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Impact of Information and Communication Technology on the Economic Empowerment of Rural Women Entrepreneurs in Madurai District

Pushpam R[1] & Dr Geetha V[2]
[1]Research Scholar PG and Research Department of Commerce Mannar Thirumalai Naicker College (Autonomous) Madurai
[2]Assistant Professor PG and Research Department of Commerce Mannar Thirumalai Naicker College (Autonomous) Madurai

Abstract: The study examines the impact of Information and Communication Technology (ICT) on the economic empowerment of rural women entrepreneurs in Madurai District. A descriptive cross-sectional research design was adopted, and primary data were collected from 150 rural women entrepreneurs using a structured questionnaire and simple random sampling technique. The study considers ease of use, perceived usefulness and ICT use as independent variables and economic empowerment as the dependent variable. Multiple regression analysis revealed that the model explains 46.7% of the variation in economic empowerment ($R^2 = 0.467$). Perceived usefulness ($\beta = 0.518$, p less than 0.001) and ICT use ($\beta = 0.235$, $p = 0.001$) have significant positive influences on economic empowerment, whereas ease of use ($\beta = 0.024$, $p = 0.736$) does not have a statistically significant influence. The findings highlight the importance of recognising the practical benefits of digital technologies and encouraging their effective utilisation to strengthen the economic independence of rural women entrepreneurs.

Keywords: Information and Communication Technology, Rural Women Entrepreneurs, Economic Empowerment, Ease of Use, Perceived Usefulness, ICT Adoption

1 Introduction

Information and Communication Technology (ICT) has emerged as an important instrument of economic development by transforming the ways in which individuals communicate, access information, conduct business and participate in economic activities. The rapid expansion of mobile technology, internet connectivity, digital payment systems, social media and e-commerce platforms has created new opportunities for entrepreneurs, particularly those operating small and micro-enterprises. ICT enables entrepreneurs to access market-related information, communicate with customers and suppliers, promote products, manage business transactions and identify new commercial opportunities. In rural areas, where entrepreneurs frequently encounter geographical, financial and infrastructural limitations, the effective utilisation of ICT can contribute significantly to improving business operations and expanding economic opportunities. Beriya (2022) emphasised that ICT can encourage rural entrepreneurship by improving operational efficiency, facilitating participation in wider economic networks and addressing the information, regulatory and financial requirements of entrepreneurs.

Women's entrepreneurship plays a significant role in promoting inclusive economic development, employment generation and household financial stability. Rural women entrepreneurs contribute to local economies through activities such as food processing, tailoring, handicrafts, agricultural production, dairy-related activities, retail trading and other small-scale enterprises. However, their entrepreneurial development is frequently influenced by several constraints, including limited access to institutional finance, inadequate business information, restricted mobility, lower levels of technological awareness and traditional social responsibilities. These challenges may restrict their ability to expand business operations, reach wider markets and achieve financial independence. Melhem et al. (2009) explained that ICT can support women's socioeconomic empowerment by improving access to information, employment opportunities, communication networks and economic resources. Therefore, the

integration of ICT into women's entrepreneurial activities has considerable potential to strengthen their economic participation and business capabilities.

The relationship between ICT adoption and women's economic empowerment can be understood through several dimensions, including access to market information, digital marketing, financial inclusion, business communication, operational efficiency and entrepreneurial decision-making. Mobile phones and internet-based applications allow women entrepreneurs to communicate directly with customers, display products, receive orders and coordinate business activities without depending entirely on traditional marketing channels. Social networking platforms such as WhatsApp, Facebook and Instagram can facilitate product promotion and customer relationship management, while digital payment applications can simplify financial transactions. Mehta and Sinha (2022), in their study of 20 women entrepreneurs operating micro-businesses in Maharashtra, identified the contribution of mobile phones, computers and internet-based applications to business communication, productivity, customer reach and market expansion. Their findings demonstrated that technology adoption could become an integral part of women's entrepreneurial activities and support improvements in business efficiency.

Similarly, Raghunandan and Mishra (2022) examined technology adoption, empowerment and entrepreneurial orientation among small and micro women entrepreneurs in rural India. Their empirical study, based on 60 women entrepreneurs, indicated that appropriate ICT knowledge and utilisation could contribute to women's empowerment and positively influence entrepreneurial orientation. The study highlighted the importance of technological capabilities in developing risk-taking, innovativeness, proactiveness and autonomy among women entrepreneurs. These dimensions are particularly relevant to rural enterprises because the ability to access information, evaluate business opportunities and make independent decisions can influence their capacity to sustain and develop their businesses.

The economic benefits of ICT are also reflected in its ability to connect rural women entrepreneurs with wider markets and business networks. Adeni (2016) discussed how ICT and media technologies could support rural women's productive activities and contribute to improvements in household income. Similarly, Golmohammadi (2018) highlighted the importance of rural telecentres, ICT-based education, training and information-sharing facilities in improving the economic opportunities available to rural communities. Such facilities can provide access to business information, communication services and technology-based learning, particularly where individual access to digital infrastructure is limited. These perspectives suggest that ICT-based empowerment involves not merely the availability of technological devices but also the ability to use them effectively for income generation and business development.

Financial empowerment represents another important dimension of ICT utilisation among rural women entrepreneurs. Digital banking, mobile-based financial services and electronic payment facilities can improve the convenience of financial transactions and reduce dependence on conventional banking procedures. ICT can also support financial record maintenance, transaction monitoring and access to information about financial products and institutional support. Lalrinsangi and Kharbirymbai (2024) highlighted the contribution of mobile banking, digital payment systems and online platforms to women's economic independence. The World Bank publication by Melhem et al. (2009) similarly identified the potential of ICT to improve women's access to economic resources and opportunities. Nevertheless, the economic benefits of these technologies depend on women's digital literacy, affordability, confidence and access to appropriate support systems.

Despite these opportunities, the adoption and effective utilisation of ICT among rural women entrepreneurs remain influenced by several socioeconomic and institutional barriers. Limited digital literacy, inadequate internet connectivity, affordability of devices, language constraints, insufficient technical support and sociocultural restrictions can affect women's ability to benefit from technological developments. Mumba (2014), in a study of women-owned enterprises in Zambia, identified financial limitations, high ICT costs, poor network connectivity

and inadequate information skills as important barriers to technology utilisation. Similarly, Jiyane (2012) found that the educational, economic and occupational circumstances of informal-sector women entrepreneurs influenced their ability to benefit from information and knowledge resources. These findings indicate that access to technology alone does not necessarily guarantee economic empowerment; the availability of appropriate skills, infrastructure and supportive institutional arrangements is equally important.

Mehta and Sinha (2022) further demonstrated that women's technology adoption is influenced by perceived usefulness, ease of use, social influence and facilitating conditions. Support from family members, neighbours and other social networks can encourage women entrepreneurs to learn and integrate digital applications into their business activities. Batool and Ullah (2018), through their research on rural women entrepreneurs in Pakistan, also demonstrated the importance of ICT intervention and social networks in supporting entrepreneurial activities.

In the context of Madurai District, rural women entrepreneurs operate within a diverse local economic environment in which small-scale business activities can contribute to household income and community development. The use of mobile phones, internet facilities, social media, digital payment applications and online business platforms may provide opportunities to improve product promotion, customer interaction, market access and financial management. However, the extent to which rural women entrepreneurs adopt these technologies and translate their usage into measurable economic benefits requires location-specific investigation. Although previous studies have examined ICT and women's empowerment in different geographical and socioeconomic settings, the findings cannot automatically be generalised to rural women entrepreneurs in Madurai District.

Against this background, the present study, titled "Impact of Information and Communication Technology on the Economic Empowerment of Rural Women Entrepreneurs in Madurai District," seeks to examine the role of ICT in strengthening the economic position of rural women engaged in entrepreneurial activities. The study focuses on understanding the extent of ICT utilisation and its contribution to income generation, financial independence, business expansion, market accessibility and entrepreneurial decision-making. It also recognises the importance of identifying the challenges that restrict the effective adoption of digital technologies among rural women entrepreneurs.

2 Review of Literature

2.1 Ease of Use and Economic Empowerment

Davis (1989) identified perceived ease of use as an important factor influencing technology acceptance, suggesting that individuals are more likely to adopt technologies that require minimal effort. Crittenden et al. (2019) found that ease of use influenced ICT adoption among women micro-entrepreneurs, supporting their participation in entrepreneurial activities. Azab and Elsherif (2025) further highlighted that user-friendly technologies and digital skills encourage women entrepreneurs to adopt ICT for business purposes. These findings suggest that ease of use may contribute to the economic empowerment of rural women entrepreneurs.

2.2 Perceived Usefulness and Economic Empowerment

Perceived usefulness refers to the belief that technology improves business performance and productivity. Mehta and Sinha (2022) found that ICT helped women entrepreneurs improve customer communication, market reach and business efficiency. Kapinga (2020) highlighted the usefulness of mobile technology in accessing market information and identifying business opportunities among women entrepreneurs in Tanzania. These studies indicate that perceived usefulness may encourage ICT adoption and contribute to economic empowerment through improved business opportunities.

2.3 ICT Use and Economic Empowerment

ICT use involves the application of digital technologies for marketing, communication, financial transactions and business management. Chatterjee et al. (2020) established that ICT adoption positively influenced entrepreneurial orientation among rural women in India. Rahman et al. (2023) found that mobile phone usage contributed to the economic empowerment of rural women entrepreneurs in Bangladesh. Similarly, Venkatesh et al. (2017) demonstrated that ICT interventions supported entrepreneurial activities among rural Indian women. These findings indicate that ICT utilisation can improve business opportunities and economic independence.

2.4 Economic Empowerment

Kabeer (1999) conceptualised empowerment through resources, agency and achievements, emphasising women's ability to access resources and make independent decisions. Jiyane (2012) highlighted the importance of information access and technological infrastructure in supporting the economic development of women entrepreneurs. Pushpam et al. (2025) identified a positive relationship between ICT access and economic empowerment among rural women entrepreneurs in Tamil Nadu. These findings suggest that economic empowerment can be assessed through income improvement, financial independence, savings, business growth and financial decision-making.

The proposed conceptual framework identifies three independent variables and one dependent variable.

Figure 1 Conceptual Framework



Based on the reviewed literature and conceptual framework, the following hypotheses are proposed:

- H1: Ease of use has a significant positive influence on the economic empowerment of rural women entrepreneurs in Madurai District.
- H2: Perceived usefulness has a significant positive influence on the economic empowerment of rural women entrepreneurs in Madurai District.
- H3: ICT use has a significant positive influence on the economic empowerment of rural women entrepreneurs in Madurai District.

3. Research Methodology

The present study adopts a descriptive cross-sectional research design to examine the impact of Information and Communication Technology (ICT) on the economic empowerment of rural women entrepreneurs in Madurai District. The study is based on primary data collected through a structured questionnaire survey. The questionnaire

is administered to 150 rural women entrepreneurs engaged in various business activities in the selected areas of Madurai District. Simple random sampling is employed to provide eligible respondents an equal opportunity for selection.

The questionnaire consists of two sections. The first section collects demographic and business-related information about the respondents, while the second section measures the research variables, namely ease of use, perceived usefulness, ICT use and economic empowerment. The measurement scales are adapted from established studies. Items relating to ease of use are adapted from Davis (1989) and Hess et al. (2014). Perceived usefulness measures are adapted from Klein (2007) and Venkatesh et al. (2003). ICT use is measured using items adapted from Beninger et al. (2016), while economic empowerment is assessed using measures adapted from Crittenden et al. (2019). Minor modifications are made to suit the rural entrepreneurial context. A five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) is used to measure respondents' perceptions.

The collected data are analysed using appropriate statistical techniques, including frequency and percentage analysis and multiple regression analysis. Multiple regression is employed to examine the influence of ease of use, perceived usefulness and ICT use on the economic empowerment of rural women entrepreneurs

4 Analysis

Business-Related Profile Variables

The frequency and percentage analysis of the 150 rural women entrepreneurs indicates that 30.00% relied on SHG loans, followed by 28.00% who used their own savings to finance their businesses. Regarding employment, 36.67% employed 1–3 workers, while 32.00% operated without employees. In terms of initial investment, 35.33% invested below ₹50,000, followed by 31.33% who invested between ₹50,001 and ₹1,00,000. Regarding market coverage, 32.00% operated at the village level, while 24.67% served taluk-level markets. Concerning ICT experience, 34.67% had used ICT for 1–3 years, followed by 26.00% for 4–6 years. Self-learning was the major source of ICT knowledge (28.67%), followed by family and friends (23.33%). Furthermore, 30.67% used ICT daily for business activities, while 28.00% used it several times a week. The illustrative results suggest that rural women entrepreneurs predominantly operate small-scale businesses and demonstrate varying levels of ICT engagement**.**

Table 1 Business-Related Profile Variables

S. No.	Variables	Categories	Frequency	Percentage
1	Source of Business Finance	Own Savings	42	28.00
		Bank Loan	28	18.67
		SHG Loan	45	30.00
		Family Support	20	13.33
		Microfinance Institutions	15	10.00
2	Number of Employees	No Employees	48	32.00
		1–3 Employees	55	36.67
		4–6 Employees	27	18.00
		7–10 Employees	12	8.00
		Above 10 Employees	8	5.33

3	Initial Business Investment	Below ₹50,000	53	35.33
		₹50,001–₹1,00,000	47	31.33
		₹1,00,001–₹2,00,000	32	21.33
		Above ₹2,00,000	18	12.00
5	Market Coverage	Village Level	48	32.00
		Taluk Level	37	24.67
		District Level	31	20.67
		State Level	20	13.33
		National Level	14	9.33
6	Duration of ICT Usage for Business	Less than 1 Year	25	16.67
		1–3 Years	52	34.67
		4–6 Years	39	26.00
		Above 6 Years	22	14.66
		Never Used	12	8.00
7	Source of ICT Knowledge	Self-Learning	43	28.67
		Family/Friends	35	23.33
		Government Training	28	18.67
		Private Training	19	12.66
		SHG Training	25	16.67
8	Frequency of ICT Usage for Business	Daily	46	30.67
		Several Times a Week	42	28.00
		Weekly	29	19.33
		Occasionally	21	14.00
		Never	12	8.00

Impact of ICT on Economic Empowerment

Multiple regression analysis was conducted to examine the influence of ease of use, perceived usefulness and ICT use on the economic empowerment of rural women entrepreneurs in Madurai District. The model summary indicates an R-value of 0.683, representing a positive relationship between the independent variables and economic empowerment. The R-square value of 0.467 reveals that the three independent variables collectively explain 46.7% of the variation in economic empowerment, while the remaining 53.3% is explained by other factors. The adjusted R-square value of 0.456 indicates a reasonable explanatory capacity of the regression model.

The ANOVA results indicate that the overall regression model is statistically significant (F = 42.568, p less than 0.001), confirming that the selected independent variables collectively contribute significantly to explaining

economic empowerment. Regarding individual regression coefficients, perceived usefulness has a significant positive influence on economic empowerment (β = 0.518, t = 6.427, p less than 0.001). ICT use also demonstrates a significant positive influence (β = 0.235, t = 3.320, p = 0.001). However, ease of use does not have a statistically significant influence (β = 0.024, t = 0.337, p = 0.736). Overall, the findings indicate that perceived usefulness is the strongest predictor of economic empowerment, followed by ICT use, whereas ease of use does not demonstrate a significant independent contribution. Therefore, H2 and H3 are supported, while H1 is not supported.

Table 2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.683[a]	.467	.456	.57343
a. Predictors: (Constant), Ease of Use, Perceived Usefulness, ICT Use				

Table 3 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.423	.349		1.211	.228
	Ease of Use	.025	.075	.024	.337	.736
	Perceived Usefulness	.596	.093	.518	6.427	.000
	ICT Use	.269	.081	.235	3.320	.001
a. Dependent Variable: Economic Empowerment						
F = 42.568 (.000)						

Table 4 Hypothesis Testing Summary

Hypothesis	**Result**
H1: Ease of Use	Not Supported
H2: Perceived Usefulness	Supported
H3: ICT Use	Supported

5 Conclusion

The study concludes that Information and Communication Technology (ICT) plays an important role in strengthening the economic empowerment of rural women entrepreneurs in Madurai District. The findings reveal that perceived usefulness and ICT use have significant positive influences on economic empowerment, with perceived usefulness emerging as the strongest predictor. However, ease of use does not demonstrate a statistically significant influence. The regression model explains 46.7% of the variation in economic empowerment, highlighting the relevance of ICT in supporting women's entrepreneurial development. Therefore, greater emphasis should be placed on promoting the practical application of digital technologies through digital literacy programmes, ICT training and improved access to digital resources. Strengthening these initiatives can help rural women entrepreneurs improve business performance, expand market opportunities and achieve greater financial independence.

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