of freedom and 5 percent significance level. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted.

This indicates that there is a statistically significant relationship between e-commerce adoption and income growth among rural enterprises. Entrepreneurs who have adopted e-commerce platforms to a greater extent tend to experience higher levels of income growth compared to those with lower adoption levels.

Correlation Analysis

H02: There is no significant relationship between the level of e-commerce usage and business performance among rural enterprises.

Table 9: Correlation between E-Commerce Usage and Business Performance

Variables	N	Correlation Coefficient (r)	Significance (p-value)
E-Commerce Usage	150	1	-
Business Performance	150	0.742**	0

Interpretation

The above table presents the Pearson correlation coefficient between e-commerce usage and business performance among rural enterprises. The correlation coefficient ($r = 0.742$) indicates a strong positive relationship between the two variables. This means that as the level of e-commerce usage increases, business performance also tends to improve.

The significance value ($p = 0.000$) is less than the prescribed significance level of 0.01, indicating that the relationship is statistically significant. Therefore, the null hypothesis stating that there is no significant relationship between e-commerce usage and business performance is rejected and the alternative hypothesis is accepted.

The strong positive correlation suggests that rural entrepreneurs who actively use e-commerce platforms for product promotion, online sales, customer interaction and digital payments experience better business outcomes in terms of sales growth, profitability, customer reach and overall business performance. The result highlights the importance of digital technologies in enhancing the competitiveness and sustainability of rural enterprises.

Multiple Regression Analysis

- **Dependent Variable:** Income Generation

Independent Variables

- E-commerce Adoption
- Digital Literacy
- Internet Accessibility
- Online Payment Systems
- Government Support

Table 9: Impact of E-Commerce Adoption Factors on Income Generation among Rural Enterprises

Variable	Beta Coefficient	t-value	Significance
E-Commerce Adoption	0.468	5.87	Significant
Digital Literacy	0.314	4.12	Significant
Internet Accessibility	0.286	3.76	Significant
Online Payment Systems	0.251	3.41	Significant
Government Support	0.198	2.94	Significant

Table 10: Model Summary of Multiple Regression Analysis

Model	R	R Square (R ²)	Adjusted R ²	Std. Error of Estimate
1	0.826	0.682	0.671	0.523

Interpretation

The R^2 value of 0.682 indicates that 68.2 percent of the variation in income generation is explained by the selected independent variables. E-commerce adoption emerges as the strongest predictor of income generation among rural enterprises.

Discussion

The findings indicate that e-commerce adoption has become an important factor influencing business growth among rural enterprises. Most respondents reported increased sales, improved customer reach and higher profitability after adopting online platforms. Digital literacy significantly affects entrepreneurs' ability to utilize e-commerce technologies effectively. Internet accessibility and reliable online payment systems also contribute positively to business performance.

The results are consistent with the findings of Sharma and Gupta (2024), who observed that online marketplaces significantly improve enterprise revenue. Similarly, Kumar and Rao (2024) found that digital transformation positively influences rural business growth. The present study further confirms that government support initiatives encourage technology adoption among rural entrepreneurs.

The study also identifies challenges such as poor internet connectivity, cyber security concerns, logistics constraints and lack of advanced digital skills. These factors limit the full realization of e-commerce benefits in rural areas.

Findings

- The majority of respondents belong to the age group of 25–35 years.
- Male entrepreneurs constitute 65.3 percent of the sample.
- Most respondents possess graduate-level education.
- Agriculture and retail enterprises dominate the rural business sector.
- More than 40 percent of respondents exhibit high levels of e-commerce adoption.
- Amazon and Flipkart are the most preferred online platforms.
- Average monthly income increased by approximately 58 percent after adopting e-commerce.
- A significant relationship exists between e-commerce adoption and income growth.
- E-commerce usage positively influences business performance.
- Digital literacy, internet accessibility, online payment systems and government support significantly affect adoption.
- Poor connectivity and limited technical knowledge remain major barriers.

Suggestions

- Improve broadband connectivity and digital infrastructure in rural areas.
- Organize digital literacy and e-commerce training programs for rural entrepreneurs.
- Enhance awareness regarding online marketplaces and digital marketing techniques.
- Provide financial assistance and subsidies for technology adoption.
- Strengthen cyber security awareness among rural businesses.
- Improve logistics and delivery networks to facilitate rural e-commerce operations.
- Promote collaboration between government agencies, financial institutions and technology providers.
- Encourage women entrepreneurs to participate in digital commerce through targeted support schemes.
- Develop local-language e-commerce platforms to improve accessibility.
- Strengthen digital payment infrastructure and customer trust mechanisms.

Conclusion

The present study examined the effect of e-commerce adoption on income generation among rural enterprises in Bengaluru North and Bengaluru South districts of Karnataka. The empirical findings demonstrate that e-commerce adoption significantly contributes to higher income, improved business performance and enhanced market access. Digital literacy, internet accessibility, online payment systems and government support positively influence adoption and income generation.

The study highlights that e-commerce serves as a powerful tool for rural economic development by connecting entrepreneurs to broader markets and reducing geographical barriers. Despite challenges such as inadequate infrastructure and limited technological expertise, the benefits of e-commerce outweigh the associated constraints. Policymakers should focus on strengthening digital ecosystems, improving infrastructure and enhancing entrepreneurial capabilities to promote sustainable rural development. The widespread adoption of e-commerce can contribute significantly to income enhancement, employment generation and inclusive economic growth in rural India.

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